

**COLLEGE PLANNING CORP. / CPC PREP.**

**CPC PREP**

**ACT**

**CPC BOOKS**

# A Message to Students

This booklet is an important first step as you get ready for college and your career.

The information here is intended to help you do your best on the ACT to gain admission to colleges and universities. Included are helpful hints and test-taking strategies, as well as a complete practice ACT, with “retired” questions from earlier tests given on previous test dates at ACT test sites. Also featured are a practice writing test, a sample answer document, answer keys, and self-scoring instructions.

Read this booklet carefully and take the practice tests well before test day. That way, you will be familiar with the tests, what they measure, and strategies you can use to do your best on test day.

You may also want to consider *The Official ACT® Self-Paced Course, Powered by Kaplan®* to learn test content and strategies in a virtual classroom. To view all of our test preparation options, go to [www.act.org/the-act/testprep](http://www.act.org/the-act/testprep).

## Contents

A Message to Students	<b>b</b>
Overview of the ACT	<b>b</b>
Test-Taking Strategies	<b>1</b>
Prohibited Behavior at the Test Center	<b>3</b>
Content of the ACT Sections	<b>4</b>
Taking the Practice Tests	<b>8</b>
Practice Multiple-Choice Sections	<b>9</b>
Practice Writing Test	<b>50</b>
Practice Answer Document	<b>53</b>
Scoring Your Tests	<b>55</b>

## Overview of the ACT

The full ACT consists of four multiple-choice sections—in English, mathematics, reading, and science—with an optional writing section. Some colleges and universities require or accept ACT writing scores, so you may consider taking the writing section.

Test	Questions	Minutes per Test
English	75	45
Mathematics	60	60
Reading	40	35
Science	40	35
Writing (optional)	1 essay	40

ACT tries out questions on National test dates to develop future tests. Your test may include questions that will not count towards your score. Please try your best on these questions. Your participation can help shape ACT’s future.

# Test-Taking Strategies

## Test Strategies for the ACT

Each multiple-choice section contains questions with either four or five answers from which you are to choose the correct, or best, answer.

The ACT measures the knowledge, understanding, and skills you have acquired throughout your years in school. Because of this, it is unlikely that a “cram” course can improve your scores. However, it is a good idea to do some test preparation to be familiar with the tests and what to expect on test day.

Here are three strategies to help you prepare for the ACT:

✓ *Get familiar with the content of the sections.*

Review the information in this booklet. Note which content areas make up a large proportion of the sections. The topics included in each content area are examples of possible topics; they do not include all possibilities.

✓ *Update your knowledge and skills in the content areas.*

Review content areas that you have studied but are not fresh in your mind. Refresh your knowledge in the content areas that make up large portions of the test.

✓ *Study content areas you are not familiar with.*

If some content areas of the ACT are unfamiliar to you, consider taking coursework in those areas before you take the test.

## Tips for Taking the Multiple-Choice Sections

✓ *Pace yourself.*

It is important that you have enough time to read the passages/questions and figure out your responses. For each section, subtract the number of minutes you estimate you will spend skimming the passages or reading the information provided, then divide the total number of remaining minutes allowed by the number of questions to determine the estimated time you should spend on each question. If possible, spend less time on each question and use the remaining time allowed for a section to review your work and return to the questions in that section that were most difficult for you.

The time limits set for each section give nearly everyone enough time to finish all questions. However, you will want to pace yourself to avoid spending too much time on one passage or puzzling over an answer to a specific problem. Go on to other questions and come back if there is time.

✓ *Read the directions carefully.*

Before you begin each section, read the directions carefully.

- The English, reading, and science sections ask for the best answer. Read and consider all of the answer choices and choose the answer that best responds to the question.
- The mathematics section asks for the correct answer. You

may want to work out the answer you feel is correct and look for it among the choices given. If your answer is not among the choices provided, reread the question and consider all the answer choices.

✓ *Read each question carefully.*

You need to understand exactly what each question asks. Some questions will require you to go through several steps to find the correct or best answer, while others can be answered more quickly.

✓ *Answer the easy questions first.*

A good strategy is to answer the easy questions and skip the questions you find difficult. After answering the easy questions, go back and answer the more difficult questions if you have time.

✓ *Use logic on more difficult questions.*

When you return to the more difficult questions, try to use logic to eliminate incorrect answers. Compare the answer choices to each other and note how they differ. Such differences may provide clues as to what the question requires. Eliminate as many incorrect answers as you can, then make an educated guess from the remaining answers.

✓ *Answer every question.*

Your scores in the sections will be based only on the number of questions that you answer correctly; there is no penalty for guessing. Try to answer every question within the time allowed for each section.

✓ *Review your work.*

If there is time left after you have answered every question in a section, go back and check your work. You will not be allowed to go back to any other section or mark responses to a section after time has been called in that section.

When testing on an answer document:

✓ *Be precise in choosing your responses.*

If you are taking the ACT on paper, make sure that you properly select the desired answer on your answer document. Marks on your answer document that extend beyond the intended oval may be scored as incorrect.

✓ *Erase completely.*

If you want to change a multiple-choice answer on paper, make sure you erase completely. Do not cross out answers or use correction fluid or tape; you must erase. Smudges or unintended marks may cause errors in scoring.

## Get Ready

Prepare well in advance for the ACT.

- Know what to expect on test day. Review the information in this booklet and at [www.actstudent.org](http://www.actstudent.org).
- Take the practice tests in the order they are shown in this booklet, time yourself, and review your responses using the answer keys.
- Carefully review the test-day checklist at [www.act.org/the-act/checklist](http://www.act.org/the-act/checklist).
- Get plenty of rest the night before the tests.

*Note: Most procedures in this booklet refer to testing on a National test date at an ACT test center (within the United States, US territories, or Puerto Rico). Procedures may differ slightly if you take a different administration of the ACT test.*

## On Test Day

### Report on Time

- For National test dates, you must report to your assigned test site by the time stated on your admission ticket (usually 8:00 a.m.). If you are late, you will not be admitted to test. If your ticket does not list a specific test room, the test staff or posted signs will direct you.

### What to Bring

- A printed copy of your admission ticket. Your ticket contains important information that helps connect your answer document to the registration on file. If you have lost your ticket, you can print another through your MyACT account. If you do not bring your ticket on test day, your scores may be delayed.
- Acceptable photo identification. You will not be permitted to test if your ID does not meet ACT requirements. See ACT requirements for ID on your ticket or at [www.act.org/the-act/id](http://www.act.org/the-act/id).
- Number 2 Pencil. Bring sharpened No. 2 pencils and good erasers (no mechanical pencils or ink pens). Do not bring any other writing instruments. You will not be allowed to use them.

*Note: International test sites are provided approved whiteboards and erasable markers.*

- Watch. You may bring a watch to pace yourself, but do not bring a watch with an alarm. During testing, your watch must be removed and placed on your desk face up. If your alarm sounds during testing, you'll be dismissed and your answers will not be scored.
- Calculator. Bring a permitted calculator to be used on the mathematics test only. You are not required to use a calculator at all, but if you do, it is your responsibility to know whether your calculator is permitted. For a current copy of the calculator policy, please visit [www.act.org/calculator-policy.html](http://www.act.org/calculator-policy.html).
- Snacks to eat outside the test room during breaks.

## What NOT to Bring

- Textbooks, foreign language or other dictionaries, scratch paper, notes, or other aids.
- Highlighter pens, colored pens or pencils, or correction fluid/tape.
- Any electronic device, other than a permitted calculator.
- Reading material.
- Tobacco in any form.

## In the Test Room

- Test staff will direct you to a seat. If you need a left-handed desk, tell the staff as you enter.
- Do not leave the test room after you have been admitted.
- Only pencils, erasers, a permitted calculator, your watch (if brought to the test center), and your paper ticket will be allowed on your desk.
- You will be required to put all other personal belongings away.
- You may not use tobacco in any form. You may consume snacks and drinks outside the test room during the break.
- Reporting time for the test will be 8:00 a.m. Testing will begin as soon as all examinees who are present at 8:00 a.m. are checked in and seated.
- Listen carefully to all directions read by the test staff.
- It is important that you follow all directions carefully.
- For the full ACT, you will normally be dismissed at about 12:35 p.m. if you take the ACT (no writing), or at about 1:35 p.m. if you take the ACT with writing.

## For Students Approved to Test at National Test Sites With One and One-Half Time

Testing with one and one-half time is available on the multiple-choice and/or writing sections for students with diagnosed disabilities and/or limited English proficiency.

If you are approved for one and one-half time at a National test site, you will have 50% additional time to complete each section.

The full ACT:

Test	Questions	Minutes per Test
English	75	70
Mathematics	60	90
Reading	40	55
Science	40	55
Writing (optional)	1 essay	60

## After Testing

### Voiding Your Test on Test Day

If you have to leave the test site before completing all of your tests, you must decide whether or not you want your test scored and then inform the test staff of your decision. If you do not, your test will be scored.

Once you access test content, you cannot request a Test Date Change. If you do not complete all your sections and want to test again, you will have to pay the full fee for your test option again. Once you begin filling out your test, you cannot change from one test option to another.

### Testing More Than Once

If you wish to take the test again to increase your scores, ACT will calculate and report a superscore for students who have taken the ACT test more than once. This gives colleges the option to use the student's best scores from all test administrations, rather than scores from just one sitting, in their admission and scholarship decisions.

For information about superscoring, see [www.act.org/the-act/superscore](http://www.act.org/the-act/superscore).

For more information about retaking the ACT, see [www.act.org/the-act/retaking](http://www.act.org/the-act/retaking).

### Testing More Than Once In the Same Administration

You may not receive scores from more than one test taken during a scheduled National or International test date. For example, you may test on Saturday, on an authorized non-Saturday date, or on a rescheduled test date—but not on more than one of those days on a particular test date. If you are admitted and allowed to test a second time on a particular test date, we will report only the scores from the first test. The second set of scores will be canceled without refund.

### Requesting a Copy of Your Test Questions and Answers

On certain test dates, you may order (for an additional fee) a copy of the multiple-choice test questions used to determine your scores, a list of your answers, and the answer key. If you took the writing section, you will also receive a copy of the writing prompt, scoring guidelines, and the scores assigned to your essay.

This service is not available for all test dates and is available only for National testing or Special testing in the United States, US Territories, and Puerto Rico. Restrictions apply.

If you are interested in this service, check [www.act.org/the-act/tir](http://www.act.org/the-act/tir) for more detail.

## Prohibited Behavior at the Test Center

A complete list of the prohibited behaviors was provided during the registration process. The following behaviors can also result in dismissal. Please be reminded of the following:

- For paper testing, you may not fill in or alter responses to any multiple-choice questions or continue to write or alter the essay after time has been called. This includes fixing stray marks.
- For paper testing, you may not look at any section of the test outside of the designated time for that test.
- You may not access an electronic device (other than your testing computer and mouse, when testing online) at any time during testing or during breaks. All other devices must be powered off and placed out of sight from the time you are admitted to the test room until you are dismissed.
- You may not give or receive assistance by any means. This includes looking at another person's test.
- The test is confidential and remains so even after the exam is complete. You may not remove any materials from the test room. You may not discuss or share test questions, answers, or test form identification numbers during test administration, during breaks, or after the test.
- You may not disclose test questions or answers in any way or at any time, including through social media, in whole or in part.
- Eating, drinking, and the use of tobacco or reading materials are not permitted in the test room.

If you are observed or suspected of engaging in prohibited behavior, you will be dismissed and your test will not be scored.

# Content of the ACT Sections

## English Section

The English section consists of multiple essays, or passages, each followed by a set of multiple-choice questions.

- For paper testing, some questions refer to underlined portions of the passage and offer several alternatives to the underlined portion. For online testing, these questions will refer to highlighted portions of the passage. You decide which choice is most appropriate in the context of the passage.
- Some questions ask about an underlined or highlighted portion, a section of the passage, or the passage as a whole. You decide which choice best answers the question posed.
- Many questions offer “NO CHANGE” to the passage as one of the choices.

The English section puts you in the position of a writer who makes decisions to revise and edit a text. Essays in different genres provide a variety of rhetorical situations.

These passages are chosen for their appropriateness in assessing writing and language skills and to reflect students’ interests and experiences.

Four scores are reported for the English section: a score for the section overall and three reporting category scores based on specific knowledge and skills. The approximate percentage of the section devoted to each reporting category is:

### Production of Writing (29–32%)

This category requires you to apply your understanding of the purpose and focus of a piece of writing.

- **Topic Development:** Demonstrate an understanding of, and control over, the rhetorical aspects of texts. Identify the purposes of parts of texts, determine whether a text or part of a text has met its intended goal, and evaluate the relevance of material in terms of a text’s focus.
- **Organization, Unity, and Cohesion:** Use various strategies to ensure that a text is logically organized, flows smoothly, and has an effective introduction and conclusion.

### Knowledge of Language (13–19%)

These questions require you to demonstrate effective language use through ensuring precision and concision in word choice and maintaining consistency in style and tone.

### Conventions of Standard English (51–56%)

These questions require you to apply an understanding of the conventions of standard English grammar, usage, and mechanics to revise and edit text.

- **Sentence Structure and Formation:** Apply understanding of sentence structure and formation in a text and make revisions to improve the writing.
- **Punctuation:** Recognize common problems with standard English punctuation and make revisions to improve the writing.
- **Usage:** Recognize common problems with standard English usage in a text and make revisions to improve the writing.

## Tips for Taking the English Section

✓ *Be aware of the writing style used in each passage.*

The passages cover a variety of topics and are written in a variety of styles. It is important that you take into account the writing style used in each passage. When responding to a question, be sure to understand the context of the question. Consider how the sentence containing an underlined or highlighted portion fits in with the surrounding sentences and into the passage as a whole.

✓ *Examine the underlined or highlighted portions of the passage.*

Before responding to a question with an underlined or highlighted portion, carefully examine what is underlined or highlighted in the text. Consider the elements of writing included in each underlined or highlighted portion.

- Some questions will ask you to base your decision on some specific element of writing, such as the tone or emphasis the text should convey.
- Some questions will ask you to choose the alternative to the underlined portion that is NOT or LEAST acceptable.

The answer choices for each question will contain changes in one or more of those elements of writing.

✓ *Be aware of questions with no underlined portions.*

You will be asked some questions about a section of the passage or about the passage as a whole, in light of a given rhetorical situation. Questions of this type are often identified by a question number in a box located at the appropriate point in the passage or by a highlighted asterisk in brackets.

Questions about the entire passage are placed at the end of the passage. For paper testing, these questions are introduced by a horizontal box enclosing the following instruction: “Questions \_\_ and \_\_ ask about the preceding passage as a whole.” For online testing, similar instructions will appear above the individual questions.

✓ *Note the differences in the answer choices.*

Many of the questions in the section will involve more than one aspect of writing. Examine each answer choice and how it differs from the others. Be careful not to choose an answer that corrects one error but causes a different error.

✓ *Determine the best answer.*

When a question asks you to choose the best alternative to an underlined or highlighted portion, consider the following approach:

- Decide how the underlined or highlighted portion might best be phrased in standard written English or in terms of the particular question posed.
  - ~ If the underlined or highlighted portion is the best answer, select “NO CHANGE.”
  - ~ If not, check to see whether your phrasing is one of the other answer choices. If you do not find your phrasing, choose the best of the answers presented.

For questions cued by a number in a box or a highlighted asterisk in brackets, decide which choice is most appropriate in terms of the question posed or the stated rhetorical situation.

✓ *Reread the sentence, using your selected answer.*

Once you have selected the answer you feel is best, reread the corresponding sentence(s) of the passage, inserting your selected answer at the appropriate place in the text to make sure it is the best answer within the context of the passage.

## Mathematics Section

The mathematics section is designed to assess the mathematical skills students have typically acquired in courses taken up to the beginning of grade 12.

Most questions are self-contained. Some questions may belong to a set of several questions (e.g., each about the same graph or chart).

The material covered emphasizes the major content areas that are prerequisites to successful performance in entry-level courses in college mathematics. Knowledge of basic formulas and computational skills are assumed as background for the problems, but recall of complex formulas and extensive computation are not required.

*Note: You may use a calculator on the mathematics section. See [www.act.org/calculator-policy.html](http://www.act.org/calculator-policy.html) for details about prohibited models and features.*

Nine scores are reported for the mathematics section: a score for the section overall and eight reporting category scores based on specific mathematical knowledge and skills. The approximate percentage of the section devoted to each reporting category is:

### Preparing for Higher Mathematics (57–60%)

This category covers the more recent mathematics that students are learning, starting when they began using algebra as a general way of expressing and solving equations. This category is divided into five subcategories:

- **Number and Quantity (7–10%):** Demonstrate knowledge of real and complex number systems. Reason with numerical quantities in many forms, including expressions with integer and rational exponents, and vectors and matrices.
- **Algebra (12–15%):** Solve, graph, and model multiple types of expressions. Interpret and use many different kinds of equations, such as linear, polynomial, radical, and exponential relationships. Find solutions to systems of equations, even when represented by a simple matrix equation, and apply results to real-world contexts.
- **Functions (12–15%):** Demonstrate knowledge of function: definition, notation, representation, and application. Use functions including linear, radical, piecewise, polynomial, exponential, and logarithmic. Manipulate and translate functions, as well as interpret and use important features of graphs.
- **Geometry (12–15%):** Apply your knowledge of shapes and solids, using concepts such as congruence and similarity

relationships or surface area and volume measurements. Apply your understanding to composite objects, and solve for missing values in triangles, circles, and other figures. Use trigonometric ratios and equations of conic sections.

- **Statistics and Probability (8–12%):** Describe center and spread of distributions. Apply and analyze data collection methods. Understand and model relationships in bivariate data. Calculate probabilities by recognizing the related sample spaces.

### Integrating Essential Skills (40–43%)

This category focuses on measuring how well you can synthesize and apply your understandings and skills to solve more complex problems. The questions ask you to address concepts such as rates and percentages; proportional relationships; area, surface area, and volume; average and median; and expressing numbers in different ways. Solve non-routine problems that involve combining skills in chains of steps; applying skills in varied contexts; understanding connections; and demonstrating fluency.

### Modeling

This category represents all questions that involve producing, interpreting, understanding, evaluating, and improving models. Each question is also counted in other appropriate reporting categories above. This category is an overall measure of how well you use modeling skills across mathematical topics.

### Tips for Taking the Mathematics Section

✓ *If you use a calculator, use it wisely.*

All of the mathematics problems can be solved without a calculator. Many of the problems are best done without a calculator. Use good judgment in deciding when, and when not, to use a calculator. For example, for some problems you may wish to do scratch work to clarify your thoughts on the question before you begin using a calculator to do computations.

✓ *Solve the problem.*

To work out solutions to the problems, you will usually do scratch work. You may wish to glance over the answer choices after reading the questions. However, working backwards from all five answer choices can take a lot of time and may not be effective.

✓ *Find your solution among the answer choices.*

Once you have solved the problem, look for your answer among the choices. If your answer is not included among the choices, carefully reread the problem to see whether you missed important information. Pay careful attention to the question being asked. If an equation is to be selected, check to see whether the equation you think is best can be transformed into one of the answer choices provided.

✓ *Make sure you answer the question.*

The solutions to many questions will involve several steps. Make sure your answer accounts for all the necessary steps. Frequently, an answer choice is an intermediate result, not the final answer.

✓ *Make sure your answer is reasonable.*

Sometimes an error in computation will result in an answer that is not practically possible for the situation described. Always think about your answer to determine whether it is reasonable.

✓ *Check your answer.*

You may arrive at an incorrect solution by making common errors in the problem-solving process. If there is time remaining before the end of the mathematics section, it is important that you reread the questions and check your answers to make sure they are correct.

## Reading Section

The reading section measures your ability to read closely, reason logically about texts using evidence, and integrate information from multiple sources.

The section questions focus on the mutually supportive skills that readers must bring to bear in studying written materials across a range of subject areas. Specifically, questions will ask you to determine main ideas; locate and interpret significant details; understand sequences of events; make comparisons; comprehend cause-effect relationships; determine the meaning of context-dependent words, phrases, and statements; draw generalizations; analyze the author's or narrator's voice and method; analyze claims and evidence in arguments; and integrate information from multiple texts.

The reading section is composed of multiple parts. Some parts consist of one long prose passage and others consist of shorter prose passages. The passages represent the levels and kinds of text commonly encountered in first-year college curricula.

Each passage is preceded by a heading that identifies the author and source, and may include important background information to help you understand the passage. Each portion contains a set of multiple-choice questions. These questions do not test the rote recall of facts from outside the passage or rules of formal logic, nor do they contain isolated vocabulary questions. In sections that contain two shorter passages, some of the questions involve both of those passages.

Five scores are reported for the reading section: a score for the section overall and three reporting category scores based on specific knowledge and skills; and an Understanding Complex Texts indicator. The approximate percentage of the section devoted to each reporting category is:

### Key Ideas and Details (52–60%)

This category requires you to read texts closely to determine central ideas and themes. Summarize information and ideas accurately. Understand relationships and draw logical inferences and conclusions, including understanding sequential, comparative, and cause-effect relationships.

### Craft and Structure (25–30%)

These questions ask you to determine word and phrase meanings; analyze an author's word choice rhetorically; analyze text structure; understand the author's purpose and perspective; and analyze characters' points of view. Interpret authorial decisions rhetorically and differentiate between various perspectives and sources of information.

## Integration of Knowledge and Ideas (13–23%)

This category requires you to understand authors' claims, differentiate between facts and opinions, and use evidence to make connections between different texts that are related by topic. Some questions will require you to analyze how authors construct arguments, and to evaluate reasoning and evidence from various sources.

## Visual and Quantitative Information in the Reading Section

Beginning in 2021, one passage in the Reading section may be accompanied by a graph, figure, or table that contains information relevant to the reading task. In the passages containing these visual and quantitative elements, some of the questions will ask the student to integrate the information from the passage and graphic to determine the best answer. These items will contribute to the student's score in the Integration of Knowledge and Ideas reporting category.

## Tips for Taking the Reading Section

✓ *Read each passage carefully.*

Before you begin answering a question, read all of the content carefully. Be conscious of relationships between or among ideas. You may take note about important ideas in the passages.

✓ *Refer to the passages when answering the questions.*

Answers to some of the questions will be found by referring to what is explicitly stated in the text of the passages. Other questions will require you to determine implicit meanings and to draw conclusions, comparisons, and generalizations. Consider the text before you answer any question.

## Science Section

The science section measures the interpretation, analysis, evaluation, reasoning, and problem-solving skills required in the natural sciences. The section presents several authentic scientific scenarios, each followed by a number of multiple-choice questions.

The content includes biology, chemistry, Earth/space sciences (e.g., geology, astronomy, and meteorology), and physics. Advanced knowledge in these areas is not required, but background knowledge acquired in general, introductory science courses may be needed to correctly answer some of the questions.

The science section focuses on multidimensional assessment, with questions that assess science content in concert with science skills and practices.

The questions require you to recognize and understand the basic features of, and concepts related to, the provided information; to examine critically the relationship between the information provided and the conclusions drawn or hypotheses developed; and to generalize from given information to gain new information, draw conclusions, or make predictions.

*Note: You are not permitted to use a calculator in the science section.*



The scientific information appears in one of three formats:

- **Data Representation (25–35%):** This format presents graphic and tabular material similar to that found in science journals and texts. The questions associated with this format measure skills such as recognizing relationships among data in tables and graphs; interpolation and extrapolation; and translating tabular data into graphs.
- **Research Summaries (45–60%):** This format provides descriptions and results of one or more related experiments. The questions focus on the design of the experiments and the interpretation of experimental results.
- **Conflicting Viewpoints (15–20%):** This format presents two or more explanations for the same scientific phenomena that, because they are based on differing premises or incomplete data, are inconsistent with one another. The questions focus on the understanding, analysis, and comparison of alternative viewpoints or hypotheses.

Four scores are reported for the science section: a score for the section overall and three reporting category scores based on scientific knowledge, skills, and practices. The approximate percentage of the section devoted to each reporting category is:

### Interpretation of Data (40–50%)

This category asks you to manipulate and analyze scientific data presented in scientific tables, graphs, and diagrams (e.g., recognize trends in data, translate tabular data into graphs, interpolate and extrapolate, and reason mathematically).

### Scientific Investigation (20–30%)

This category requires you to understand experimental tools, procedures, and design (e.g., identify controls and variables) and compare, extend, and modify experiments (e.g., predict the results of additional trials).

### Evaluation of Models, Inferences, and Experimental Results (25–35%)

These questions ask you to judge the validity of scientific information and formulate conclusions and predictions based on that information (e.g., determine which explanation for a scientific phenomenon is supported by new findings).

## Tips for Taking the Science Section

✓ *Read the passage carefully.*

Before you begin answering a question, read the scientific material provided. It is important that you read the entire text and examine any tables, graphs, or figures. You may take notes about important ideas. Some of the information sets will describe experiments. You should consider the experimental design, including the controls and variables, because questions are likely to address this component of scientific research.

✓ *Note the different viewpoints in passages.*

Some material will present conflicting viewpoints, and the questions will ask you to distinguish among them. It may be helpful for you to take notes summarizing each viewpoint about specific portions of the section.

## Writing Section (Optional)

If you register for the full ACT with writing, you will take the writing section after the four multiple-choice sections. Your score in the writing section will not affect your scores on the multiple-choice or your Composite score.

The writing section is a 40-minute essay test that measures your writing skills—specifically, writing skills taught in high school English classes and in entry-level college composition courses.

The section consists of one writing prompt that describes a complex issue and provides three different perspectives on the issue. You are asked to read the prompt and write an essay in which you develop your own perspective on the issue. Your essay must analyze the relationship between your own perspective and one or more other perspectives. You may adopt one of the perspectives given in the prompt as your own, or you may introduce one that is completely different from those given. Your score will not be affected by the perspective you take on the issue.

Five scores are reported for the writing section: a single subject-level writing score reported on a scale of 2–12, and four domain scores that are based on an analytic scoring rubric. The subject score is the rounded average of the four domain scores. The four writing domains are:

### Ideas and Analysis

Scores in this domain reflect the ability to generate productive ideas and engage critically with multiple perspectives on the given issue. Competent writers understand the issue they are invited to address, the purpose for writing, and the audience. They generate ideas that are relevant to the situation.

### Development and Support

Scores in this domain reflect the ability to discuss ideas, offer rationale, and bolster an argument. Competent writers explain and explore their ideas, discuss implications, and illustrate through examples. They help the reader understand their thinking about the issue.

### Organization

Scores in this domain reflect the ability to organize ideas with clarity and purpose. Organizational choices are integral to effective writing. Competent writers arrange their essay in a way that clearly shows the relationship between ideas, and they guide the reader through their discussion.

### Language Use and Conventions

Scores in this domain reflect the ability to use written language to convey arguments with clarity. Competent writers make use of the conventions of grammar, syntax, word usage, and mechanics. They are also aware of their audience and adjust the style and tone of their writing to communicate effectively.

## Tips for Taking the Writing Section

✓ *Pace yourself.*

Budget your time based on your experience in taking essay tests in school and in other circumstances when you have done

writing within a time limit. It is unlikely that you will have time to draft, revise, and recopy your essay.

✓ *Plan.*

Before writing, carefully read and consider all prompt material. Be sure you understand the issue, the different perspectives on the issue, and your essay task.

Planning questions are included with the prompt that will help you analyze the different perspectives and develop your own. Use these questions to think critically about the prompt and generate an effective response. How would you best organize and support your ideas in a written argument? Spend time structuring or outlining your response.

*Note: The planning questions are optional and are not scored.*

✓ *Write.*

Establish the focus of your essay by making clear your argument and its main ideas.

- Explain and illustrate your ideas with sound reasoning and meaningful examples.
- Discuss the significance of your ideas: what are the implications of what you have to say, and why is your argument important to consider?

As you write, ask yourself if your logic is clear, if you have supported your claims, and if you have chosen precise words to communicate your ideas.

✓ *Review your essay.*

Try to make your essay as polished as you can. Take a few minutes before time is called to read over your essay and correct any mistakes.

If you take the ACT on paper, be sure to write your essay legibly. If you find words that are hard to read, recopy them. Make corrections and revisions neatly, between the lines. Do not write in the margins, if applicable.

✓ *Practice.*

There are many ways to prepare for the writing section. Read newspapers and magazines, watch/listen to news analyses online, on TV, or on radio, or participate in discussions and debates, thinking carefully about other perspectives in relation to your own.

One good way to prepare for the writing section is to practice writing with different purposes for different audiences. The writing you do in your classes will help you, as will writing a personal journal, stories, essays, editorials, or other writing you do on your own.

It is also a good idea to practice writing within a time limit. Taking the practice writing test will give you a sense of how much additional practice you may need. You might want to take the practice writing section even if you do not plan to take the ACT with writing. It will help you build skills that are important in college-level learning and the world of work.

## Taking the Practice Tests

It is a good idea to take the practice tests under conditions as similar as possible to those you will experience on test day. The following tips will help you:

- If taking the full ACT, the four multiple-choice tests require 2 hours and 55 minutes to complete. Take them in order, in one sitting, with a 10- to 15-minute break between Tests 2 and 3.
- You will need only sharpened, soft lead No. 2 pencils and good erasers. Remove all other items from your desk. You will not be allowed to use unapproved scratch paper.
- If you plan to use a permitted calculator on the mathematics test, use the same one you will use on test day.
- Use a digital timer or clock to time yourself on each practice test. Set your timer for five minutes less than the time allowed for each test so you can get used to the verbal announcement of five minutes remaining.
- Give yourself only the time allowed for each test.
- Detach and use the sample multiple-choice answer document on pages 53–54.
- Read the test directions on the first page of each multiple-choice test. These are the same directions that will appear in your test booklet on test day.
- Start your timer and begin with Test 1. Continue through Test 4, taking a 10- to 15-minute break between Tests 2 and 3.
- Score your multiple-choice tests using the information beginning on page 55.
- If you plan to take the ACT with writing, read the directions on the first page of the practice ACT writing test (page 50). These are the same directions that will appear in your test booklet on test day. Start your timer, then read the prompt on page 51. After you understand what the prompt is asking you to do, plan your essay and then write or print it on lined paper. On test day, if you test on paper, your answer document will have lined pages on which you will write your essay. Score your essay using the information on pages 60–61.

# Practice Multiple-Choice Sections

## EXAMINEE STATEMENTS, CERTIFICATION, AND SIGNATURE

1. **Statements:** I understand that by registering for, launching, starting, or submitting answer documents for an ACT® test, I am agreeing to comply with and be bound by the *Terms and Conditions: Testing Rules and Policies for the ACT® Test* (“Terms”).

**I UNDERSTAND AND AGREE THAT THE TERMS PERMIT ACT TO CANCEL MY SCORES IF THERE IS REASON TO BELIEVE THEY ARE INVALID. THE TERMS ALSO LIMIT DAMAGES AVAILABLE TO ME AND REQUIRE ARBITRATION OF CERTAIN DISPUTES. BY AGREEING TO ARBITRATION, ACT AND I BOTH WAIVE THE RIGHT TO HAVE THOSE DISPUTES HEARD BY A JUDGE OR JURY.**

I understand that ACT owns the test questions and responses, and I will not share them with anyone by any form of communication before, during, or after the test administration. I understand that taking the test for someone else may violate the law and subject me to legal penalties.

I consent to the collection and processing of personally identifying information I provide, and its subsequent use and disclosure, as described in the ACT Privacy Policy ([www.act.org/privacy.html](http://www.act.org/privacy.html)). I also permit ACT to transfer my personally identifying information to the United States, to ACT, or to a third-party service provider, where it will be subject to use and disclosure under the laws of the United States, including being accessible to law enforcement or national security authorities.

2. **Certification:** Copy the italicized certification below, then sign, date, and print your name in the spaces provided.

*I agree to the **Statements** above and certify that I am the person whose information appears on this form.*

\_\_\_\_\_

\_\_\_\_\_

Your Signature

Today's Date

Print Your Name

The **ACT**®

**Form 2176CPRE**

## Directions

This booklet contains tests in English, mathematics, reading, and science. These tests measure skills and abilities highly related to high school course work and success in college. **Calculators may be used on the mathematics test only.**

The questions in Tests 1–4 are numbered, and the suggested answers for each question are lettered. On the answer document, the rows of ovals are numbered to match the questions, and the ovals in each row are lettered to correspond to the suggested answers.

For each question, first decide which answer is best. Next, locate on the answer document the row of ovals numbered the same as the question. Then, locate the oval in that row lettered the same as your answer. Finally, fill in the oval completely. Use a soft lead pencil and make your marks heavy and black. **Do not use ink or a mechanical pencil.**

Mark only one answer to each question. If you change your mind about an answer, erase your first mark thoroughly before marking your new answer. For each question, make certain that you mark in the row of ovals with the same number as the question.

Only responses marked on your answer document will be scored. Your score on each test will be based only on the number of questions you answer correctly during the time allowed for that test. You will **not** be penalized for guessing. **It is to your advantage to answer every question even if you must guess.**

You may work on each test **only** when the testing staff tells you to do so. If you finish a test before time is called for that test, you should use the time remaining to reconsider questions you are uncertain about in that test. You may **not** look back to a test on which time has already been called, and you may **not** go ahead to another test. To do so will disqualify you from the examination.

Lay your pencil down immediately when time is called at the end of each test. You may **not** for any reason fill in or alter ovals for a test after time is called for that test. To do so will disqualify you from the examination.

For Test 5, follow the directions on the first page of that test.

Do not fold or tear the pages of your test booklet.

**DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.**

©2021 by ACT, Inc. All rights reserved.

NOTE: This test material is the confidential copyrighted property of ACT, Inc., and may not be copied, reproduced, sold, scanned, emailed, or otherwise transferred without the prior express written permission of ACT, Inc. Violators of ACT's copyrights are subject to civil and criminal penalties.

# Practice Test #1



## ENGLISH TEST

45 Minutes—75 Questions

**DIRECTIONS:** In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose “NO CHANGE.” In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

### PASSAGE I

The following paragraphs may or may not be in the most logical order. Each paragraph is numbered in brackets, and question 14 will ask you to choose where Paragraph 3 should most logically be placed.

#### Bar Codes: A Linear History

[1]

In 1948, graduate students, Norman Woodland<sup>1</sup> and Bernard Silver<sup>1</sup>, took on a problem that had troubled retailers for years: how to keep track of store inventories.

Inspired by the dots and dashes of Morse code, however<sup>2</sup>, Woodland and Silver created a system of lines that could encode data. Called a *symbology*, the pattern created by the spacing and widths of the lines encodes information by representing different characters.

1. **A.** NO CHANGE  
**B.** students, Norman Woodland and Bernard Silver  
**C.** students Norman Woodland and Bernard Silver  
**D.** students Norman Woodland and Bernard Silver,

2. **F.** NO CHANGE  
**G.** in other words,  
**H.** consequently,  
**J.** DELETE the underlined portion.



[2]

The first bar code was composed of four white lines set at specific distances from each other on a black

background. The first line was always present. [4] Depending on the presence or absence of the remaining three lines, up to seven different arrangements were

susceptible and, therefore, seven different encodings.

Today, twenty-nine white lines making more than half a billion encodings possible.

[3]

To create a bar code scanner, Woodland and Silver adapted technology from an optical movie sound system. Their prototype scanner used a 500-watt bulb, a photomultiplier tube (a device that detects light), and an oscilloscope (a device that translates electronic signals into readable information). Although successful, the concoction

was both large and costly. For example, progress stalled until the 1970s, when laser technology (both more compact and less expensive) became available.

[4]

In today's scanners, a laser sends light back and forth across a bar code. While the black lines absorb the light, the white lines reflect it back at a fixed mirror inside the scanner. In this way, the scanner reads the symbology and decodes the information.

3. A. NO CHANGE  
B. distances so that each was separated, one from the  
C. locations, each one set apart from the  
D. lengths of distance from each
4. The writer is considering deleting the preceding sentence. Should the sentence be kept or deleted?  
F. Kept, because it begins the description that is completed in the sentence that follows.  
G. Kept, because it gives a clear image of what the first bar code looked like.  
H. Deleted, because it provides an extra detail that is not relevant to the subject of the paragraph.  
J. Deleted, because it contradicts a point made later in the paragraph.
5. A. NO CHANGE  
B. responsible  
C. possible  
D. capable
6. F. NO CHANGE  
G. which make  
H. to make  
J. make
7. A. NO CHANGE  
B. contraption  
C. substance  
D. stuff
8. F. NO CHANGE  
G. As a result,  
H. However,  
J. Even so,
9. A. NO CHANGE  
B. them  
C. ones  
D. one



[5]

10 Today,

being that there are one- and  
<sup>11</sup>  
two-dimensional bar codes using numeric  
and alphanumeric symbologies. Bar codes  
are used not only for a pack of gum or an airline  
ticket, but also for research. In one study, for  
instance, tiny bar codes were placed on bees tracking  
<sup>12</sup>  
their activities. Shaping the way we gather, track, and  
share information, we have almost certainly exceeded  
<sup>13</sup>  
even Woodland and Silver's expectations.  
<sup>13</sup>

10. Which of the following true statements, if added here, would most effectively lead into the new subject of the paragraph?
- F. In the 1940s, Woodland and Silver were graduate students at the Drexel Institute of Technology in Philadelphia.
  - G. Woodland and Silver were granted a patent for their bar code on October 7, 1952.
  - H. Bar code equipment has been available for retail use since 1970.
  - J. Bar codes themselves have advanced as well.
11. A. NO CHANGE  
B. there are  
C. where  
D. DELETE the underlined portion.
12. F. NO CHANGE  
G. had been placed on bees trying to track  
H. placed on bees, which would track  
J. were placed on bees to track
13. A. NO CHANGE  
B. exceeding Woodland and Silver's expectations about bar codes has almost certainly been done.  
C. bar codes have almost certainly exceeded even Woodland and Silver's expectations.  
D. it is almost certain that we have exceeded even Woodland and Silver's expectations.

Questions 14 and 15 ask about the preceding passage as a whole.

14. For the sake of the logic and coherence of the essay, Paragraph 3 should be placed:
- F. where it is now.
  - G. before Paragraph 1.
  - H. after Paragraph 1.
  - J. after Paragraph 5.
15. Suppose the writer's primary purpose had been to describe how a specific technological advancement changed business practices. Would this essay accomplish that purpose?
- A. Yes, because it offers an overview of current bar code technology and indicates the variety of ways in which bar codes are used by specific businesses.
  - B. Yes, because it explains how bar codes and scanners made it easier for stores to keep track of their inventories.
  - C. No, because it focuses primarily on the development of bar codes and only briefly mentions how businesses have implemented the use of bar codes.
  - D. No, because it focuses on why businesses needed new technology but does not explain how bar codes were able to serve that need.



## PASSAGE II

## Glowing on an Adventure

As I pulled my camera out of my backpack, I felt a tap on my arm.

“No photographs,” whispered the woman next to me, pointing up to the cave ceiling. “The flash will

16

make them stop glowing,” she said, whispering.

17

She was referring to the thousands of glowworms that clung to the limestone ceiling and, with their radiant bodies, flooded the cave in aquamarine light. While

18

I was traveling on canoe on a group tour through

19

the renowned Glowworm Grotto of New Zealand’s

Waitomo Caves. Were it not for the twinkling

light of these *Arachnocampa luminosa*, a species

unique to New Zealand and abundant in these caves,

this meandering subterranean passageway would

feel as though it were downright ensconced in shadows.

20

I sheepishly tucked the camera away and focused again on the glowworms. Collectively, they resembled the cosmos, a sea of stars in a clear night sky. Beautiful—yet what made them glow?

“Bioluminescence,” the woman said, peculiarly sensing my curiosity. 21 A badge

was pinned to her shirt indicated she was a biochemist, here, I guessed, to research the organism.

22

16. F. NO CHANGE  
 G. me, and then pointing  
 H. me and she pointed  
 J. me, she pointed
17. A. NO CHANGE  
 B. glowing,” she said as she pointed up to the ceiling.  
 C. glowing,” she said in a hushed, whispering voice.  
 D. glowing.”
18. F. NO CHANGE  
 G. Although  
 H. Since  
 J. DELETE the underlined portion.
19. A. NO CHANGE  
 B. with  
 C. by  
 D. in
20. F. NO CHANGE  
 G. end up pretty hard to see.  
 H. have not a lot of light.  
 J. be utterly dark.
21. At this point, the writer wants to emphasize the idea that the narrator found the woman’s comment peculiar. Which of the following best accomplishes that goal?  
 A. I figured she had been to the caves before.  
 B. Surprised, I hesitantly turned toward her.  
 C. She had a notepad in her hand.  
 D. I happened to agree.
22. F. NO CHANGE  
 G. had been  
 H. it was  
 J. DELETE the underlined portion.





She explained that to attract prey, glowworms (not really worms at all, but the larval stage of a fungus gnat) emit light through their translucent skin; via a <sup>23</sup> cellular chemical reaction. The cells produce luciferin, a chemical pigment that reacts with oxygen to produce light that shines through the organism's tail-end intestine.

From its mouth, she showed me, all glowworms dangle shimmering silken <sup>24</sup> threads glossed in beads of mucus. Cave-dwelling insects are trapped in these threads, then reeled in <sup>25</sup> like fish on a line, and finally lured by the light. <sup>25</sup> The light responds to environmental factors. The

sound of splashing water, however, <sup>26</sup> might signal

that prey is nearby, causing them to <sup>27</sup>

brighten. 28

23. A. NO CHANGE  
B. skin, and via  
C. skin. Via  
D. skin via
24. F. NO CHANGE  
G. all of the glowworms are dangling  
H. each of the glowworms dangle  
J. each glowworm dangles
25. A. NO CHANGE  
B. lured by the light, then trapped in these threads, and finally reeled in like fish on a line.  
C. reeled in like fish on a line, then trapped in these threads, and finally lured by the light.  
D. trapped in these threads, then lured by the light, and finally reeled in like fish on a line.
26. F. NO CHANGE  
G. on the other hand,  
H. for example,  
J. above all,
27. A. NO CHANGE  
B. the light  
C. these  
D. DELETE the underlined portion.
28. Which of the following choices, if added here, would best conclude the paragraph and refer back to the conversation at the beginning of the essay?  
F. Insects are likely attracted to the light because the sky-like appearance of the glowworms fools the insects into believing they are outdoors.  
G. She told me that the cave is usually quiet, with only occasional noises, such as tour boats passing through the water.  
H. A camera flash, she reminded me, may also spell danger, and the glowworms' light is doused.  
J. The light is also brighter in a hungry larva than in those that have just eaten.



Our trip neared its end. I spotted  
a dragonfly in the cave. I knew its  
29

fate, it would be ensnared, just as I had  
30  
been by the brilliance of these luminescent  
glowworms.

29. The writer is considering revising the underlined portion to the following:  
soaring toward the light.  
Should the writer make this revision?
- A. Yes, because the revised phrase more specifically describes the dragonfly's actions to help support the narrator's claim that she knew what its fate would be.
  - B. Yes, because the revised phrase adds information that explains why the light of the glowworms was suddenly dim.
  - C. No, because the original phrase more clearly establishes that the trip is ending and that the narrator sees the dragonfly as they exit the cave.
  - D. No, because the original phrase builds on the suspense established in the narrative regarding the fate of the dragonfly.

30. F. NO CHANGE  
G. fate; and  
H. fate:  
J. fate

---

PASSAGE III

**A Rose by the Name Antique**

With shears in hand, I clip a thin branch  
from the rosebush in my backyard garden. I place this  
clipping into the basket next to me and crouch under  
31  
this again. I snip a few more branches and then rise  
32  
to head to the greenhouse. There, I will deposit these  
clippings in rich soil; roots will take hold, buds will sprout,  
33  
and a new plant will find a home in my garden.

My roses are not your average hybrid-tea roses (those  
long-stemmed, special occasion roses with well-formed  
buds). Mine are antique roses, old, or heirloom varieties,  
34  
that have existed in gardens worldwide for centuries.

31. A. NO CHANGE  
B. basket next, to me  
C. basket, next to me  
D. basket next to me,
32. F. NO CHANGE  
G. the rosebush  
H. one  
J. it
33. Which choice most closely maintains the sentence pattern the writer establishes after the semicolon?
- A. NO CHANGE
  - B. I will see new buds that have been sprouting,
  - C. followed by the buds, which have sprouted,
  - D. then come the sprouting buds after that,
34. F. NO CHANGE  
G. roses, old or heirloom, varieties,  
H. roses old, or heirloom varieties  
J. roses, old or heirloom varieties



Compared to vibrant hybrid-tea colors, antique rose colors

35

tend to be silenced. Their stems are also shorter, and their buds are a bit droopier. Their fragrance, however, is unmatched. And unlike the hybrid-tea whose long stems make into a rosebush that is rather scraggly looking,

37

antique rosebushes can be grown in a variety of colors, handsomely landscaping gardens.

38

The plant thrives best when it is exposed to six hours of direct sunlight daily. The plant can withstand extreme

39

temperatures and survive nearly anywhere. It's also easier

40

to grow antiques. Cultivating hybrid-teas having involved a process of grafting two species of rose together, but the grafted area remains weak and susceptible to viruses.

41

Antiques, on the other hand, are less prone to disease because they are grown simply by placing cuttings from a parent plant into nutrient-rich soil. They require far less pruning, fertilizing, and nurturing than their hybrid-tea

42

35. A. NO CHANGE  
B. vibrant hybrid-tea, colors,  
C. vibrant, hybrid-tea colors  
D. vibrant hybrid-tea colors

36. F. NO CHANGE  
G. reduced.  
H. muted.  
J. lower.

37. A. NO CHANGE  
B. about  
C. like  
D. for

38. The writer wants to add a detail here that best completes the contrast to hybrid-tea roses in the first part of the sentence. Which choice best accomplishes that goal?  
F. NO CHANGE  
G. are lush and shapely,  
H. can grow quite large,  
J. tend to be less thorny,

39. Which choice best introduces the main focus of the paragraph?  
A. NO CHANGE  
B. The varieties of antique roses are numerous, the most popular of which are the silken peach *Mutabilis* and the crimson *Louis Phillippe*.  
C. Aside from the rose's beauty, what gardeners like me most appreciate is that antiques are incredibly durable and low maintenance.  
D. While I am fond of bush varieties, I am also drawn to climbing varieties that can be placed against walls, fences, or trellises.

40. F. NO CHANGE  
G. They're  
H. Their  
J. Its

41. A. NO CHANGE  
B. which involves  
C. involves  
D. involving

42. F. NO CHANGE  
G. Antiques, requiring  
H. Antiques require  
J. Requiring



counterparts, antiques can reportedly survive without any care from human hands, a fact that surprises many.

[1] I dig small holes in a pot of soil, place each clipping a half inch deep, and pack down the soil around them. [2] Back in my greenhouse, I strip the clippings of all leaves and branches. [3] Then I wait: the roots will take hold and, eventually, buds will sprout. 44

43. The writer wants to add a detail here that emphasizes the antique rose's ability to survive without human care. Which choice best accomplishes that goal?
- A. NO CHANGE
  - B. blooming year after year even at abandoned sites.
  - C. making them more popular among gardeners.
  - D. often blooming between midspring and fall.
44. Which sequence of sentences makes this paragraph most logical?
- F. NO CHANGE
  - G. 2, 1, 3
  - H. 3, 1, 2
  - J. 1, 3, 2

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer's primary purpose had been to describe the process of planting a particular flower. Would this essay accomplish that purpose?
- A. Yes, because the essay discusses the steps involved in growing and maintaining antique rosebushes.
  - B. Yes, because the writer explains the specific conditions needed to plant antique roses and how long it takes for new buds to sprout.
  - C. No, because the essay is more focused on comparing the qualities and cultivation of antique and hybrid-tea roses.
  - D. No, because while the writer mentions growing antique roses in his garden, the essay is more focused on the history of antiques in gardens worldwide.

---

**PASSAGE IV**

**Jeremy Frey, Weaving Heritage Into Modern Art**

[1]

The winning piece was a basket, it was eighteen inches tall with a curved, vaselike silhouette. [A] It was made of ash wood finely woven into bold stripes of black and white that ran from its crown to its base. [B]

46. **F.** NO CHANGE  
**G.** this work of art reached  
**H.** the object stood  
**J.** DELETE the underlined portion.



In the ninety-year history of the Santa Fe Indian

Market—the largest Indian art festival in the nation—the

47

2011 event marked the first time a basket won best of

show. The creator of the piece, thirty-three-year-old

Passamaquoddy Indian Jeremy Frey from Princeton,

Maine, the basket sold at auction for \$16,000.

48

[2]

[C] Frey describes his baskets as

“cutting-edge traditional.” [D] He primarily

weaves a classic material, wood from the brown

ash tree, but, unlike most contemporary basketmakers,

49

he harvests, cuts, pounds, dries, and dyes the wood

himself. Then creating highly elaborate versions

50

of the sturdy utility baskets that have been used

by generations of Passamaquoddy fishermen from

51

Maine. He honors tradition, but he highlights

artistic design. For example, his baskets feature

complex weaving on areas that are often hidden

52

and therefore typically not embellished. Many

traditional baskets have basic, woven lids.

47. A. NO CHANGE  
B. Market the largest Indian art festival—in the nation—  
C. Market, the largest Indian art festival, in the nation  
D. Market, the largest Indian art festival in the nation

48. F. NO CHANGE  
G. looked on as the  
H. as his  
J. his

49. A. NO CHANGE  
B. but, unlike most, contemporary basketmakers  
C. but unlike, most contemporary basketmakers,  
D. but, unlike most contemporary basketmakers

50. F. NO CHANGE  
G. Going on to create  
H. Frey creates  
J. Creating

51. If the writer were to delete the underlined portion, the essay would primarily lose:
- A. an indication that Frey honors Passamaquoddy cultural heritage by creating baskets that look nearly identical to traditional pieces.  
B. a mention of a physical characteristic of the earliest baskets used by Passamaquoddy fishermen.  
C. a detail that connects Frey’s basketry work to long-standing Passamaquoddy traditions.  
D. a point revealing that Frey’s baskets are used by Passamaquoddy fishermen today.
52. Which choice provides the clearest and most specific information about which parts of Frey’s baskets are being referred to in the sentence and about Frey’s manner of weaving those parts?
- F. NO CHANGE  
G. a remarkable level of detail on certain sections, the  
H. intricately woven interiors and bottoms,  
J. characteristic interiors and bottoms,



Frey's porcupine quill lids are often decorated

53

with art inlaid on birch bark; as far as lids go,

54

I wouldn't say that's basic. And while braids of

54

grass are customarily woven into ash baskets

55

to make them better, Frey incorporates braided

56

cedar bark to create striking new textures.

[3]

Now that he's a nationally recognized artist of who

57

has rejuvenated the art of basketry, Frey feels his role

is to inspire. He's on the board of the Maine Indian

Basketmakers Alliance, a group that works to help

preserve it by reaching out to young members of Native

58

communities in the state. His other goal is to continue to

stand out. The woven grass bracelets he saw on a recent

59

trip to Hawaii have influenced how he shapes the bases

of some of his newer baskets, as he finds yet another way

to make traditional Passamaquoddy weaving something

spectacularly his own.

53. Which placement of the underlined portion makes clear that the art that decorates the lid, not the lid itself, is made of porcupine quill?

- A. Where it is now
- B. After the word *are*
- C. After the word *often*
- D. After the word *with*

54. F. NO CHANGE

- G. bark, which is not exactly formulating a lid through a conventional ideology.
- H. bark; this is just part of his really artistic way.
- J. bark.

55. A. NO CHANGE

- B. has been
- C. is seen
- D. is

56. Which choice provides the clearest and most specific reason that grass is woven into ash baskets?

- F. NO CHANGE
- G. for the sake of the objects,
- H. for a useful purpose,
- J. to strengthen them,

57. A. NO CHANGE

- B. being whom
- C. whom
- D. who

58. F. NO CHANGE

- G. this art
- H. that
- J. DELETE the underlined portion.

59. A. NO CHANGE

- B. distinguish himself from other weavers so as a weaver he is set apart from them.
- C. remain to be someone who gets noticed.
- D. keep on being fully distinct.

Question 60 asks about the preceding passage as a whole.

60. The writer is considering adding the following sentence to the essay:

The black stripes were woven flat, sharply setting off the white stripes, which were woven to form raised columns of perfectly even points that seemed to cascade down the piece.

If the writer were to add this sentence, it would most logically be placed at:

- F. Point A in Paragraph 1.
- G. Point B in Paragraph 1.
- H. Point C in Paragraph 2.
- J. Point D in Paragraph 2.



## PASSAGE V

## The Flow of Time

Nine hundred years ago, Emperor Zhezong of China,  
ordered the design and construction of a clock<sup>61</sup>

built to keep time more accurately than other clocks.  
<sup>62</sup>

This would be no simple timepiece and because  
<sup>63</sup>

Chinese dynasties continued to astrology, they relied  
<sup>64</sup>  
 on complicated clocks that not only kept time but also  
 helped track stars, planets, the sun, and the moon. An  
eminent scientist and bureaucrat named Su Song lead  
<sup>65</sup>  
 Zhezong's ambitious project.

Using his expertise in calendrical science,  
<sup>66</sup>

Su Song created a spectacular timepiece housed within  
<sup>67</sup>  
 an ornate forty-foot-tall tower. At the tower's top sat an

armillary sphere, or a nest of metal rings representing  
<sup>68</sup>  
 celestial reference points such as the horizon and  
 the sun's path—that rotated in sync with the  
 earth, enabling precise astronomical observations.

Inside the tower, a sphere depicting the sky  
 revolved to display the stars that were overhead.

61. A. NO CHANGE  
 B. ago, Emperor Zhezong, of China  
 C. ago, Emperor Zhezong of China  
 D. ago Emperor Zhezong of China,
62. F. NO CHANGE  
 G. to keep time more accurately than clocks that had previously come before it.  
 H. more accurate at keeping time correctly than any other clock of the time.  
 J. more accurate than any other.
63. A. NO CHANGE  
 B. timepiece. Because  
 C. timepiece, because  
 D. timepiece because
64. F. NO CHANGE  
 G. adhered  
 H. linked  
 J. fixed
65. A. NO CHANGE  
 B. imminent scientist and bureaucrat named Su Song lead  
 C. imminent scientist and bureaucrat named Su Song led  
 D. eminent scientist and bureaucrat named Su Song led
66. Given that all the choices are accurate, which one best indicates that Su Song relied on engineering achievements from earlier times?  
 F. NO CHANGE  
 G. Building on centuries of Chinese clock-making knowledge,  
 H. While authoring his treatise on astronomical clockwork,  
 J. After first crafting a working small-scale wooden model,
67. A. NO CHANGE  
 B. secured between  
 C. encased around  
 D. nestled among
68. F. NO CHANGE  
 G. sphere—  
 H. sphere:  
 J. sphere,



Besides, below the star sphere, the tower's open  
<sup>69</sup> sides exposed a detailed model of a five-story pagoda.

Automated figurines would appear in the pagoda's  
 doorways and ring bells to announce hours, sunsets,  
<sup>70</sup> seasons, and other chronological events.

The clock's inner workings were equally remarkable.  
<sup>71</sup> Hidden in the tower, a waterwheel eleven feet in diameter  
 powered the entire clock. Therefore, water would pour at  
<sup>72</sup> a constant rate into one of the wheel's thirty-six buckets.  
 When the bucket was full, the water's weight pulled it  
 down, rotating the waterwheel. Then a stop mechanism  
 halted the wheel and positioned the next bucket for filling.

Chinese clockmakers had long used waterwheels, but  
<sup>73</sup> Su Song's stop mechanism, which regulated the inertia  
 of the waterwheel, represented significant innovation.

Unfortunately, after Su Song's clock ran  
 for thirty years, invaders stole it. Later the clock  
 vanished altogether. It would be a few hundred years  
until with the refinement of mechanical clocks in Europe  
<sup>74</sup>

other clocks approached the complexity of Su Song's  
<sup>75</sup> masterpiece.

69. A. NO CHANGE  
 B. Sooner or later,  
 C. Lastly,  
 D. Thus,

70. Which of the following alternatives to the underlined  
 portion would NOT be acceptable?  
 F. bells, which served to announce  
 G. bells, they announced  
 H. bells that announced  
 J. bells, announcing

71. A. NO CHANGE  
 B. reveals themselves as being  
 C. was shown to be  
 D. has proved

72. F. NO CHANGE  
 G. In other words, water  
 H. For example, water  
 J. Water

73. A. NO CHANGE  
 B. nevertheless,  
 C. regardless,  
 D. DELETE the underlined portion.

74. F. NO CHANGE  
 G. until—with the refinement of mechanical clocks in  
 Europe—  
 H. until with the refinement (of mechanical clocks in  
 Europe)  
 J. until, with the refinement, of mechanical clocks in  
 Europe

75. A. NO CHANGE  
 B. eventually became able to draw anywhere near to  
 the complexity  
 C. grew to attain such a high degree as that  
 D. could even fathom coming within reach

**END OF TEST 1**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**





## MATHEMATICS TEST

60 Minutes—60 Questions

**DIRECTIONS:** Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

1. The numbers 1 through 15 were each written on individual pieces of paper, 1 number per piece. Then the 15 pieces of paper were put in a jar. One piece of paper will be drawn from the jar at random. What is the probability of drawing a piece of paper with a number less than 9 written on it?

- A.  $\frac{1}{9}$
- B.  $\frac{1}{15}$
- C.  $\frac{6}{15}$
- D.  $\frac{7}{15}$
- E.  $\frac{8}{15}$

2. Which of the following expressions is equivalent to  $-4x^3 - 12x^3 + 9x^2$ ?

- F.  $x^8$
- G.  $-7x^8$
- H.  $-8x^3 + 9x^2$
- J.  $-16x^3 + 9x^2$
- K.  $-16x^6 + 9x^2$

3. When  $x = 2$ ,  $10 + 3(12 \div (3x)) = ?$

- A. 12
- B. 16
- C. 26
- D. 34
- E. 104

4.  $|6 - 4| - |3 - 8| = ?$

- F. -7
- G. -3
- H. 3
- J. 7
- K. 21

5. The expression  $(4c - 3d)(3c + d)$  is equivalent to:

- A.  $12c^2 - 13cd - 3d^2$
- B.  $12c^2 - 13cd + 3d^2$
- C.  $12c^2 - 5cd - 3d^2$
- D.  $12c^2 - 5cd + 3d^2$
- E.  $12c^2 - 3d^2$

6. Of the 180 students in a college course,  $\frac{1}{4}$  of the students earned an A for the course,  $\frac{1}{3}$  of the students earned a B for the course, and the rest of the students earned a C for the course. How many of the students earned a C for the course?

- F. 75
- G. 90
- H. 105
- J. 120
- K. 135

7. The number of fish,  $f$ , in Skipper's Pond at the beginning of each year can be modeled by the equation  $f(x) = 3(2^x)$ , where  $x$  represents the number of years after the beginning of the year 2000. For example,  $x = 0$  represents the beginning of the year 2000,  $x = 1$  represents the beginning of the year 2001, and so forth. According to the model, how many fish were in Skipper's Pond at the beginning of the year 2006?

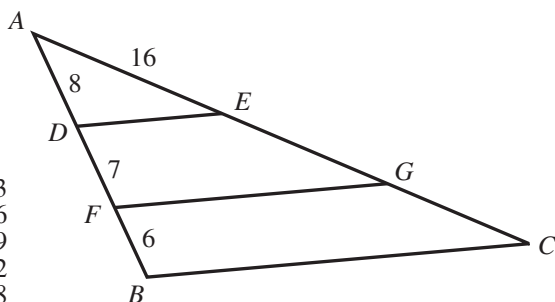
- A. 96
- B. 192
- C. 384
- D. 1,458
- E. 46,656



8. Manish drove from Chicago to Baton Rouge. At 8:00 a.m., he was 510 km from Baton Rouge. At 1:00 p.m., he was 105 km from Baton Rouge. Which of the following values is closest to Manish's average speed, in kilometers per hour, from 8:00 a.m. to 1:00 p.m. ?

F. 58  
G. 68  
H. 81  
J. 94  
K. 102

9. In the figure shown below,  $E$  and  $G$  lie on  $\overline{AC}$ ,  $D$  and  $F$  lie on  $\overline{AB}$ ,  $\overline{DE}$  and  $\overline{FG}$  are parallel to  $\overline{BC}$ , and the given lengths are in feet. What is the length of  $\overline{AC}$ , in feet?



A. 13  
B. 26  
C. 29  
D. 42  
E. 48

10. Katerina runs 15 miles in  $2\frac{1}{2}$  hours. What is the average number of *minutes* it takes her to run 1 mile?

F. 6  
G. 10  
H.  $12\frac{1}{2}$   
J.  $16\frac{2}{3}$   
K.  $17\frac{1}{2}$

11. A bag contains 8 red marbles, 9 yellow marbles, and 7 green marbles. How many additional red marbles must be added to the 24 marbles already in the bag so that the probability of randomly drawing a red marble is  $\frac{3}{5}$  ?

A. 11  
B. 16  
C. 20  
D. 24  
E. 32

12. In the standard  $(x,y)$  coordinate plane, the point  $(2,1)$  is the midpoint of  $\overline{CD}$ . Point  $C$  has coordinates  $(6,8)$ . What are the coordinates of point  $D$  ?

F.  $(-2, -\frac{7}{2})$   
G.  $(-2, -6)$   
H.  $(4, \frac{9}{2})$   
J.  $(10, 10)$   
K.  $(10, 15)$

13. At his job, the first 40 hours of each week that Thomas works is *regular time*, and any additional time that he works is *overtime*. Thomas gets paid \$15 per hour during regular time. During overtime Thomas gets paid 1.5 times as much as he gets paid during regular time. Thomas works 46 hours in 1 week and gets \$117 in deductions taken out of his pay for this week. After the deductions are taken out, how much of Thomas's pay for this week remains?

A. \$492  
B. \$573  
C. \$609  
D. \$618  
E. \$735

14. At Sweet Stuff Fresh Produce the price of a bag of grapes depends on the total number of bags purchased at 1 time, as shown in the table below. In 2 trips to Sweet Stuff this week, Janelle purchased 3 bags of grapes on Monday and 4 bags of grapes on Wednesday. How much money would Janelle have saved if she had instead purchased 7 bags of grapes in 1 trip on Monday?

Number of bags	Price per bag
1–3	\$3.00
4–6	\$2.80
7–9	\$2.60
10 or more	\$2.50

F. \$0.20  
G. \$1.00  
H. \$1.40  
J. \$2.00  
K. \$2.50

15. What is 3% of  $4.14 \times 10^4$  ?

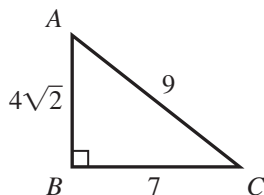
A. 1,242  
B. 1,380  
C. 12,420  
D. 13,800  
E. 124,200



16. What value of  $x$  satisfies the equation  $-3(4x - 5) = 2(1 - 5x)$  ?

F.  $-\frac{17}{2}$   
 G.  $-\frac{17}{22}$   
 H.  $-1$   
 J.  $\frac{3}{17}$   
 K.  $\frac{13}{2}$

17. In right triangle  $\triangle ABC$  shown below, the given lengths are in millimeters. What is  $\sin A$  ?



A.  $\frac{4\sqrt{2}}{9}$   
 B.  $\frac{4\sqrt{2}}{7}$   
 C.  $\frac{7\sqrt{2}}{8}$   
 D.  $\frac{7}{9}$   
 E.  $\frac{9}{7}$

18.  $\left(\frac{27}{64}\right)^{-\frac{2}{3}} = ?$

F.  $-\frac{9}{16}$   
 G.  $-\frac{9}{32}$   
 H.  $\frac{9}{32}$   
 J.  $\frac{16}{9}$   
 K.  $\frac{32}{9}$

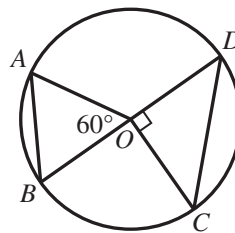
19. Loto begins at his back door and walks 8 yards east, 6 yards north, 12 yards east, and 5 yards north to the barn door. About how many yards less would he walk if he could walk directly from the back door to the barn door?

A. 8  
 B. 19  
 C. 23  
 D. 26  
 E. 31

20. For a given set of data, the standard score,  $z$ , corresponding to the raw score,  $x$ , is given by  $z = \frac{x - \mu}{\sigma}$ , where  $\mu$  is the mean of the set and  $\sigma$  is the standard deviation. If, for a set of scores,  $\mu = 78$  and  $\sigma = 6$ , which of the following is the raw score,  $x$ , corresponding to  $z = 2$  ?

F. 90  
 G. 84  
 H. 80  
 J. 76  
 K. 66

21. In the figure below,  $A$ ,  $B$ ,  $C$ , and  $D$  lie on the circle centered at  $O$ .



Which of the following does NOT appear in the figure?

A. Acute triangle  
 B. Equilateral triangle  
 C. Isosceles triangle  
 D. Right triangle  
 E. Scalene triangle

22. What is the slope of a line, in the standard  $(x,y)$  coordinate plane, that is parallel to  $x + 5y = 9$  ?

F.  $-5$   
 G.  $-\frac{1}{5}$   
 H.  $\frac{1}{5}$   
 J.  $\frac{9}{5}$   
 K. 9

23. Given  $y = \frac{x}{x-1}$  and  $x > 1$ , which of the following is a possible value of  $y$  ?

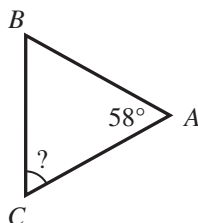
A.  $-1.9$   
 B.  $-0.9$   
 C.  $0.0$   
 D.  $0.9$   
 E.  $1.9$



24. The set of all positive integers that are divisible by both 15 and 35 is infinite. What is the least positive integer in this set?

F. 5  
G. 50  
H. 105  
J. 210  
K. 525

25. In  $\triangle ABC$  shown below, the measure of  $\angle A$  is  $58^\circ$ , and  $\overline{AB} \cong \overline{AC}$ . What is the measure of  $\angle C$ ?



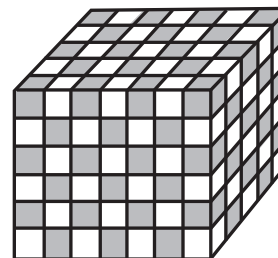
- A.  $32^\circ$   
B.  $42^\circ$   
C.  $58^\circ$   
D.  $61^\circ$   
E.  $62^\circ$
26. About  $1.48 \times 10^8$  square kilometers of Earth's surface is land; the rest, about  $3.63 \times 10^8$  square kilometers, is water. If a returning space capsule lands at a random point on Earth's surface, which of the following is the best estimate of the probability that the space capsule will land in water?

F. 80%  
G. 71%  
H. 65%  
J. 41%  
K. 29%

27. On the first 7 statistics tests of the semester, Jamal scored 61, 76, 79, 80, 80, 84, and 91. The mean, median, and mode of his scores were 79, 80, and 80, respectively. On the 8th statistics test, Jamal scored 90. How do the mean, median, and mode of all 8 of his scores compare to the mean, median, and mode of his first 7 scores?

	Mean	Median	Mode
A.	equal	greater	greater
B.	greater	greater	greater
C.	greater	greater	equal
D.	greater	equal	greater
E.	greater	equal	equal

28. The solid rectangular prism shown below was built by alternating congruent black cubes and white cubes such that 2 cubes of the same color have at most 1 edge touching. What is the total number of *white* cubes that were used to build the prism?



F. 45  
G. 102  
H. 105  
J. 140  
K. 210

29. One side of square  $ABCD$  has a length of 12 meters. A certain rectangle whose area is equal to the area of  $ABCD$  has a width of 8 meters. What is the length, in meters, of the rectangle?

A. 12  
B. 16  
C. 18  
D. 20  
E. 24

30. The average of a list of 4 numbers is 92.0. A new list of 4 numbers has the same first 3 numbers as the original list, but the fourth number in the original list is 40, and the fourth number in the new list is 48. What is the average of this new list of numbers?

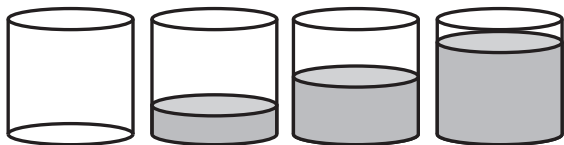
F. 81.0  
G. 92.0  
H. 94.0  
J. 94.4  
K. 96.6

31. The vector  $\mathbf{i}$  represents 1 mile per hour east, and the vector  $\mathbf{j}$  represents 1 mile per hour north. Maria is jogging south at 12 miles per hour. One of the following vectors represents Maria's velocity, in miles per hour. Which one?

A.  $-12\mathbf{i}$   
B.  $-12\mathbf{j}$   
C.  $12\mathbf{i}$   
D.  $12\mathbf{j}$   
E.  $12\mathbf{i} + 12\mathbf{j}$



32. Four identical glasses are shown below. One glass is empty, and the other 3 glasses are  $\frac{1}{4}$  full,  $\frac{1}{2}$  full, and  $\frac{4}{5}$  full of water, respectively. If the water were redistributed equally among the 4 glasses, what fractional part of each glass would be filled?



- F.  $\frac{2}{11}$   
 G.  $\frac{8}{11}$   
 H.  $\frac{3}{22}$   
 J.  $\frac{31}{60}$   
 K.  $\frac{31}{80}$
33. Aurelio is purchasing carpet tiles to cover an area of his living room floor that is  $8\frac{1}{3}$  feet wide by 10 feet long. Each carpet tile is a square 20 inches wide by 20 inches long. What is the minimum number of carpet tiles that Aurelio must purchase to cover this area of his living room floor?
- A. 5  
 B. 11  
 C. 21  
 D. 30  
 E. 84
34. In the standard  $(x,y)$  coordinate plane, a circle with its center at  $(8,5)$  and a radius of 9 coordinate units has which of the following equations?
- F.  $(x - 8)^2 + (y - 5)^2 = 81$   
 G.  $(x - 8)^2 + (y - 5)^2 = 9$   
 H.  $(x + 8)^2 + (y + 5)^2 = 81$   
 J.  $(x + 8)^2 + (y + 5)^2 = 9$   
 K.  $(x + 5)^2 + (y + 8)^2 = 81$

Use the following information to answer questions 35–38.

Many humans carry the gene Yq77. The Yq test determines, with 100% accuracy, whether a human carries Yq77. If a Yq test result is positive, the human carries the Yq77 gene. If a Yq test result is negative, the human does NOT carry Yq77. Sam designed a less expensive test for Yq77 called the Sam77 test. It produces some incorrect results. To determine the accuracy of the Sam77 test, both tests were administered to 1,000 volunteers. The results from this administration are summarized in the table below.

	Positive Yq test	Negative Yq test
Positive Sam77 test	590	10
Negative Sam77 test	25	375

35. It cost \$2,500 to administer each Yq test and \$50 to administer each Sam77 test. What was the total cost to administer both tests to all the volunteers?
- A. \$1,537,500  
 B. \$1,556,750  
 C. \$1,568,250  
 D. \$2,500,000  
 E. \$2,550,000
36. What percent of the volunteers actually carry Yq77 ?
- F. 57.5%  
 G. 60.0%  
 H. 60.5%  
 J. 61.5%  
 K. 62.5%
37. For how many volunteers did the Sam77 test give an incorrect result?
- A. 10  
 B. 25  
 C. 35  
 D. 385  
 E. 400
38. One of the volunteers whose Sam77 test result was positive will be chosen at random. To the nearest 0.001, what is the probability the chosen volunteer does NOT possess Yq77 ?
- F. 0.017  
 G. 0.026  
 H. 0.035  
 J. 0.041  
 K. 0.063

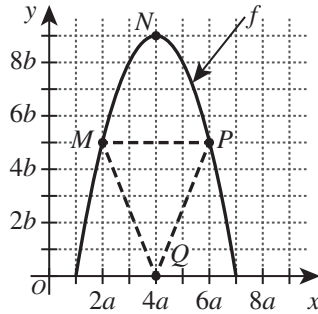


39. Given matrices  $X = [-1 \ 0]$  and  $Y = \begin{bmatrix} -2 \\ -1 \end{bmatrix}$ , which of the following matrices is  $XY$ ?
- A.  $[-4]$   
 B.  $[-3]$   
 C.  $[-2]$   
 D.  $[ \ 2]$   
 E.  $[ \ 3]$
40. Regardless of how the graph is oriented in the standard  $(x,y)$  coordinate plane, NO graph in one of the following categories has a vertical line of symmetry. Which one?
- F. Line  
 G. Square  
 H. Pentagon  
 J. Parallelogram  
 K. Scalene triangle
41. The equation  $24x^2 + 2x = 15$  has 2 solutions. What is the greater of the 2 solutions?
- A.  $\frac{3}{4}$   
 B.  $\frac{4}{3}$   
 C.  $\frac{5}{6}$   
 D.  $\frac{7}{6}$   
 E.  $\frac{11}{15}$
42. Which of the following expressions is equal to  $(\sin 60^\circ)(\cos 30^\circ) + (\cos 60^\circ)(\sin 30^\circ)$ ?
- F.  $\cos(60^\circ - 30^\circ)$   
 G.  $\cos(60^\circ + 30^\circ)$   
 H.  $\sin(60^\circ - 30^\circ)$   
 J.  $\sin(60^\circ + 30^\circ)$   
 K.  $\sin\left(\frac{60^\circ + 30^\circ}{2}\right)$
43. What is the area, in square units, of a circle that has a circumference  $12\pi$  units long?
- A.  $6\pi$   
 B.  $12\pi$   
 C.  $24\pi$   
 D.  $36\pi$   
 E.  $144\pi$
44. A barrel contains 25 liters of a solvent mixture that is 40% solvent and 60% water. Lee will add pure solvent to the barrel, without removing any of the mixture currently in the barrel, so that the new mixture will contain 50% solvent and 50% water. How many liters of pure solvent should Lee add to create this new mixture?
- F. 2.5  
 G. 5  
 H. 10  
 J. 12.5  
 K. 15
45. For all  $x \neq \pm y$ ,  $\frac{x}{x+y} + \frac{y}{x-y} = ?$
- A.  $\frac{1}{x-y}$   
 B.  $\frac{x+y}{x-y}$   
 C.  $\frac{x+y}{2x}$   
 D.  $x^2 + y^2$   
 E.  $\frac{x^2 + y^2}{x^2 - y^2}$
46. Mary, James, and Carlos sold  $\frac{1}{4}$ -page advertisements for the school yearbook. Mary sold twice as many as Carlos did, and James sold 3 times as many as Mary did. What fraction of these advertisements did Carlos sell?
- F.  $\frac{1}{9}$   
 G.  $\frac{1}{7}$   
 H.  $\frac{1}{6}$   
 J.  $\frac{1}{5}$   
 K.  $\frac{1}{3}$
47. In a window display at a flower shop, there are 3 spots for 1 plant each. To fill these 3 spots, Emily has 6 plants to select from, each of a different type. Selecting from the 6 plants, Emily can make how many possible display arrangements with 1 plant in each spot?
- (Note: The positions of the unselected plants do not matter.)
- A. 3  
 B. 6  
 C. 15  
 D. 120  
 E. 216



Use the following information to answer questions 48–50.

The quadratic function  $f$  and  $\triangle MPQ$  are graphed in the standard  $(x,y)$  coordinate plane below. Points  $M(2a, 5b)$ ,  $N(4a, 9b)$ , and  $P(6a, 5b)$  are on  $f$ . Point  $Q(4a, 0)$  is NOT on  $f$ .



48. In terms of  $a$  and  $b$ , what is the area, in square coordinate units, of  $\triangle MPQ$ ?

- F.  $8ab$
- G.  $10ab$
- H.  $12ab$
- J.  $15ab$
- K.  $20ab$

49. Point  $M$  will remain fixed, and point  $Q$  will move to the right along the  $x$ -axis. As  $Q$  continues to move to the right, which of the following statements describes what will happen to the slope of  $\overline{MQ}$ ?

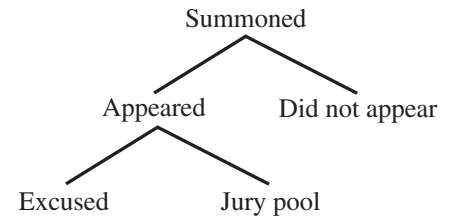
- A. It will decrease and eventually be negative.
- B. It will decrease but never be negative.
- C. It will stay the same.
- D. It will increase but never be positive.
- E. It will increase and eventually be positive.

50. One of the following values is equal to  $f(5a)$ . Which one?

- F.  $3a$
- G.  $5a$
- H.  $5b$
- J.  $8a$
- K.  $8b$

51. Twelve jurors are needed for an upcoming trial. The diagram below illustrates a part of the process of jury selection. The 12 jurors will be selected from a jury pool of about 60 people. The court records show a trend that only 40% of the people who are summoned for jury duty actually appear and that of the people who appear,  $\frac{1}{3}$  are excused. If this same trend continues, how many people should be summoned to have as close as possible to 60 people in the jury pool?

- A. 45
- B. 90
- C. 150
- D. 225
- E. 800



52. What is the 275th digit after the decimal point in the repeating decimal  $0.\overline{6295}$ ?

- F. 0
- G. 2
- H. 5
- J. 6
- K. 9

53. Given that  $f(x) = x^2 - 4$  and  $g(x) = x + 3$ , what are all the values of  $x$  for which  $f(g(x)) = 0$ ?

- A.  $-5$  and  $-1$
- B.  $-3$ ,  $-2$ , and  $2$
- C.  $-1$  and  $1$
- D.  $1$  and  $5$
- E.  $-\sqrt{5}$  and  $\sqrt{5}$

54. Given that  $p$  is a positive number,  $n$  is a negative number, and  $|p| > |n|$ , which of the following expressions has the greatest value?

- F.  $\left| \frac{p-n}{p} \right|$
- G.  $\left| \frac{p-n}{n} \right|$
- H.  $\left| \frac{p+n}{p-n} \right|$
- J.  $\left| \frac{p+n}{p} \right|$
- K.  $\left| \frac{p+n}{n} \right|$

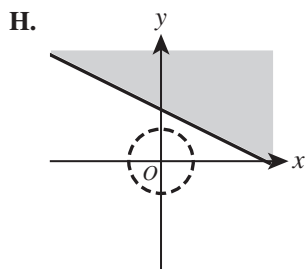
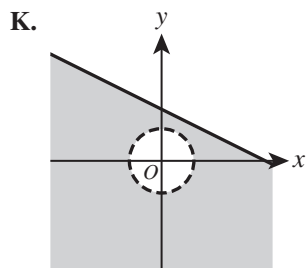
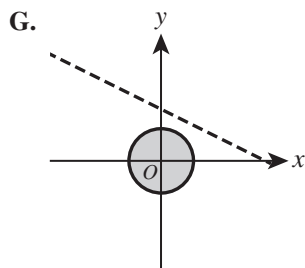
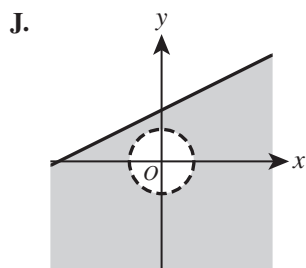
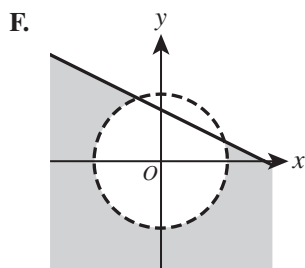


55. If  $i = \sqrt{-1}$ , then  $\frac{i+i^2+i^3}{i^3+i^4+i^5} = ?$

- A. -3
- B. -1
- C.  $\frac{1}{2}$
- D. 1
- E. 3

56. In one of the following graphs in the standard  $(x,y)$  coordinate plane, the solution set to the system of inequalities below is shown shaded. Which one?

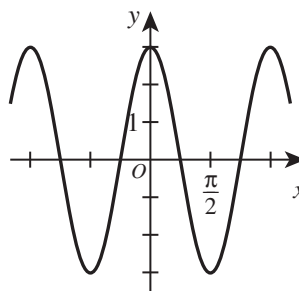
$$\begin{cases} x + 2y \leq 6 \\ 3x^2 > 12 - 3y^2 \end{cases}$$



57. Let  $a$ ,  $b$ ,  $c$ , and  $d$  be real numbers. Given that  $ac = 1$ ,  $\frac{b+c}{d}$  is undefined, and  $abc = d$ , which of the following *must* be true?

- A.  $a = 0$  or  $c = 0$
- B.  $a = 1$  and  $c = 1$
- C.  $a = -c$
- D.  $b = 0$
- E.  $b + c = 0$

58. A cosine function is shown in the standard  $(x,y)$  coordinate plane below.

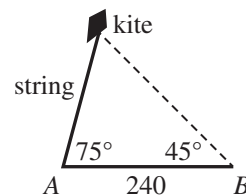


One of the following equations represents this function. Which one?

- F.  $y = 2 \cos\left(\frac{x}{3}\right)$
- G.  $y = 2 \cos(3x)$
- H.  $y = 3 \cos\left(\frac{x}{3}\right)$
- J.  $y = 3 \cos\left(\frac{x}{2}\right)$
- K.  $y = 3 \cos(2x)$

59. The figure below shows a flying kite. At a certain moment, the kite string forms an angle of elevation of  $75^\circ$  from point  $A$  on the ground. At the same moment, the angle of elevation of the kite at point  $B$ , 240 ft from  $A$  on level ground, is  $45^\circ$ . What is the length, in feet, of the string?

- A.  $60\sqrt{3}$
- B.  $80\sqrt{6}$
- C. 144
- D. 180
- E. 240



60. If a publisher charges \$15 for the first copy of a book that is ordered and \$12 for each additional copy, which of the following expressions represents the cost of  $y$  books?

- F.  $12y + 3$
- G.  $12y + 15$
- H.  $15y - 3$
- J.  $15y + 3$
- K.  $15y + 12$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.



## READING TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is accompanied by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

## Passage I

**LITERARY NARRATIVE:** Passage A is adapted from the memoir *The Piano Shop on the Left Bank* by Thad Carhart (©2001 by T.E. Carhart). Passage B is adapted from the article “Me and My Violin” by Arnold Steinhardt (©2014 by Listen: Life with Classical Music).

## Passage A by Thad Carhart

- Even when Luc was busy and could not talk he always made me welcome and allowed me to wander around the inner sanctum of the back room on my own. When things were quieter, he seemed glad of the company and would tell me about the pianos that had just arrived. Our talks made real for me one of his fundamental beliefs, that each and every piano had completely individual characteristics, even if of the same manufacturer and age.
- 10 Sometimes he knew all the details, had even met the owners and talked about their instrument with them and knew intimately how they had treated it. Other times he knew nothing beyond what he could see, feel, or hear. Most often pianos came to him from auctions and charity sales, their history anonymous. But even then, like an expert in artifacts, he could deduce a great deal: whether a piano had been played much or little, whether it had been in an environment with the proper level of humidity (one of his cardinal rules), whether there had been children in the household, even whether it had recently been transported by ship. (“The worst thing you can possibly do to a piano,” he told me more than once.) At these moments he was part detective, part archaeologist, part social critic.
- 25 His attitude about how people treated their pianos seemed to mirror his philosophy of life. While regretting the depredations worked by children on keyboards and strings, he regarded them as tolerable because the piano was at least used and, as he put it, “*au sein de la famille*” (“at the heart of the family”). It was more than just any piece of furniture, but it was that, too, and if drinks were spilled and stains bit into shiny finishes, it was the price one paid for initiating the young to a joy that should stem from familiarity rather than reverence.
- 35 Those who preserved their piano as an altar upon which the art of music was to be worshipped irritated

Luc, but he was deeply respectful of serious musicians who used and depended upon their instrument for their livelihood.

## Passage B by Arnold Steinhardt

- 40 Marc Lifschey, one of the greatest oboists of his era, told me that after retiring as a performer and teacher, he sold his oboe. On the face of it, giving up an instrument you no longer use seems perfectly reasonable, but nevertheless I was taken aback. Marc was not merely an excellent oboist; he was a great artist. Still, Marc didn’t do it alone. He and his oboe did it together. Even in retirement, wouldn’t Marc have some sort of lasting relationship with his oboe that transcended performing on it? Wouldn’t he want to keep it if for no other reason than as a reminder of the magnificent music the two of them had made together?
- 55 Joseph Roisman, the distinguished first violinist of the Budapest String Quartet, seemed to be content to give up his beloved Lorenzo Storioni when he agreed to sell it to me after the Quartet retired. But when I finally met with him, he had second thoughts. “Steinhardt,” he said to me plaintively, “I’ll sell the violin to you some day, but for now I’m enjoying playing chamber music with my friends every Friday night.” And that is exactly what he did until his death a year or two later.
- 65 Lifschey and Roisman dealt with retirement in different ways, but their stories made me wonder about not only what I’ll do with my violin if and when I retire, but also about the very nature of a musician’s day-to-day, year-to-year relationship with his instrument.
- I began playing violin when I was six years old, and now I’m seventy-six. It has been an integral part of my life for the last seven decades. Does that make the violin my very close friend? Well, yes. Sometimes. The violin obviously can’t speak with words, but when I ask something of it, the instrument can respond with an astonishing range of substance and emotion. This is friendship on a most exalted level.
- 75 There are other moments, however, when the violin stubbornly refuses to do my bidding—when it only reluctantly plays in tune, or makes the sound I want, or delivers the music’s essence for which I strive. Then I have to cajole, bargain or adjust to its every

whim. Some friend; more like an adversary, you might  
80 say.

Or is the violin my partner? A woman once went  
backstage to congratulate the great violinist Jascha  
Heifetz after a concert. “What a wonderful sound your  
violin has, Mr. Heifetz!” she exclaimed. Heifetz leaned  
85 over his violin that lay in its open case, listened intently  
for a moment, and said, “Funny, I don’t hear a thing.”  
My violin also lies mute in its case without me—but, on  
the other hand, I stand mute on the concert stage with-  
out it.

1. In Passage A, the parenthetical information in line 19 and lines 21–23 mainly serves to:
  - A. specify how Luc identified certain aspects of a piano’s history.
  - B. portray Luc as overly judgmental about piano transportation.
  - C. describe the types of rules that visitors to Luc’s shop were required to follow.
  - D. indicate some of Luc’s firm beliefs about piano care.
2. Based on the assertion in Passage A that Luc’s “attitude about how people treated their pianos seemed to mirror his philosophy of life” (lines 25–26), which of the following statements would most nearly describe Luc’s philosophy of life?
  - F. It’s better to live a full and imperfect life than not participate because something might go wrong.
  - G. Life is a fragile gift that must be cherished and kept safe at all times.
  - H. Living well is like playing the piano well; it requires dedication and practice.
  - J. It’s important not to take life’s opportunities for granted because they may not come a second time.
3. As it is used in line 32, the phrase *bit into* most nearly means:
  - A. pinched.
  - B. ingested.
  - C. marred.
  - D. severed.
4. In the third paragraph of Passage B (lines 61–65), the author most clearly shifts from:
  - F. making an argument against musicians selling their instruments to using evidence from his life to support that argument.
  - G. introducing musicians he admires to explaining why he hopes people admire him as a musician.
  - H. examining his own emotions about his violin to explaining why musicians must develop a partnership with their instruments.
  - J. discussing the connection between other musicians and their instruments to pondering his own connection with his violin.
5. In Passage B, the statement that Lifschey “was not merely an excellent oboist; he was a great artist” (lines 44–45) can best be described as:
  - A. a fact supported by details about Lifschey’s career.
  - B. a fact confirmed by experts quoted in the passage.
  - C. an opinion that the author attributes to Lifschey’s colleagues and students.
  - D. an opinion that the author asserts but does not explain.
6. In Passage B, it can most reasonably be inferred that Heifetz’s response to the woman who congratulates him is intended to point out that:
  - F. the woman hears Heifetz’s violin differently than Heifetz does.
  - G. the woman isn’t qualified to judge the quality of Heifetz’s violin.
  - H. Heifetz enjoyed the woman’s humorous comment.
  - J. Heifetz’s violin doesn’t make sounds by itself.
7. In Passage B, the author most directly indicates that the violin is sometimes an adversary by stating that it:
  - A. lies mute in its case.
  - B. makes him adjust to its whims.
  - C. responds with a range of emotion.
  - D. can’t speak with words.
8. Compared to Passage A, Passage B is more directly focused on the:
  - F. damage a musician can do to an instrument.
  - G. characteristics of an instrument that give clues to its history.
  - H. interdependence between musician and instrument.
  - J. benefits of making instruments available to young children.
9. In contrast to the way the pianos are described in Passage A, the passage author’s violin in Passage B is described as:
  - A. exhibiting unique characteristics.
  - B. having an active personality of its own.
  - C. sustaining damage from careless children.
  - D. being important to daily life.
10. Which of the following assertions about instruments is most strongly supported by details provided in both Passage A and Passage B?
  - F. Familiarity with your instrument is an important part of the joy of playing music.
  - G. Instruments should be revered and never treated like furniture.
  - H. Selling your instrument shows disrespect for the music you have made together.
  - J. Maintaining proper humidity levels is essential to preserving an instrument.

## Passage II

**INFORMATIONAL:** This passage is adapted from the article “Notes from a Wedding” by Lauren Wilcox Puchowski (©2010 by Lauren Wilcox Puchowski).

It was never Kenney Holmes’s intention to become a wedding singer. The grandson of West Indian immigrants, Holmes was raised in Gordon Heights, on Long Island, in what he calls “a small black community  
5 founded by like-minded thinkers,” families of immigrants and Southern blacks who, as Holmes says, “didn’t come here to fool around” and who handed down to their children their own keen sense of ambition.

10 “We grew up in that kind of atmosphere,” he says, “of positive thinking, of getting educated, whether or not you had a degree.”

Like any American boy in the 1950s and ’60s, he was fascinated with popular music: He listened to the  
15 area’s one radio station, which “mostly played Sinatra”; sometimes in the evenings, with a coat hanger stuck into the top of his portable radio, he could pick up a faint signal from WWRL, a rhythm and blues station in New York City. When he was a teenager, his brother  
20 brought home a guitar. “I was 16, it was a Sunday night,” he says. “I sat down and played ‘I Can’t Get No Satisfaction.’ I was addicted.”

While he was not a virtuoso, he was, he discovered, good at making money at it. He learned three  
25 songs—“Satisfaction” by the Rolling Stones, “And I Love Her” by the Beatles, and “Shotgun” by Junior Walker and the All Stars—and formed a band. “We went out and sold it,” he says. “We could play those three songs all night. We got pretty popular out on the  
30 island, playing battle of the bands, fire halls, high school proms, for \$10 a night.”

Still, a career as a musician was not what he, or his family, had had in mind. Over the next few years, he  
35 says: “I did everything I could not to be a guitar player. I went to college not to be a guitar player.” Thinking he would be a psychiatrist, he took pre-med classes but didn’t complete a degree. Along the way, he continued playing nightclubs and parties.

In his mid-20s, he visited his brother in Wash-  
40 ington. Washington looked, to Holmes, like a good place to be an ambitious, career-minded black man, but it also had a thriving music scene in nightclubs and hotel lounges, and the next 15 years played out as a sort of tussle between his creative pursuits and his more busi-  
45 ness-driven impulses. Trying to work his way up in the music scene, he played five and six nights a week in nightclubs and wrote his own music. He started a recording studio called Sound Ideas, which trawled local talent for the makings of a hit song, but he found  
50 the pickings slim.

The club scene, after a long while, began to wear on him, as well. Unwilling to resign himself to the life

of a starving artist, when an agent approached him in the early ’90s about specializing in wedding and private  
55 parties, Holmes decided to try it.

It was a revelation. “I could make in one night what I used to make in five,” he says. And “it changed the culture of what I was doing.”

Holmes was well-suited for the role of event band-  
60 leader. His production skills helped him control his band’s sound, and his familiarity with country, big-band and classical music made him popular with audiences who wanted, as he says, “a tango or a Viennese waltz,” as well as Wilson Pickett.

65 Because business ebbs and flows with the seasons and the economy, Holmes has always kept a variety of sidelines, including a job driving a limousine for nine years to put his oldest daughter through a private high school and college. These days, at gigs, he hands out a  
70 stack of million-dollar “bills” printed with his image and his current enterprises: bandleader, commercial mortgage broker, hard money lender.

Holmes uses as many as eight musicians and two  
singers for weddings. He accepts turnover as a fact of  
75 running a band, but his current core lineup has, in the mercurial world of part-time performers, been fairly steady. Sam Brawner, the drummer, and Atiba Taylor, the sax player, have played with him for three and four years, respectively, and Bruce Robinson, the key-  
80 boardist, has played with him for 15.

This is perhaps partly because Holmes insists on making music. During performances, he lets his musi-  
cians take the lead and uses specialized, stripped-down  
tracks, called digital sequences, to set the tempo and fill  
85 in musical parts when necessary, ultimately preferring the messy alchemy of live music to something more canned. The musicians say that this is in contrast to other bandleaders they’ve worked for, who often rely heavily on recordings and use musicians more as visual  
90 props. Holmes’s respect for the music endears him to his musicians. “These guys play from the heart,” says Robinson. “They’re not just trying to get through the gig.”

11. The main purpose of the passage is to:

- A. explain why Holmes’s musical tastes gradually changed over time.
- B. describe how Holmes’s hectic professional life affects his personal life.
- C. highlight the different instruments Holmes mastered in becoming a famous musician.
- D. document how Holmes eventually became an enterprising bandleader.

12. One theme of the passage is that:
- F. one's previous experiences and pursuits can be useful in achieving success.
  - G. talent is the most important factor in achieving success in both business and music.
  - H. recognizing one's limitations is necessary in overcoming one's failures.
  - J. pursuing one's dreams should take precedence over more practical matters.
13. Which of the following events referred to in the passage occurred last chronologically?
- A. Taylor joined Holmes's band.
  - B. Brawner joined Holmes's band.
  - C. Holmes started driving a limousine.
  - D. Holmes started Sound Ideas.
14. Based on the passage, the residents of Gordon Heights in the 1950s and 1960s would best be described as:
- F. artistic and sophisticated.
  - G. driven and optimistic.
  - H. friendly and easygoing.
  - J. generous and dependable.
15. The main purpose of the third paragraph (lines 13–22) is to:
- A. indicate why Holmes preferred rhythm and blues to Sinatra songs.
  - B. establish that Holmes's parents disapproved of his interest in music.
  - C. reveal that Holmes was considered a musical prodigy.
  - D. describe what inspired Holmes to start playing music.
16. The main idea of the fourth paragraph (lines 23–31) is that:
- F. Holmes was better at playing music than he was at promoting his band.
  - G. Holmes's band was able to earn money despite having a limited repertoire.
  - H. Holmes's band became a national phenomenon despite the band members' lack of musical talent.
  - J. Holmes would have had more success early on if he had taken the time to learn more songs.
17. Based on the passage, the main reason Holmes eventually preferred playing music at weddings and private parties to playing music in clubs was that:
- A. he could play a wider variety of music at weddings and private parties.
  - B. audiences at weddings and private parties were easier to please.
  - C. weddings and private parties were more profitable.
  - D. weddings and private parties required less travel.
18. The main idea of the eleventh paragraph (lines 73–80) is that:
- F. Holmes often has to alter his musical style based on which band members are available to play a gig.
  - G. Holmes typically needs more band members to play at weddings than he needs to play at private parties.
  - H. Holmes's core lineup of band members has been relatively consistent for a business with a high turnover rate.
  - J. Holmes's core lineup of band members is constantly changing because Holmes expects his musicians to travel long distances.
19. It can most reasonably be inferred from the passage that Holmes's band members like playing music with Holmes in part because, in contrast to other band leaders, Holmes:
- A. is familiar with big band, classical, and country music.
  - B. allows band members to showcase their talents during gigs.
  - C. played music in the Washington club scene for fifteen years.
  - D. uses sophisticated elements like digital sequences during gigs.<sup>4</sup>
20. In the passage, the phrase *something more canned* (lines 86–87) most nearly refers to:
- F. sound effects.
  - G. music videos.
  - H. improvised music.
  - J. recorded music.

## Passage III

**INFORMATIONAL:** This passage is adapted from the article “Photography Changes How Cultural Groups Are Represented and Perceived” by Edwin Schupman (©2012 by The Smithsonian Institution).

The author of the passage is a citizen of the Muscogee (Creek) Nation of Oklahoma.

Using photographs as educational resources presents particular challenges and must be done with care. There is always more than face value in any photo, and historical photos of American Indians are no exception.

5 Photography’s rise in the late nineteenth century coincided with great change in American Indian communities—an era that capped over three hundred years of diseases, wars, cultural disruption, and land dispossession. As Indian people struggled to adapt to catastrophic changes to their old ways of living, photographers took thousands of studio portraits and made what they believed to be neutral ethnographic images of the “vanishing Indian.” As Indian cultures bent under pressure to assimilate into mainstream America, photographers routinely captured images that compared the new “civilized” Indian to the tradition-bound “savages.” Indian delegations that traveled to Washington, D.C., to defend tribal treaty rights were photographed in studios and in front of federal buildings. Photographers also accompanied government expeditions to the West where they documented traditional cultures, leading the way for tourists and commercial photographers who followed, carrying their cameras and preconceptions into Native American communities. These efforts generated a legacy of photographic images of American Indian people that can serve today as rich educational resources. But if used carelessly, they can also fuel romanticized and stereotypical perceptions of American Indians.

30 Consider some of the many photographs of Goyathlay, the Apache man who Mexicans named “Geronimo.” He and other Chiricahua Apaches fought a protracted war from 1863 to 1886 against the United States for the right to live in their traditional homelands rather than on reservations.

The Chiricahua Apaches’ fight for freedom captured the American imagination in the late nineteenth century. “Geronimo,” especially, became a legendary figure and a media phenomenon whose legacy has lasted into the twenty-first century. He became synonymous with courage, daring, and savage ruthlessness. World War II paratroopers shouted his name as they jumped from airplanes into combat. Movies, television shows, comic books, popular songs, posters, T-shirts, and American cities have borne his image and name. One photo that shows Goyathlay and three other Chiricahuas in their camp just prior to surrendering to U.S. forces in 1886 documents a critical and difficult day for the people who had fought so diligently for their freedom.

In another well-known studio portrait, circa 1890, Goyathlay poses with a rifle. To late-nineteenth-century Americans, Geronimo was a dangerous enemy, yet at the same time a curiosity and romantic symbol of the “Wild West.” This photo personifies the renegade image but, strangely, it was taken about two to four years after Goyathlay surrendered—while he was a prisoner of war. Why, then, was this photo taken? What meaning did it convey at the time? What must have been in Goyathlay’s mind? What does the photo mean today? Is it loaded with historical truths or is it as empty as the prisoner’s bullet chamber?

A few years later, Goyathlay was photographed again, this time in a more pastoral pose and place—holding a melon in a garden with his wife and three of their children. What was the meaning behind this photo? Did people of the time see it as a simple family photo, or did it personify the government’s policy toward Indians at the time—subduing feared and hated warriors, “re-educating” them, and teaching them to farm in order to guide them toward a “better” way of life? Ironically, the Apaches had long farmed as part of the traditional life they fought so tenaciously to protect.

The educational potential of photographs is enormous. However, photographs are not objective; they can easily tell as many lies as truths. As much as any written document, they have to be read with care in order to be understood accurately in unbiased and non-stereotypical terms. Every photo of people contains history, culture, and context. To do justice to the subjects and their stories, it is crucial to fill in the information gaps. In addition to conducting background research, try putting yourself inside these photos—stand next to Goyathlay, his peers, his wife, and their children, and imagine their lives—you might begin to understand the world from their points of view. Framed with factual information and viewed empathetically, each photograph can reach its richest potential as a significant educational opportunity and resource.

21. Which of the following rhetorical techniques does the author repeatedly use in the passage as a means to engage the reader?
- A. Fortright attacks on what he labels as readers’ misunderstanding of basic historical fact
  - B. Open-ended questions and appeals directed to readers
  - C. Direct quotations from past readers of his work that capture their responses to his ideas
  - D. Descriptions of his own experiences as a citizen of the Muscogee (Creek) Nation of Oklahoma

22. It can most reasonably be inferred that the author's statements about the educational use of photographs apply to photographs taken during what time period?
- F. Any time period since photographs were first taken
  - G. In the nineteenth century exclusively
  - H. Any time period prior to the digital age, but not beyond
  - J. Only in the ten years after photographers first joined government expeditions to the West
23. Which of the following words is most nearly given a negative connotation in the passage?
- A. Educational (line 1)
  - B. Old (line 10)
  - C. Romanticized (line 28)
  - D. Traditional (line 34)
24. Which of the following actions referred to in the passage most clearly characterizes a hypothetical event rather than an actual event?
- F. "Traveled to" (line 17)
  - G. "Defend" (line 18)
  - H. "Farmed" (line 72)
  - J. "Stand next to" (line 83)
25. Particular photographs of Goyathlay are referred to and described by the author to support his claim that:
- A. accurately understanding a photograph depends on knowing the circumstances in which a photograph was taken.
  - B. photographs can be used to date events in the life of a legendary figure like Goyathlay.
  - C. anyone can control his or her public image by becoming more involved in the field of photography.
  - D. the merits of a photograph from the nineteenth century depend on who took the photograph.
26. The author most strongly suggests that one reason commercial photographers began to photograph Native American communities was that commercial photographers were:
- F. instructed to do so by the US government.
  - G. devoted to creating educational resources about Native American communities.
  - H. committed to overcoming their preconceived ideas about the West.
  - J. influenced to do so by the photographers who had joined government expeditions to the West.
27. In the passage, the author notes that a strange aspect of the photo of Goyathlay with a rifle is that the photo was taken:
- A. by an unknown photographer.
  - B. when Goyathlay was a prisoner of war.
  - C. with Goyathlay's permission.
  - D. by a US government photographer.
28. The author directly refers to which of the following aspects of the photograph of Goyathlay in a garden as being ironic?
- F. Goyathlay was not a gardener but instead was in the midst of trying to stop the US government's attack on his people.
  - G. Goyathlay's people had long practiced farming, but the photo seemed to suggest that Goyathlay had learned farming from others.
  - H. People do not automatically think of Goyathlay as a man of peace.
  - J. For years it was assumed to be a photograph of someone other than Goyathlay.
29. The author indicates that for the sake of an unbiased interpretation, compared to reading written documents with care, reading photographs with care is:
- A. significantly more important.
  - B. slightly more important.
  - C. just as important.
  - D. slightly less important.
30. In line 86, the word *framed* is used figuratively to describe:
- F. the way background research can support the proper viewing of a photograph.
  - G. a common means of preserving a photograph.
  - H. a technique in which a photograph is displayed with factual information surrounding it.
  - J. the manner in which many photographs of Goyathlay are displayed in museums.

## Passage IV

**INFORMATIONAL:** This passage is adapted from *Summer World: A Season of Bounty* by Bernd Heinrich (©2009 by Bernd Heinrich).

Adaptations of plants to deserts include dormancy and a variety of structural and behavioral adaptations. The majority of desert plants depend on a strategy that capitalizes on small size. They are annuals that spring  
5 up from dry, dormant, heat-resistant seeds. Some of these seeds may wait up to half a century before they are activated. The plants' challenge is to be quick enough to respond to rain so that they can produce their seeds before the earth dries up again, while not jumping  
10 the gun to start growth until there is sufficient water for them to grow to maturity for seed production. Some achieve this balance on a tightrope by "measuring" rainfall. They have chemicals in their seeds that inhibit germination, and a minimum amount of rain is required  
15 before these are leached out. Others have seed coats that must be mechanically scarred to permit sufficient wetting for germination, and the scarring happens only when they are subjected to flash floods in the riverbeds where they grow. A plant in the Negev Desert releases  
20 its seed from a tough capsule only under the influence of water through a mechanism that resembles a Roman ballistic machine. Its two outer sepals generate side-ways tension that can fling two seeds out of the fruit, but the two seeds are held inside by a lock mechanism  
25 at the top. However, when the sepals are sufficiently wetted, then the tension increases to such an extent that the lock mechanism snaps, and the capsule "explodes" and releases the seeds.

In moist regions where it rains predictably (though  
30 not necessarily in abundance), we help agricultural plants to capture the precipitation by scarring the soil to facilitate the infiltration of the water into it, and hence into the roots. Least runoff and maximum water absorption are achieved by plowing the soil. However, such a  
35 strategy would not work in a true desert such as the Negev. A different program is required there because rain is infrequent and plowing would facilitate only the evaporation of scarce water from the soil. The solution applied by the peoples who inhabited the Negev in past  
40 centuries was a practice they called "runoff farming." Farmers had mastered harnessing the flash floods that rush down into the gullies by catching the runoffs—not only by making terraces but also by building large cisterns into which the water was directed to be held for  
45 later use. Remnants of these constructions still exist.

Water-storage mechanisms have been invented by other organisms living in deserts, but mainly through modifications of body plan. Many plants, especially  
50 cacti and euphorbia, have the ability to swell their roots or stems with water stores. Possibly the most familiar is the saguaro cactus, *Carnegiea gigantea*, of the Sonoran desert in the American southwest. It has a shallow root system that extends in all directions to distances of  
55 about its height, fifty feet. In one rainstorm the root system can soak up 200 gallons of water, which are

transferred into its tall trunk. This trunk is pleated like an accordion and can swell to store tons of water that can last the plant for a year. The cactus has no leaves, but the stem is green and can photosynthesize and produce nutrients as well as store water. The saguaro's survival strategy requires it to grow extremely slowly. But it lives a century or more.

Some desert animals similarly store water. The frog *Cyclorana platycephala*, from the northern Australian desert, fills up and greatly expands its urinary bladder to use as a water bag before burying itself in the soil, where it spends most of the year waiting for the next rain. While in the ground it sloughs off skin and forms around itself a nearly waterproof cocoon that  
70 resembles a plastic bag and reduces evaporative water loss.

Desert ants of a variety of species (of at least seven different genera) in American as well as Australian deserts collectively called "honeypot ants" have  
75 evolved a solution that combines water storage with energy storage. Ants typically feed each other; and some of the larger worker ants may take up more liquid than the others, and others may bring more. Those that take the fluid may gorge themselves until they distend  
80 their abdomens up to the size of a grape, by which time they are unable to move from the spot. They then hang in groups of dozens to hundreds from the ceiling of a chamber in the ant nest, where they are then the specialized so-called repletes that later regurgitate fluid  
85 when the colony members are no longer bringing the fluid in but rather needing it.

31. The fourth paragraph (lines 63–71) marks a shift in the focus of the passage from:
- A. plants that store water above ground to plants that store water below ground.
  - B. animals that don't go dormant to animals that do go dormant.
  - C. desert-dwelling plants to desert-dwelling animals.
  - D. inhabitants of the Negev Desert to inhabitants of northern Australian deserts.
32. Based on the passage, the author's use of the word "measuring" (line 12) most nearly describes the way that some desert plants:
- F. have roots that are extremely sensitive to moisture levels in the soil.
  - G. have methods of delaying seed germination until a certain amount of water is present.
  - H. are visibly more vigorous after a rainfall.
  - J. can calculate how many inches of rain have fallen in recent days.

33. Which of the following statements best summarizes the process by which the frog *Cyclorana platycephala* survives in the desert?
- A. The frog stores water in its body, buries itself, and conserves water until emerging at the next rain.
  - B. The frog buries itself, waits for rain, absorbs rain-water through its skin, and emerges.
  - C. The frog forms a nearly waterproof cocoon around itself, buries itself, and waits to emerge until it needs water.
  - D. The frog buries itself, absorbs water through its skin, and goes dormant until springtime.
34. Based on the passage, which of the following plants and animals employ a communal strategy to survive in the desert?
- F. The saguaro cactus only
  - G. The saguaro cactus and the frog *Cyclorana platycephala* only
  - H. The frog *Cyclorana platycephala* and honeypot ants only
  - J. Honeypot ants only
35. The passage most strongly suggests that compared to the frog *Cyclorana platycephala*, the honeypot ants are unique in that they:
- A. can store water inside their bodies.
  - B. live in Australian deserts.
  - C. combine water storage with energy storage.
  - D. go dormant during dry times.
36. Which of the following provides the best paraphrase of lines 7–11?
- F. Annual plants survive in deserts by making seeds swiftly when conditions are right.
  - G. Annual plants in deserts make seeds during dry conditions so the seeds will be ready when rain arrives.
  - H. Dry conditions require the seeds of desert plants to start germination prior to the arrival of rain.
  - J. The seeds of annual plants in deserts are designed to wait years for the right conditions for growth.
37. Based on the passage, it can most reasonably be inferred that the scarring some seeds require before germination is accomplished through:
- A. intense drying experienced between rainfalls.
  - B. internal tension from the seed capsule's sepals.
  - C. chemicals in the seeds.
  - D. abrasion sustained during flash floods.
38. As it is used in line 26, the word *extent* most nearly means:
- F. length.
  - G. degree.
  - H. reach.
  - J. boundary.
39. According to the passage, which of the following actions did people in the Negev Desert take in order to farm there?
- A. Plowing the soil
  - B. Widening gullies
  - C. Constructing terraces
  - D. Constructing aqueducts
40. Based on the passage, the pleats in the body of the saguaro cactus:
- F. increase the efficiency of photosynthesis.
  - G. allow the cactus to expand for storing water.
  - H. reduce evaporative water loss.
  - J. regulate the cactus's growth.

**END OF TEST 3**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**

**DO NOT RETURN TO A PREVIOUS TEST.**



**SCIENCE TEST***35 Minutes—40 Questions*

**DIRECTIONS:** There are several passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

**Passage I**

In a particular *playa* (relatively flat, dry desert basin) evidence shows that some large rocks have moved along the surface, leaving shallow trails in the clay sediment, some up to several hundred meters long. Three scientists provided explanations for how these rocks moved.

*Scientist 1*

In the spring, snowmelt from surrounding mountains runs downhill and collects in the *playa*. At night, cold temperatures cause this water to freeze around the rocks. When temperatures rise again, the ice begins to melt, leaving a layer of mud on the surface and ice “rafts” around the rocks. The buoyancy of the ice rafts floats the rocks on top of the mud such that even light winds can then push the rocks along the surface. Evidence of this lifting is seen in that the trails left by rocks are both shallow and only about  $\frac{2}{3}$  as wide as the rocks themselves. Due to the combination of ice, mud, and light winds, the rocks are able to move several hundred meters in a few days.

*Scientist 2*

Snowmelt from surrounding mountains does collect in the *playa* during the spring. However, the temperature in the *playa* does not get cold enough for ice to form. When the *playa*’s surface gets wet, the top layer of clay transforms into a slick, muddy film. In addition, dormant algae present in the dry clay begin to grow rapidly when the clay becomes wet. The presence of mud and algae reduces friction between the rocks and the clay. Even so, relatively strong winds are required to push the rocks along the wet surface, forming trails. Due to the combination of mud, algae, and strong winds, the rocks are able to move several hundred meters in a few hours.

*Scientist 3*

Water does collect in the *playa*, producing mud and ice. However, neither mud nor ice is responsible for the rocks’ movements. The *playa* is located along a fault line between tectonic plates. Minor vertical shifts in the plates cause the rocks to move downhill, leaving trails. Due to the combination of tectonic plate movement and strong winds, the rocks are able to move only a few meters over several years.

- According to Scientist 2, friction between the rocks and the clay is reduced by which of the following?
  - Ice only
  - Algae only
  - Ice and mud only
  - Mud and algae only
- Suppose a researcher observed that wind speeds greater than 80 miles per hour are needed to move the rocks in the *playa*. This observation is consistent with which of the scientists’ explanations?
  - Scientists 1 and 2 only
  - Scientists 1 and 3 only
  - Scientists 2 and 3 only
  - Scientists 1, 2, and 3
- Suppose that no seismic activity was recorded in the *playa* where the trails left by the rocks are found. This finding would *weaken* which of the scientists’ explanations?
  - Scientist 1 only
  - Scientist 3 only
  - Scientist 1 and Scientist 2 only
  - Scientist 2 and Scientist 3 only
- Suppose it were discovered that a particular rock formed a 200 m long trail in 72 hr. Would this discovery support Scientist 1’s explanation?
  - Yes; Scientist 1 indicated the rocks can move several hundred meters in a few hours.
  - Yes; Scientist 1 indicated the rocks can move several hundred meters in a few days.
  - No; Scientist 1 indicated the rocks can move several hundred meters in a few hours.
  - No; Scientist 1 indicated the rocks can move several hundred meters in a few days.

**4****4**

5. Suppose that during one year there was no measurable movement of any rocks in the playa during the spring. Scientists 1 and 2 would most likely both agree that this was due to the absence of which of the following factors?
- A. Algae
  - B. Snowmelt
  - C. Strong winds
  - D. Subzero temperatures
6. Suppose that air temperature in the playa varies between  $4^{\circ}\text{C}$  and  $47^{\circ}\text{C}$ . Would this information support the explanation of Scientist 2 ?
- F. Yes, because ice cannot form in that temperature range.
  - G. Yes, because ice can form in that temperature range.
  - H. No, because ice cannot form in that temperature range.
  - J. No, because ice can form in that temperature range.
7. Based on Scientist 1's explanation, a rock trail that is 33 cm wide was most likely made by a rock with approximately what width?
- A. 10 cm
  - B. 25 cm
  - C. 50 cm
  - D. 65 cm

**Passage II**

When certain substances are added to diet cola, CO<sub>2</sub> gas is produced, generating a foam. Two experiments were done to study this process.

In each trial, an apparatus like that shown in Figure 1 was used as follows: A jar was nearly filled with H<sub>2</sub>O and fitted with a 2-holed lid. One end of a tube (Tube B) was inserted through one of the holes and submerged. The other end of Tube B was placed in an empty graduated cylinder. Another tube (Tube A) was inserted through the other hole in the lid. A certain solid substance was inserted into the other end of Tube A, and the substance was secured by a clamp. Tube A was then attached to a freshly opened bottle containing 355 mL of diet cola. The clamp was removed, releasing the substance into the diet cola. The foam that was produced traveled into the jar, and liquid was transferred into the cylinder. The mass of CO<sub>2</sub> produced was calculated based on the volume of liquid that was measured in the cylinder after foaming had ceased.

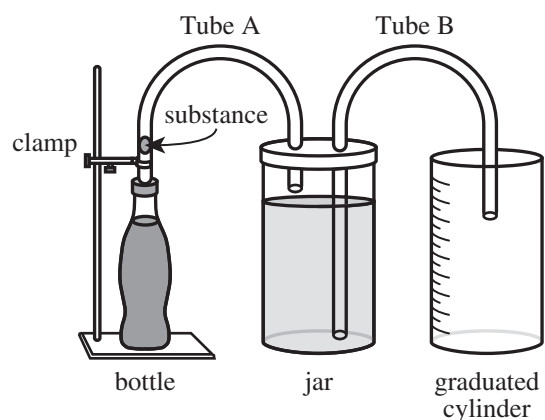


Figure 1

*Experiment 1*

In each of Trials 1–4, a different 1 of 4 substances of equal mass—a piece of chalk, a sugar cube, a fruit-flavored piece of candy, or a mint-flavored piece of candy—was added to a bottle of diet cola at 3°C. See Table 1.

Trial	Substance	Volume of liquid in cylinder (mL)	Mass of CO <sub>2</sub> produced (g)
1	chalk	699	1.36
2	sugar cube	570	1.11
3	fruit candy	525	1.02
4	mint candy	631	1.23

*Experiment 2*

In each of Trials 5–8, Trial 4 from Experiment 1 was repeated, except that the temperature of the diet cola was different in each trial. See Table 2.

Trial	Temperature (°C)	Volume of liquid in cylinder (mL)	Mass of CO <sub>2</sub> produced (g)
5	10	598	1.13
6	25	539	0.969
7	45	501	0.844
8	60	476	0.766

Tables 1 and 2 adapted from Christopher J. Huber and Aaron M. Massari, "Quantifying the Soda Geyser." ©2014 by Division of Chemical Education, Inc., American Chemical Society.



8. If another trial had been performed in Experiment 2 and 450 mL of liquid had been measured in the cylinder, the temperature of the diet cola in this trial would most likely have been:
- F. less than 25°C.
  - G. between 25°C and 45°C.
  - H. between 45°C and 60°C.
  - J. greater than 60°C.
9. Suppose Trial 6 had been repeated, but the bottle of diet cola had been opened and then left undisturbed at 25°C for 12 hours *before* it was attached to the apparatus. Would the mass of CO<sub>2</sub> produced in this trial likely be greater than 0.969 g or less than 0.969 g?
- A. Greater, because over the 12 hours, the concentration of CO<sub>2</sub> in the diet cola would have decreased.
  - B. Greater, because over the 12 hours, the concentration of CO<sub>2</sub> in the diet cola would have increased.
  - C. Less, because over the 12 hours, the concentration of CO<sub>2</sub> in the diet cola would have decreased.
  - D. Less, because over the 12 hours, the concentration of CO<sub>2</sub> in the diet cola would have increased.
10. One *millimole* (mmol) of CO<sub>2</sub> has a mass of 0.044 g. How many trials resulted in the production of at least 1 mmol of CO<sub>2</sub>?
- F. 1
  - G. 4
  - H. 5
  - J. 8
11. According to Figure 1, which of Tube A and Tube B, if either, had at least one end submerged in a liquid before the clamp was removed?
- A. Tube A only
  - B. Tube B only
  - C. Both Tube A and Tube B
  - D. Neither Tube A nor Tube B
12. Is the relationship between the volume of liquid in the cylinder at the end of the experiment and the mass of CO<sub>2</sub> produced a direct relationship or an inverse relationship?
- F. Direct; as the volume of liquid that was measured in the cylinder increased, the mass of CO<sub>2</sub> produced increased.
  - G. Direct; as the volume of liquid that was measured in the cylinder increased, the mass of CO<sub>2</sub> produced decreased.
  - H. Inverse; as the volume of liquid that was measured in the cylinder increased, the mass of CO<sub>2</sub> produced increased.
  - J. Inverse; as the volume of liquid that was measured in the cylinder increased, the mass of CO<sub>2</sub> produced decreased.
13. Consider these steps that were performed in each trial.
1. Removing clamp
  2. Measuring liquid in cylinder
  3. Inserting a solid substance into Tube A
  4. Attaching Tube A to a bottle of diet cola
- According to the procedure, these steps were performed in what sequence?
- A. 3, 1, 2, 4
  - B. 3, 4, 1, 2
  - C. 4, 2, 3, 1
  - D. 4, 3, 1, 2
14. Assume that *room temperature* is 25°C. In how many trials was the diet cola tested at a temperature *lower* than room temperature?
- F. 1
  - G. 2
  - H. 5
  - J. 8



## Passage III

Scientists studied the effects of pH and of nickel concentration on plant growth and on the uptake of iron and zinc by plants. Recently germinated seedlings of Species M and Species U were fed 1 of 12 nutrient solutions (Solutions 1–12) for 8 days and then were harvested. Solutions 1–12 differed only in pH and/or nickel concentration. Table 1 shows, for each species, the average dry mass of the plants that were fed each nutrient solution. Figure 1 shows, for each species, the average iron content and the average zinc content of the plants that were fed Solutions 1–4.

Solution	pH	Nickel concentration ( $\mu\text{M}^*$ )	Average dry mass (g) of plants of Species:	
			M	U
1	7	0	33.9	10.7
2	7	5	28.8	10.7
3	7	10	23.8	9.6
4	7	15	18.7	8.5
5	6	0	33.9	9.2
6	6	5	28.8	9.2
7	6	10	23.8	8.1
8	6	15	18.7	7.0
9	5	0	27.8	7.7
10	5	5	22.7	7.7
11	5	10	17.6	6.6
12	5	15	12.4	5.4

\* $\mu\text{M}$  = micromoles per liter

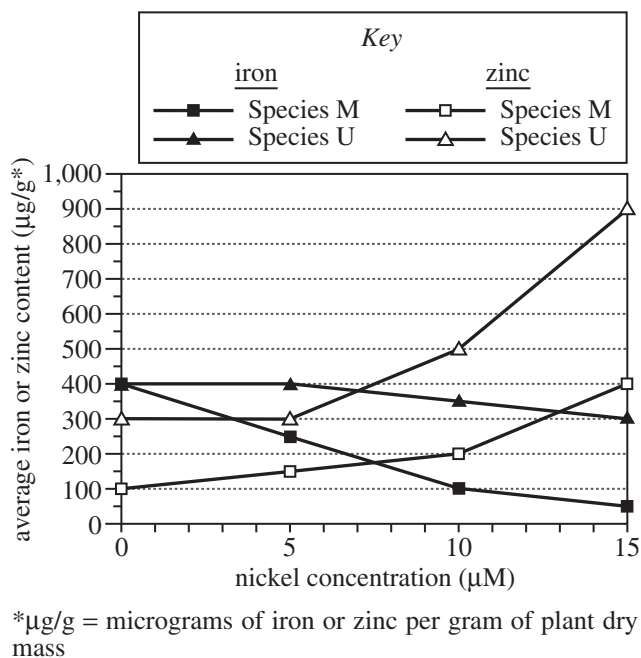


Figure 1

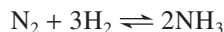
15. According to Figure 1, as the nickel concentration in the nutrient solutions increased, the average iron content of Species M plants:
- increased only.
  - decreased only.
  - increased, then decreased.
  - decreased, then increased.



16. According to Table 1, the Species U plants that were fed the solution that had a pH of 6 and a nickel concentration of  $10\ \mu\text{M}$  had an average dry mass of:
- F. 7.0 g.  
 G. 8.1 g.  
 H. 9.2 g.  
 J. 23.8 g.
17. According to Table 1, Species M plants that were fed a nutrient solution with which of the following combinations of pH and nickel concentration had the greatest average dry mass?
- |    | <u>pH</u> | <u>nickel concentration</u> |
|----|-----------|-----------------------------|
| A. | 6         | $0\ \mu\text{M}$            |
| B. | 6         | $5\ \mu\text{M}$            |
| C. | 5         | $0\ \mu\text{M}$            |
| D. | 5         | $5\ \mu\text{M}$            |
18. According to Table 1 and Figure 1, the Species M plants that were fed Solution 3 had an average zinc content of:
- F.  $100\ \mu\text{g/g}$ .  
 G.  $150\ \mu\text{g/g}$ .  
 H.  $200\ \mu\text{g/g}$ .  
 J.  $400\ \mu\text{g/g}$ .
19. According to Table 1 and Figure 1, for the Species M plants that were fed Solutions 1–4, what was the order of the nutrient solutions, from the solution that resulted in the lowest average iron content to the solution that resulted in the highest average iron content?
- A. 1, 2, 3, 4  
 B. 1, 4, 3, 2  
 C. 4, 2, 1, 3  
 D. 4, 3, 2, 1
20. According to Table 1, compared to the average dry mass of Species U plants that were fed Solution 3, the average dry mass of Species M plants that were fed Solution 6 was approximately:
- F.  $\frac{1}{3}$  as great.  
 G.  $\frac{1}{2}$  as great.  
 H. 2 times as great.  
 J. 3 times as great.

**Passage IV**

Ammonia ( $\text{NH}_3$ ) can be produced according to the chemical equation



The *equilibrium arrow* ( $\rightleftharpoons$ ) indicates that this reaction proceeds in both directions until it is at *equilibrium*, so that both the forward reaction (production of  $\text{NH}_3$ ) and the backward reaction (production of  $\text{N}_2$  and  $\text{H}_2$ ) occur at the same rate. Equilibrium can be shifted forward or backward by changing the temperature, pressure, or concentration of reactants or products.

Two experiments were done using the following apparatus to produce  $\text{NH}_3$ .

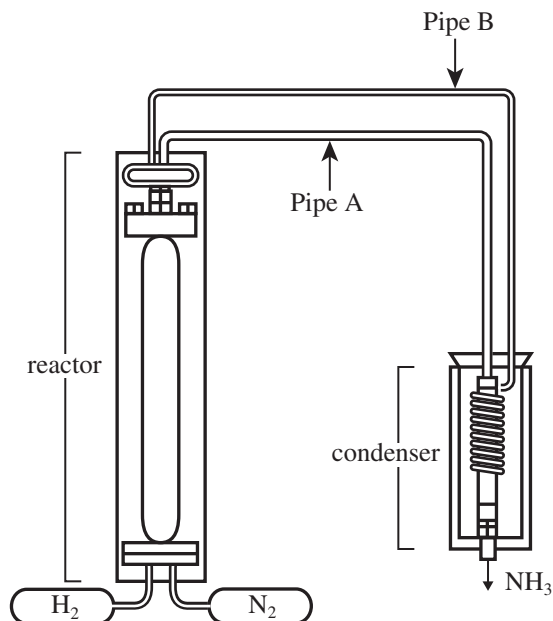


diagram of apparatus

In each trial, Steps 1–4 occurred:

1. A fresh catalyst (Catalyst W, X, Y, or Z), 160 kg of  $\text{H}_2$ , and 745 kg of  $\text{N}_2$  were placed in the reactor.
2. The  $\text{H}_2$  and  $\text{N}_2$  reacted at a constant temperature and a constant pressure until equilibrium was established.
3. A mixture of  $\text{NH}_3$  and any unreacted  $\text{H}_2$  and  $\text{N}_2$  flowed through Pipe A to a  $-50^\circ\text{C}$  condenser at 1 atmosphere (atm) of pressure.
4.  $\text{NH}_3$  condensed and exited the apparatus. ( $\text{H}_2$  and  $\text{N}_2$  do not condense at  $-50^\circ\text{C}$ .) Any unreacted  $\text{H}_2$  and  $\text{N}_2$  flowed into Pipe B, returning to the reactor.

Steps 2–4 reoccurred in cycles until no more  $\text{H}_2$  and  $\text{N}_2$  returned from the condenser.

**Experiment 1**

A set of 9 trials was conducted with each of the 4 catalysts. For each set, the pressure was 150 atm; within each set, the temperature was different for each trial. Figure 1 shows, for each trial, the number of cycles of Steps 2–4.

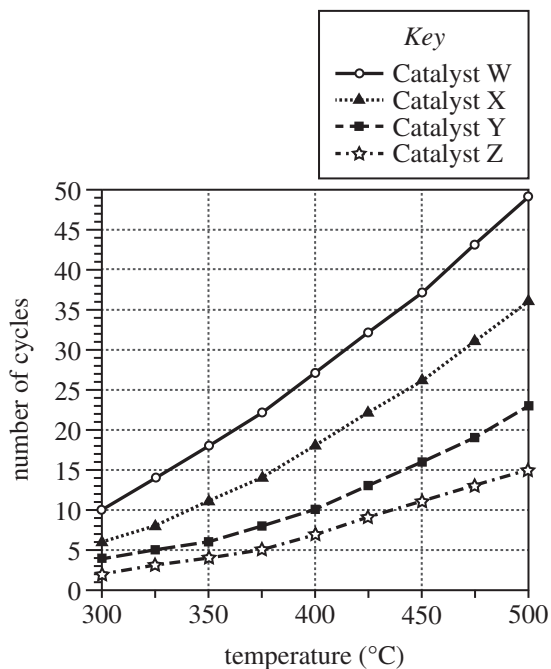


Figure 1

**Experiment 2**

Four sets of 9 trials each were conducted with Catalyst Z. For each set, the temperature was different; within each set, the pressure was different for each trial. Figure 2 shows, for each trial, the amount of  $\text{NH}_3$  produced in the first cycle of Steps 2–4.

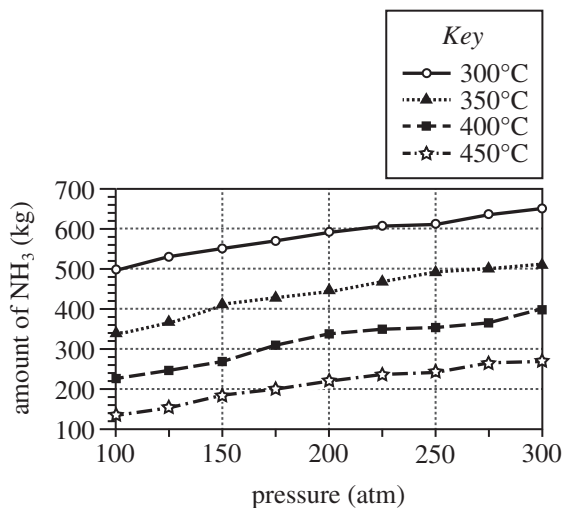


Figure 2



Diagram and figures adapted from Jayant M. Modak, "Haber Process for Ammonia Synthesis." ©2002 by Indian Academy of Sciences.

21. According to the results of Experiment 1, for any given catalyst, as the temperature was increased, the number of cycles needed to complete the reaction:
- increased only.
  - decreased only.
  - increased, then decreased.
  - decreased, then increased.
22. In Experiment 1, 26 cycles were needed to complete the reaction at 450°C when which catalyst was used?
- Catalyst W
  - Catalyst X
  - Catalyst Y
  - Catalyst Z
23. The movement of H<sub>2</sub> and N<sub>2</sub> through the apparatus as Steps 1–4 occurred is best represented by which of the following expressions?
- Reactor → condenser → Pipe A → Pipe B
  - Condenser → reactor → Pipe A → Pipe B
  - Reactor → Pipe A → condenser → Pipe B
  - Condenser → Pipe A → reactor → Pipe B
24. Consider the results of Experiment 1 for 375°C. All the H<sub>2</sub> and N<sub>2</sub> were consumed in less than 20 cycles when which catalysts were used?
- Catalysts W and X only
  - Catalysts Y and Z only
  - Catalysts W, X, and Y only
  - Catalysts X, Y, and Z only
25. If a trial had been performed in Experiment 2 at 425°C and 225 atm, the amount of NH<sub>3</sub> produced would most likely have been:
- less than 230 kg.
  - between 230 kg and 320 kg.
  - between 320 kg and 410 kg.
  - greater than 410 kg.
26. At 1 atm of pressure, the melting point of NH<sub>3</sub> is –77°C and the boiling point of NH<sub>3</sub> is –33°C. Based on this information and the description of the apparatus, when the NH<sub>3</sub> exited the condenser, was it more likely a solid or a liquid?
- Solid, because the temperature of the condenser was lower than the melting point of NH<sub>3</sub> and the boiling point of NH<sub>3</sub>.
  - Solid, because the temperature of the condenser was between the melting point of NH<sub>3</sub> and the boiling point of NH<sub>3</sub>.
  - Liquid, because the temperature of the condenser was higher than the melting point of NH<sub>3</sub> and the boiling point of NH<sub>3</sub>.
  - Liquid, because the temperature of the condenser was between the melting point of NH<sub>3</sub> and the boiling point of NH<sub>3</sub>.
27. Consider the trial in Experiment 2 that produced 550 kg of NH<sub>3</sub>. Based on Figure 1, the number of cycles that were needed to complete the reaction in this trial was most likely:
- less than 5.
  - between 5 and 10.
  - between 10 and 15.
  - greater than 15.



**Passage V**

As a sound wave travels through a medium, the wave becomes *attenuated* (loses energy). The attenuation coefficient,  $\alpha$ , is the rate at which the wave's *intensity level* (a measure of sound volume) decreases with distance as a result of this energy loss; the greater the value of  $\alpha$ , the greater the decrease in intensity level with distance. Figure 1 shows, for waves of 3 different frequencies (in hertz, Hz), how  $\alpha$  (in decibels per kilometer, dB/km) varies with temperature in air at 10% relative humidity.

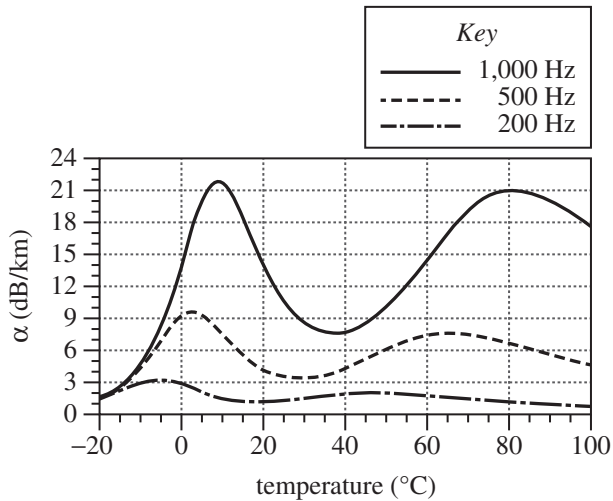


Figure 1

Figure 2 shows, for waves of 3 different frequencies, how  $\alpha$  varies with relative humidity in air at 20°C.

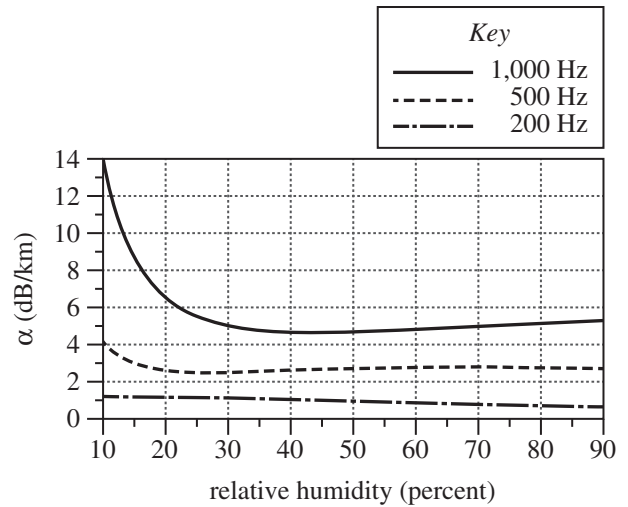


Figure 2

Figures adapted from Richard Lord, "Calculation of Absorption of Sound by the Atmosphere." ©2004 National Physical Laboratory.



28. What is the approximate maximum  $\alpha$  shown in Figure 1 for a 200 Hz sound wave in air at 10% relative humidity, and at approximately what temperature does that maximum occur?

	$\alpha$ (dB/km)	temperature ( $^{\circ}\text{C}$ )
F.	3.0	-5
G.	3.0	35
H.	9.5	-5
J.	9.5	35

29. Based on Figure 2, the attenuation coefficient for a 1,000 Hz sound wave in air at  $20^{\circ}\text{C}$  reaches a *minimum* value at a relative humidity closest to which of the following?

- A. 25%  
B. 45%  
C. 65%  
D. 85%

30. For the range of temperatures and the range of relative humidities shown in Figures 1 and 2, respectively, is  $\alpha$  for a 200 Hz sound wave more strongly affected by changes in temperature or by changes in relative humidity?

- F. Temperature, because the maximum variation in  $\alpha$  is about 0.5 dB/km in Figure 1 but about 2.5 dB/km in Figure 2.  
G. Temperature, because the maximum variation in  $\alpha$  is about 2.5 dB/km in Figure 1 but about 0.5 dB/km in Figure 2.  
H. Relative humidity, because the maximum variation in  $\alpha$  is about 0.5 dB/km in Figure 1 but about 2.5 dB/km in Figure 2.  
J. Relative humidity, because the maximum variation in  $\alpha$  is about 2.5 dB/km in Figure 1 but about 0.5 dB/km in Figure 2.

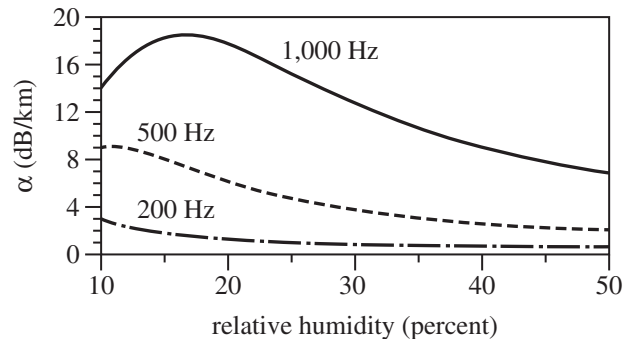
31. Consider a 1,000 Hz sound wave in air at 10% relative humidity. At how many of the temperatures shown in Figure 1 does  $\alpha$  for this wave have a value of 18 dB/km?

- A. 2  
B. 3  
C. 4  
D. 5

32. Suppose that 2 sound waves—a 150 Hz wave and a 1,100 Hz wave—are simultaneously emitted from a speaker into air at  $20^{\circ}\text{C}$  and 45% relative humidity. Based on Figure 2, as the waves travel away from the speaker, the intensity level of which wave will more likely decrease at the greater rate due to attenuation?

- F. The 150 Hz wave, because the value of  $\alpha$  is lesser for the 150 Hz wave than for the 1,100 Hz wave.  
G. The 150 Hz wave, because the value of  $\alpha$  is greater for the 150 Hz wave than for the 1,100 Hz wave.  
H. The 1,100 Hz wave, because the value of  $\alpha$  is lesser for the 1,100 Hz wave than for the 150 Hz wave.  
J. The 1,100 Hz wave, because the value of  $\alpha$  is greater for the 1,100 Hz wave than for the 150 Hz wave.

33. The graph below shows, for sound waves of 3 different frequencies, how  $\alpha$  varies with relative humidity in air at a particular temperature.



Based on Figure 1, the particular air temperature is most likely which of the following?

- A.  $-20^{\circ}\text{C}$   
B.  $0^{\circ}\text{C}$   
C.  $20^{\circ}\text{C}$   
D.  $100^{\circ}\text{C}$

**Passage VI**

Three studies compared the effects of 5 sweeteners (Sweeteners Q–U) on food consumption by rats and on the concentrations of *leptin* and *ghrelin* (hormones that regulate appetite) in the blood of rats. Sweeteners Q–U differ only in the percent by mass of fructose and of glucose (see Table 1).

Sweetener	Percent by mass of:	
	fructose	glucose
Q	0	100
R	42	58
S	50	50
T	55	45
U	100	0

**Study 1**

Each of 5 groups (Groups 1–5) of rats was assigned a solution having a 100 g/L concentration of 1 of the 5 sweeteners. Each rat was placed in a separate cage and provided unlimited access to the assigned sweetener solution and to solid food for 56 days. Table 2 shows, for each group, the amounts of sweetener solution and solid food consumed per rat per day. On Day 56, blood was collected from each rat for analysis in Studies 2 and 3.

Group	Sweetener	Amount consumed per rat per day	
		sweetener solution (mL)	solid food (g)
1	Q	73	9
2	R	55	14
3	S	52	16
4	T	48	18
5	U	29	23

Table 2 adapted from Heather R. Light et al., “The Type of Caloric Sweetener Added to Water Influences Weight Gain, Fat Mass, and Reproduction in Growing Sprague-Dawley Female Rats.” ©2009 by the Society for Experimental Biology and Medicine.

**Study 2**

A 1 mL blood sample from each rat was placed in a separate test tube containing 0.2 mL of *Indicator N* (which reacts with leptin to form a blue dye). The concentration of blue dye in each tube was directly proportional to the leptin concentration in the blood sample. Table 3 shows the leptin concentration per sample for each group.

Group	Sweetener	Leptin concentration per sample (pM*)
1	Q	804
2	R	622
3	S	553
4	T	475
5	U	251

\*picomolar

**Study 3**

Study 2 was repeated, except that *Indicator P* (which reacts with ghrelin to form a yellow dye) was used instead of *Indicator N*. The concentration of yellow dye in each tube was directly proportional to the ghrelin concentration in the blood sample (see Table 4).

Group	Sweetener	Ghrelin concentration per sample (pM)
1	Q	852
2	R	1,125
3	S	1,279
4	T	1,450
5	U	1,758

Tables 3 and 4 adapted from Andreas Lindqvist, Annemie Baelemans, and Charlotte Erlanson-Albertsson, “Effects of Sucrose, Glucose and Fructose on Peripheral and Central Appetite Signals.” ©2008 by Elsevier B.V.



34. In Study 1, as the ratio of fructose to glucose in the sweetener solutions increased, the amount of sweetener solution consumed per rat per day:
- F. increased only.
  - G. decreased only.
  - H. increased and then decreased.
  - J. decreased and then increased.
35. In Study 1, the amount of sweetener solution consumed daily by each rat could be measured because which of the following steps had been taken?
- A. The rats' access to solid food had been restricted.
  - B. The rats' access to solid food had not been restricted.
  - C. The rats had been placed in the same cage.
  - D. The rats had been placed in separate cages.
36. Suppose that a sweetener composed of 46% fructose and 54% glucose by mass had been tested in Study 1. Based on Table 1 and the results of Study 3, the ghrelin concentration per sample would most likely have been:
- F. less than 852 pM.
  - G. between 852 pM and 1,125 pM.
  - H. between 1,125 pM and 1,279 pM.
  - J. greater than 1,279 pM.
37. Consider the claim "The group of rats that consumed the lowest amount of solid food per rat per day was also the group that had the lowest concentration of leptin per sample." Do the results of Studies 1 and 2 support this claim?
- A. Yes; the rats in Group 1 consumed the lowest amount of solid food per rat per day and also had the lowest concentration of leptin per sample.
  - B. Yes; the rats in Group 5 consumed the lowest amount of solid food per rat per day and also had the lowest concentration of leptin per sample.
  - C. No; the rats in Group 1 consumed the lowest amount of solid food per rat per day, but the rats in Group 5 had the lowest concentration of leptin per sample.
  - D. No; the rats in Group 5 consumed the lowest amount of solid food per rat per day, but the rats in Group 1 had the lowest concentration of leptin per sample.
38. Which of the following groups of rats should have been included in Study 1 to serve as a control for the effect of consuming a sweetener solution on the consumption of solid food by rats? A group of rats that had access:
- F. only to water.
  - G. only to solid food.
  - H. only to water and solid food.
  - J. to neither water nor solid food.
39. Consider the sweetener that resulted in a solid food consumption of 16 g per rat per day in Study 1. Based on Table 1, how many grams of fructose would be present in 200 g of this sweetener?
- A. 50 g
  - B. 100 g
  - C. 150 g
  - D. 200 g
40. The experimental designs of Studies 2 and 3 were identical with respect to which of the factors listed below, if either?
- I. The chemical indicator that was used
  - II. The hormone with which the chemical indicator reacted
- F. I only
  - G. II only
  - H. Both I and II
  - J. Neither I nor II

**END OF TEST 4**

**STOP! DO NOT RETURN TO ANY OTHER TEST.**

## Practice Writing Test

Your Signature: \_\_\_\_\_  
(Do not print.)

Print Your Name Here: \_\_\_\_\_

Your Date of Birth:									
		-			-				
Month			Day			Year			

# Form 21BM20

The **ACT**<sup>®</sup>

# WRITING TEST BOOKLET

**You must take the multiple-choice tests before you take the writing test.**

### Directions

This is a test of your writing skills. You will have **forty** (40) minutes to read the prompt, plan your response, and write an essay in English. Before you begin working, read all material in this test booklet carefully to understand exactly what you are being asked to do.

You will write your essay on the lined pages in the **answer document** provided. Your writing on those pages will be scored. You may use the unlined pages in this test booklet to plan your essay. Your work on these pages will not be scored.

Your essay will be evaluated based on the evidence it provides of your ability to:

- clearly state your own perspective on a complex issue and analyze the relationship between your perspective and at least one other perspective
- develop and support your ideas with reasoning and examples
- organize your ideas clearly and logically
- communicate your ideas effectively in standard written English

Lay your pencil down immediately when time is called.

**DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.**

**ACT**<sup>®</sup>

PO Box 168  
Iowa City, IA 52243-0168

©2021 by ACT, Inc. All rights reserved.

NOTE: This test material is the confidential copyrighted property of ACT, Inc., and may not be copied, reproduced, sold, scanned, emailed, or otherwise transferred without the prior express written permission of ACT, Inc. Violators of ACT's copyrights are subject to civil and criminal penalties.

## Extracurricular Activities and Codes of Conduct

For many students, extracurricular activities are a meaningful part of the high school experience. These activities allow students to develop their skills in areas such as sports, music, and drama while building relationships with peers and gaining experience performing or competing. But at many schools, students who participate in extracurricular activities are subject to special codes of conduct. These codes often establish high standards for academic performance and behavior, and students must meet the standards to stay eligible for their activities. Should students who participate in extracurricular activities be subject to special codes of conduct?

*Read and carefully consider these perspectives. Each suggests a particular way of thinking about the question above.*

### Perspective One

All school rules and standards must apply equally to every student. It is unfair to hold students who play sports or music to higher standards than students who do not.

### Perspective Two

Participation in school activities is a privilege, not a right. It is fair to ask students to earn this privilege by studying hard and behaving themselves.

### Perspective Three

School programs should be open to all students. Not all students can meet high standards, which means not all students can participate in extracurricular activities.

### Essay Task

Write a unified, coherent essay in which you address the question of whether students who participate in extracurricular activities should be subject to special codes of conduct. In your essay, be sure to:

- clearly state your own perspective and analyze the relationship between your perspective and at least one other perspective
- develop and support your ideas with reasoning and examples
- organize your ideas clearly and logically
- communicate your ideas effectively in standard written English

Your perspective may be in full agreement with any of those given, in partial agreement, or completely different.

## Planning Your Essay

*Your work on these prewriting pages will not be scored.*

Use the space below and on the back cover to generate ideas and plan your essay. You may wish to consider the following as you think critically about the task:

Strengths and weaknesses of different perspectives on the issue

- What insights do they offer, and what do they fail to consider?
- Why might they be persuasive to others, or why might they fail to persuade?

Your own knowledge, experience, and values

- What is your perspective on this issue, and what are its strengths and weaknesses?
- How will you support your perspective in your essay?

### **Note**

- For your practice essay, you will need scratch paper to plan your essay and four lined sheets of paper for your response.
- On test day, if you are taking the paper test, you will receive a test booklet with space to plan your essay and an answer document with four lined pages on which to write your response.
- Read pages 60–61 for information and instructions on scoring your practice writing test.

# The ACT® 2020–2021 Answer Document (No Writing)

## EXAMINEE STATEMENTS, CERTIFICATION, AND SIGNATURE

**1. Statements:** I understand that by registering for, launching, starting, or submitting answer documents for an ACT® test, I am agreeing to comply with and be bound by the *Terms and Conditions: Testing Rules and Policies for the ACT® Test* (“Terms”).

**I UNDERSTAND AND AGREE THAT THE TERMS PERMIT ACT TO CANCEL MY SCORES IF THERE IS REASON TO BELIEVE THEY ARE INVALID. THE TERMS ALSO LIMIT DAMAGES AVAILABLE TO ME AND REQUIRE ARBITRATION OF CERTAIN DISPUTES. BY AGREEING TO ARBITRATION, ACT AND I BOTH WAIVE THE RIGHT TO HAVE THOSE DISPUTES HEARD BY A JUDGE OR JURY.**

I understand that ACT owns the test questions and responses, and I will not share them with anyone by any form of communication before, during, or after the test administration. I understand that taking the test for someone else may violate the law and subject me to legal penalties. I consent to the collection and processing of personally identifying information I provide, and its subsequent use and disclosure, as described in the ACT Privacy Policy ([www.act.org/privacy.html](http://www.act.org/privacy.html)). I also permit ACT to transfer my personally identifying information to the United States, to ACT, or to a third-party service provider, where it will be subject to use and disclosure under the laws of the United States, including being accessible to law enforcement or national security authorities.

**2. Certification:** Copy the italicized certification below, then sign and date in the spaces provided.

*I agree to the **Statements** above and certify that I am the person whose information appears on this form.*

\_\_\_\_\_

\_\_\_\_\_

Your Signature

Today's Date

Do NOT mark in this shaded area.

**USE A SOFT LEAD NO. 2 PENCIL ONLY.**  
(Do NOT use a mechanical pencil, ink, ballpoint, correction fluid, or felt-tip pen.)

**A NAME, MAILING ADDRESS, AND TELEPHONE**  
(Please print.)

Last Name \_\_\_\_\_ First Name \_\_\_\_\_ MI (Middle Initial) \_\_\_\_\_

House Number & Street (Apt. No.); or PO Box & No.; or RR & No. \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_ ZIP/Postal Code \_\_\_\_\_

Area Code \_\_\_\_\_ Number \_\_\_\_\_ Country \_\_\_\_\_

ACT, Inc.—Confidential Restricted when data present

**ALL** examinees must complete block A – please print.

**Blocks B, C, and D** are required for all examinees. Find the MATCHING INFORMATION on your ticket. Enter it EXACTLY the same way, even if any of the information is missing or incorrect. Fill in the corresponding ovals. If you do not complete these blocks to match your previous information EXACTLY, your scores will be **delayed up to 8 weeks**.

**ACT**®

PO BOX 168, IOWA CITY, IA 52243-0168

**B MATCH NAME**  
(First 5 letters of last name)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A	A	A	A	A
B	B	B	B	B
C	C	C	C	C
D	D	D	D	D
E	E	E	E	E
F	F	F	F	F
G	G	G	G	G
H	H	H	H	H
I	I	I	I	I
J	J	J	J	J
K	K	K	K	K
L	L	L	L	L
M	M	M	M	M
N	N	N	N	N
O	O	O	O	O
P	P	P	P	P
Q	Q	Q	Q	Q
R	R	R	R	R
S	S	S	S	S
T	T	T	T	T
U	U	U	U	U
V	V	V	V	V
W	W	W	W	W
X	X	X	X	X
Y	Y	Y	Y	Y
Z	Z	Z	Z	Z

**C MATCH NUMBER**

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
0	0	0	0	0	0	0	0	0	0

**D DATE OF BIRTH**





Month	Day	Year
<input type="radio"/> January		
<input type="radio"/> February		
<input type="radio"/> March	<input type="radio"/> 1	<input type="radio"/> 1
<input type="radio"/> April	<input type="radio"/> 2	<input type="radio"/> 2
<input type="radio"/> May	<input type="radio"/> 3	<input type="radio"/> 3
<input type="radio"/> June	<input type="radio"/> 4	<input type="radio"/> 4
<input type="radio"/> July	<input type="radio"/> 5	<input type="radio"/> 5
<input type="radio"/> August	<input type="radio"/> 6	<input type="radio"/> 6
<input type="radio"/> September	<input type="radio"/> 7	<input type="radio"/> 7
<input type="radio"/> October	<input type="radio"/> 8	<input type="radio"/> 8
<input type="radio"/> November	<input type="radio"/> 9	<input type="radio"/> 9
<input type="radio"/> December	<input type="radio"/> 0	<input type="radio"/> 0









**Marking Directions:** Mark only **one** oval for each question. Fill in response completely. Erase errors cleanly without smudging.




**Correct mark:** ○ ● ○ ○




**Do NOT use these incorrect or bad marks.**

Incorrect marks:    

Overlapping mark:   

Cross-out mark:   

Smudged erasure:   

Mark is too light:   

**BOOKLET NUMBER**

1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
0	0	0	0	0	0

**FORM**

--	--	--

Print your 3-character **Test Form** in the boxes above and fill in the corresponding oval at the right.

PRE

**BE SURE TO FILL IN THE CORRECT FORM OVAL.**

**TEST 1**

1 (A B C D)	14 (F G H J)	27 (A B C D)	40 (F G H J)	53 (A B C D)	66 (F G H J)
2 (F G H J)	15 (A B C D)	28 (F G H J)	41 (A B C D)	54 (F G H J)	67 (A B C D)
3 (A B C D)	16 (F G H J)	29 (A B C D)	42 (F G H J)	55 (A B C D)	68 (F G H J)
4 (F G H J)	17 (A B C D)	30 (F G H J)	43 (A B C D)	56 (F G H J)	69 (A B C D)
5 (A B C D)	18 (F G H J)	31 (A B C D)	44 (F G H J)	57 (A B C D)	70 (F G H J)
6 (F G H J)	19 (A B C D)	32 (F G H J)	45 (A B C D)	58 (F G H J)	71 (A B C D)
7 (A B C D)	20 (F G H J)	33 (A B C D)	46 (F G H J)	59 (A B C D)	72 (F G H J)
8 (F G H J)	21 (A B C D)	34 (F G H J)	47 (A B C D)	60 (F G H J)	73 (A B C D)
9 (A B C D)	22 (F G H J)	35 (A B C D)	48 (F G H J)	61 (A B C D)	74 (F G H J)
10 (F G H J)	23 (A B C D)	36 (F G H J)	49 (A B C D)	62 (F G H J)	75 (A B C D)
11 (A B C D)	24 (F G H J)	37 (A B C D)	50 (F G H J)	63 (A B C D)	
12 (F G H J)	25 (A B C D)	38 (F G H J)	51 (A B C D)	64 (F G H J)	
13 (A B C D)	26 (F G H J)	39 (A B C D)	52 (F G H J)	65 (A B C D)	

**TEST 2**

1 (A B C D E)	11 (A B C D E)	21 (A B C D E)	31 (A B C D E)	41 (A B C D E)	51 (A B C D E)
2 (F G H J K)	12 (F G H J K)	22 (F G H J K)	32 (F G H J K)	42 (F G H J K)	52 (F G H J K)
3 (A B C D E)	13 (A B C D E)	23 (A B C D E)	33 (A B C D E)	43 (A B C D E)	53 (A B C D E)
4 (F G H J K)	14 (F G H J K)	24 (F G H J K)	34 (F G H J K)	44 (F G H J K)	54 (F G H J K)
5 (A B C D E)	15 (A B C D E)	25 (A B C D E)	35 (A B C D E)	45 (A B C D E)	55 (A B C D E)
6 (F G H J K)	16 (F G H J K)	26 (F G H J K)	36 (F G H J K)	46 (F G H J K)	56 (F G H J K)
7 (A B C D E)	17 (A B C D E)	27 (A B C D E)	37 (A B C D E)	47 (A B C D E)	57 (A B C D E)
8 (F G H J K)	18 (F G H J K)	28 (F G H J K)	38 (F G H J K)	48 (F G H J K)	58 (F G H J K)
9 (A B C D E)	19 (A B C D E)	29 (A B C D E)	39 (A B C D E)	49 (A B C D E)	59 (A B C D E)
10 (F G H J K)	20 (F G H J K)	30 (F G H J K)	40 (F G H J K)	50 (F G H J K)	60 (F G H J K)

**TEST 3**

1 (A B C D)	8 (F G H J)	15 (A B C D)	22 (F G H J)	29 (A B C D)	36 (F G H J)
2 (F G H J)	9 (A B C D)	16 (F G H J)	23 (A B C D)	30 (F G H J)	37 (A B C D)
3 (A B C D)	10 (F G H J)	17 (A B C D)	24 (F G H J)	31 (A B C D)	38 (F G H J)
4 (F G H J)	11 (A B C D)	18 (F G H J)	25 (A B C D)	32 (F G H J)	39 (A B C D)
5 (A B C D)	12 (F G H J)	19 (A B C D)	26 (F G H J)	33 (A B C D)	40 (F G H J)
6 (F G H J)	13 (A B C D)	20 (F G H J)	27 (A B C D)	34 (F G H J)	
7 (A B C D)	14 (F G H J)	21 (A B C D)	28 (F G H J)	35 (A B C D)	

**TEST 4**

1 (A B C D)	8 (F G H J)	15 (A B C D)	22 (F G H J)	29 (A B C D)	36 (F G H J)
2 (F G H J)	9 (A B C D)	16 (F G H J)	23 (A B C D)	30 (F G H J)	37 (A B C D)
3 (A B C D)	10 (F G H J)	17 (A B C D)	24 (F G H J)	31 (A B C D)	38 (F G H J)
4 (F G H J)	11 (A B C D)	18 (F G H J)	25 (A B C D)	32 (F G H J)	39 (A B C D)
5 (A B C D)	12 (F G H J)	19 (A B C D)	26 (F G H J)	33 (A B C D)	40 (F G H J)
6 (F G H J)	13 (A B C D)	20 (F G H J)	27 (A B C D)	34 (F G H J)	
7 (A B C D)	14 (F G H J)	21 (A B C D)	28 (F G H J)	35 (A B C D)	

# Scoring Your Tests

## How to Score the Multiple-Choice Tests

Follow the instructions below and on the following pages to score your practice multiple-choice tests and review your performance.

### Raw Scores

The number of questions you answered correctly on each test and in each reporting category is your **raw score**. Because there are many forms of the ACT, each with different questions, some forms will be slightly easier (and some slightly harder) than others. A raw score of 67 on one form of the English test, for example, may be about as difficult to earn as a raw score of 70 on another form of that test.

To compute your raw scores, check your answers with the scoring keys on pages 57–59. Count the number of correct answers for each of the four tests and seventeen reporting categories and enter the number in the blanks provided on those pages. These numbers are your raw scores on the tests and reporting categories.

### Scale Scores

To adjust for the small differences that occur among different forms of the ACT, the raw scores for tests are converted into **scale scores**. Scale scores are printed on the reports sent to you and your college and scholarship choices.

When your raw scores are converted into scale scores, it becomes possible to compare your scores with those of examinees who took different test forms. For example, a scale score of 26 on the English test has the same meaning regardless of the form of the ACT on which it is based.

To determine the scale scores corresponding to your raw scores on the practice test, use Table 1 on page 60, which explains the procedures used to obtain scale scores from raw scores. This table shows the raw-to-scale score conversions for each test. Because each form of the ACT is unique, each form has somewhat different conversion tables. Consequently, this table provides only approximations of the raw-to-scale score conversions that would apply if a different form of the ACT were taken. Therefore, the scale scores obtained from the practice tests don't match precisely the scale scores received from an actual administration of the ACT.

### Computing the Composite Score

The **Composite score** is the average of the four scale scores in English, mathematics, reading, and science. If you left any of these tests blank, do not calculate a Composite score. If you take the ACT with writing, your writing results do **not** affect your Composite score.

## Comparing Your Scores

Information about comparing your scores on the practice multiple-choice tests with the scores of recent high school graduates who took the ACT can be found at [www.actstudent.org](http://www.actstudent.org).

Your scores and percent at or below are only **estimates** of the scores that you will receive during an actual administration of the ACT. Test scores are only one indicator of your level of learning. Consider your scores in connection with your grades, your performance in outside activities, and your career interests.

## ACT College and Career Readiness Standards

The ACT College and Career Readiness Standards describe the types of skills, strategies, and understandings you will need to make a successful transition from high school to college. For English, mathematics, reading, and science, standards are provided for six score ranges that reflect the progression and complexity of the skills in each of the academic areas measured by the ACT tests. For writing, standards are provided for five score ranges. The ACT College and Career Readiness Standards and benchmark scores for each test can be found at [www.act.org](http://www.act.org).

## Reviewing Your Performance on the Multiple-Choice Tests

Consider the following as you review your scores:

- Did you run out of time? Reread the information in this booklet on pacing yourself. You may need to adjust the way you use your time in responding to the questions.
- Did you spend too much time trying to understand the directions for the tests? The directions for the practice tests are the same directions that will appear in your test booklet on test day. Make sure you understand them before test day.
- Review the questions that you missed. Did you select a response that was an incomplete answer or that did not directly respond to the question being asked? Try to figure out what you overlooked in answering the questions.
- Did a particular type of question confuse you? Did the questions you missed come from a particular reporting category? In reviewing your responses, check to see whether a particular type of question or a particular reporting category was more difficult for you.

## Scoring Keys for the ACT Practice Tests

Use the scoring key for each test to score your answer document for the multiple-choice tests. Mark a “1” in the blank for each question you answered correctly. Add up the numbers in each reporting category and enter the total number correct for each reporting category in the blanks provided. Also enter the total number correct for each test in the blanks provided. The total number correct for each test is the sum of the number correct in each reporting category.

### Test 1: English—Scoring Key

2176CPRE

Key	Reporting Category*		
	POW	KLA	CSE
1. C			
2. J	—		
3. A		—	
4. F	—		
5. C		—	
6. J			—
7. B		—	
8. G	—		
9. A			—
10. J	—		
11. B			—
12. J			—
13. C			—
14. F	—		
15. C	—		
16. F			—
17. D		—	
18. J			—
19. C			—
20. J		—	
21. B	—		
22. J			—
23. D			—
24. J			—
25. B	—		
26. H	—		
27. B			—
28. H	—		
29. A	—		
30. H			—
31. A			—
32. G			—
33. A		—	
34. J			—
35. A			—
36. H		—	
37. D			—
38. G	—		

Key	Reporting Category*		
	POW	KLA	CSE
39. C	—		
40. F			—
41. C			—
42. J			—
43. B	—		
44. G	—		
45. C	—		
46. J			—
47. A			—
48. G			—
49. A			—
50. H			—
51. C	—		
52. H	—		
53. D			—
54. J		—	
55. A			—
56. J	—		
57. D			—
58. G			—
59. A		—	
60. G	—		
61. C			—
62. J		—	
63. B			—
64. G		—	
65. D			—
66. G	—		
67. A			—
68. G			—
69. C	—		
70. G			—
71. A			—
72. J	—		
73. A			—
74. G			—
75. A		—	

#### \*Reporting Categories

**POW** = Production of Writing

**KLA** = Knowledge of Language

**CSE** = Conventions of Standard English

Number Correct (Raw Score) for:	
Production of Writing (POW)	_____ (23)
Knowledge of Language (KLA)	_____ (12)
Conventions of Standard English (CSE)	_____ (40)
Total Number Correct for English Test (POW + KLA + CSE)	_____ (75)

Key	Reporting Category*						
	PHM					IES	MDL
	N	A	F	G	S		
1. E						—	—
2. J		—					
3. B		—				—	
4. G						—	
5. C		—					
6. F		—				—	—
7. B		—	—			—	—
8. H			—			—	—
9. D			—	—			
10. G	—			—			—
11. B	—				—		—
12. G				—			—
13. D				—		—	—
14. J						—	—
15. A		—					
16. K		—					
17. D		—		—			
18. J	—			—			
19. A	—			—			—
20. F				—	—		
21. E					—	—	
22. G				—			
23. E			—				
24. H			—			—	
25. D						—	
26. G						—	—
27. E						—	
28. H						—	
29. C						—	—
30. H					—		

Key	Reporting Category*						
	PHM					IES	MDL
	N	A	F	G	S		
31. B	—						—
32. K						—	—
33. D						—	—
34. F				—			
35. E				—			—
36. J						—	—
37. C					—		—
38. F					—	—	—
39. D	—						
40. K	—			—			—
41. A		—					
42. J		—	—				
43. D			—			—	—
44. G		—					—
45. E		—					
46. F		—				—	—
47. D					—		—
48. G					—	—	—
49. D			—				
50. K			—				
51. D			—			—	—
52. K						—	—
53. A			—				
54. G			—			—	—
55. B	—						
56. K	—	—					
57. D		—				—	—
58. K			—				
59. B				—			—
60. F						—	—

Combine the totals of these columns and put in the blank for PHM in the box below.

**\*Reporting Categories**

**PHM** = Preparing for Higher Math

N = Number & Quantity

A = Algebra

F = Functions

G = Geometry

S = Statistics & Probability

**IES** = Integrating Essential Skills

**MDL** = Modeling

Number Correct (Raw Score) for:	
Preparing for Higher Math (PHM) (N + A + F + G + S)	(35)
Integrating Essential Skills (IES)	(25)
Total Number Correct for Mathematics Test (PHM + IES)	(60)
Modeling (MDL) (Not included in total number correct for mathematics test raw score)	(24)

**Test 3: Reading—Scoring Key**

2176CPRE

Key	Reporting Category*		
	KID	CS	IKI
1. D			
2. F	___	___	
3. C		___	
4. J		___	
5. D			___
6. J	___		
7. B	___		
8. H			___
9. B			___
10. F			___
11. D		___	
12. F	___		
13. B	___		
14. G	___		
15. D		___	
16. G	___		
17. C	___		
18. H	___		
19. B	___		
20. J		___	

Key	Reporting Category*		
	KID	CS	IKI
21. B			
22. F	___	___	
23. C		___	
24. J		___	
25. A			___
26. J	___		
27. B	___		
28. G	___		
29. C	___		
30. F		___	
31. C		___	
32. G	___		
33. A	___		
34. J	___		
35. C	___		
36. F	___		
37. D	___		
38. G		___	
39. C	___		
40. G	___		

**\*Reporting Categories**

**KID** = Key Ideas & Details

**CS** = Craft & Structure

**IKI** = Integration of Knowledge & Ideas

Number Correct (Raw Score) for:	
Key Ideas & Details (KID)	_____ (23)
Craft & Structure (CS)	_____ (12)
Integration of Knowledge & Ideas (IKI)	_____ (5)
Total Number Correct for Reading Test (KID + CS + IKI)	_____ (40)

**Test 4: Science—Scoring Key**

2176CPRE

Key	Reporting Category*		
	IOD	SIN	EMI
1. D			___
2. H			___
3. B			___
4. G			___
5. B			___
6. F			___
7. C			___
8. J		___	
9. C		___	
10. J	___		
11. B		___	
12. F	___		
13. B		___	
14. H		___	
15. B	___		
16. G	___		
17. A	___		
18. H	___		
19. D	___		
20. J	___		

Key	Reporting Category*		
	IOD	SIN	EMI
21. A	___		
22. G	___		
23. C		___	
24. J	___		
25. B		___	
26. J		___	
27. A			___
28. F	___		
29. B	___		
30. G			___
31. C	___		
32. J	___		
33. B	___		
34. G	___		
35. D		___	
36. H		___	
37. C			___
38. H		___	
39. B	___		
40. J	___		

**\*Reporting Categories**

**IOD** = Interpretation of Data

**SIN** = Scientific Investigation

**EMI** = Evaluation of Models, Inferences & Experimental Results

Number Correct (Raw Score) for:	
Interpretation of Data (IOD)	_____ (18)
Scientific Investigation (SIN)	_____ (12)
Evaluation of Models, Inferences & Experimental Results (EMI)	_____ (10)
Total Number Correct for Science Test (IOD + SIN + EMI)	_____ (40)

# Table 1

## Explanation of Procedures Used to Obtain Scale Scores from Raw Scores

On each of the four multiple-choice tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

ACT Test 2176CPRE	Your Scale Score
English	_____
Mathematics	_____
Reading	_____
Science	_____
<hr/>	
<b>Sum of scores</b>	_____
<b>Composite score (sum ÷ 4)</b>	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

To calculate your writing score, use the rubric on pages 60–61.

Scale Score	Raw Scores				Scale Score
	Test 1 English	Test 2 Mathematics	Test 3 Reading	Test 4 Science	
36	72-75	58-60	39-40	38-40	36
35	70-71	56-57	38	37	35
34	68-69	54-55	37	36	34
33	67	53	35-36	35	33
32	66	51-52	34	34	32
31	65	49-50	33	—	31
30	64	48	—	33	30
29	62-63	46-47	32	32	29
28	61	44-45	31	31	28
27	60	41-43	30	—	27
26	58-59	39-40	29	30	26
25	56-57	37-38	28	28-29	25
24	53-55	35-36	27	26-27	24
23	51-52	33-34	26	25	23
22	48-50	31-32	24-25	23-24	22
21	45-47	30	23	22	21
20	42-44	28-29	21-22	20-21	20
19	40-41	26-27	20	19	19
18	38-39	24-25	19	17-18	18
17	36-37	21-23	17-18	15-16	17
16	33-35	17-20	16	13-14	16
15	30-32	13-16	14-15	12	15
14	27-29	10-12	12-13	11	14
13	25-26	8-9	11	10	13
12	23-24	6-7	9-10	9	12
11	19-22	5	7-8	8	11
10	16-18	4	6	7	10
9	13-15	—	5	6	9
8	11-12	3	—	5	8
7	9-10	—	4	4	7
6	7-8	2	3	3	6
5	6	—	—	—	5
4	4-5	1	2	2	4
3	3	—	—	1	3
2	2	—	1	—	2
1	0-1	0	0	0	1

## How to Score the Writing Test

It is difficult to be objective about one's own work. However, it is to your advantage to read your own writing critically, as doing so can help you grow as a writer and as a reader. It may also be helpful for you to give your practice essay to another reader, such as a classmate, parent, or teacher. To rate your essay, you and your reader(s) should review the guidelines and sample essays at [www.actstudent.org](http://www.actstudent.org) and then use the scoring rubric below to assign your practice essay a score of 1 (low) through 6 (high) in each of the four writing domains (Ideas and Analysis, Development and Support, Organization, Language Use).

## Scoring Rubric (below)

The rubric presents the standards by which your essay will be evaluated. Readers will use this rubric to assign your essay four unique scores, one per writing domain. To score your essay, determine which scorepoint, in each domain, best describes the features of your writing. Because each domain receives its own score, the four scores you assign need not be identical. For example, you may find that your essay exhibits stronger skill in organization than in the development of ideas. In this case, you may determine that your essay should receive a higher score in Organization than in Development and Support.

## The ACT Writing Test Scoring Rubric

	<i>Ideas and Analysis</i>	<i>Development and Support</i>	<i>Organization</i>	<i>Language Use</i>
<b>Score 6:</b> <b>Responses at this scorepoint demonstrate effective skill in writing an argumentative essay.</b>	<p>The writer generates an argument that critically engages with multiple perspectives on the given issue. The argument's thesis reflects nuance and precision in thought and purpose. The argument establishes and employs an insightful context for analysis of the issue and its perspectives. The analysis examines implications, complexities and tensions, and/or underlying values and assumptions.</p>	<p>Development of ideas and support for claims deepen insight and broaden context. An integrated line of skillful reasoning and illustration effectively conveys the significance of the argument. Qualifications and complications enrich and bolster ideas and analysis.</p>	<p>The response exhibits a skillful organizational strategy. The response is unified by a controlling idea or purpose, and a logical progression of ideas increases the effectiveness of the writer's argument. Transitions between and within paragraphs strengthen the relationships among ideas.</p>	<p>The use of language enhances the argument. Word choice is skillful and precise. Sentence structures are consistently varied and clear. Stylistic and register choices, including voice and tone, are strategic and effective. While a few minor errors in grammar, usage, and mechanics may be present, they do not impede understanding.</p>
<b>Score 5:</b> <b>Responses at this scorepoint demonstrate well-developed skill in writing an argumentative essay.</b>	<p>The writer generates an argument that productively engages with multiple perspectives on the given issue. The argument's thesis reflects precision in thought and purpose. The argument establishes and employs a thoughtful context for analysis of the issue and its perspectives. The analysis addresses implications, complexities and tensions, and/or underlying values and assumptions.</p>	<p>Development of ideas and support for claims deepen understanding. A mostly integrated line of purposeful reasoning and illustration capably conveys the significance of the argument. Qualifications and complications enrich ideas and analysis.</p>	<p>The response exhibits a productive organizational strategy. The response is mostly unified by a controlling idea or purpose, and a logical sequencing of ideas contributes to the effectiveness of the argument. Transitions between and within paragraphs consistently clarify the relationships among ideas.</p>	<p>The use of language works in service of the argument. Word choice is precise. Sentence structures are clear and varied often. Stylistic and register choices, including voice and tone, are purposeful and productive. While minor errors in grammar, usage, and mechanics may be present, they do not impede understanding.</p>
<b>Score 4:</b> <b>Responses at this scorepoint demonstrate adequate skill in writing an argumentative essay.</b>	<p>The writer generates an argument that engages with multiple perspectives on the given issue. The argument's thesis reflects clarity in thought and purpose. The argument establishes and employs a relevant context for analysis of the issue and its perspectives. The analysis recognizes implications, complexities and tensions, and/or underlying values and assumptions.</p>	<p>Development of ideas and support for claims clarify meaning and purpose. Lines of clear reasoning and illustration adequately convey the significance of the argument. Qualifications and complications extend ideas and analysis.</p>	<p>The response exhibits a clear organizational strategy. The overall shape of the response reflects an emergent controlling idea or purpose. Ideas are logically grouped and sequenced. Transitions between and within paragraphs clarify the relationships among ideas.</p>	<p>The use of language conveys the argument with clarity. Word choice is adequate and sometimes precise. Sentence structures are clear and demonstrate some variety. Stylistic and register choices, including voice and tone, are appropriate for the rhetorical purpose. While errors in grammar, usage, and mechanics are present, they rarely impede understanding.</p>

## The ACT Writing Test Scoring Rubric

	<i>Ideas and Analysis</i>	<i>Development and Support</i>	<i>Organization</i>	<i>Language Use</i>
<b>Score 3:</b> <b>Responses at this scorepoint demonstrate some developing skill in writing an argumentative essay.</b>	<p>The writer generates an argument that responds to multiple perspectives on the given issue. The argument's thesis reflects some clarity in thought and purpose. The argument establishes a limited or tangential context for analysis of the issue and its perspectives. Analysis is simplistic or somewhat unclear.</p>	<p>Development of ideas and support for claims are mostly relevant but are overly general or simplistic. Reasoning and illustration largely clarify the argument but may be somewhat repetitious or imprecise.</p>	<p>The response exhibits a basic organizational structure. The response largely coheres, with most ideas logically grouped. Transitions between and within paragraphs sometimes clarify the relationships among ideas.</p>	<p>The use of language is basic and only somewhat clear. Word choice is general and occasionally imprecise. Sentence structures are usually clear but show little variety. Stylistic and register choices, including voice and tone, are not always appropriate for the rhetorical purpose. Distracting errors in grammar, usage, and mechanics may be present, but they generally do not impede understanding.</p>
<b>Score 2:</b> <b>Responses at this scorepoint demonstrate weak or inconsistent skill in writing an argumentative essay.</b>	<p>The writer generates an argument that weakly responds to multiple perspectives on the given issue. The argument's thesis, if evident, reflects little clarity in thought and purpose. Attempts at analysis are incomplete, largely irrelevant, or consist primarily of restatement of the issue and its perspectives.</p>	<p>Development of ideas and support for claims are weak, confused, or disjointed. Reasoning and illustration are inadequate, illogical, or circular, and fail to fully clarify the argument.</p>	<p>The response exhibits a rudimentary organizational structure. Grouping of ideas is inconsistent and often unclear. Transitions between and within paragraphs are misleading or poorly formed.</p>	<p>The use of language is inconsistent and often unclear. Word choice is rudimentary and frequently imprecise. Sentence structures are sometimes unclear. Stylistic and register choices, including voice and tone, are inconsistent and are not always appropriate for the rhetorical purpose. Distracting errors in grammar, usage, and mechanics are present, and they sometimes impede understanding.</p>
<b>Score 1:</b> <b>Responses at this scorepoint demonstrate little or no skill in writing an argumentative essay.</b>	<p>The writer fails to generate an argument that responds intelligibly to the task. The writer's intentions are difficult to discern. Attempts at analysis are unclear or irrelevant.</p>	<p>Ideas lack development, and claims lack support. Reasoning and illustration are unclear, incoherent, or largely absent.</p>	<p>The response does not exhibit an organizational structure. There is little grouping of ideas. When present, transitional devices fail to connect ideas.</p>	<p>The use of language fails to demonstrate skill in responding to the task. Word choice is imprecise and often difficult to comprehend. Sentence structures are often unclear. Stylistic and register choices are difficult to identify. Errors in grammar, usage, and mechanics are pervasive and often impede understanding.</p>

### Calculating Your Writing Subject Score

Complete these steps to calculate your Writing Subject Score (2–12 score range).

Score Calculation Steps	Domain	Rubric Score	Domain Score
1. Determine Rubric Score for each Domain	Ideas and Analysis	___	x 2 = ___
2. Multiply each Rubric Score by 2 to get Domain Score	Development and Support	___	x 2 = ___
	Organization	___	x 2 = ___
	Language Use and Conventions	___	x 2 = ___
3. Find the Sum of all Domain Scores (range 8–48)	Sum of Domain Scores _____		
4. Divide Sum by 4 (range 2–12)*	<b>Writing Subject Score</b> _____		
*Round value to the nearest whole number. Round down any fraction less than one-half; round up any fraction that is one-half or more.			



# Practice Test #2



## ENGLISH TEST

45 Minutes—75 Questions

**DIRECTIONS:** In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose “NO CHANGE.” In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

## PASSAGE I

## Dragonfly

The nature trail is six feet wide and seven miles long. It slithers through the forest like a snake curving, and bending along the banks of the river.

The county cleared this path and paved it with packed

gravel, so they would have a peaceful place to hike and bike.

I ride this trail nearly every day—not on a bike, but on “Luigi.” That’s the nickname I gave my

motorized wheelchair. 5 Today, Luigi’s battery

1. A. NO CHANGE  
B. snake, curving and bending  
C. snake curving and bending,  
D. snake, curving, and bending,
2. Which of the following alternatives to the underlined portion would NOT be acceptable?  
F. path, paving  
G. path and then paved  
H. path before paving  
J. path paved
3. A. NO CHANGE  
B. knowing they  
C. that they  
D. people
4. F. NO CHANGE  
G. day; not on a bike  
H. day not on a bike  
J. day, not on a bike;
5. If the writer were to delete the preceding sentence, the essay would primarily lose:  
A. a reason why the narrator is in the forest.  
B. a detail important for understanding the essay.  
C. a contrast to the lighthearted tone of the essay.  
D. nothing at all; this information is irrelevant to the essay.



is fully charged, I know I can go all the way to the end  
 of the trail and back. But I always carry a cell phone on  
 me just in case.

Luigi's motor moves slowly as we venture along  
 the trail. I can hear the gravel quietly crunching beneath

Luigi's rubber wheels. I hear the songs of cardinals in the  
 trees and the clamor of crickets in the grasses. I hear the  
 murmur of water slipping over time-smoothed rocks. It is  
 September, and some of the trees are starting to blush red  
 and orange at their tips. The wind ruffles my hair and  
 chills my face as I bounce gently, along in my padded  
 chair.

Bicyclists streak past in a blur of color and a cloud of

dust I don't understand their hurry. Luigi can go fast, but I  
 like to ride slowly, to see like a hovering dragonfly. I want  
 to see everything that has changed, grown, bloomed, or  
 died since yesterday. Today I notice that a spider has  
 woven a web between some honeysuckle bushes by the  
 bridge. I see that the bank of vibrant yellow black-eyed  
 Susans by the barbed wire fence is starting to dry and fade  
 away. I spend an hour; looking and listening and learning.

6. F. NO CHANGE  
 G. charged, because of that,  
 H. charged, this means that  
 J. charged, so
7. Which choice would most logically and effectively emphasize the positive, friendly attitude the narrator has toward Luigi?  
 A. NO CHANGE  
 B. travels safely  
 C. proceeds carefully  
 D. purrs softly
8. F. NO CHANGE  
 G. You can hear  
 H. One can even hear  
 J. While hearing
9. A. NO CHANGE  
 B. Due to the fact that it is  
 C. It turns into the month of  
 D. Because it has turned into
10. F. NO CHANGE  
 G. gentle, along  
 H. gently along  
 J. gentle along,
11. Which choice most effectively leads into the new subject of this paragraph?  
 A. NO CHANGE  
 B. The sun begins to set  
 C. Nature always impresses me  
 D. Days can go by quickly
12. F. NO CHANGE  
 G. dust, however,  
 H. dust.  
 J. dust,
13. A. NO CHANGE  
 B. hour, looking,  
 C. hour looking;  
 D. hour looking

And now my ride is finished for today. I leave the trail and come out into the open, manicured park at the trails end. There, my older brother helps me out of my chair and into his waiting van. He puts Luigi in the back, and I return to the world of pavement, streetlights, and traffic. But in my mind, I am still gliding through the forest. I am like the water, flowing over ancient stones. Inside, I am still a dragonfly.

14. F. NO CHANGE  
 G. trail's  
 H. trails'  
 J. trails's

Question 15 asks about the preceding passage as a whole.

15. Suppose the writer's goal had been to write an essay illustrating the pleasure that people can take in nature. Would this essay accomplish that goal?
- A. Yes, because it focuses on a variety of wildflowers that the narrator enjoys.  
 B. Yes, because it focuses on the narrator's joy at having access to nature.  
 C. No, because it describes the world of the city as being more important to the narrator.  
 D. No, because it focuses primarily on the functioning of the narrator's motorized wheelchair.

## PASSAGE II

### Beneath the Streets of New York

At 2 p.m., on October 27, 1904; thousands of New York City residents poured into the streets of Manhattan. Their cheers competed with the blare of ferryboat horns and the whistle of power plants. The city was celebrating an incredible engineering feat; the completion of the first section of the New York City

Subway. 18

16. F. NO CHANGE  
 G. 2 p.m. on October 27, 1904, thousands  
 H. 2 p.m., on October 27, 1904; thousands,  
 J. 2 p.m. on October 27, 1904, thousands,
17. A. NO CHANGE  
 B. feat, over  
 C. feat:  
 D. feat
18. The writer is concerned about the level of detail in the preceding sentence and is considering deleting the phrase "the first section of" from it. If the writer were to make this deletion, the paragraph would primarily lose information that:
- F. reveals how expansive the New York City Subway would become.  
 G. clarifies that only part of the subway system had been completed by October 27, 1904.  
 H. makes clear that by October 27, 1904, construction of the second section of the subway was already underway.  
 J. provides evidence that New York City residents at this celebration believed the entire subway system was complete.



The original subway line was 9.1 miles long and had twenty-eight stations. [A] The first train took twenty-six minutes to complete the route, which ran from City Hall to West 145th Street in under a half an hour. Tens of thousands of New Yorkers could now avoid traffic jams

by traveling underneath the streets. [B]

As early as 1865, there had been proposals for a New York subway, but that took decades to resolve the many political, financial, and technical challenges. The engineer, William Barclay Parsons accepted responsibility for overseeing this project.

Parsons decided that most of the subway tunnel would be constructed using an innovation engineering method known as “cut and cover.” [C] First, workers used picks and shovels to remove roads and dig a deep trench. After installing wooden braces to hold back the earth, workers built a concrete floor. Tunnel walls were

created: with layers of brick, ceramic blocks, tar-soaked felt for waterproofing, and concrete. The roof was made from arch-shaped wooden molds also covered with concrete. Next, track beds were filled with crushed stone, and rails were secured to wooden ties. Finally, the roof was covered with tar-soaked felt, and the roads were rebuilt.

19. A. NO CHANGE  
B. in the completion of its route.  
C. in twenty-six minutes.  
D. DELETE the underlined portion and end the sentence with a period.
20. Which choice would most effectively conclude the sentence by indicating clearly how the subway system could address the problem described in the first part of the sentence?  
F. NO CHANGE  
G. traveling more effectively.  
H. trying something new.  
J. using a system.
21. A. NO CHANGE  
B. it  
C. those  
D. DELETE the underlined portion.
22. F. NO CHANGE  
G. engineer—William Barclay Parsons  
H. engineer William Barclay Parsons,  
J. engineer William Barclay Parsons
23. A. NO CHANGE  
B. innovate engineer  
C. innovative engineering  
D. innovate engineering
24. F. NO CHANGE  
G. into the ground deeply under where the roads had previously been removed by them.  
H. a trench far down below since it was necessary to shovel deep into the earth in this method known as “cut and cover.”  
J. DELETE the underlined portion and end the sentence with a period.
25. A. NO CHANGE  
B. created, with  
C. created with  
D. created with:



Brightly lit stations welcomed the public, many  
of them were skeptical of traveling underground. [D] It  
26

didn't take long for New Yorkers to adapt, however. The  
day after the subway opened, one newspaper reported that  
the riders were emerging from underground "having  
finished what will be to them the daily routine of the  
rest of their lives." 28

26. **F.** NO CHANGE  
**G.** of whom  
**H.** of who  
**J.** DELETE the underlined portion.
27. **A.** NO CHANGE  
**B.** therefore.  
**C.** for instance.  
**D.** that is.
28. The writer wishes to add a sentence that describes the magnitude and expansiveness of the New York City Subway system today. Given that all the following statements are true, which one, if added here, would most clearly and effectively accomplish the writer's goal?
- F.** Even today, for many New Yorkers that newspaper's account is right!  
**G.** Today, riding a portion of the New York City Subway's 656 miles of mainline track is a daily routine for more than 4 million people.  
**H.** Today, the New York City Transit Authority continuously maintains two separate fleets of subway cars.  
**J.** Now, a typical New York City Subway waiting platform ranges from 400 to 700 feet.

Question 29 asks about the preceding passage as a whole.

29. Upon reviewing the essay and finding that some information has been left out, the writer composes the following sentence incorporating that information:
- This technique, also known as "open excavation," became the standard for subway tunneling for nearly sixty years.
- If the writer were to add this sentence to the essay, the sentence would most logically be placed at Point:
- A.** A.  
**B.** B.  
**C.** C.  
**D.** D.



## PASSAGE III

**Diego Rivera: The People's Painter**

In the 1920s, Mexican artist Diego Rivera (1886–1957) practiced the art of painting frescoes, large murals done on fresh plaster. Rivera's frescoes appeared on the outside walls of buildings in Mexico City, in plain sight of any passerby. This brought art out of the elite galleries by catering to the upper class and literally to the public.

Rivera attracted for his belief controversy that the working class should wield more political power. His

dominant artistic subject in his art was as expansive than his frescoes: the role played by laborers in the past, present, and future of humanity. One of his frescoes depict a progression through time and can be read as time lines from left to right. For example, on the left side of a fresco, there might be field workers hunched over in fatigue and surrounded by the tools of their trade. On the right side, after they have moved through history. The same workers stand tall, radiating strength and confidence. Such empowerment of the worker were to be the bright future Rivera envisioned for all the workers of the world.

30. The writer wants to suggest that the art of the fresco had been in decline previous to Rivera. Which choice best accomplishes that goal?
- F. NO CHANGE  
G. engaged in  
H. influenced  
J. revived
31. A. NO CHANGE  
B. that catered  
C. while catering  
D. and catered
32. F. NO CHANGE  
G. Rivera should wield more political power for his belief that controversy attracted the working class.  
H. Rivera for his controversy attracted belief that the working class should wield more political power.  
J. Rivera attracted controversy for his belief that the working class should wield more political power.
33. A. NO CHANGE  
B. that he was interested in  
C. that he focused on  
D. DELETE the underlined portion.
34. F. NO CHANGE  
G. then  
H. as  
J. if
35. A. NO CHANGE  
B. Many  
C. Each  
D. Any one
36. F. NO CHANGE  
G. history; the  
H. history, the  
J. history—the
37. A. NO CHANGE  
B. if it were  
C. was  
D. if it was



Rivera received various prestigious commissions while he was in the United States. In the 1930s, he was commissioned by the Ford Motor Company to paint a twenty-seven-panel fresco in the Detroit Institute of Arts. The fresco, *Detroit Industry*, portrays some of the varied groups that shaped American culture and constituted its workforce. The central panel on the north wall shows the manufacture of a 1932 Ford V-8 engine, when the central panel on the south wall shows the production of this same car's exterior. Smaller panels depicting workers in a variety of other Detroit industries. 42 The fresco is a dynamic work because, by capturing the energy, humanity, and collective achievement of the Detroit workers, celebrates all working men and women. However, Rivera considered it the greatest achievement of his career.

38. F. NO CHANGE  
G. various, prestigious,  
H. various, and prestigious  
J. various and prestigious,
39. If the underlined phrase were deleted, the sentence would primarily lose a detail that:  
A. repeats information found elsewhere in the sentence.  
B. is necessary for the sentence to be grammatically complete.  
C. provides new and relevant information to the sentence.  
D. is ambiguous and unnecessary to the sentence.
40. F. NO CHANGE  
G. since  
H. thus  
J. and
41. A. NO CHANGE  
B. depict  
C. depicting some  
D. had depicted
42. The writer is thinking of adding the following phrase to the end of the preceding sentence (changing the period after *industries* to a comma):  
such as medicine, pharmaceuticals, and chemicals.  
Should the writer make this addition there?  
F. Yes, because it offers relevant examples that help to specify a broad term.  
G. Yes, because it helps explain how the panels were physically constructed.  
H. No, because it provides a sampling of industries rather than a full listing.  
J. No, because it digresses from the main point of the sentence.
43. A. NO CHANGE  
B. that,  
C. while,  
D. that was,
44. F. NO CHANGE  
G. Despite this,  
H. Regardless,  
J. DELETE the underlined portion.





## PASSAGE IV

## After All These Years

[1]

[1] I met Joan, the person who would be my best friend for the next twenty years, the first morning I played outside my family's new California home. [2] I was five years old. [3] We became inseparable childhood friends, and we remained close, even though we attended different high schools and colleges.

[2]

Joan enjoyed jogging and painting cityscapes. I loved hiking trips and writing. We shared an appreciation of the outdoors and a passion for our creative work. More importantly though we enjoyed being together. Through our history of shared experiences, we formed a rare understanding of each other.

[3]

[1] Last February, I had to travel to Fairbanks, Alaska, for my work. [2] Though we had rarely spoken to each other in fifteen years, when I called Joan to suggest a meeting, her voice sounded wonderfully familiar.

45. A. NO CHANGE  
 B. close, yet even  
 C. close; even  
 D. close. Even

46. Which of the following alternatives to the underlined portion would NOT be acceptable?  
 F. cityscapes, while I  
 G. cityscapes; I  
 H. cityscapes. I, on the other hand,  
 J. cityscapes I

47. A. NO CHANGE  
 B. important though  
 C. importantly, though,  
 D. important, though

48. Which choice would best express the narrator's positive reaction to speaking with Joan and the narrator's fondness for her friend?  
 F. NO CHANGE  
 G. she said that she would rearrange her schedule so that we could meet.  
 H. she told me that she immediately recognized my voice.  
 J. her quick words and the sound of her laugh surprised me.

[3] Through my parents, whom were still in touch with

49

Joan's father, I learned that Joan was currently living in

50

Fairbanks. [51]

[4]

I parked my rental car in downtown Fairbanks, and to keep the battery from freezing, I plugged the engine into an electrical outlet in the parking lot so the battery would stay warm. It was twenty below

52

zero that afternoon, and the sky shone with a pale gray

53

light. [54] I called Joan from a pay phone. She soon met me on a street corner that was close to her art studio.

[5]

As we walked upstairs to her studio, we slipped into our familiar habits, talking about the people in our lives and our work. We talked just as easily as we had in the past, when we would sit in the field behind Joan's house atop the rabbit hutch and discuss our friends and our hopes for the future.

56

49. A. NO CHANGE  
B. who  
C. whose  
D. which

50. F. NO CHANGE  
G. we  
H. they  
J. he

51. Which of the following sequences of sentences makes Paragraph 3 most logical?  
A. NO CHANGE  
B. 1, 3, 2  
C. 2, 1, 3  
D. 3, 2, 1

52. F. NO CHANGE  
G. located in the downtown area of the city.  
H. so the battery would continue to work properly despite the cold weather.  
J. DELETE the underlined portion and end the sentence with a period.

53. Which of the following alternatives to the underlined portion would NOT be acceptable?  
A. was glowing  
B. glowed  
C. shined  
D. shoned

54. If the writer were to delete the preceding sentence, the essay would primarily lose:  
F. an indication of the narrator's response to the weather conditions in Fairbanks.  
G. a detailed analysis of why the narrator had to plug the car engine into an electrical outlet.  
H. descriptive details that help set the scene of the narrator's meeting with Joan.  
J. unnecessary details that repeat information given earlier in the paragraph.

55. A. NO CHANGE  
B. fell upon  
C. dropped by  
D. returned with

56. F. NO CHANGE  
G. in the field atop the rabbit hutch behind Joan's house  
H. atop the rabbit hutch in the field behind Joan's house  
J. behind Joan's house in the field atop the rabbit hutch



[6]

When I saw Joan's new paintings, I immediately remembered her distinct way of emphasizing shadows and light. I remembered everything about her: how she would get so absorbed in her work that she'd forget to eat, how  
57

she disliked talking in the morning, how she was firm in  
58

her decisions. The years of separation had not affected the  
59  
heart of our connection, our friendship.  
59

57. Which of the following alternatives to the underlined portion would NOT be acceptable?
- A. engrossed in
  - B. acquired by
  - C. immersed in
  - D. engaged in
58. Which of the following alternatives to the underlined portion would NOT be acceptable?
- F. with
  - G. regarding
  - H. along
  - J. about
59. Given that all the choices are true, which one would best conclude this essay by effectively summarizing its main idea?
- A. NO CHANGE
  - B. Sadly, I realized that although we might be able to meet once a year, Joan and I would probably never again live in the same city.
  - C. Even though we had followed different interests, I was glad to know that both Joan and I had been able to devote time to our creative work.
  - D. As a result of the time we spent together when we were very young, I'll always remember Joan.

Question 60 asks about the preceding passage as a whole.

60. Upon reviewing the essay and finding that some information has been left out, the writer composes the following sentence incorporating that information:
- Yet, despite such strong ties, we moved far apart as adults and lost touch.
- This sentence would most logically be placed:
- F. after Sentence 2 in Paragraph 1.
  - G. at the end of Paragraph 2.
  - H. at the end of Paragraph 4.
  - J. after the first sentence in Paragraph 6.



## PASSAGE V

## Three Stars, Many Stories

Many thousands of years ago, people around the world began attaching different stories to the stars in the

61

night sky. The Sun sets gradually the images of a winged horse, a drinking gourd, a heartbroken hero appear in lights overhead. In some cases, a pattern of stars may represent a simple object that has meaning in day-to-day life. In other cases, the pattern, or constellation, may be

63

a figure with a different kind of meaning.

64

Three bright stars that I've read about have acquired

65

significance for many viewers around the globe. In some

66

agricultural parts of Japan, for instance, these three stars are commonly referred to as *Karasuki* and represent a

67

three-pronged plow. It's awesome that in other parts of Japan, the same three stars appear in a constellation

68

61. A. NO CHANGE  
 B. stories, which they connected to  
 C. stories, to which they related to  
 D. stories because of
62. F. NO CHANGE  
 G. sets, gradually,  
 H. sets, and gradually  
 J. setting gradually
63. A. NO CHANGE  
 B. pattern, or constellation  
 C. pattern or constellation,  
 D. pattern or constellation:
64. Given that all the choices are true, which one ends this paragraph with the clearest allusion to *Orion*, as the constellation is described later in the essay?  
 F. NO CHANGE  
 G. that is interesting but hard to see without a telescope.  
 H. who plays a dramatic role in a myth that has been told and retold for centuries.  
 J. that is also represented in the night sky once the Sun has set and the stars emerge.
65. Given that all the choices are true, which one offers visual information about the stars as they appear in modern times?  
 A. NO CHANGE  
 B. have different names in different cultures  
 C. formed long before any of us were born  
 D. together roughly form a straight line
66. Which of the following alternatives to the underlined portion would NOT be acceptable?  
 F. observers  
 G. overseers  
 H. night-sky watchers  
 J. stargazers
67. Given that all the choices are true, which one provides a detail that has the most direct connection to the information that follows in this sentence?  
 A. NO CHANGE  
 B. distant  
 C. populated  
 D. historic
68. F. NO CHANGE  
 G. You'll be amazed to learn that in  
 H. Consider, if you will, the notion that in  
 J. In



representing the floor-length sleeve of a woman's kimono.

In still other parts of Japan, this shining trio appears in the center of an hourglass-shaped drum, a *tsuzumi*.

On the other side of the world, the same three stars <sup>69</sup>has traditionally represented three zebras to the Namaqua people of South Africa. In

the mythology, of the Tswana people of South Africa, <sup>70</sup>these same stars represent three pigs.

[1] *Orion* is the name many Westerners use for a constellation that contains these three stars. [2] In Greek mythology, Orion is a mighty hunter. [3] In the night sky, he carries a bow and arrow and is accompanied by his loyal dogs, *Canis Major* and *Canis Minor*. [4] The three stars form the brilliant belt around the hunter's waist. [5] In the sky with Orion are the animals he used to hunt on Earth—from a small rabbit to a huge bull. [6] The scorpion that, according to myth, killed Orion inhabits the sky as well, but at such a distance because <sup>71</sup>it can never sting the hunter again. [7] Even in an age of big-screen televisions, their <sup>72</sup>is still no show on Earth as big as the night sky. [8] Stars up there play different roles around the world, <sup>73</sup>their dazzling careers span thousands of years. 74

69. A. NO CHANGE  
B. In Japan's imagination, this  
C. In Japan, this  
D. This

70. F. NO CHANGE  
G. have  
H. could of  
J. has been

71. A. NO CHANGE  
B. mythology of the Tswana people, of South Africa  
C. mythology, of the Tswana people, of South Africa  
D. mythology of the Tswana people of South Africa,

72. F. NO CHANGE  
G. so when  
H. this means  
J. that

73. A. NO CHANGE  
B. they're  
C. there  
D. but there

74. F. NO CHANGE  
G. world, and their  
H. world, with  
J. world,

75. The writer wants to divide the preceding paragraph into two to create a concluding paragraph that is free of direct references to a specific culture's view of the three stars. The best place to begin the new paragraph would be at the beginning of Sentence:
- A. 4.  
B. 5.  
C. 6.  
D. 7.

END OF TEST 1

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.



## MATHEMATICS TEST

60 Minutes—60 Questions

**DIRECTIONS:** Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

1. The weekly fee for staying at the Pleasant Lake Campground is \$20 per vehicle and \$10 per person. Last year, weekly fees were paid for  $v$  vehicles and  $p$  persons. Which of the following expressions gives the total amount, in dollars, collected for weekly fees last year?
  - A.  $20v + 10p$
  - B.  $20p + 10v$
  - C.  $10(v + p)$
  - D.  $30(v + p)$
  - E.  $10(v + p) + 20p$
2. If  $r = 9$ ,  $b = 5$ , and  $g = -6$ , what does  $(r + b - g)(b + g)$  equal?
  - F.  $-20$
  - G.  $-8$
  - H.  $8$
  - J.  $19$
  - K.  $20$
3. A copy machine makes 60 copies per minute. A second copy machine makes 80 copies per minute. The second machine starts making copies 2 minutes after the first machine starts. Both machines stop making copies 8 minutes after the first machine started. Together, the 2 machines made how many copies?
  - A. 480
  - B. 600
  - C. 680
  - D. 720
  - E. 960
4. Marlon is bowling in a tournament and has the highest average after 5 games, with scores of 210, 225, 254, 231, and 280. In order to maintain this exact average, what *must* be Marlon's score for his 6th game?
  - F. 200
  - G. 210
  - H. 231
  - J. 240
  - K. 245
5. Joelle earns her regular pay of \$7.50 per hour for up to 40 hours of work in a week. For each hour over 40 hours of work in a week, Joelle is paid  $1\frac{1}{2}$  times her regular pay. How much does Joelle earn for a week in which she works 42 hours?
  - A. \$126.00
  - B. \$315.00
  - C. \$322.50
  - D. \$378.00
  - E. \$472.50
6. Which of the following mathematical expressions is equivalent to the verbal expression "A number,  $x$ , squared is 39 more than the product of 10 and  $x$ " ?
  - F.  $2x = 39 + 10x$
  - G.  $2x = 39x + 10x$
  - H.  $x^2 = 39 - 10x$
  - J.  $x^2 = 39 + x^{10}$
  - K.  $x^2 = 39 + 10x$
7. If  $9(x - 9) = -11$ , then  $x = ?$ 
  - A.  $-\frac{92}{9}$
  - B.  $-\frac{20}{9}$
  - C.  $-\frac{11}{9}$
  - D.  $-\frac{2}{9}$
  - E.  $\frac{70}{9}$



8. Discount tickets to a basketball tournament sell for \$4.00 each. Enrico spent \$60.00 on discount tickets, \$37.50 less than if he had bought the tickets at the regular price. What was the regular ticket price?
- F. \$ 2.50  
G. \$ 6.40  
H. \$ 6.50  
J. \$ 7.50  
K. \$11.00
9. The expression  $(3x - 4y^2)(3x + 4y^2)$  is equivalent to:
- A.  $9x^2 - 16y^4$   
B.  $9x^2 - 8y^4$   
C.  $9x^2 + 16y^4$   
D.  $6x^2 - 16y^4$   
E.  $6x^2 - 8y^4$
10. A rectangle has an area of 32 square feet and a perimeter of 24 feet. What is the shortest of the side lengths, in feet, of the rectangle?
- F. 1  
G. 2  
H. 3  
J. 4  
K. 8
11. In  $\triangle ABC$ , the sum of the measures of  $\angle A$  and  $\angle B$  is  $47^\circ$ . What is the measure of  $\angle C$ ?
- A.  $47^\circ$   
B.  $86^\circ$   
C.  $94^\circ$   
D.  $133^\circ$   
E.  $143^\circ$
12. In the school cafeteria, students choose their lunch from 3 sandwiches, 3 soups, 4 salads, and 2 drinks. How many different lunches are possible for a student who chooses exactly 1 sandwich, 1 soup, 1 salad, and 1 drink?
- F. 2  
G. 4  
H. 12  
J. 36  
K. 72
13. For 2 consecutive integers, the result of adding the smaller integer and triple the larger integer is 79. What are the 2 integers?
- A. 18, 19  
B. 19, 20  
C. 20, 21  
D. 26, 27  
E. 39, 40
14. A function  $f(x)$  is defined as  $f(x) = -8x^2$ . What is  $f(-3)$ ?
- F. -72  
G. 72  
H. 192  
J. -576  
K. 576
15. If  $3^x = 54$ , then which of the following must be true?
- A.  $1 < x < 2$   
B.  $2 < x < 3$   
C.  $3 < x < 4$   
D.  $4 < x < 5$   
E.  $5 < x$
16. What is the least common multiple of 70, 60, and 50?
- F. 60  
G. 180  
H. 210  
J. 2,100  
K. 210,000
17. Hot Shot Electronics is designing a packing box for its new line of Acoustical Odyssey speakers. The box is a rectangular prism of length 45 centimeters, width 30 centimeters, and volume 81,000 cubic centimeters. What is the height, in centimeters, of the box?
- A. 75  
B. 60  
C. 48  
D. 27  
E. 18
18. Four points,  $A$ ,  $B$ ,  $C$ , and  $D$ , lie on a circle having a circumference of 15 units.  $B$  is 2 units counterclockwise from  $A$ .  $C$  is 5 units clockwise from  $A$ .  $D$  is 7 units clockwise from  $A$  and 8 units counterclockwise from  $A$ . What is the order of the points, starting with  $A$  and going clockwise around the circle?
- F.  $A, B, C, D$   
G.  $A, B, D, C$   
H.  $A, C, B, D$   
J.  $A, C, D, B$   
K.  $A, D, C, B$
19. A group of cells grows in number as described by the equation  $y = 16(2)^t$ , where  $t$  represents the number of days and  $y$  represents the number of cells. According to this formula, how many cells will be in the group at the end of the first 5 days?
- A. 80  
B. 160  
C. 400  
D. 512  
E. 1,280



20. The length of a rectangle is 3 times the length of a smaller rectangle. The 2 rectangles have the same width. The area of the smaller rectangle is  $A$  square units. The area of the larger rectangle is  $kA$  square units. Which of the following is the value of  $k$ ?

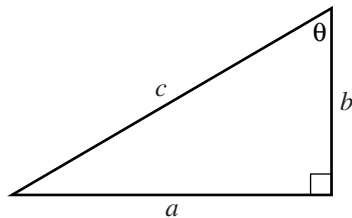
F.  $\frac{1}{9}$   
 G.  $\frac{1}{3}$   
 H. 1  
 J. 3  
 K. 9

21.  $(a + 2b + 3c) - (4a + 6b - 5c)$  is equivalent to:

A.  $-4a - 8b - 2c$   
 B.  $-4a - 4b + 8c$   
 C.  $-3a + 8b - 2c$   
 D.  $-3a - 4b - 2c$   
 E.  $-3a - 4b + 8c$

22. The dimensions of the right triangle shown below are given in feet. What is  $\sin \theta$ ?

F.  $\frac{a}{b}$   
 G.  $\frac{a}{c}$   
 H.  $\frac{b}{c}$   
 J.  $\frac{b}{a}$   
 K.  $\frac{c}{a}$



23. In a basketball passing drill, 5 basketball players stand evenly spaced around a circle. The player with the ball (the passer) passes it to another player (the receiver). The receiver cannot be the player to the passer's immediate right or left and cannot be the player who last passed the ball. A designated player begins the drill as the first passer. This player will be the receiver for the first time on which pass of the ball?

A. 4th  
 B. 5th  
 C. 6th  
 D. 10th  
 E. 24th

24. Lines  $p$  and  $n$  lie in the standard  $(x,y)$  coordinate plane. An equation for line  $p$  is  $y = 0.12x + 3,000$ . The slope of line  $n$  is 0.1 greater than the slope of line  $p$ . What is the slope of line  $n$ ?

F. 0.012  
 G. 0.02  
 H. 0.22  
 J. 1.2  
 K. 300

25. The expression  $-8x^3(7x^6 - 3x^5)$  is equivalent to:

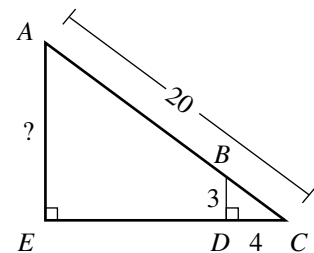
A.  $-56x^9 + 24x^8$   
 B.  $-56x^9 - 24x^8$   
 C.  $-56x^{18} + 24x^{15}$   
 D.  $-56x^{18} - 24x^{15}$   
 E.  $-32x^4$

26.  $-3|-6 + 8| = ?$

F. -42  
 G. -6  
 H. -1  
 J. 6  
 K. 42

27. In right triangle  $\triangle ACE$  below,  $\overline{BD}$  is parallel to  $\overline{AE}$ , and  $\overline{BD}$  is perpendicular to  $\overline{EC}$  at  $D$ . The length of  $\overline{AC}$  is 20 feet, the length of  $\overline{BD}$  is 3 feet, and the length of  $\overline{CD}$  is 4 feet. What is the length, in feet, of  $\overline{AE}$ ?

A. 10  
 B. 12  
 C. 15  
 D. 16  
 E. 17



28. As part of a lesson on motion, students observed a cart rolling at a constant rate along a straight line. As shown in the chart below, they recorded the distance,  $y$  feet, of the cart from a reference point at 1-second intervals from  $t = 0$  seconds to  $t = 5$  seconds.

$t$	0	1	2	3	4	5
$y$	14	19	24	29	34	39

Which of the following equations represents this data?

F.  $y = t + 14$   
 G.  $y = 5t + 9$   
 H.  $y = 5t + 14$   
 J.  $y = 14t + 5$   
 K.  $y = 19t$





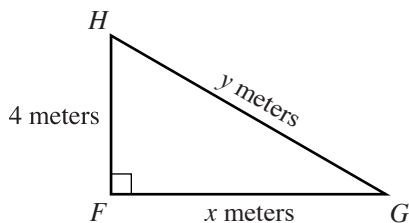
29. The inequality  $6(x + 2) > 7(x - 5)$  is equivalent to which of the following inequalities?

- A.  $x < -23$
- B.  $x < 7$
- C.  $x < 17$
- D.  $x < 37$
- E.  $x < 47$

30. The sides of a square are 3 cm long. One vertex of the square is at  $(2,0)$  on a square coordinate grid marked in centimeter units. Which of the following points could also be a vertex of the square?

- F.  $(-4, 0)$
- G.  $(0, 1)$
- H.  $(1, -1)$
- J.  $(4, 1)$
- K.  $(5, 0)$

31. For  $\triangle FGH$ , shown below, which of the following is an expression for  $y$  in terms of  $x$ ?

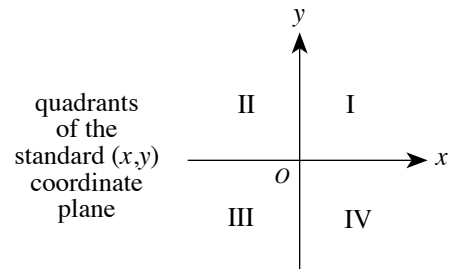


- A.  $x + 4$
- B.  $\sqrt{x^2 + 4}$
- C.  $\sqrt{x^2 + 8}$
- D.  $\sqrt{x^2 - 16}$
- E.  $\sqrt{x^2 + 16}$

32. A bag contains 12 red marbles, 5 yellow marbles, and 15 green marbles. How many additional red marbles must be added to the 32 marbles already in the bag so that the probability of randomly drawing a red marble is  $\frac{3}{5}$ ?

- F. 13
- G. 18
- H. 28
- J. 32
- K. 40

33. What are the quadrants of the standard  $(x,y)$  coordinate plane below that contain points on the graph of the equation  $4x - 2y = 8$ ?



- A. I and III only
- B. I, II, and III only
- C. I, II, and IV only
- D. I, III, and IV only
- E. II, III, and IV only

34. The graph of  $y = -5x^2 + 9$  passes through  $(1,2a)$  in the standard  $(x,y)$  coordinate plane. What is the value of  $a$ ?

- F. 2
- G. 4
- H. 7
- J. -1
- K. -8

35. Jerome, Kevin, and Seth shared a submarine sandwich. Jerome ate  $\frac{1}{2}$  of the sandwich, Kevin ate  $\frac{1}{3}$  of the sandwich, and Seth ate the rest. What is the ratio of Jerome's share to Kevin's share to Seth's share?

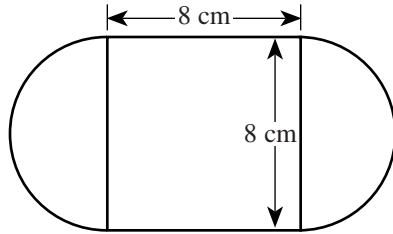
- A. 2:3:6
- B. 2:6:3
- C. 3:1:2
- D. 3:2:1
- E. 6:3:2

36. A particular circle in the standard  $(x,y)$  coordinate plane has an equation of  $(x - 5)^2 + y^2 = 38$ . What are the radius of the circle, in coordinate units, and the coordinates of the center of the circle?

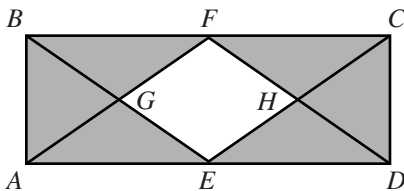
- |    | <u>radius</u> | <u>center</u> |
|----|---------------|---------------|
| F. | $\sqrt{38}$   | $(5,0)$       |
| G. | 19            | $(5,0)$       |
| H. | 38            | $(5,0)$       |
| J. | $\sqrt{38}$   | $(-5,0)$      |
| K. | 19            | $(-5,0)$      |



37. The figure below consists of a square and 2 semicircles, with dimensions as shown. What is the outside perimeter, in centimeters, of the figure?



- A.  $8 + 8\pi$   
 B.  $16 + 8\pi$   
 C.  $16 + 16\pi$   
 D.  $32 + 8\pi$   
 E.  $32 + 16\pi$
38. In the figure below, points  $E$  and  $F$  are the midpoints of sides  $\overline{AD}$  and  $\overline{BC}$  of rectangle  $ABCD$ , point  $G$  is the intersection of  $\overline{AF}$  and  $\overline{BE}$ , and point  $H$  is the intersection of  $\overline{CE}$  and  $\overline{DF}$ . The interior of  $ABCD$  except for the interior of  $EGFH$  is shaded. What is the ratio of the area of  $EGFH$  to the area of the shaded region?



- F. 1:2  
 G. 1:3  
 H. 1:4  
 J. 1:6  
 K. Cannot be determined from the given information
39. The coordinates of the endpoints of  $\overline{CD}$ , in the standard  $(x,y)$  coordinate plane, are  $(-4,-2)$  and  $(14,2)$ . What is the  $x$ -coordinate of the midpoint of  $\overline{CD}$ ?

- A. 0  
 B. 2  
 C. 5  
 D. 9  
 E. 10
40. What is the surface area, in square inches, of an 8-inch cube?

- F. 512  
 G. 384  
 H. 320  
 J. 256  
 K. 192

41. The equations below are linear equations of a system where  $a$ ,  $b$ , and  $c$  are positive integers.

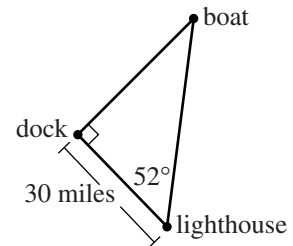
$$\begin{aligned} ay + bx &= c \\ ay - bx &= c \end{aligned}$$

Which of the following describes the graph of at least 1 such system of equations in the standard  $(x,y)$  coordinate plane?

- I. 2 parallel lines  
 II. 2 intersecting lines  
 III. A single line
- A. I only  
 B. II only  
 C. III only  
 D. I or II only  
 E. I, II, or III

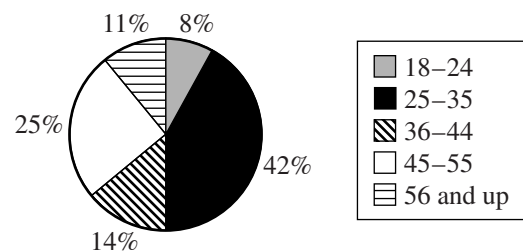
42. According to the measurements given in the figure below, which of the following expressions gives the distance, in miles, from the boat to the dock?

- F.  $30 \tan 52^\circ$   
 G.  $30 \cos 52^\circ$   
 H.  $30 \sin 52^\circ$   
 J.  $\frac{30}{\cos 52^\circ}$   
 K.  $\frac{30}{\sin 52^\circ}$



43. The circle graph below shows the distribution of registered voters, by age, for a community. Registered voters are randomly selected from this distribution to be called for jury duty. What are the odds (in the age range: not in the age range) that the first person called for jury duty is in the age range of 25–35 years?

Distribution of Registered Voters by Age

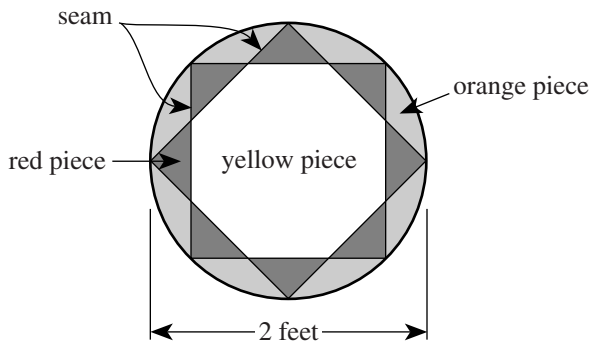


- A. 1:3  
 B. 7:8  
 C. 7:43  
 D. 21:29  
 E. 42:25



Use the following information to answer questions 44–46.

The figure below shows the design of a circular stained-glass panel on display at Hopewell's Antique Shop. Seams separate the pieces of the panel. All red triangular pieces shown are congruent and have a common vertex with each adjoining triangular piece. The 2 squares shown are inscribed in the circle. The diameter of the panel is 2 feet.



44. The design of the stained-glass panel has how many lines of symmetry in the plane of the panel?

F. 2  
G. 4  
H. 8  
J. 16  
K. Infinitely many

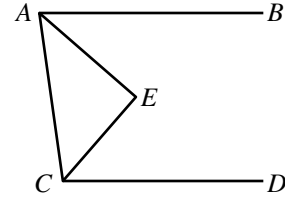
45. What is the area of the stained-glass panel, to the nearest 0.1 square foot?

A. 3.1  
B. 4.0  
C. 6.2  
D. 8.0  
E. 12.6

46. Kaya wants to install a new circular stained-glass window in her living room. The design of the window will be identical to that of the panel. The diameter of the new window will be 75% longer than the diameter of the panel. The new window will be how many feet in diameter?

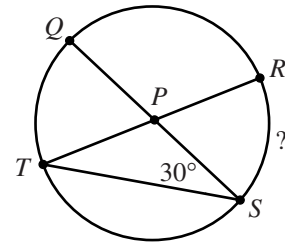
F. 1.50  
G. 2.50  
H. 2.75  
J. 3.50  
K. 4.00

47. In the figure below,  $\overline{AB} \parallel \overline{CD}$ ,  $\overline{AE}$  bisects  $\angle BAC$ , and  $\overline{CE}$  bisects  $\angle ACD$ . If the measure of  $\angle BAC$  is  $82^\circ$ , what is the measure of  $\angle AEC$ ?



- A.  $86^\circ$   
B.  $88^\circ$   
C.  $90^\circ$   
D.  $92^\circ$   
E. Cannot be determined from the given information

48. In the circle shown below, chords  $\overline{TR}$  and  $\overline{QS}$  intersect at  $P$ , which is the center of the circle, and the measure of  $\angle PST$  is  $30^\circ$ . What is the degree measure of minor arc  $\widehat{RS}$ ?



- F.  $30^\circ$   
G.  $45^\circ$   
H.  $60^\circ$   
J.  $90^\circ$   
K. Cannot be determined from the given information

49. For what value of  $a$  would the following system of equations have an infinite number of solutions?

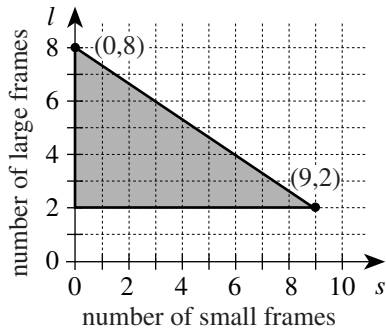
$$\begin{aligned} 2x - y &= 8 \\ 6x - 3y &= 4a \end{aligned}$$

- A. 2  
B. 6  
C. 8  
D. 24  
E. 32



Use the following information to answer questions 50–52.

Marcia makes and sells handcrafted picture frames in 2 sizes: small and large. It takes her 2 hours to make a small frame and 3 hours to make a large frame. The shaded triangular region shown below is the graph of a system of inequalities representing weekly constraints Marcia has in making the frames. For making and selling  $s$  small frames and  $l$  large frames, Marcia makes a profit of  $30s + 70l$  dollars. Marcia sells all the frames she makes.



50. The weekly constraint represented by the horizontal line segment containing  $(9, 2)$  means that each week Marcia makes a minimum of:

- F. 2 large frames.
- G. 9 large frames.
- H. 2 small frames.
- J. 9 small frames.
- K. 11 small frames.

51. For every hour that Marcia spends making frames in the second week of December each year, she donates \$3 from that week's profit to a local charity. This year, Marcia made 4 large frames and 2 small frames in that week. Which of the following is closest to the percent of that week's profit Marcia donated to the charity?

- A. 6%
- B. 12%
- C. 14%
- D. 16%
- E. 19%

52. What is the maximum profit Marcia can earn from the picture frames she makes in 1 week?

- F. \$410
- G. \$460
- H. \$540
- J. \$560
- K. \$690

53. The *determinant* of a matrix  $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$  equals  $ad - cb$ .

What must be the value of  $x$  for the matrix  $\begin{bmatrix} x & 8 \\ x & x \end{bmatrix}$  to

have a determinant of  $-16$ ?

- A.  $-4$
- B.  $-2$
- C.  $-\frac{8}{5}$
- D.  $\frac{8}{3}$
- E.  $4$

54. A formula for finding the value,  $A$  dollars, of  $P$  dollars invested at  $i\%$  interest compounded annually for  $n$  years is  $A = P(1 + 0.01i)^n$ . Which of the following is an expression for  $P$  in terms of  $i$ ,  $n$ , and  $A$ ?

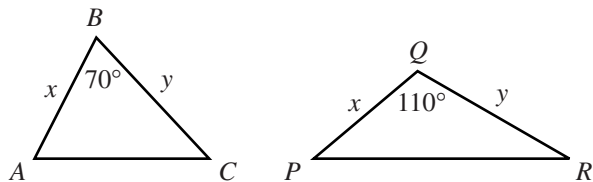
- F.  $A - 0.01i^n$
- G.  $A + 0.01i^n$
- H.  $\left(\frac{A}{1 + 0.01i}\right)^n$
- J.  $\frac{A}{(1 - 0.01i)^n}$
- K.  $\frac{A}{(1 + 0.01i)^n}$

55. If  $x$  and  $y$  are real numbers such that  $x > 1$  and  $y < -1$ , then which of the following inequalities *must* be true?

- A.  $\frac{x}{y} > 1$
- B.  $|x|^2 > |y|$
- C.  $\frac{x}{3} - 5 > \frac{y}{3} - 5$
- D.  $x^2 + 1 > y^2 + 1$
- E.  $x^{-2} > y^{-2}$



56. Triangles  $\triangle ABC$  and  $\triangle PQR$  are shown below. The given side lengths are in centimeters. The area of  $\triangle ABC$  is 30 square centimeters. What is the area of  $\triangle PQR$ , in square centimeters?



- F. 15  
G. 19  
H. 25  
J. 30  
K. 33
57. Triangle  $\triangle ABC$  is shown in the figure below. The measure of  $\angle A$  is  $40^\circ$ ,  $AB = 18$  cm, and  $AC = 12$  cm. Which of the following is the length, in centimeters, of  $\overline{BC}$ ?
- (Note: For a triangle with sides of length  $a$ ,  $b$ , and  $c$  opposite angles  $\angle A$ ,  $\angle B$ , and  $\angle C$ , respectively, the law of sines states  $\frac{\sin \angle A}{a} = \frac{\sin \angle B}{b} = \frac{\sin \angle C}{c}$  and the law of cosines states  $c^2 = a^2 + b^2 - 2ab \cos \angle C$ .)
- 
- A.  $12 \sin 40^\circ$   
B.  $18 \sin 40^\circ$   
C.  $\sqrt{18^2 - 12^2}$   
D.  $\sqrt{12^2 + 18^2}$   
E.  $\sqrt{12^2 + 18^2 - 2(12)(18) \cos 40^\circ}$
58. What is the sum of the first 4 terms of the arithmetic sequence in which the 6th term is 8 and the 10th term is 13?
- F. 10.5  
G. 14.5  
H. 18  
J. 21.25  
K. 39.5
59. In the equation  $x^2 + mx + n = 0$ ,  $m$  and  $n$  are integers. The *only* possible value for  $x$  is  $-3$ . What is the value of  $m$ ?
- A. 3  
B.  $-3$   
C. 6  
D.  $-6$   
E. 9
60. The solution set of which of the following equations is the set of real numbers that are 5 units from  $-3$ ?
- F.  $|x + 3| = 5$   
G.  $|x - 3| = 5$   
H.  $|x + 5| = 3$   
J.  $|x - 5| = 3$   
K.  $|x + 5| = 3$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

## READING TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is accompanied by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

## Passage I

**LITERARY NARRATIVE:** This passage is adapted from the short story “From Aboard the Night Train” by Kimberly M. Blaeser (©1993 by Kimberly M. Blaeser), which appeared in *Earth Song, Sky Spirit: Short Stories of the Contemporary Native American Experience*.

The passage begins with a female narrator traveling to her hometown.

The moon gives some light and I can make out the contours of the land, see the faint reflection in the lakes and ponds we pass. Several times I see or imagine I see glowing eyes staring back at me from a patch of woods beside the track. When we pass through the tiny towns, I try to read their signs, catch their names from their water towers or grain elevators. Occasionally the train stops at . . . Portage . . . Winona . . . Red Wing.

In my sleeping compartment, watching the night countryside, so much world rolls by my window. Like a voyeur I watch the various reunion scenes. I feel these scenes add up to something, some meaning or lesson about all life, and I try to put it into words for myself but find I can’t. I finally give up, roll over, go to sleep, and dream.

But now I am awake, keeping my vigil over the Midwest’s pastoral kingdom. Chicago, even Minneapolis seems a long way away. A few hours later, still in the deep night hours, the train arrives at my stop, Detroit Lakes, Minnesota, the closest I can get to my destination.

Suddenly, as I descend the two steps from the train, the porter hands me into one of the reunion scenes. “Hi, honey, how was the trip? Did you get any sleep?” “A little. Been waiting long?” “Long enough to beat your dad in two games of cribbage . . .” Glancing back at the train windows, I imagine I am looking into eyes hidden behind mirrored sunglasses.

\* \* \*

I think about progress a lot in the next few days and about what passes for progress. Nightly we walk about town, talk marriages and funerals, then sit on the newly installed benches on Main Street. Together we assemble from our memories the town as it was twenty or twenty-five years ago. We remember the little Model

Meat Market and the old Pioneer office. We rebuild the Landmark Hotel, take down the vinyl fronts from the grocery store, change the light posts, the awnings, the names of the current businesses. I put back the old depot, you the corner funeral home. But soon we are distracted and leave things half constructed when we begin to add the people, what’s-his-name, the square dance caller; Ed, the fire chief; and Lydia, the town’s best gossip. On the walk back home, we have begun to list very specific things, which is the closest we get to the intangibles: the rental meat lockers, the four-digit telephone numbers, the free ice cream during dairy month.

Late at night in my old bed, I listen to the night sounds of the house and fall asleep counting the changes that have come to my little hometown: The park is off limits after dark now, the football field is fenced in, one-hour photo has come to town along with a tanning salon and a pizza parlor. The dry goods store is gone, the dairy, long gone. People lock their houses now more than once a year when the carnival comes to town. But all of these changes pale in comparison to what has replaced the bait shop, the used car lot, and Mr. Morton’s small farm, what has sprung up on Highway 59 at the edge of town: Las Vegas-style gambling.

\* \* \*

Taking the train back, I decide to put on pajamas and crawl under the sheets, hoping to trick myself into a good night’s sleep. It seems to work. I have slept soundly for several hours, but then the dreams start. I fall in and out of them. But they are not the usual nightmares. I am in a place where folks know you ten, fifteen, twenty years after you’ve left and still see in your face that of your grandfather or aunt or cousin. I know I am home and I feel safe.

I have an early breakfast with a would-be journalist and some ski vacationers who want to talk about election prospects. I merely feign attention. I nod or laugh on cue, while I try to read upside-down a story in the would-be journalist’s newspaper that has caught my eye. It is about the Russian space station and the cosmonaut who had been up in orbit during the takeover attempt and ultimate dissolution of the Soviet Union. After sixteen long months, they are bringing the capsule back. While the train carries me back to my current home and away from my former, I keep thinking about

that poor cosmonaut coming back to find his whole world changed, to find himself a man without a country—at least without the country he left behind.

85 I watch the ten o'clock national news broadcast. I see him emerge from the capsule. I see him try to stand and have his knees buckle. I know they said it was because he hadn't been able to exercise for such a long time, but I wonder if his weak-kneed feeling might not  
90 have more to do with what he saw out the window of the space station and with how the world was happening around without him.

1. The point of view from which the passage is told is best described as that of:
  - A. a young adult riding a train through the small towns of the Upper Midwest.
  - B. a young adult preparing to move away from her hometown.
  - C. an adult missing the new home she has established.
  - D. an adult reflecting on the past and pondering the present.
2. The passage contains recurring references to all of the following EXCEPT:
  - F. dreams.
  - G. reunion scenes.
  - H. photographs.
  - J. train trips.
3. The first three paragraphs (lines 1–21) establish all of the following about the narrator EXCEPT that she is:
  - A. passing through a number of towns.
  - B. originally from Chicago.
  - C. traveling by train.
  - D. observant of the landscape.
4. It can reasonably be inferred from the passage that the narrator thinks her hometown has:
  - F. improved significantly over the years.
  - G. made little genuine progress.
  - H. remained about the same as it was years ago.
  - J. a chance of being rebuilt as it used to be.
5. Based on the narrator's account, all of the following were part of the past, rather than the present, in her hometown EXCEPT:
  - A. four-digit phone numbers.
  - B. the fenced-in football field.
  - C. free ice cream during dairy month.
  - D. the depot.
6. According to the narrator, which of the following businesses is relatively new to her hometown?
  - F. The tanning salon
  - G. The bait shop
  - H. The dry goods store
  - J. The used-car lot
7. When the narrator refers to the cosmonaut as "a man without a country" (lines 83–84), she is most likely directly referring to the:
  - A. cosmonaut's feeling that he is now a citizen of space, not the former Soviet Union.
  - B. cosmonaut's unrealized expectation that he will be treated like a hero.
  - C. political transformation that occurred while the cosmonaut was in space.
  - D. sixteen months that the cosmonaut spent in orbit around Earth.
8. Details in the passage most strongly suggest that the people meeting the narrator at the train station include:
  - F. her father.
  - G. her sister.
  - H. a neighbor.
  - J. a journalist.
9. The narrator indicates that the most significant change to her hometown has been the addition of:
  - A. square dancing.
  - B. vinyl storefronts.
  - C. benches on Main Street.
  - D. Las Vegas-style gambling.
10. According to the passage, news reports attributed the cosmonaut's knees buckling to:
  - F. his gratitude at being back on Earth.
  - G. political changes in the world.
  - H. a lack of exercise.
  - J. his dismay at what he had seen from the space station.

## Passage II

**SOCIAL SCIENCE:** This passage is adapted from the article “Green Music in the Rain Forest” by Suzanne Charlé, which appeared in the Fall 2002 *Ford Foundation Report*.

OELA is an acronym based on Portuguese words rather than the English words used in this article. A *luthier* is a maker of stringed musical instruments.

The Amazonian Workshop School for Fabrication of Stringed Instruments (OELA) is a small part of a larger effort to create a sustainable harvest of the great Amazon forest and to give employment to the region’s  
5 burgeoning population.

“Few people know that the Amazon is one of the most rapidly urbanizing regions of the world,” observes José Gabriel López, a Ford Foundation program officer in Brazil. The city of Manaus, for example, has grown  
10 in the past decade from 850,000 to 1.5 million. “This rural-urban migration and the resultant urban shantytowns stand as living symbols of failed or nonexistent rural development policies,” López says. “In many  
15 places, small-scale rural producers have been abandoned—devoid of health and education services, credit, technical assistance and opportunity. What Rubens Gomes, founder of the workshop school, and his colleagues have created in Manaus is hope.”

Gomes knows how to build hope. The school, he  
20 notes proudly, is the first to make stringed instruments in the Amazon. And it is the first in all of the Americas to construct instruments exclusively of lumber harvested in an environmentally and socially sustainable manner certified by the Forest Stewardship Council.

“Officially, there are 30 million cubic meters of wood cut in the Amazon annually,” Gomes says. “Twenty million of this is wasted—sawdust, scraps, unwanted wood left to rot. And those are the official  
25 numbers. The motive of this school is to transform what is lost into things of value. Many people could do this—but there are no schools teaching carpentry in the Amazon.”

OELA is meant to help fill the void. To graduate, each student must make a stringed instrument. All the  
35 guitars are made from certified wood. Gomes explains that traditionally, Brazilian rosewood and ebony were used in the construction of guitars. But because of intense harvesting, these trees are close to extinction. “I’ve been working for years, trying to find Amazon  
40 woods that are unknown on the market, that are in plentiful supply and that can be used in instrument making,” Gomes says. He experimented with dozens before he found types that have the right strength and sound. (Like other master luthiers, he can tell by touching  
45 the wood whether it will reverberate well.) Once he identified the woods as possible substitutes, he sent them to a laboratory to be tested for the right grain and density. Today, *Brosimum rubescens* is substituted for rosewood, *Aniba canellila* for ebony, and *Protium*  
50 species for Brazilian mahogany and cedar. These and

some 25 other undervalued tropical hardwoods have found their way into the luthiers’ workshop, taking the pressure off the better-known woods.

For the past year, master luthier Raúl Lage from  
55 the Fernando Ortiz Instrument-Making School of the Cuban Music Institute has been working with the students. There are hurdles, he cautions, a number of them technical. The high humidity in Manaus means that the wood will crack in drier climates unless properly  
60 treated. Glue frequently doesn’t hold. These problems are slowly being resolved.

There is also a major obstacle outside the workshop: The resistance of buyers to new woods. Thus far, most of the instruments have been sold to environmentalists, some of whom “adopt” a student by paying his  
65 or her tuition; the student’s “project guitar” is then given to the donor as a gift.

There is also the possibility of contract work from outside the Amazon. Gomes’s hopes were raised  
70 recently when the president of a well-known guitar company based in Nashville, Tennessee, ordered 15 guitars to be auctioned off for the Rainforest Alliance.

Lage cautions that it will be a long time before any  
75 of the students can command a master luthier’s fee. “There is a saying,” Lage says. “Anyone can make one good guitar; it takes a master to make one every time.”

José Lucio do Nascimento Rabelo, director of the technical school, says, “By learning this skill, students  
80 come to look at the forest in a new way; there are ways other than logging for plywood and firewood to earn a living, to better the life of the people.” One of the woods being used as a replacement for the precious rosewood, he notes, is typically used to make charcoal.

Such an appreciation for the forest, says Rabelo,  
85 could have a huge effect on the survival of the rain forest; some 80 percent of the students come from other parts of the state of Amazonas, and virtually all of them return to their home towns. “Some,” he adds, “go on to  
90 become politicians who will have a direct influence on the future of the forest.”

11. Which of the following assumptions would be most critical for a reader to accept in order to agree fully with the author’s claims in the passage?
- A. Shantytowns in the Amazon need to be relocated if the forest is to be saved.
  - B. Learning to make consistently good guitars requires access to the best materials available.
  - C. Small-scale rural producers in the Amazon can help preserve the forest by being innovative.
  - D. Consumers outside of the Amazon can do little to help prevent deforestation.



12. In the context of the passage, the statement “All the guitars are made from certified wood” (lines 34–35) most nearly suggests that Gomes’s workshop:
- F. uses environmentally sustainable woods in its guitars.
  - G. isn’t doing enough to stop unnecessary deforestation in the Amazon.
  - H. has little chance of pleasing both musicians and environmentalists.
  - J. uses only traditional woods in making its guitars.
13. It can most reasonably be inferred from the passage that regarding OELA, the author feels:
- A. skeptical of the workshop’s aims.
  - B. dismayed by the workshop’s low productivity.
  - C. supportive of the workshop’s goals.
  - D. confident that the workshop could be duplicated in other places.
14. The main purpose of the second paragraph (lines 6–18) is to:
- F. draw attention to the Amazon’s tremendous population growth.
  - G. explain the necessity for ventures such as Gomes’s.
  - H. explain the presence of the Ford Foundation in the Amazon.
  - J. justify raising taxes to increase social services in the Amazon.
15. The main function of the fifth paragraph (lines 33–53) is to:
- A. demonstrate the woodworking skills required to be a master luthier.
  - B. explore the limitations of science as compared to intuition.
  - C. outline the scientific reasons why one type of wood cannot be replaced by another.
  - D. show that experiments led to the discovery of good substitutes for rare woods.
16. The passage notes all of the following as problems that the fledgling Amazon guitar industry has experienced EXCEPT that:
- F. glue on the guitars sometimes doesn’t hold.
  - G. the wood used may crack in drier climates.
  - H. woods usable for guitars have become extinct.
  - J. buyers resist guitars made with nontraditional woods.
17. The passage indicates that, as a group, the OELA students may impact the survival of the rain forests because most of them:
- A. care deeply enough about music to spend their lives making musical instruments.
  - B. will return to their homes and spread their environmental knowledge.
  - C. are willing to endure personal hardships in order to use their new skills.
  - D. will have political careers after they return home.
18. In the passage, Gomes indicates that of the wood cut in the Amazon rain forest each year, approximately how much wood is wasted?
- F. One-fourth
  - G. One-third
  - H. One-half
  - J. Two-thirds
19. The passage states that all of the following are woods traditionally used for making stringed instruments EXCEPT:
- A. Aniba canellila.
  - B. rosewood.
  - C. Brazilian mahogany.
  - D. ebony.
20. According to the passage, when an OELA student is “adopted,” he or she receives:
- F. tuition.
  - G. room and board.
  - H. food and clothing.
  - J. a musical instrument.

## Passage III

**HUMANITIES:** This passage is adapted from the article “Finding Philosophy” by Colin McGinn (©2003 by Prospect).

*Descartes* (line 63) refers to René Descartes (1596–1650), a French mathematician, philosopher, and scientist.

I have been an academic philosopher for the past 30 years. I came from an academically disinclined background in the northeast of England, my relatives being mainly coalminers and other manual workers. I was the first in my family to attend university, and indeed had no thought of it until age 17, when a teacher mentioned it at school. My father had become a successful builder, so we were not materially deprived, and it was expected that I would become some sort of technical worker. The idea that I might one day become a professional philosopher was inconceivable in those days, to me and everyone else. I was simply not living in a place where that kind of thing ever happened; it was far likelier—though still not at all likely—that I would become a pop star (I played drums in a rock band).

The paperback British edition of my memoir *The Making of a Philosopher* has a photograph on the cover of a man sitting on a bench, placed in a grey and listless landscape. He is overlooking the sea on a misty grim day, and the atmosphere is bleak and melancholy. The man, hunched up, immobile, coiled almost, has a pensive posture, as if frozen in thought. This picture is based on a story I tell in the book about sitting on a bench in Blackpool, aged 18, pondering the metaphysical question of how objects relate to their properties. Is an object just the sum total of its properties, a mere coalescence of general features, or does it somehow lie behind its properties, supporting them, a solid peg on which they happen to hang? When I look at an object do I really see the object itself, or just the appearance its properties offer to me? I remember the feeling of fixation that came over me when I thought about these questions—a kind of floating fascination, a still perplexity.

When I look back on this period in my late teens, I recall the harnessing of undirected mental energy by intellectual pursuits. Up until then, my mental energy had gone into things like reading *Melody Maker*, which contained fairly serious articles about pop musicians; I always knew the top 20 off by heart, and studied the articles about drummers intensely, hoping to improve my own technique. I suspect that this kind of swashing mental energy is fairly typical of boys that age. School doesn't seem to connect with it, and it goes off in search of some object of interest, often trivial, sometimes destructive. In my case, it was philosophy that seized that energy and converted it into a passion—though one that took several years to form fully. It is a delicate and fastidious energy that I am speaking of, despite its power, and it will only be satisfied by certain employments, which of course vary from person to person. I had had a similar passion for chemistry when

I was ten, and for butterflies and lizards before that. How to harness such passions to formal education remains a great and unresolved problem.

It was—of course—a teacher who tapped into my formless and fizzing mental energy. Mr Marsh, teacher of divinity, brimmingly Christian, a man with very active eyebrows and sharp enunciation, in love with scholarship (oh, how he relished that word)—it was he who first brought out my inner philosopher. From him I heard of Descartes, locked up in his room, wondering whether anything could really be known beyond his own existence. But what I mainly got from the enthusiastic Mr Marsh was the desire to study. His own passion for study shone through, and he managed to make it seem, if not glamorous, then at least exhilarating—when done the right way and in the right spirit. Pencils and stationery were made to seem like shiny tools, and the pleasure of making one's mark on a blank sheet of paper hymned. Choosing a good spot to study was emphasised. Above all, I learned a very valuable lesson, one that had hitherto escaped me: make notes. Thinking and writing should be indissoluble activities, the hand ministering to the thought, the thought shaped by the hand. Today, if I find myself without pen and paper and thoughts start to arrive, my fingers begin to twitch and I long for those implements of cogitation. With such rudimentary tools you can perform the miracle of turning an invisible thought into a concrete mark, bringing the ethereal interior into the public external world, refining it into something precious and permanent. The physical pleasure of writing, which I find survives in the use of a computer, is something worth dwelling on in matters of education.

21. The passage is best described as being told from the point of view of a philosopher who is:
- A. discussing metaphysical questions that have troubled philosophers since the time of Descartes.
  - B. presenting in chronological order the key events in his thirty-year professional career.
  - C. reflecting on his own early, developing interest in philosophy and in scholarship generally.
  - D. advising professional educators on how to get more students to study philosophy.
22. Based on the passage, which of the following was most likely the first to engage the author's passionate interest?
- F. Drumming
  - G. Philosophy
  - H. Chemistry
  - J. Butterflies

23. The main purpose of the last paragraph is to:
- A. reveal the enduring impact of Mr. Marsh’s lessons on the author.
  - B. acknowledge that the author came to doubt some of Mr. Marsh’s teachings.
  - C. describe a typical class as taught by Mr. Marsh.
  - D. present a biographical sketch of Mr. Marsh.
24. The passage indicates that the man in the book-cover photograph represents:
- F. Descartes, wondering what could be known.
  - G. Mr. Marsh, deep in scholarly thought.
  - H. the author at age seventeen, thinking about enrolling in college.
  - J. the author at age eighteen, contemplating a philosophical issue.
25. The author mentions *Melody Maker*, the top 20, and articles about musicians primarily to suggest that his:
- A. early interest in music has remained with him to the present.
  - B. time spent playing music should instead have been spent reading.
  - C. fascination with pop music and musicians gave focus to his life for a time.
  - D. commitment to study enabled him to perfect his drumming technique.
26. In the third paragraph (lines 36–56), the author most nearly characterizes the energy he refers to as:
- F. potent yet difficult to channel in a constructive way.
  - G. powerful and typically leading to destructive results.
  - H. delicate and inevitably wasted in trivial undertakings.
  - J. gentle yet capable of uniting people who have different interests.
27. Viewed in the context of the passage, the statement in lines 55–56 is most likely intended to suggest that:
- A. schools should require students to take philosophy courses.
  - B. students can become passionate when learning about science in school.
  - C. schools need to keep searching for ways to tap into students’ deeply held interests.
  - D. students should resolve to take school courses that interest them.
28. The author calls pen and paper “rudimentary tools” (line 80) as part of his argument that:
- F. the use of computers has made the use of pen and paper obsolete.
  - G. students should become skilled with pen and paper before moving on to better tools.
  - H. while writing with pen and paper can be pleasant, it can also be physically painful.
  - J. although seemingly simple, pen and paper allow people to perform great feats.
29. In the context of the passage, lines 17–23 are best described as presenting images of:
- A. gloom, tension, and fascination.
  - B. anger, bitterness, and betrayal.
  - C. stillness, peacefulness, and relaxation.
  - D. frustration, surprise, and satisfaction.
30. Which of the following does NOT reasonably describe the transition the author presents in lines 80–84?
- F. Precious to commonplace
  - G. Fleeting to permanent
  - H. Invisible to visible
  - J. Private to public

## Passage IV

**NATURAL SCIENCE:** This passage is adapted from *Consider the Eel* by Richard Schweid (©2002 by Richard Schweid).

The known facts, as they are pretty much universally accepted among biologists and naturalists today, are that all the eels in all the rivers of eastern North America and the Caribbean countries, and all the eels in all the rivers of eastern and western Europe, are born in the same area of the Sargasso Sea, a huge area within the Atlantic Ocean, between Bermuda and the Azores, the surface of which is frequently covered with sargassum seaweed. In fact, the word “Sargasso” comes from the Portuguese *sargaço*, meaning seaweed. The sea is about 2,000 miles long and 1,000 miles wide, set off from the surrounding waters of the Atlantic by strong currents. It includes the area known in popular legend as the Bermuda Triangle.

Eels hatch in the Sargasso as larvae and are carried by the ocean currents to either Europe or the United States, a journey that can cover thousands of miles and take years. Where they end up depends on which of two similar species they belong to. Those that are *Anguilla anguilla* invariably wind up in European rivers, and those that enter North American rivers always belong to the species *Anguilla rostrata*. The first person to find eel larvae in the Sargasso Sea was Danish researcher Johannes Schmidt, who published his findings in 1924, after spending 18 years hauling nets in search of eels.

The larvae of both species are shaped like small oval leaves and are called leptocephali. Each leptocephalus begins to assume the form of a tiny eel, called an elver or glass eel, when it gets close to the coasts of either Europe or the Americas. By the time it reaches brackish water, where fresh and salt water mix, it is thin and transparent, hardly bigger than a hair, with a pair of eyes like black dots at one end.

From the estuaries and mouths of rivers, the tiny eels frequently continue upstream, particularly the females, who sometimes go great distances inland. American eels have been found as far up the Mississippi River system as the rivers of Iowa. They keep going upriver until something tells them they’ve reached home, and then they stop. Whatever it is that signals to eels that they are home is definitive—they settle in and live there for as long as 20 years, growing up to a yard long before beginning their journey back to the Sargasso Sea. Scientists determine an eel’s age using a microscope to read the growth rings of its otolith—a small, hard calcium deposit at the base of its skull.

In preparation for the return journey to the Sargasso, sexually mature female eels feed voraciously and change color from the muddy-yellow/green of adult eels, often called yellow eels, to a darker green on top and snow-white on their bellies. At this stage, they are called silver eels. They swim downriver in the fall, on the first leg of their journey to the Sargasso, and when

they reach estuarine waters, they rest, completing their final transformation as silver eels. They will have eaten heavily and will be about 28 percent body fat. They will never eat again, and their digestive systems will atrophy. Their pupils will expand and turn blue. They will need a new kind of sight adapted to the depths of the sea, where there is little light. They will also have to go through a drastic adjustment, via osmosis, in their blood chemistry, to prepare for the tremendous change in water pressure, going from some 14 pounds of freshwater pressure per inch of their bodies to over a ton of ocean pressure per inch. Once they are back in the Sargasso Sea, the females produce eggs for the males to fertilize, and then the adults die.

At least that is what today’s marine biologists and naturalists tell us, although adult eels have never been seen swimming, reproducing, or dying in the Sargasso. In fact, live adult eels have never been seen there at all. The only two adult eels ever reported in the Sargasso Sea were dead, found in the stomachs of other fish. The eel’s migration back to its birthplace and what it actually does when it gets there are assumed to take place far below the water’s surface and, as of the year 2001, were still completely unobserved. However, the eel larvae—the leptocephali that Schmidt found in the Sargasso—were so small that it was certain they had been born recently, and nearby. Such small larvae have never been seen elsewhere, and while eels have never been observed reproducing in the Sargasso, they have never been seen doing so anywhere else either. Scientists believe the larvae hatch out of eggs at a depth of 100–300 yards and rise slowly toward the light at the sea’s surface.

31. One of the main ideas established by the passage is that:
- A. researchers have nearly exhausted their resources after spending decades investigating the Sargasso Sea.
  - B. significant gaps still remain in researchers’ understanding of the life cycle of eels.
  - C. eels live their entire lives in the Sargasso Sea, but no one has ever seen them there.
  - D. female eels turn into silver eels toward the end of their lives.
32. Learning about which of the following had the largest impact on scientists’ current understanding of where eels breed?
- F. The direction in which ocean currents carry eel larvae
  - G. The relationship of the yellow eel stage to the silver eel stage
  - H. Schmidt’s discovery of eel larvae in the Sargasso Sea
  - J. The adult eels found in the stomachs of other fish

33. The main purpose of the fourth paragraph (lines 34–47) is to describe the:
- A. eels' transition from freshwater to the ocean.
  - B. method of determining the age of eels.
  - C. complexity of the Mississippi River system.
  - D. river stage of the eel life cycle.
34. The passage states that the Sargasso Sea is set off from the rest of the Atlantic Ocean by:
- F. the Azores.
  - G. several Caribbean countries.
  - H. powerful winds.
  - J. strong currents.
35. The passage notes that the Sargasso Sea includes:
- A. the eastern North American shore.
  - B. the Bermuda Triangle.
  - C. certain coastal estuaries.
  - D. the mouth of the Mississippi River.
36. As it is used in line 13, the word *popular* most nearly means:
- F. well liked.
  - G. commonly known.
  - H. scientifically accepted.
  - J. most admired.
37. As it is used in line 45, the word *read* most nearly means to:
- A. learn from print.
  - B. observe.
  - C. think about.
  - D. predict.
38. The passage indicates that female eels' pupils expand and turn blue because the eels:
- F. must adapt to see in an environment with much less light than they are used to.
  - G. are about to undergo a change in their blood chemistry.
  - H. no longer need to be able to recognize food sources since they have stopped eating.
  - J. need to be able to recognize the male eels that will fertilize their eggs.
39. The passage most strongly emphasizes that the process of osmosis is necessary for the eels' transition from:
- A. shallower to deeper water.
  - B. feeding to nonfeeding.
  - C. immature to mature form.
  - D. elver to yellow eel.
40. According to the passage, which of the following characteristics of the eel larvae found by Schmidt provided the best evidence that the larvae were hatched in the Sargasso Sea?
- F. Size
  - G. Shape
  - H. Color
  - J. Species

**END OF TEST 3**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**

**DO NOT RETURN TO A PREVIOUS TEST.**



## SCIENCE TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

## Passage I

Finch beak depth (see Figure 1) is an *inherited* trait (it can be passed from parents to offspring).



Figure 1

Researchers studied the beak depth of 2 species of finches, *Geospiza fortis* and *Geospiza fuliginosa*. Both species live on Island A. *G. fortis* alone lives on Island B, and *G. fuliginosa* alone lives on Island C. For both species, the primary food is seeds. Birds with shallower beaks can efficiently crush and eat only small seeds. Birds with deeper beaks can crush and eat both large and small seeds, but they prefer small seeds.

## Study 1

Researchers captured 100 *G. fortis* finches and 100 *G. fuliginosa* finches on Island A. They tagged each bird, measured its beak depth, and released it. Then they calculated the percent of birds having each of the beak depths that had been measured. The researchers followed the same procedures with 100 *G. fortis* finches from Island B and 100 *G. fuliginosa* finches from Island C. The results of this study are shown in Figure 2.

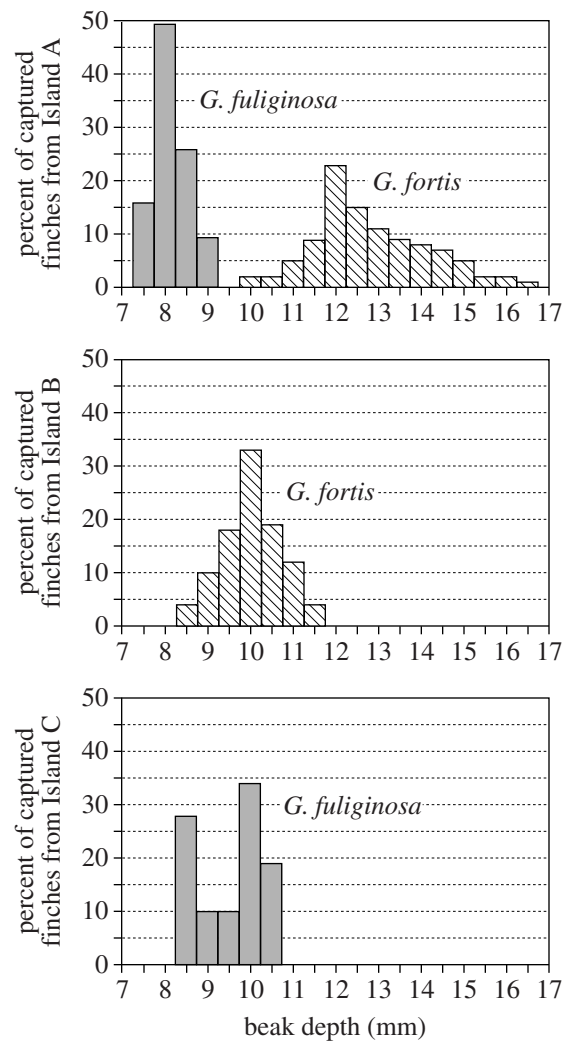


Figure 2

## Study 2

After completing Study 1, the researchers returned to Island B each of the next 10 years, from 1976 to 1985. During each visit, the researchers captured at least 50 *G. fortis* finches and measured their beak depths. Then



they calculated the average *G. fortis* beak depth for each of the 10 years. The researchers noted that, during the 10-year period, 3 years were exceptionally dry, and 1 year was very wet (see Figure 3). Small seeds are abundant during wet years. During dry years, all seeds are less abundant, and the average size of the available seeds is larger.

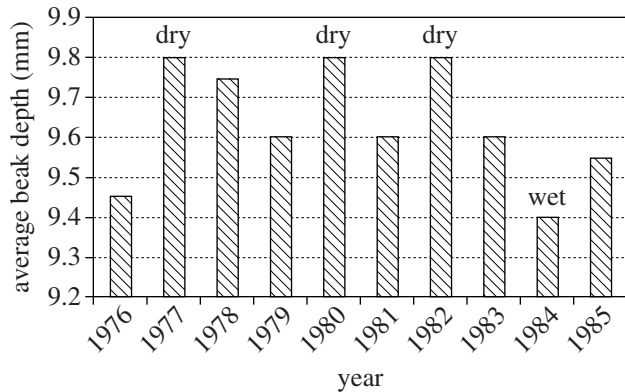


Figure 3

Figures adapted from Neil A. Campbell, Jane B. Reece, and Lawrence G. Mitchell, *Biology*, 5th ed. ©1999 by Benjamin/Cummings.

- Based on the results of Study 1, the highest percent of finches on Island B and Island C had a beak depth of:
 

	Island B	Island C
A.	8 mm	8 mm
B.	9 mm	12 mm
C.	10 mm	8 mm
D.	10 mm	10 mm
- During which of the following years were small seeds likely most abundant on Island B ?
  - 1977
  - 1980
  - 1982
  - 1984
- Study 1 differed from Study 2 in which of the following ways?
  - G. fortis* finches were captured during Study 1 but not during Study 2.
  - G. fuliginosa* finches were captured during Study 1 but not during Study 2.
  - The beak depth of captured birds was measured during Study 1 but not during Study 2.
  - The beak depth of captured birds was measured during Study 2 but not during Study 1.
- It is most likely that the researchers tagged the birds that they captured during Study 1 to:
  - determine how beak depth was affected by rainfall on Island A.
  - determine the average age of each finch population.
  - ensure that the beak depth of each finch was measured multiple times during Study 1.
  - ensure that the beak depth of each finch was measured only once during Study 1.
- Based on the results of Study 2, would a finch with a beak depth of 9.4 mm or a finch with a beak depth of 9.9 mm more likely have had a greater chance of survival during 1977 ?
  - A finch with a beak depth of 9.4 mm, because, on average, the size of available seeds is larger during dry years.
  - A finch with a beak depth of 9.4 mm, because, on average, the size of available seeds is smaller during dry years.
  - A finch with a beak depth of 9.9 mm, because, on average, the size of available seeds is larger during dry years.
  - A finch with a beak depth of 9.9 mm, because, on average, the size of available seeds is smaller during dry years.
- A researcher hypothesized that there would be more variation in the beak depths measured for the *G. fortis* finches when they were forced to compete with another finch species for seeds. Do the results of Study 1 support this hypothesis?
  - Yes; the range of beak depths measured for *G. fortis* finches was greater on Island A than on Island B.
  - Yes; the range of beak depths measured for *G. fortis* finches was greater on Island B than on Island A.
  - No; the range of beak depths measured for *G. fortis* finches was greater on Island A than on Island B.
  - No; the range of beak depths measured for *G. fortis* finches was greater on Island B than on Island A.

**Passage II**

Substances in the atmosphere, such as  $\text{Cu}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Cl}^-$ , and  $\text{SO}_4^{2-}$  ions, are carried down to Earth's surface by precipitation. This process is known as *wet deposition*.  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$  ions are put into the atmosphere by high-temperature combustion processes. The presence of  $\text{Cl}^-$  and  $\text{SO}_4^{2-}$  ions in the atmosphere can be attributed to road-salt dust and electrical power generation, respectively.

**Study 1**

A rain gauge, placed on the roof of a 1-story building, at a specific urban site was used to collect precipitation over a 12-month period. At the same time each evening, the amount of precipitation in the rain gauge was recorded, after which the collected precipitation was emptied from the gauge and stored. (Assume no measurable evaporation occurred during any day.) Figure 1 shows the measured monthly precipitation in centimeters.

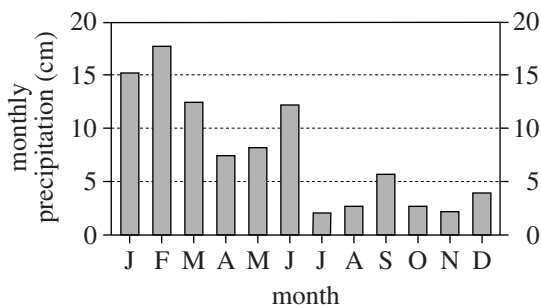


Figure 1

At the end of each month, all the samples collected during that month were mixed, and some of this combined sample was analyzed for the concentrations of  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$  ions. Using these data, the monthly wet deposition of each substance, in micrograms ( $\mu\text{g}$ ) per meter<sup>2</sup>, was calculated (see Figure 2).

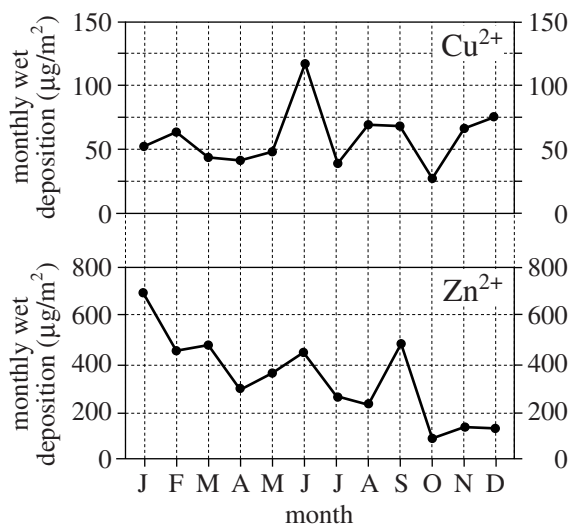


Figure 2

**Study 2**

Another portion of the combined sample for each month was analyzed for the concentrations of  $\text{Cl}^-$  and  $\text{SO}_4^{2-}$  ions. Using these data, the monthly wet deposition of each substance, in milliequivalents (meq) per m<sup>2</sup>, was calculated (see Figure 3).

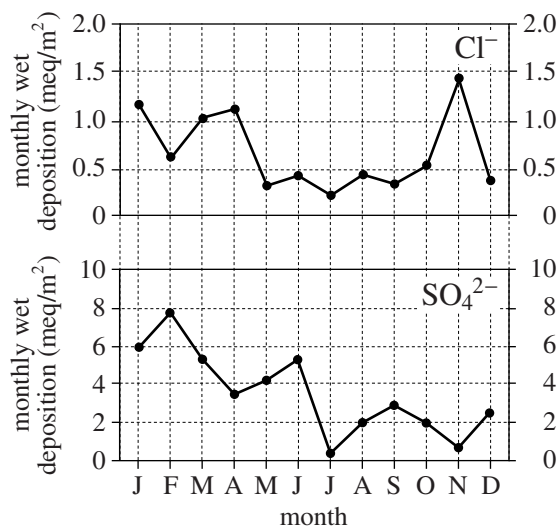


Figure 3

**Study 3**

The *annual* wet deposition of  $\text{Cu}^{2+}$  and of  $\text{Zn}^{2+}$  for the 12-month period, in  $\mu\text{g}/\text{m}^2$ , was calculated for the urban site (the source of the  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$ ) and also for Rural Sites 1 and 2, located 50 km and 100 km east, respectively, of the urban site (see Figure 4).

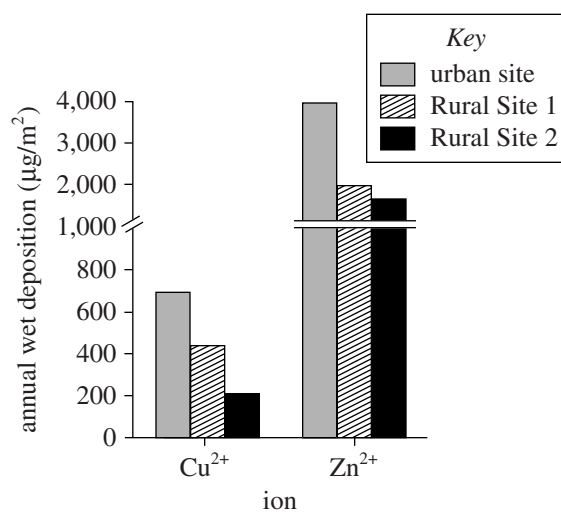


Figure 4

Figures adapted from Kathryn Conko et al., "Atmospheric Wet Deposition of Trace Elements to a Suburban Environment, Reston, Virginia, USA." ©2004 by Elsevier, Ltd.





7. According to Figure 1, over the 12-month period, the monthly precipitation at the urban site was maximum in February and minimum in July. According to Figures 2 and 3, the wet deposition of which ion was also maximum in February and minimum in July?
- A.  $\text{Cu}^{2+}$
  - B.  $\text{Zn}^{2+}$
  - C.  $\text{Cl}^-$
  - D.  $\text{SO}_4^{2-}$
8. Based on the results of Study 1, the average monthly wet deposition for  $\text{Cu}^{2+}$  over the 12-month period was:
- F. less than  $50 \mu\text{g}/\text{m}^2$ .
  - G. between  $50 \mu\text{g}/\text{m}^2$  and  $75 \mu\text{g}/\text{m}^2$ .
  - H. between  $75 \mu\text{g}/\text{m}^2$  and  $100 \mu\text{g}/\text{m}^2$ .
  - J. greater than  $100 \mu\text{g}/\text{m}^2$ .
9. Is the statement “The values for  $\text{Cl}^-$  wet deposition were greater during the winter and early spring when road salt is typically applied” supported by the results of Study 2 ?
- A. Yes, because  $\text{Cl}^-$  wet deposition values were, on average, greater from November to April than they were from May to October.
  - B. Yes, because  $\text{Cl}^-$  wet deposition values were, on average, less from November to April than they were from May to October.
  - C. No, because  $\text{Cl}^-$  wet deposition values were, on average, greater from November to April than they were from May to October.
  - D. No, because  $\text{Cl}^-$  wet deposition values were, on average, less from November to April than they were from May to October.
10. Suppose there had been no precipitation during 1 entire month of the 12-month period. Based on the information provided, during that month there would have been:
- F. significant wet deposition of all 4 substances.
  - G. significant wet deposition of  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$ , but no wet deposition of  $\text{Cl}^-$  and  $\text{SO}_4^{2-}$ .
  - H. no wet deposition of any of the 4 substances.
  - J. no wet deposition of  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$ , but significant wet deposition of  $\text{Cl}^-$  and  $\text{SO}_4^{2-}$ .
11. According to Study 3, as distance from the urban site increased, the annual wet deposition:
- A. increased for both  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$ .
  - B. increased for  $\text{Cu}^{2+}$  but decreased for  $\text{Zn}^{2+}$ .
  - C. decreased for both  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$ .
  - D. remained the same for both  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$ .
12. Which of the following variables was kept constant in Study 2 ?
- F. Site
  - G. Monthly rainfall
  - H. Wet deposition of  $\text{Zn}^{2+}$
  - J. Wet deposition of  $\text{Cl}^-$



### Passage III

Cloud cover is the percent of Earth’s surface covered by clouds. Cloud cover may increase because of an increase in the *cosmic ray flux* (number of high-energy particles from space reaching Earth per m<sup>2</sup> per hour). Table 1 shows how Earth’s cover of *low clouds* (0 km to 3.2 km altitude) varies with the cosmic ray flux. Figures 1–3 show the *relative cosmic ray flux*, RCRF (the percent below the flux measured on October 1, 1965), and the monthly average cover of *high clouds* (6.0 km to 16.0 km altitude), *middle clouds* (3.2 km to 6.0 km altitude), and low clouds, respectively, from January 1980 to January 1995.

Cosmic ray flux (particles/m <sup>2</sup> /hr)	Cover of low clouds (%)
340,000	27.8
360,000	28.1
380,000	28.4
400,000	28.7
420,000	29.0

Table 1 adapted from E. Palle Bagó and C. J. Butler, “The Influence of Cosmic Rays on Terrestrial Clouds and Global Warming.” ©2000 by Institute of Physics Publications, Ltd.

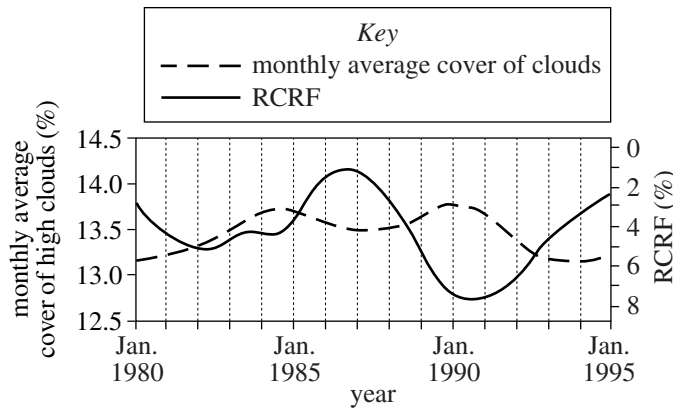


Figure 1

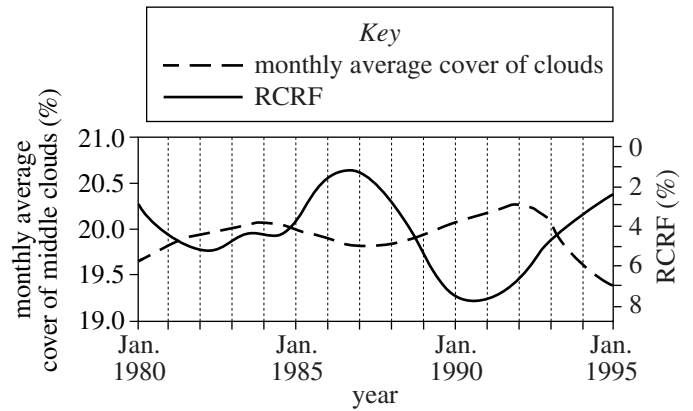


Figure 2

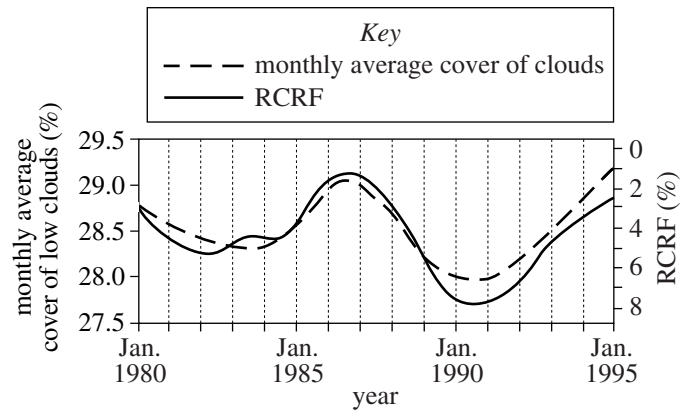


Figure 3

Figures adapted from Nigel Marsh and Henrik Svensmark, “Low Cloud Properties Influenced by Cosmic Rays.” ©2000 by The American Physical Society.



13. The percent of Earth's surface covered by high clouds in January 1987 was closest to which of the following?
- 13.0%
  - 13.5%
  - 14.0%
  - 14.5%
14. Based on Table 1, a cosmic ray flux of 440,000 particles/m<sup>2</sup>/hr would correspond to a cover of low clouds that is closest to which of the following?
- 28.7%
  - 29.0%
  - 29.3%
  - 29.6%
15. Is the statement "The monthly average cover of low clouds is more directly correlated with cosmic ray flux than is the monthly average cover of high clouds" consistent with Figures 1 and 3 ?
- Yes, because the plot for the monthly average cover of low clouds more closely parallels the plot for RCRF.
  - Yes, because the plot for the monthly average cover of high clouds more closely parallels the plot for RCRF.
  - No, because the plot for the monthly average cover of low clouds more closely parallels the plot for RCRF.
  - No, because the plot for the monthly average cover of high clouds more closely parallels the plot for RCRF.
16. Which of the following figures best represents the monthly average cover of high, middle, and low clouds in January 1992 ?
- F.**
- H.**
- G.**
- J.**
17. High clouds are composed primarily of ice crystals, whereas low clouds are composed primarily of water droplets. This difference is most likely because the average air temperature at altitudes from:
- 0 km to 3.2 km is at or below 0°C, whereas the average air temperature at altitudes from 3.2 km to 6.0 km is above 0°C.
  - 0 km to 3.2 km is at or below 0°C, whereas the average air temperature at altitudes from 6.0 km to 16.0 km is above 0°C.
  - 0 km to 3.2 km is above 0°C, whereas the average air temperature at altitudes from 3.2 km to 6.0 km is at or below 0°C.
  - 0 km to 3.2 km is above 0°C, whereas the average air temperature at altitudes from 6.0 km to 16.0 km is at or below 0°C.

**Passage IV**

*Acid-base titration* is a technique in which precise volumes of a *titrant* (an acid or base solution) are added incrementally to a known volume of a *sample solution* (a base or acid solution, respectively). This process can be monitored by adding an *acid-base indicator* (a substance that changes color over a certain pH range) to the sample solution or by measuring the sample solution's *conductivity*. Conductivity (measured in kilosiemens per centimeter, kS/cm) is a measure of a substance's ability to conduct electricity.

Two titration experiments were done at 25°C using a 0.10 M sodium hydroxide (NaOH) solution and either a 0.0010 M hydrochloric acid (HCl) solution or a 0.0010 M acetic acid solution (where M is moles of acid or base per liter of solution). All solutions were aqueous. An acid-base indicator solution of *nitrazine yellow* was also used. Nitrazine yellow is yellow if the pH is less than 6.0 or blue if the pH is greater than 7.0.

**Experiment 1**

A drop of nitrazine yellow solution was added to a flask containing 100.0 mL of the HCl solution. A probe that measures conductivity was placed in the solution. The NaOH solution was slowly added to the HCl solution in small increments. After each addition, the HCl solution was stirred and then the solution's color and conductivity were recorded (see Figure 1).

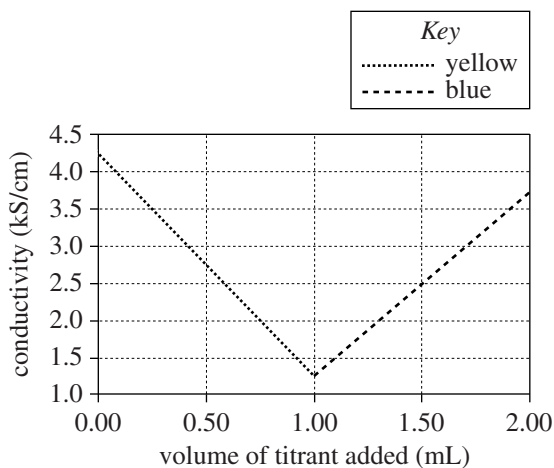


Figure 1

**Experiment 2**

Experiment 1 was repeated, except that the acetic acid solution was used instead of the HCl solution (see Figure 2).

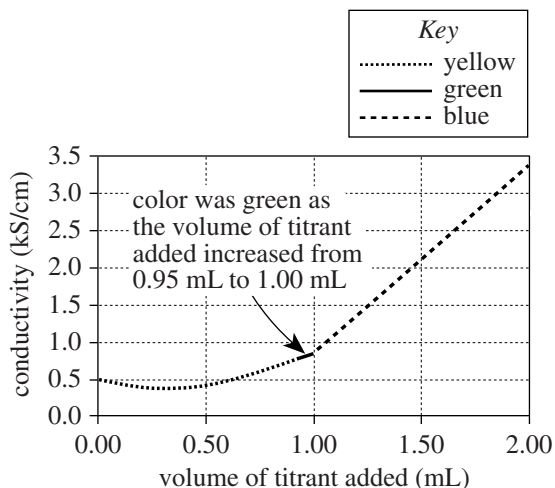


Figure 2

Figures adapted from J. West Loveland, "Conductance and Oscillography," in Gary D. Christian and James E. O'Reilly, eds., *Instrumental Analysis*, 2nd ed. ©1986 by Allyn and Bacon, Inc.

18. In Experiment 1, the sample solution was yellow at which of the following values for the volume of titrant added?

- F. 0.80 mL
- G. 1.20 mL
- H. 1.60 mL
- J. 2.00 mL

19. In Experiment 2, the sample solution was neutral at which of the following values for the volume of titrant added?

- A. 0.50 mL
- B. 1.00 mL
- C. 1.50 mL
- D. 2.00 mL



20. In Experiment 1, if 2.30 mL of titrant had been added to the sample solution, the conductivity would most likely have been:
- F. less than 0.80 kS/cm.
  - G. between 0.80 kS/cm and 2.30 kS/cm.
  - H. between 2.30 kS/cm and 3.80 kS/cm.
  - J. greater than 3.80 kS/cm.
21. In Experiment 2, which solution was the titrant and which solution was the sample solution?
- | <u>titrant</u> | <u>sample solution</u> |
|----------------|------------------------|
| A. acetic acid | NaOH                   |
| B. HCl         | NaOH                   |
| C. NaOH        | acetic acid            |
| D. NaOH        | HCl                    |
22. In Experiments 1 and 2, the probe that was placed in the sample solution most likely did which of the following?
- F. Cooled the solution to its freezing point
  - G. Heated the solution to its boiling point
  - H. Detected the concentration of nitrazine yellow in the solution
  - J. Passed an electrical current through a portion of the solution
23. A chemist claimed that in Experiment 2, the pH of the sample solution was greater at a value of 0.2 mL of titrant added than at a value of 1.8 mL of titrant added. Do the results of Experiment 2 support this claim?
- A. No; at a value of 0.2 mL of titrant added, the sample solution was yellow, and at a value of 1.8 mL of titrant added, the sample solution was blue.
  - B. No; at a value of 0.2 mL of titrant added, the sample solution was blue, and at a value of 1.8 mL of titrant added, the sample solution was yellow.
  - C. Yes; at a value of 0.2 mL of titrant added, the sample solution was yellow, and at a value of 1.8 mL of titrant added, the sample solution was blue.
  - D. Yes; at a value of 0.2 mL of titrant added, the sample solution was blue, and at a value of 1.8 mL of titrant added, the sample solution was yellow.

**Passage V**

An astronomy class is given the following facts about stellar evolution.

1. A star's evolution can be divided into 3 stages: *pre-main sequence* (pre-MS), *main sequence* (MS), and *post-main sequence* (post-MS).
2. Gravity causes part of a cloud of gas and dust to collapse and heat up, creating a pre-MS star. The star's hot dust and gas emit its energy.
3. A pre-MS star becomes an MS star when the star produces the majority of its energy by fusing hydrogen nuclei (protons) at its center to make helium nuclei.
4. An MS star becomes a post-MS star when the star expands in volume and produces the majority of its energy by fusing hydrogen to make helium in a shell surrounding its center.
5. The more massive a star, the more rapidly the star passes through each of the 3 stages of its evolution.

Two students discuss the evolution of the *Algol system*—Algol A, a 3.6-solar-mass MS star; Algol B, a 0.8-solar-mass post-MS star; and Algol C, a 1.7-solar-mass MS star. (One solar mass = the Sun's mass.) The 3 stars orbit a mutual center of mass, with Algol A and Algol B much closer to each other and to the center of mass than to Algol C.

*Student 1*

The 3 stars of the Algol system formed at the same time from the same cloud of gas and dust. Algol B, originally the most massive of the 3 stars, became a post-MS star and expanded in volume while Algol A remained an MS star. Because the matter in the outer parts of Algol B was more strongly attracted to Algol A than to the matter in the inner parts of Algol B, this matter flowed from Algol B to Algol A, and, over time, Algol A became more massive than Algol B.

*Student 2*

Algol B was not part of the original Algol system (Algol A and Algol C). Algol B and the original Algol system formed in different clouds of gas and dust at different times and moved in 2 different but intersecting orbits around the center of the galaxy. During a particular orbit, Algol B encountered the original Algol system at the intersection of the 2 orbits and became part of the Algol system.

Algol B became a post-MS star while Algol A and Algol C remained MS stars. Algol B never lost mass to Algol A. Algol B was always less massive than Algol A.

24. Based on Student 2's discussion, Algol B is part of the present Algol system because of which of the following forces exerted on Algol B by the original Algol system?
  - F. Electric force
  - G. Magnetic force
  - H. Gravitational force
  - J. Nuclear force
25. Based on Student 1's discussion and Fact 4, while matter flowed between Algol A and Algol B, Algol B produced the majority of its energy by fusing:
  - A. hydrogen nuclei to make helium nuclei at its center.
  - B. hydrogen nuclei to make helium nuclei in a shell surrounding its center.
  - C. helium nuclei to make hydrogen nuclei at its center.
  - D. helium nuclei to make hydrogen nuclei in a shell surrounding its center.
26. Suppose that chemical composition is uniform among stars formed from the same cloud of gas and dust, but that chemical composition varies among stars formed from different clouds of gas and dust. Student 2 would most likely agree with which of the following statements comparing the chemical compositions of the stars in the present-day Algol system at the time they formed?
  - F. Algol A and Algol B had the most similar compositions.
  - G. Algol A and Algol C had the most similar compositions.
  - H. Algol B and Algol C had the most similar compositions.
  - J. Algol A, Algol B, and Algol C had the same composition.
27. If the mass of the Sun is  $2.0 \times 10^{30}$  kg, what is the mass of Algol C?
  - A.  $1.6 \times 10^{30}$  kg
  - B.  $2.0 \times 10^{30}$  kg
  - C.  $3.4 \times 10^{30}$  kg
  - D.  $7.2 \times 10^{30}$  kg
28. Which of the following statements best explains why the reaction described in Fact 3 requires a high temperature and pressure?
  - F. All protons are positively charged, and like charges attract each other.
  - G. All protons are positively charged, and like charges repel each other.
  - H. All electrons are negatively charged, and like charges attract each other.
  - J. All electrons are negatively charged, and like charges repel each other.

**4****4**

29. Based on Fact 5 and Student 1's discussion, which of the 3 stars in the Algol system, if any, was most likely the first to become an MS star?
- A. Algol A
  - B. Algol B
  - C. Algol C
  - D. The 3 stars became MS stars at the same time.

30. Based on Fact 5, would Student 2 agree that by the time Algol A stops being an MS star, Algol A will have spent as much time being an MS star as Algol B spent being an MS star?
- F. Yes, because according to Student 2, Algol A has always been more massive than Algol B.
  - G. Yes, because according to Student 2, Algol A has always been less massive than Algol B.
  - H. No, because according to Student 2, Algol A has always been more massive than Algol B.
  - J. No, because according to Student 2, Algol A has always been less massive than Algol B.

**Passage VI**

Three experiments were done using CO<sub>2</sub>, krypton (Kr), or O<sub>2</sub>. For each gas:

1. A 3 L steel vessel was fitted with a cap that contained a gas inlet valve and a pressure and temperature sensor.
2. Air was pumped out of the vessel until the pressure measured 0.00 torr.
3. The vessel was placed on a balance, and the balance was reset to 0.000 g.
4. Some of the gas was added to the vessel.
5. When the gas in the vessel reached room temperature (22°C), mass and pressure were recorded.
6. Steps 4 and 5 were repeated several times.

The experiments were then repeated, except that a 6 L vessel was used (see Figures 1 and 2).

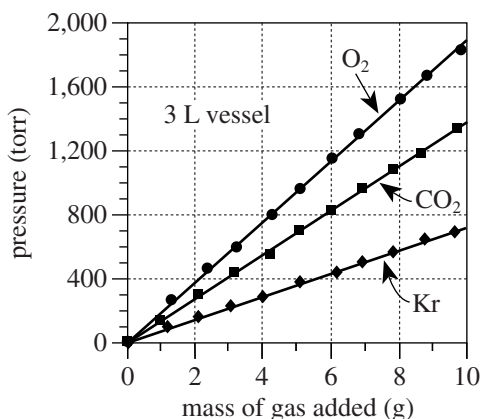


Figure 1

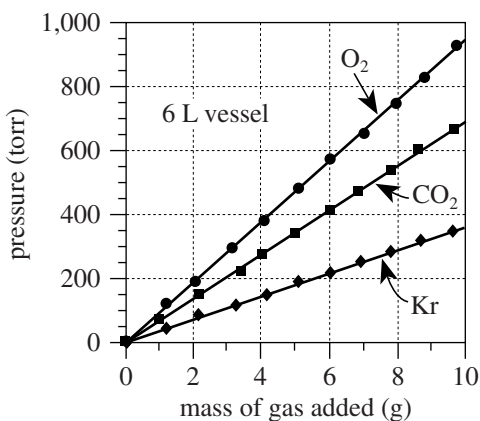


Figure 2

31. Based on Figure 2, if 13 g of Kr had been added to the 6 L vessel, the pressure would have been:
  - A. less than 200 torr.
  - B. between 200 torr and 400 torr.
  - C. between 400 torr and 600 torr.
  - D. greater than 600 torr.
32. Suppose the experiments had been repeated, except with a 5 L vessel. Based on Figures 1 and 2, the pressure exerted by 7 g of CO<sub>2</sub> would most likely have been:
  - F. less than 500 torr.
  - G. between 500 torr and 1,000 torr.
  - H. between 1,000 torr and 1,500 torr.
  - J. greater than 1,500 torr.
33. Based on Figures 1 and 2, for a given mass of O<sub>2</sub> at 22°C, how does the pressure exerted by the O<sub>2</sub> in a 6 L vessel compare to the pressure exerted by the O<sub>2</sub> in a 3 L vessel? In the 6 L vessel, the O<sub>2</sub> pressure will be:
  - A.  $\frac{1}{2}$  as great as in the 3 L vessel.
  - B. the same as in the 3 L vessel.
  - C. 2 times as great as in the 3 L vessel.
  - D. 4 times as great as in the 3 L vessel.
34. Which of the following best explains why equal masses of O<sub>2</sub> and CO<sub>2</sub> at the same temperature and in the same-size vessel had different pressures? The pressure exerted by the O<sub>2</sub> was:
  - F. less, because there were fewer O<sub>2</sub> molecules per gram than there were CO<sub>2</sub> molecules per gram.
  - G. less, because there were more O<sub>2</sub> molecules per gram than there were CO<sub>2</sub> molecules per gram.
  - H. greater, because there were fewer O<sub>2</sub> molecules per gram than there were CO<sub>2</sub> molecules per gram.
  - J. greater, because there were more O<sub>2</sub> molecules per gram than there were CO<sub>2</sub> molecules per gram.
35. Suppose the experiment involving O<sub>2</sub> and the 6 L vessel had been repeated, except at a room temperature of 14°C. For a given mass of O<sub>2</sub>, compared to the pressure measured in the original experiment, the pressure measured at 14°C would have been:
  - A. less, because pressure is directly proportional to temperature.
  - B. less, because pressure is inversely proportional to temperature.
  - C. greater, because pressure is directly proportional to temperature.
  - D. greater, because pressure is inversely proportional to temperature.





### Passage VII

The *human threshold of hearing* is the minimum intensity at each sound frequency required for a sound to be heard by humans. The *human threshold of pain* is the maximum intensity at each sound frequency that humans can tolerate without pain.

The figure below displays, for sounds in water and in air, the human thresholds of hearing and of pain. The figure also shows  $S$ , the percent increase in air density and water density that accompanies the compression of air and water by sound waves of given intensities. Sound intensities are given in decibels (db) and frequencies are given in hertz [(Hz); 1 Hz = 1 cycle/sec].

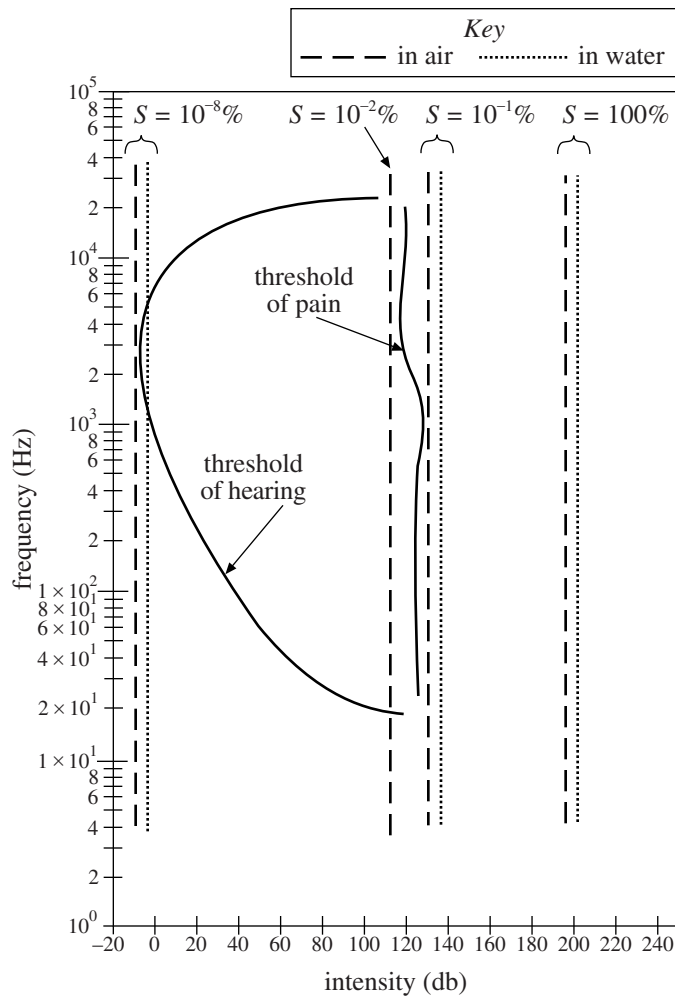
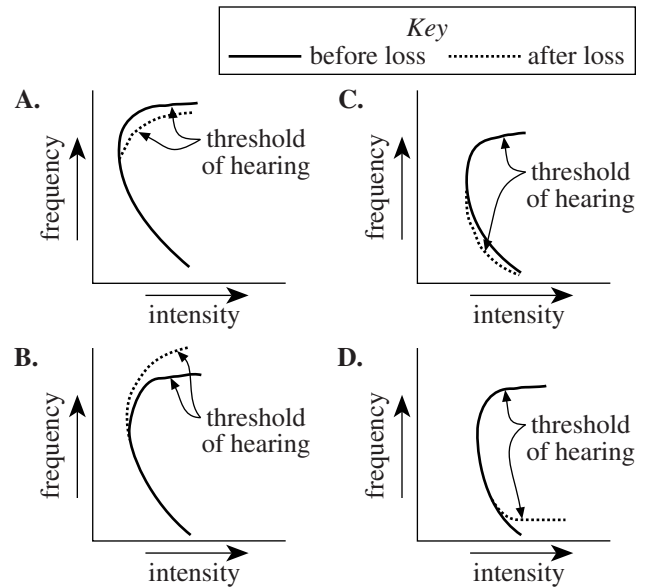


Figure adapted from Rita G. Lerner and George L. Trigg, eds., *Encyclopedia of Physics*, 2nd ed. ©1991 by VCH Publishers, Inc.

36. According to the figure, which of the following is closest to the lowest frequency that can be heard by a human being?
- F. 8 Hz
  - G. 20 Hz
  - H. 1,000 Hz
  - J. 20,000 Hz

37. As humans age, it is common for selective hearing loss to occur at high sound frequencies. Which of the following figures best illustrates this loss?



38. Based on the figure, a sound of a given frequency will have the highest intensity for which of the following sets of conditions?

Sound is passing through:		$S$
F.	water	100%
G.	water	$10^{-8}\%$
H.	air	100%
J.	air	$10^{-8}\%$

39. A student hypothesized that sounds of any intensity at a frequency of  $10^5$  Hz would be painful for humans to hear. Do the data in the figure support this hypothesis?
- A. Yes, because the threshold of pain is relatively constant with changes in frequency.
  - B. Yes, because as frequency increases above  $10^5$  Hz, the threshold of pain increases.
  - C. No, because humans cannot hear sounds at  $10^5$  Hz.
  - D. No, because the threshold of pain is relatively constant with changes in frequency.
40. Based on the figure, does  $S$  depend on the frequency of a sound wave of a given intensity?
- F. Yes, because as frequency increases,  $S$  increases.
  - G. Yes, because as frequency increases,  $S$  remains constant.
  - H. No, because as frequency increases,  $S$  increases.
  - J. No, because as frequency increases,  $S$  remains constant.

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

**If you plan to take the ACT Plus Writing, sharpen your pencils and continue with the Writing Test on page 53.**

**If you do not plan to take the ACT Plus Writing, skip to page 55 for instructions on scoring your multiple-choice tests.**

## Practice Writing Test

Your Signature: \_\_\_\_\_  
(Do not print.)

Print Your Name Here: \_\_\_\_\_

Your Date of Birth:									
<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Month		Day		Year					

# Form 14R

The **ACT**<sup>®</sup>

# WRITING TEST BOOKLET

**You must take the multiple-choice tests before you take the Writing Test.**

## Directions

This is a test of your writing skills. You will have thirty (30) minutes to write an essay in English. Before you begin planning and writing your essay, read the writing prompt carefully to understand exactly what you are being asked to do. Your essay will be evaluated on the evidence it provides of your ability to express judgments by taking a position on the issue in the writing prompt; to maintain a focus on the topic throughout the essay; to develop a position by using logical reasoning and by supporting your ideas; to organize ideas in a logical way; and to use language clearly and effectively according to the conventions of standard written English.

You may use the unlined pages in this test booklet to plan your essay. These pages will not be scored. ***You must write your essay in pencil on the lined pages in the answer folder.*** Your writing on those lined pages will be scored. You may not need all the lined pages, but to ensure you have enough room to finish, do NOT skip lines. You may write corrections or additions neatly between the lines of your essay, but do NOT write in the margins of the lined pages. ***Illegible essays cannot be scored, so you must write (or print) clearly.***

If you finish before time is called, you may review your work. Lay your pencil down immediately when time is called.

**DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.**

**ACT**<sup>®</sup>

PO BOX 168  
IOWA CITY, IA 52243-0168

©2014 by ACT, Inc. All rights reserved.

NOTE: This test material is the confidential copyrighted property of ACT, Inc., and may not be copied, reproduced, sold, or otherwise transferred without the prior express written permission of ACT, Inc. Violators of ACT's copyrights are subject to civil and criminal penalties.

## ACT Writing Test Prompt

Rather than concentrating on doing one thing at a time, high school students often divide their attention among several activities, such as watching television and using the computer while doing homework. Educators debate whether performing several tasks at the same time is too distracting when students are doing homework. Some educators believe multitasking is a bad practice when doing homework because they think dividing attention between multiple tasks negatively affects the quality of students' work. Other educators do not believe multitasking is a bad practice when doing homework because they think students accomplish more during their limited free time as a result of multitasking. In your opinion, is it too distracting for high school students to divide their attention among several activities when they are doing homework?

In your essay, take a position on this question. You may write about either one of the two points of view given, or you may present a different point of view on this question. Use specific reasons and examples to support your position.

### Note

- For your practice essay, you will need scratch paper to plan your essay and four lined sheets of paper for your response.
- On test day, you will receive a test booklet with space to plan your essay and four lined pages on which to write your response.
- Read pages 61–62 for information and instructions on scoring your practice Writing Test.

# 5 Scoring Your Tests

## How to Score the Multiple-Choice Tests

Follow the instructions below and on the following pages to score your practice multiple-choice tests and review your performance.

### Raw Scores

The number of questions you answered correctly on each test and in each subscore area is your raw score. Because there are many forms of the ACT, each with different questions, some forms will be slightly easier (and some slightly harder) than others. A raw score of 67 on one form of the English Test, for example, may be about as difficult to earn as a raw score of 70 on another form of that test.

To compute your raw scores, check your answers with the scoring keys on pages 56–57. Count the number of correct answers for each of the four tests and seven subscore areas, and enter the number in the blanks provided on those pages. These numbers are your raw scores on the tests and subscore areas.

### Scale Scores

To adjust for the small differences that occur among different forms of the ACT, the raw scores for tests and subscore areas are converted into *scale scores*. Scale scores are printed on the reports sent to you and your college and scholarship choices.

When your raw scores are converted into scale scores, it becomes possible to compare your scores with those of examinees who took different test forms. For example, a scale score of 26 on the English Test has the same meaning regardless of the form of the ACT on which it is based.

To determine the scale scores corresponding to your raw scores on the practice test, use the tables explaining procedures used to obtain scale scores from raw scores on pages 58–59. Table 1 on page 58 shows the raw-to-scale score conversions for each test, and Table 2 on page 59 shows the raw-to-scale score conversions for the subscore areas. Because each form of the ACT is unique, each form has somewhat different conversion tables. Consequently, these tables provide only approximations of the raw-to-scale score conversions that would apply if a different form of the ACT were taken. Therefore, the scale scores obtained from the practice tests don't match precisely the scale scores received from an actual administration of the ACT.

### Computing the Composite Score

The Composite score is the average of the four scale scores in English, Mathematics, Reading, and Science. If you left any of these tests blank, do not calculate a Composite score. If you take the ACT Plus Writing, your Writing results do **not** affect your Composite score.

### Comparing Your Scores

You may want to know how your scores compare to the scores of other students who took the ACT.

Table 3A on page 60 lets you compare your scores on the practice multiple-choice tests with the scores of recent high school graduates who took the ACT. The numbers reported are cumulative percents. A cumulative percent is the percent of students who scored *at or below* a given score. If a Composite score of 20 has a cumulative percent of 48, this means that 48% of students had a Composite score of 20 or lower.

Your scores and percent at or below are only *estimates* of the scores that you will receive during an actual administration of the ACT. Test scores are only one indicator of your level of learning. Consider your scores in connection with your grades, your performance in outside activities, and your career interests.

### College Readiness Standards

The College Readiness Standards describe the types of skills, strategies, and understandings you will need to make a successful transition from high school to college. For English, Mathematics, Reading, and Science, standards are provided for six score ranges that reflect the progression and complexity of the skills in each of the academic areas measured by the ACT tests. For Writing, standards are provided for five score ranges. The College Readiness Standards and benchmark scores for each test can be found at [www.act.org/standard](http://www.act.org/standard) and [www.act.org/education/benchmarks.html](http://www.act.org/education/benchmarks.html).

## Reviewing Your Performance on the Practice Multiple-Choice Tests

Consider the following as you review your scores.

- Did you run out of time? Reread the information in this booklet on pacing yourself. You may need to adjust the way you use your time in responding to the questions.
- Did you spend too much time trying to understand the directions for the tests? The directions for the practice tests are the same directions that will appear in your test booklet on test day. Make sure you understand them before test day.
- Review the questions that you missed. Did you select a response that was an incomplete answer or that did not directly respond to the question being asked? Try to figure out what you overlooked in answering the questions.
- Did a particular type of question confuse you? Did the questions you missed come from a particular subscore area? In reviewing your responses, check to see whether a particular type of question or a particular subscore area was more difficult for you.

### Scoring Keys for the ACT Practice Tests

Use the scoring key for each test to score your answer document for the multiple-choice tests. Mark a "1" in the blank for each question you answered correctly. Add up the numbers in each subscore area and enter the total number correct for each subscore area in the blanks provided. Also enter the total number correct for each test in the blanks provided. The total number correct for each test is the sum of the number correct in each subscore area.

#### Test 1: English—Scoring Key

	Key	Subscore Area*			Key	Subscore Area*	
		UM	RH			UM	RH
1.	B	___		39.	C		___
2.	J	___		40.	J		___
3.	D		___	41.	B	___	
4.	F	___		42.	F		___
5.	B		___	43.	B	___	
6.	J	___		44.	J		___
7.	D		___	45.	A	___	
8.	F	___		46.	J	___	
9.	A		___	47.	C	___	
10.	H	___		48.	F		___
11.	A		___	49.	B	___	
12.	H	___		50.	F	___	
13.	D	___		51.	B		___
14.	G	___		52.	J		___
15.	B		___	53.	D	___	
16.	G	___		54.	H		___
17.	C	___		55.	A	___	
18.	G		___	56.	H	___	
19.	D		___	57.	B		___
20.	F		___	58.	H	___	
21.	B	___		59.	A		___
22.	J	___		60.	G		___
23.	C	___		61.	A	___	
24.	F		___	62.	H	___	
25.	C	___		63.	A	___	
26.	G	___		64.	H		___
27.	A		___	65.	D		___
28.	G		___	66.	G		___
29.	C		___	67.	A		___
30.	J		___	68.	J		___
31.	B		___	69.	A		___
32.	J		___	70.	G	___	
33.	D		___	71.	D	___	
34.	H	___		72.	J	___	
35.	B	___		73.	C	___	
36.	H	___		74.	G	___	
37.	C	___		75.	D		___
38.	F	___					

Number Correct (Raw Score) for:	
Usage/Mechanics (UM) Subscore Area	___ (40)
Rhetorical Skills (RH) Subscore Area	___ (35)
Total Number Correct for English Test (UM + RH)	___ (75)

\*UM = Usage/Mechanics  
RH = Rhetorical Skills

1267C

#### Test 2: Mathematics—Scoring Key

	Key	Subscore Area*				Key	Subscore Area*		
		EA	AG	GT			EA	AG	GT
1.	A	___			35.	D			___
2.	F	___			36.	F			___
3.	E	___			37.	B			___
4.	J	___			38.	G			___
5.	C	___			39.	C			___
6.	K	___			40.	G			___
7.	E	___			41.	B			___
8.	H	___			42.	F			___
9.	A	___			43.	D	___		
10.	J			___	44.	H			___
11.	D			___	45.	A			___
12.	K	___			46.	J	___		
13.	B	___			47.	C			___
14.	F		___		48.	H			___
15.	C		___		49.	B			___
16.	J	___			50.	F			___
17.	B			___	51.	C	___		
18.	J			___	52.	J			___
19.	D	___			53.	E			___
20.	J			___	54.	K	___		
21.	E	___			55.	C	___		
22.	G			___	56.	J			___
23.	B	___			57.	E			___
24.	H		___		58.	G			___
25.	A		___		59.	C	___		
26.	G	___			60.	F			___
27.	B			___					
28.	H		___						
29.	E		___						
30.	K		___						
31.	E			___					
32.	G	___							
33.	D		___						
34.	F		___						

Number Correct (Raw Score) for:	
Pre-Alg./Elem. Alg. (EA) Subscore Area	___ (24)
Inter. Alg./Coord. Geo. (AG) Subscore Area	___ (18)
Plane Geo./Trig. (GT) Subscore Area	___ (18)
Total Number Correct for Math Test (EA + AG + GT)	___ (60)

\*EA = Pre-Algebra/Elementary Algebra  
AG = Intermediate Algebra/Coordinate Geometry  
GT = Plane Geometry/Trigonometry

1267C

**Test 3: Reading—Scoring Key**

Subscore Area*			Subscore Area*			Subscore Area*		
Key	SS	AL	Key	SS	AL	Key	SS	AL
1.	D	_____	15.	D	_____	29.	A	_____
2.	H	_____	16.	H	_____	30.	F	_____
3.	B	_____	17.	B	_____	31.	B	_____
4.	G	_____	18.	J	_____	32.	H	_____
5.	B	_____	19.	A	_____	33.	D	_____
6.	F	_____	20.	F	_____	34.	J	_____
7.	C	_____	21.	C	_____	35.	B	_____
8.	F	_____	22.	J	_____	36.	G	_____
9.	D	_____	23.	A	_____	37.	B	_____
10.	H	_____	24.	J	_____	38.	F	_____
11.	C	_____	25.	C	_____	39.	A	_____
12.	F	_____	26.	F	_____	40.	F	_____
13.	C	_____	27.	C	_____			
14.	G	_____	28.	J	_____			

Number Correct (Raw Score) for:	
Social Studies/Sciences (SS) Subscore Area	_____ (20)
Arts/Literature (AL) Subscore Area	_____ (20)
Total Number Correct for Reading Test (SS + AL)	_____ (40)

\*SS = Social Studies/Sciences  
AL = Arts/Literature

**Test 4: Science—Scoring Key**

Key	Key	Key
1. D _____	15. A _____	29. B _____
2. J _____	16. G _____	30. H _____
3. B _____	17. D _____	31. C _____
4. J _____	18. F _____	32. G _____
5. C _____	19. B _____	33. A _____
6. F _____	20. J _____	34. J _____
7. D _____	21. C _____	35. A _____
8. G _____	22. J _____	36. G _____
9. A _____	23. A _____	37. A _____
10. H _____	24. H _____	38. F _____
11. C _____	25. B _____	39. C _____
12. F _____	26. G _____	40. J _____
13. B _____	27. C _____	
14. H _____	28. G _____	

Number Correct (Raw Score) for:	
Total Number Correct for Science Test	_____ (40)

**TABLE 1****Explanation of Procedures Used to Obtain Scale Scores from Raw Scores**

On each of the four multiple-choice tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

<b>ACT Test 67C</b>	<b>Your Scale Score</b>
English	_____
Mathematics	_____
Reading	_____
Science	_____
<hr/>	
<b>Sum of scores</b>	_____
<b>Composite score (sum ÷ 4)</b>	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

<b>Scale Score</b>	<b>Raw Scores</b>				<b>Scale Score</b>
	<b>Test 1 English</b>	<b>Test 2 Mathematics</b>	<b>Test 3 Reading</b>	<b>Test 4 Science</b>	
<b>36</b>	75	59-60	40	40	<b>36</b>
<b>35</b>	73-74	57-58	39	39	<b>35</b>
<b>34</b>	71-72	55-56	38	38	<b>34</b>
<b>33</b>	70	54	—	37	<b>33</b>
<b>32</b>	69	53	37	—	<b>32</b>
<b>31</b>	68	52	36	36	<b>31</b>
<b>30</b>	67	50-51	35	35	<b>30</b>
<b>29</b>	66	49	34	34	<b>29</b>
<b>28</b>	64-65	47-48	33	33	<b>28</b>
<b>27</b>	62-63	45-46	32	31-32	<b>27</b>
<b>26</b>	60-61	43-44	31	30	<b>26</b>
<b>25</b>	58-59	41-42	30	28-29	<b>25</b>
<b>24</b>	56-57	38-40	29	26-27	<b>24</b>
<b>23</b>	53-55	36-37	27-28	24-25	<b>23</b>
<b>22</b>	51-52	34-35	26	23	<b>22</b>
<b>21</b>	48-50	33	25	21-22	<b>21</b>
<b>20</b>	45-47	31-32	23-24	19-20	<b>20</b>
<b>19</b>	42-44	29-30	22	17-18	<b>19</b>
<b>18</b>	40-41	27-28	20-21	16	<b>18</b>
<b>17</b>	38-39	24-26	19	14-15	<b>17</b>
<b>16</b>	35-37	19-23	18	13	<b>16</b>
<b>15</b>	33-34	15-18	16-17	12	<b>15</b>
<b>14</b>	30-32	12-14	14-15	11	<b>14</b>
<b>13</b>	29	10-11	13	10	<b>13</b>
<b>12</b>	27-28	8-9	11-12	9	<b>12</b>
<b>11</b>	25-26	6-7	9-10	8	<b>11</b>
<b>10</b>	23-24	5	8	7	<b>10</b>
<b>9</b>	20-22	4	7	6	<b>9</b>
<b>8</b>	17-19	—	6	5	<b>8</b>
<b>7</b>	14-16	3	5	4	<b>7</b>
<b>6</b>	11-13	—	4	3	<b>6</b>
<b>5</b>	9-10	2	3	—	<b>5</b>
<b>4</b>	6-8	—	—	2	<b>4</b>
<b>3</b>	5	1	2	1	<b>3</b>
<b>2</b>	3-4	—	1	—	<b>2</b>
<b>1</b>	0-2	0	0	0	<b>1</b>



# TABLE 2

## Explanation of Procedures Used to Obtain Scale Subscores from Raw Scores

For each of the seven subscore areas, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale subscores. For each of the seven subscore areas, locate and circle either the raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale subscore that corresponds to that raw score. As you determine your scale subscores, enter them in the blanks provided on the right. The highest possible scale subscore is 18. The lowest possible scale subscore is 1.

If you left a test completely blank and marked no responses, do not list any scale subscores for that test.

### ACT Test 67C Your Scale Subscore

#### English

Usage/Mechanics \_\_\_\_\_

Rhetorical Skills \_\_\_\_\_

#### Mathematics

Pre-Algebra/Elementary Algebra \_\_\_\_\_

Intermed. Algebra/Coord. Geometry \_\_\_\_\_

Plane Geometry/Trigonometry \_\_\_\_\_

#### Reading

Social Studies/Sciences \_\_\_\_\_

Arts/Literature \_\_\_\_\_

Scale Subscore	Raw Scores										Scale Subscore
	Test 1 English			Test 2 Mathematics			Test 3 Reading				
	Usage/Mechanics	Rhetorical Skills	Pre-Algebra/Elem. Algebra	Inter. Algebra/Coord. Geometry	Plane Geometry/Trigonometry	Social Studies/Sciences	Arts/Literature	Social Studies/Sciences	Arts/Literature	Arts/Literature	
18	39-40	35	23-24	18	18	18	20	20	20	20	18
17	37-38	34	22	17	17	17	19	19	19	19	17
16	35-36	33	21	16	16	16	18	18	18	18	16
15	34	31-32	20	15	14-15	17	17	17	17	17	15
14	32-33	29-30	19	13-14	13	16	16	16	16	16	14
13	31	27-28	18	12	11-12	15	15	15	15	15	13
12	29-30	25-26	17	10-11	10	14	14	14	14	14	12
11	27-28	22-24	16	9	9	12-13	11	11	11	11	11
10	24-26	20-21	15	7-8	7-8	9	9	9	9	9	10
9	22-23	18-19	13-14	6	6	6	11	11	11	11	9
8	20-21	15-17	11-12	4-5	5	8	10	10	10	10	8
7	18-19	13-14	9-10	—	4	6-7	9	9	9	9	7
6	16-17	12	6-8	3	3	5	8	8	8	8	6
5	14-15	10-11	5	2	—	4	6-7	6-7	6-7	6-7	5
4	12-13	8-9	3-4	—	2	—	4	4	4	4	4
3	9-11	5-7	2	1	—	—	3	3	3	3	3
2	6-8	3-4	1	—	—	—	2	2	2	2	2
1	0-5	0-2	0	0	0	0	1	1	1	1	1

# TABLES 3A and 3B

## Norms Tables

Use the norms tables below (3A and 3B) to determine your estimated percent at or below for each of your multiple-choice scale scores (3A), and for your Writing scores (3B), if applicable.

In the far left column of the multiple-choice norms table (3A), circle your scale score for the English Test (from page 56). Then read across to the percent at or below column for that test; circle or put a check mark beside the corresponding percent at or below. Use the same procedure for each test and subscore area. Use the far right column of scale scores in Table 3A, for your Science Test and Composite scores. Follow the same procedure on the Writing Test norms to get your estimated percent at or below for your Writing subscore and Combined English/Writing score.

As you mark your percents at or below, enter them in the blanks provided at the right. You may also find it helpful to compare your performance with the national mean (average) score for each of the tests, subscore areas, and the Composite as shown at the bottom of the norms tables.

**Your Estimated Percent At or Below on Practice Test**

<b>English</b>	_____	_____
Usage/Mechanics	_____	_____
Rhetorical Skills	_____	_____
<b>Mathematics</b>	_____	_____
Pre-Algebra/Elem. Alg.	_____	_____
Alg./Coord. Geometry	_____	_____
Plane Geometry/Trig.	_____	_____
<b>Reading</b>	_____	_____
Soc. Studies/Sciences	_____	_____
Arts/Literature	_____	_____
<b>Science</b>	_____	_____
<b>Composite</b>	_____	_____
<b>Combined English/Writing</b>	_____	_____
<b>Writing</b>	_____	_____

<b>3A</b> National Distributions of Cumulative Percents for ACT Test Scores ACT-Tested High School Graduates from 2011, 2012, and 2013												
Score	ENGLISH			MATHEMATICS			READING			SCIENCE		Score
	Usage/Mechanics	Rhetorical Skills		Pre-Algebra/Elem. Alg.	Alg./Coord. Geometry	Plane Geometry/Trig.	Soc. Studies/Sciences	Arts/Literature				
36	99			99			99		99	99	36	
35	99			99			99		99	99	35	
34	99			99			99		99	99	34	
33	97			98			97		99	99	33	
32	96			97			95		98	98	32	
31	94			96			93		97	97	31	
30	92			95			90		96	95	30	
29	90			93			87		95	93	29	
28	88			91			85		93	90	28	
27	85			88			82		90	87	27	
26	82			84			79		87	83	26	
25	78			79			75		83	79	25	
24	74			73			72		77	74	24	
23	68			67			66		70	68	23	
22	63			60			61		63	62	22	
21	57			55			55		56	55	21	
20	50			51			48		47	49	20	
19	44			47			42		38	42	19	
18	39	99	99	41	99	99	36	99	32	35	18	
17	34	97	98	35	96	99	30	97	25	28	17	
16	30	92	98	26	92	98	25	93	20	22	16	
15	25	88	92	14	88	95	20	87	16	17	15	
14	19	83	86	06	82	91	15	82	12	11	14	
13	15	78	79	02	75	83	11	76	09	07	13	
12	12	72	71	01	66	72	07	68	06	03	12	
11	09	65	60	01	58	63	04	58	04	01	11	
10	06	56	49	01	48	50	02	49	02	01	10	
09	04	44	40	01	40	36	01	40	01	01	09	
08	02	36	28	01	33	23	01	29	01	01	08	
07	01	28	20	01	22	13	01	20	01	01	07	
06	01	20	13	01	10	07	01	11	01	01	06	
05	01	13	09	01	04	04	01	06	01	01	05	
04	01	08	05	01	01	02	01	02	01	01	04	
03	01	04	02	01	01	01	01	01	01	01	03	
02	01	01	01	01	01	01	01	01	01	01	02	
01	01	01	01	01	01	01	01	01	01	01	01	
<b>Mean</b>	<b>20.4</b>	<b>10.2</b>	<b>10.5</b>	<b>21.0</b>	<b>10.9</b>	<b>10.6</b>	<b>10.5</b>	<b>21.2</b>	<b>10.8</b>	<b>10.7</b>	<b>20.8</b>	<b>21.0</b>
<b>S.D.</b>	<b>6.5</b>	<b>4.0</b>	<b>3.5</b>	<b>5.3</b>	<b>3.6</b>	<b>2.9</b>	<b>3.1</b>	<b>6.2</b>	<b>3.6</b>	<b>3.9</b>	<b>5.2</b>	<b>5.3</b>

**Note:** These norms are the source of national norms, for multiple-choice tests, printed on ACT score reports during the 2013–2014 testing year. Sample size: 5,088,372.

<b>3B</b> National Distributions of Cumulative Percents for ACT Writing Test Scores ACT-Tested High School Graduates from 2011, 2012, and 2013			
Score	Combined English/Writing	Writing	
36	99		
35	99		
34	99		
33	99		
32	99		
31	98		
30	95		
29	93		
28	90		
27	87		
26	84		
25	79		
24	75		
23	70		
22	61		
21	55		
20	47		
19	41		
18	35		
17	30		
16	25		
15	19		
14	15		
13	11		
12	9	99	
11	6	99	
10	4	99	
9	3	95	
8	2	88	
7	1	52	
6	1	38	
5	1	12	
4	1	7	
3	1	3	
2	1	2	
1	1		
<b>Mean</b>	<b>20.7</b>	<b>7.0</b>	
<b>S.D.</b>	<b>5.8</b>	<b>1.6</b>	

**Note:** These norms are the source of the Writing Test norms printed on the ACT score reports of students who take the optional Writing Test during 2013–2014. Sample size: 2,778,952.

## How to Score the Writing Test

It is difficult to be objective about one's own work. However, it is to your advantage to read your own writing critically. Becoming your own editor helps you grow as a writer and as a reader. It may also be helpful for you to give your practice essay to another reader: a classmate, parent, or teacher. To rate your essay, you and your reader(s) should review the scoring guidelines and sample essays at [www.actstudent.org/writing](http://www.actstudent.org/writing), and then assign your practice essay a score of 1 (low) through 6 (high).

### Scoring Guidelines (below)

These are the guidelines that will be used to score your essay. To score your paper, read your response and try to determine which score point best describes your essay.

Because your Writing Test subscore (2–12 range) is the sum of two readers' ratings of your essay, you should multiply your score

by 2 when you use Table 4, on page 62, to find your Combined English/Writing score. If two readers score your practice essay, add those scores together.

### Comparing Your Scores

The Writing Test norms table (Table 3B on page 60) allows you to compare your score on the practice Writing Test with the scores of recent high school graduates who took the ACT Plus Writing. For example, a Writing subscore of 8 has a cumulative percent of 87. This means that 87% of students had a Writing subscore of 8 or lower. Your scores and percents at or below are only *estimates* of the scores you will receive on an actual administration of the ACT Plus Writing. They should be considered in connection with your performance on other essay tests and your planned college curriculum.

## Scoring Guidelines for the ACT Writing Test

Papers at each level exhibit *all* or *most* of the characteristics described at each score point.

### Score = 6—Essays within this score range demonstrate effective skill in responding to the task.

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a critical context for discussion. The essay addresses complexity by examining different perspectives on the issue, or by evaluating the implications and/or complications of the issue, or by fully responding to counterarguments to the writer's position. Development of ideas is ample, specific, and logical. Most ideas are fully elaborated. A clear focus on the specific issue in the prompt is maintained. The organization of the essay is clear: the organization may be somewhat predictable or it may grow from the writer's purpose. Ideas are logically sequenced. Most transitions reflect the writer's logic and are usually integrated into the essay. The introduction and conclusion are effective, clear, and well developed. The essay shows a good command of language. Sentences are varied and word choice is varied and precise. There are few, if any, errors to distract the reader.

### Score = 5—Essays within this score range demonstrate competent skill in responding to the task.

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a broad context for discussion. The essay shows recognition of complexity by partially evaluating the implications and/or complications of the issue, or by responding to counterarguments to the writer's position. Development of ideas is specific and logical. Most ideas are elaborated, with clear movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained. The organization of the essay is clear, although it may be predictable. Ideas are logically sequenced, although simple and obvious transitions may be used. The introduction and conclusion are clear and generally well developed. Language is competent. Sentences are somewhat varied and word choice is sometimes varied and precise. There may be a few errors, but they are rarely distracting.

### Score = 4—Essays within this score range demonstrate adequate skill in responding to the task.

The essay shows an understanding of the task. The essay takes a position on the issue and may offer some context for discussion. The essay may show some recognition of complexity by providing some response to counterarguments to the writer's position. Development of ideas is adequate, with some movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained throughout most of the essay. The organization of the essay is apparent but predictable. Some evidence of logical sequencing of ideas is apparent, although most transitions are simple and obvious. The introduction and conclusion are clear and somewhat developed. Language is adequate, with some sentence variety and appropriate word choice. There may be some distracting errors, but they do not impede understanding.

### Score = 3—Essays within this score range demonstrate some developing skill in responding to the task.

The essay shows some understanding of the task. The essay takes a position on the issue but does not offer a context for discussion. The essay may acknowledge a counterargument to the writer's position, but its development is brief or unclear. Development of ideas is limited and may be repetitious, with little, if any, movement between general statements and specific reasons, examples, and details. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. The organization of the essay is simple. Ideas are logically grouped within parts of the essay, but there is little or no evidence of logical sequencing of ideas. Transitions, if used, are simple and obvious. An introduction and conclusion are clearly discernible but underdeveloped. Language shows a basic control. Sentences show a little variety and word choice is appropriate. Errors may be distracting and may occasionally impede understanding.

### Score = 2—Essays within this score range demonstrate inconsistent or weak skill in responding to the task.

The essay shows a weak understanding of the task. The essay may not take a position on the issue, or the essay may take a position but fail to convey reasons to support that position, or the essay may take a position but fail to maintain a stance. There is little or no recognition of a counterargument to the writer's position. The essay is thinly developed. If examples are given, they are general and may not be clearly relevant. The essay may include extensive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. There is some indication of an organizational structure, and some logical grouping of ideas within parts of the essay is apparent. Transitions, if used, are simple and obvious, and they may be inappropriate or misleading. An introduction and conclusion are discernible but minimal. Sentence structure and word choice are usually simple. Errors may be frequently distracting and may sometimes impede understanding.

### Score = 1—Essays within this score range show little or no skill in responding to the task.

The essay shows little or no understanding of the task. If the essay takes a position, it fails to convey reasons to support that position. The essay is minimally developed. The essay may include excessive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is usually maintained, but focus on the specific issue in the prompt may not be maintained. There is little or no evidence of an organizational structure or of the logical grouping of ideas. Transitions are rarely used. If present, an introduction and conclusion are minimal. Sentence structure and word choice are simple. Errors may be frequently distracting and may significantly impede understanding.

### No Score—Blank, Off-Topic, Illegible, Not in English, or Void

# TABLE 4

## Calculating Your Combined English/Writing Score

Complete these steps to calculate your Combined English/Writing score for your practice tests.

1. Locate your scale score for the English Test on page 58 and enter it here: \_\_\_\_\_.
2. Enter your Writing Test score (1–6) here \_\_\_\_\_ and double it to get your Writing subscore (2–12): \_\_\_\_\_  
(If two people read and scored your Writing Test, add those two scores to get your Writing subscore.)
3. Use the table below to find your Combined English/Writing score.
  - First, circle your ACT English Test score in the left column.
  - Second, circle your ACT Writing subscore at the top of the table.

- Finally, follow the English Test score row across and the Writing subscore column down until the two meet. Circle the Combined English/Writing score where the row and column meet. (For example, for an English Test score of 19 and a Writing subscore of 6, the Combined English/Writing score is 18.)
4. Using the number you circled in the table below, write your Combined English/Writing score here: \_\_\_\_\_.  
(The highest possible Combined English/Writing score is 36 and the lowest possible score is 1.)

ACT English Test score \_\_\_\_\_

Writing subscore \_\_\_\_\_

---

**Combined English/Writing Score** \_\_\_\_\_  
(from table below)

<b>Combined English/Writing Scale Scores</b>											
English Test Score	Writing Subscore										
	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	6	7	8	9	10	11
3	2	3	4	5	6	7	8	9	10	11	12
4	3	4	5	6	7	8	9	10	11	12	13
5	4	5	6	7	8	9	10	11	12	12	13
6	5	6	7	7	8	9	10	11	12	13	14
7	5	6	7	8	9	10	11	12	13	14	15
8	6	7	8	9	10	11	12	13	14	15	16
9	7	8	9	10	11	12	13	13	14	15	16
10	8	9	9	10	11	12	13	14	15	16	17
11	8	9	10	11	12	13	14	15	16	17	18
12	9	10	11	12	13	14	15	16	17	18	19
13	10	11	12	13	14	14	15	16	17	18	19
14	10	11	12	13	14	15	16	17	18	19	20
15	11	12	13	14	15	16	17	18	19	20	21
16	12	13	14	15	16	17	18	19	20	20	21
17	13	14	15	16	16	17	18	19	20	21	22
18	13	14	15	16	17	18	19	20	21	22	23
19	14	15	16	17	18	19	20	21	22	23	24
20	15	16	17	18	19	20	21	21	22	23	24
21	16	17	17	18	19	20	21	22	23	24	25
22	16	17	18	19	20	21	22	23	24	25	26
23	17	18	19	20	21	22	23	24	25	26	27
24	18	19	20	21	22	23	23	24	25	26	27
25	18	19	20	21	22	23	24	25	26	27	28
26	19	20	21	22	23	24	25	26	27	28	29
27	20	21	22	23	24	25	26	27	28	28	29
28	21	22	23	24	24	25	26	27	28	29	30
29	21	22	23	24	25	26	27	28	29	30	31
30	22	23	24	25	26	27	28	29	30	31	32
31	23	24	25	26	27	28	29	30	30	31	32
32	24	25	25	26	27	28	29	30	31	32	33
33	24	25	26	27	28	29	30	31	32	33	34
34	25	26	27	28	29	30	31	32	33	34	35
35	26	27	28	29	30	31	31	32	33	34	35
36	26	27	28	29	30	31	32	33	34	35	36



**Marking Directions:** Mark only **one** oval for each question. Fill in response completely. Erase errors cleanly without smudging.

**Correct mark:**

**Do NOT use these incorrect or bad marks.**

- Incorrect marks:
- Overlapping mark:
- Cross-out mark:
- Smudged erasure:
- Mark is too light:

**BOOKLET NUMBER**

1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
0	0	0	0	0	0

**FORM**

--	--	--

**BE SURE TO FILL IN THE CORRECT FORM OVAL.**

1267C

Print your 3-character **Test Form** in the boxes above and fill in the corresponding oval at the right.

**TEST 1**

1 (A B C D)	14 (F G H J)	27 (A B C D)	40 (F G H J)	53 (A B C D)	66 (F G H J)
2 (F G H J)	15 (A B C D)	28 (F G H J)	41 (A B C D)	54 (F G H J)	67 (A B C D)
3 (A B C D)	16 (F G H J)	29 (A B C D)	42 (F G H J)	55 (A B C D)	68 (F G H J)
4 (F G H J)	17 (A B C D)	30 (F G H J)	43 (A B C D)	56 (F G H J)	69 (A B C D)
5 (A B C D)	18 (F G H J)	31 (A B C D)	44 (F G H J)	57 (A B C D)	70 (F G H J)
6 (F G H J)	19 (A B C D)	32 (F G H J)	45 (A B C D)	58 (F G H J)	71 (A B C D)
7 (A B C D)	20 (F G H J)	33 (A B C D)	46 (F G H J)	59 (A B C D)	72 (F G H J)
8 (F G H J)	21 (A B C D)	34 (F G H J)	47 (A B C D)	60 (F G H J)	73 (A B C D)
9 (A B C D)	22 (F G H J)	35 (A B C D)	48 (F G H J)	61 (A B C D)	74 (F G H J)
10 (F G H J)	23 (A B C D)	36 (F G H J)	49 (A B C D)	62 (F G H J)	75 (A B C D)
11 (A B C D)	24 (F G H J)	37 (A B C D)	50 (F G H J)	63 (A B C D)	
12 (F G H J)	25 (A B C D)	38 (F G H J)	51 (A B C D)	64 (F G H J)	
13 (A B C D)	26 (F G H J)	39 (A B C D)	52 (F G H J)	65 (A B C D)	

**TEST 2**

1 (A B C D E)	11 (A B C D E)	21 (A B C D E)	31 (A B C D E)	41 (A B C D E)	51 (A B C D E)
2 (F G H J K)	12 (F G H J K)	22 (F G H J K)	32 (F G H J K)	42 (F G H J K)	52 (F G H J K)
3 (A B C D E)	13 (A B C D E)	23 (A B C D E)	33 (A B C D E)	43 (A B C D E)	53 (A B C D E)
4 (F G H J K)	14 (F G H J K)	24 (F G H J K)	34 (F G H J K)	44 (F G H J K)	54 (F G H J K)
5 (A B C D E)	15 (A B C D E)	25 (A B C D E)	35 (A B C D E)	45 (A B C D E)	55 (A B C D E)
6 (F G H J K)	16 (F G H J K)	26 (F G H J K)	36 (F G H J K)	46 (F G H J K)	56 (F G H J K)
7 (A B C D E)	17 (A B C D E)	27 (A B C D E)	37 (A B C D E)	47 (A B C D E)	57 (A B C D E)
8 (F G H J K)	18 (F G H J K)	28 (F G H J K)	38 (F G H J K)	48 (F G H J K)	58 (F G H J K)
9 (A B C D E)	19 (A B C D E)	29 (A B C D E)	39 (A B C D E)	49 (A B C D E)	59 (A B C D E)
10 (F G H J K)	20 (F G H J K)	30 (F G H J K)	40 (F G H J K)	50 (F G H J K)	60 (F G H J K)

**TEST 3**

1 (A B C D)	8 (F G H J)	15 (A B C D)	22 (F G H J)	29 (A B C D)	36 (F G H J)
2 (F G H J)	9 (A B C D)	16 (F G H J)	23 (A B C D)	30 (F G H J)	37 (A B C D)
3 (A B C D)	10 (F G H J)	17 (A B C D)	24 (F G H J)	31 (A B C D)	38 (F G H J)
4 (F G H J)	11 (A B C D)	18 (F G H J)	25 (A B C D)	32 (F G H J)	39 (A B C D)
5 (A B C D)	12 (F G H J)	19 (A B C D)	26 (F G H J)	33 (A B C D)	40 (F G H J)
6 (F G H J)	13 (A B C D)	20 (F G H J)	27 (A B C D)	34 (F G H J)	
7 (A B C D)	14 (F G H J)	21 (A B C D)	28 (F G H J)	35 (A B C D)	

**TEST 4**

1 (A B C D)	8 (F G H J)	15 (A B C D)	22 (F G H J)	29 (A B C D)	36 (F G H J)
2 (F G H J)	9 (A B C D)	16 (F G H J)	23 (A B C D)	30 (F G H J)	37 (A B C D)
3 (A B C D)	10 (F G H J)	17 (A B C D)	24 (F G H J)	31 (A B C D)	38 (F G H J)
4 (F G H J)	11 (A B C D)	18 (F G H J)	25 (A B C D)	32 (F G H J)	39 (A B C D)
5 (A B C D)	12 (F G H J)	19 (A B C D)	26 (F G H J)	33 (A B C D)	40 (F G H J)
6 (F G H J)	13 (A B C D)	20 (F G H J)	27 (A B C D)	34 (F G H J)	
7 (A B C D)	14 (F G H J)	21 (A B C D)	28 (F G H J)	35 (A B C D)	

**ACT STUDENT REVIEW:** The test administrator will give you instructions for completing this section.



**Student Review:** Your responses to these items will assist ACT and your test center in providing the best possible conditions for testing and planning for the future. Fill in the oval indicating your response to each item printed on the back of your test booklet.

Yes	No	Yes	No	Yes	No
1 <input type="radio"/>	<input type="radio"/>	6 <input type="radio"/>	<input type="radio"/>	11 <input type="radio"/>	<input type="radio"/>
2 <input type="radio"/>	<input type="radio"/>	7 <input type="radio"/>	<input type="radio"/>	12 <input type="radio"/>	<input type="radio"/>
3 <input type="radio"/>	<input type="radio"/>	8 <input type="radio"/>	<input type="radio"/>	13 <input type="radio"/>	<input type="radio"/>
4 <input type="radio"/>	<input type="radio"/>	9 <input type="radio"/>	<input type="radio"/>	14 <input type="radio"/>	<input type="radio"/>
5 <input type="radio"/>	<input type="radio"/>	10 <input type="radio"/>	<input type="radio"/>	15 <input type="radio"/>	<input type="radio"/>



# Practice Test #3



## ENGLISH TEST

45 Minutes—75 Questions

**DIRECTIONS:** In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose “NO CHANGE.” In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

## PASSAGE I

## The Potter’s Kiln

Unbricking a kiln after a firing is like a person  
1

uncovering buried treasure. As the potter takes bricks away  
2  
to create an opening into the oven, an expanding view

of gleaming shapes rewards the artist for months  
3  
of hard work.

The process of creating ceramics begins in a studio. My friend Ellen is typical of many more potters in that  
4  
some pieces she shapes on a spinning potter’s wheel and others she builds on a work table from coils or slabs of clay. Over many weeks, as time goes by, her collection  
5  
slowly grows: clay bowls, cups, vases, and sculptures fill the studio. She dries them on racks, dips them in glazes, and dries them again.

1. A. NO CHANGE  
B. someone  
C. a potter  
D. OMIT the underlined portion.
2. The writer would like to suggest the potter’s cautious pace and sense of anticipation in opening the kiln. Given that all the choices are true, which one best accomplishes the writer’s goal?  
F. NO CHANGE  
G. removes bricks by hand  
H. removes one brick at a time  
J. experiences great anticipation and removes bricks
3. A. NO CHANGE  
B. rewarding  
C. reward  
D. as a reward for
4. F. NO CHANGE  
G. of many  
H. mostly of  
J. for most
5. A. NO CHANGE  
B. with the passing of time,  
C. gradually,  
D. OMIT the underlined portion.





At last, Ellen will have enough pieces for a firing. She then carries the assortment outside to the wood-fired kiln, it is a brick structure designed to bake pottery to a<sup>6</sup> hardness and transform glazes to glorious colors that drying alone won't achieve. 7 The chamber is just big

enough for her to crouch in as she carefully arranges the<sup>8</sup> pieces inside. When the objects are in place, she backs out gingerly and seals the chamber shut with bricks.

The next morning, using twigs, for kindling she<sup>9</sup> starts a small blaze in the firebox, located directly below the main chamber. The fire grows steadily throughout the day as she feeds it lumber scraps and then logs. By nightfall a controlled inferno roars in the kiln.<sup>10</sup>

Occasionally, the fire chugs like a train engine, hungry<sup>11</sup> for more oxygen. Each time the fire is stoked, sparks

shoot from the chimney into the night sky.<sup>12</sup>

6. **F.** NO CHANGE  
**G.** the brick structure is  
**H.** a brick structure  
**J.** brick
7. The writer is considering deleting the phrase “and transform glazes to glorious colors” from the preceding sentence. Should the phrase be kept or deleted?
  - A.** Kept, because it emphasizes that painting pottery is a time-consuming process.
  - B.** Kept, because it is relevant to the essay’s focus on the role of kilns in making pottery.
  - C.** Deleted, because the appearance of the pottery is not as important to the essay’s focus as how kilns function.
  - D.** Deleted, because this level of detail is not consistent with the essay’s description of a kiln firing.
8. **F.** NO CHANGE  
**G.** stoops to carefully arrange  
**H.** bends over to arrange with care  
**J.** carefully stoops over to arrange
9. **A.** NO CHANGE  
**B.** morning, using twigs for kindling,  
**C.** morning, using twigs for kindling;  
**D.** morning using twigs, for kindling,
10. The writer would like to indicate that at this point the fire is extremely intense. Given that all the choices are true, which one best accomplishes the writer’s goal?
  - F.** NO CHANGE
  - G.** the fire is stronger than ever
  - H.** there is more heat being produced
  - J.** a kind of intense blaze takes place
11. Which of the following alternatives to the underlined portion would NOT be acceptable?
  - A.** On occasion,
  - B.** Once in a while,
  - C.** Now and then,
  - D.** Time or again,
12. Which of the following alternatives to the underlined portion would NOT be acceptable?
  - F.** at the chimney in
  - G.** up the chimney toward
  - H.** through the chimney up into
  - J.** out the chimney into



Periodically, Ellen looks through a porthole in the wall of the kiln to determine the fire's intensity. The clay pieces gleam white-hot amid the flames. At last, when the temperature soars out of sight, she knows the firing is nearing its end.

Having died down, she bricks up the firebox as well, sealing the remaining heat inside. In a few days, when the kiln has cooled, Ellen opens the chamber, revealing the results of her labor and of the fire's magic. Each piece shines as it meets the light of day.

13. Given that all the choices are true, which one provides the most specific detail and maintains the style and tone of the essay?
- A. NO CHANGE
  - B. rises beyond belief,
  - C. soars well above a thousand degrees,
  - D. elevates in increments to the point that a temperature of more than one thousand degrees is reached,
14. F. NO CHANGE  
G. Finally it dies  
H. With a blaze that dies  
J. Once the blaze dies
15. A. NO CHANGE  
B. labor, which is the fire's  
C. labor, of which the fire is  
D. labor, and the fire is

---

**PASSAGE II**

**A Family Heirloom**

I live with my father in the summer, when I'm on vacation from school. Last week, he told me he had to go on a business trip in connection with his work and that I'd be staying with his sister for three days. Although I love my aunt, I wasn't happy about the prospect of three days at her house with nothing to do. It turns out I was in for a surprise.

Soon after I arrived, my aunt said she had a gift for me. "It belonged to my mother, your grandma. I'm sorry you never had the chance to know her," she told me.

16. F. NO CHANGE  
G. having something to do with his job  
H. that involved traveling to another city  
J. OMIT the underlined portion.
17. Which of the following alternatives to the underlined portion would NOT be acceptable?
- A. Not long
  - B. A short time
  - C. As soon
  - D. Shortly
18. F. NO CHANGE  
G. aunt, said  
H. aunt said,  
J. aunt said;

I was expecting my aunt to hand me a ring or a bracelet, or maybe an old book, but instead she led me outside. 19

[1] She pointed to a corner of the yard, where a tortoise was calmly munching a dandelion. [2] Rosie must have heard us talking, because she began to amble over to us. <sup>20</sup> [3] She was over a foot long and about seven inches high. [4] As soon as my aunt assured me that Rosie <sup>21</sup> wouldn't snap or bite, I reached down to stroke her neck, admiring her brown and tan carapace, or upper shell. 22

Rosie, it turns out is: a desert tortoise that my <sup>23</sup> grandmother had started raising over twenty years <sup>24</sup> ago. My aunt said that she would have checked with <sup>25</sup> my parents, who each agreed that if I wanted to take responsibility for Rosie, I could take her home with me.

19. The writer is considering deleting the first part of the preceding sentence, so that the sentence would read:

She led me outside.

If the writer were to make this change, the essay would primarily lose:

- A. details that indicate to the reader what will eventually happen.
  - B. the contrast between the gift and what the narrator had anticipated receiving.
  - C. examples of the kinds of gifts the narrator normally receives.
  - D. an indication of how close the narrator and her aunt are.
20. F. NO CHANGE  
G. have heard of  
H. of heard about  
J. of heard
21. Which of the following alternatives to the underlined portion would NOT be acceptable?  
A. After my  
B. When my  
C. My  
D. Once my
22. Upon reviewing this paragraph and realizing that some information has been left out, the writer composes the following sentence:  
"This is Rosie," she announced.  
This sentence should most logically be placed after Sentence:  
F. 1.  
G. 2.  
H. 3.  
J. 4.
23. A. NO CHANGE  
B. Rosie, it turns out, is  
C. Rosie, it turns out is  
D. Rosie it turns out, is
24. Which of the following alternatives to the underlined portion would NOT be acceptable?  
F. begun to raise  
G. started to raise  
H. started up raising  
J. begun raising
25. A. NO CHANGE  
B. had checked  
C. would check  
D. must check



It's interesting that Rosie is older than I am.

<sup>26</sup>  
Tortoises are land-dwelling, vegetarian turtles. They can

experience the satisfaction of contentment through a diet  
<sup>27</sup>  
of grass clippings, lettuce, broccoli, melons, and other

vegetables and fruit. They like to warm themselves in the  
<sup>28</sup>  
sun but will burrow into the ground when they want to be  
safe and cool. I learned that I should build plywood

enclosures in each of my parents' backyards so that  
<sup>29</sup>  
Rosie would be safe year-round.

I learned that tortoises are among the most  
endangered families in reptiles. That means having a  
tortoise is a privilege, and I'm proud that my family has  
<sup>30</sup>  
entrusted me with Rosie's care. By caring for Rosie I'll be  
able to share something with the grandma I never knew.

26. Given that all the choices are true, which one most effectively introduces the information that follows in this paragraph?

- F. NO CHANGE
- G. I asked my aunt about Rosie's needs and care.
- H. Most tortoise species are now found only in Africa.
- J. Some giant tortoises weigh as much as 180 kilograms.

27. A. NO CHANGE  
B. reap their necessary nutritional requirements from  
C. be kept as happy as a clam with  
D. be adequately nourished by

28. Which choice provides the most specific and precise information?

- F. NO CHANGE
- G. things they could eat.
- H. edible items.
- J. fresh foods.

29. A. NO CHANGE  
B. parent's backyards  
C. parents backyards  
D. parents backyards,

30. F. NO CHANGE  
G. families of  
H. family in  
J. family of

---

**PASSAGE III**

The following paragraphs may or may not be in the most logical order. Each paragraph is numbered in brackets, and question 45 will ask you to choose where Paragraph 5 should most logically be placed.

**A Thirst for Knowledge**

[1]

Benjamin Banneker, African American  
inventor and astronomer, grew up on his  
family's farm in colonial Maryland. Though  
<sup>31</sup>

31. A. NO CHANGE  
B. family's  
C. families'  
D. families



he had limited access to formal education, Banneker  
<sup>32</sup>  
nevertheless demonstrated a keen curiosity and a  
consuming interest in acquiring knowledge.

[2]

Banneker's grandmother was an indentured  
servant from England whom, after completing the term  
<sup>33</sup>  
of her contract, bought some land and then married a freed  
slave. <sup>34</sup> Their daughter Mary—Benjamin's mother—  
also married a freed slave. Benjamin's grandmother taught

him to read, and he attended a one-room Quaker school  
<sup>35</sup>  
when the farmwork slowed down during the winter.

[3]

In 1753, at the age of twenty-two, Banneker  
constructed a clock out of hand-carved wooden parts,  
<sup>36</sup>  
displayed his mechanical skills, and displaying his interest  
<sup>36</sup>  
in learning. He had dismantled a pocket watch borrowed  
<sup>36</sup>

from a traveling merchant, made detailed drawings of it's  
<sup>37</sup>  
components, and returned it—fully functioning—to the  
merchant. Based on those drawings, Banneker designed  
the works for his own clock and carved the gears, wheels,

32. Which of the following alternatives to the underlined portion would NOT be acceptable?
- F. limiting his access to formal education,
  - G. his access to formal education was limited,
  - H. it was difficult for him to acquire formal education,
  - J. having limited access to formal education,

33. A. NO CHANGE  
B. who,  
C. which,  
D. OMIT the underlined portion.

34. At this point, the writer is considering adding the following true statement:

Indentured servants needed a master's permission to leave their place of work, to perform work for others, or to keep money for personal use.

Should the writer add this sentence here?

- F. Yes, because it shows the extent of control that masters held over indentured servants.
  - G. Yes, because it is necessary to understanding the essay as a whole.
  - H. No, because it provides information that is included elsewhere in the essay.
  - J. No, because it would distract readers from the main topic of the essay.
35. Which of the following alternatives to the underlined portion would NOT be acceptable?

- A. read; he
- B. read, and he also
- C. read he
- D. read. He

36. Which choice provides the most logical arrangement of the parts of this sentence?

- F. NO CHANGE
- G. displayed his skills when he constructed a clock out of hand-carved wooden parts and displayed his interest in mechanical skills.
- H. displayed his interest in learning and his mechanical skills when he constructed a clock out of hand-carved wooden parts.
- J. displayed his interest in mechanical skills by constructing a clock out of hand-carved wooden parts and his interest in learning.

37. A. NO CHANGE  
B. its'  
C. its  
D. their

**GO ON TO THE NEXT PAGE.**



and other moving parts. The clock keeps precise time

38

for—can you believe it?—over forty years.

39

[4]

Banneker lived and worked on the family farm.

After his father died in 1759, Banneker took over the responsibility of the farm and the care of his mother and younger sisters. In addition, he pursued scientific studies

40

and taught himself to play the flute and violin. 41

[5]

In 1788, a neighbor loaned Banneker some astronomical instruments and four books on mathematics and astronomy. Banneker quickly became engrossed in his studies and began to calculate the paths of the Sun, Moon, and other celestial bodies. Using them, he predicted a solar eclipse that occurred the next year. He also began to

42

calculate annual tables of yearly sets of astronomical data, which became the basis for almanacs published under his name from 1792 through 1797.

[6]

Grandson of an indentured servant, Benjamin Banneker liked to study music and astronomy.

44

44

38. F. NO CHANGE  
G. has kept  
H. kept  
J. still keeps
39. A. NO CHANGE  
B. for over forty years. Amazing!  
C. for over forty unbelievable years.  
D. for over forty years.

40. F. NO CHANGE  
G. sisters. Therefore,  
H. sisters, in addition,  
J. sisters, therefore,

41. If the writer were to delete the last part of the preceding sentence (ending the sentence with a period after the word *studies*), the paragraph would primarily lose:
- A. support for the essay's point about Banneker's love of learning.  
B. a direct link to the previous paragraph.  
C. a humorous description of Banneker's other interests.  
D. an extensive digression about music.

42. F. NO CHANGE  
G. these calculations,  
H. those,  
J. these things,

43. A. NO CHANGE  
B. covering a year's worth  
C. about twelve months  
D. OMIT the underlined portion.

44. Given that all the choices are true, which one most effectively concludes and summarizes this essay?
- F. NO CHANGE  
G. Calculator of the paths of the Sun and Moon, Benjamin Banneker became interested in how things work when he took apart a pocket watch and made some drawings.  
H. Clock designer and farmer, Benjamin Banneker acquired responsibility for the farm at a young age but retained an interest in learning.  
J. Farmer, inventor, and self-taught mathematician and astronomer, Benjamin Banneker took advantage of every opportunity to learn and contribute to the society of his time.



Question 45 asks about the preceding passage as a whole.

45. For the sake of the logic and coherence of this essay, Paragraph 5 should be placed:
- A. where it is now.
  - B. after Paragraph 1.
  - C. after Paragraph 2.
  - D. after Paragraph 3.

PASSAGE IV

**Kayaks and Kayaking**

Kayaks are lightweight canoes originally used for hunting and fishing by the Inuit peoples of the northern coasts of North America. Today, many people use kayaks recreationally for white-water sports and for touring wilderness areas that are extremely wild.

46

Most kayaks are made of rubberized cloth, molded plastic, or fiberglass. It is covered except for the opening

47

in which the paddler or paddlers sit. [48] The two principal

types of kayaks are; the easily maneuverable white-water

49

kayak and the largest sea kayak.

50

[1] Kayaking in white

water the tumultuous rapids of swift-moving rivers  
appeals to people seeking adventure and excitement.

51

46. F. NO CHANGE  
G. of great remoteness.  
H. that are uncivilized.  
J. OMIT the underlined portion and end the sentence with a period.
47. A. NO CHANGE  
B. One is  
C. They are  
D. Which are
48. The writer is considering deleting the preceding sentence. Should this sentence be kept or deleted?
- F. Kept, because the reader needs to understand the different types of kayaks.
  - G. Kept, because it helps the reader visualize the kayak's construction.
  - H. Deleted, because it is not relevant to the preceding sentence.
  - J. Deleted, because it is unnecessarily wordy.
49. A. NO CHANGE  
B. kayaks, are  
C. kayaks are  
D. kayaks—are
50. F. NO CHANGE  
G. very biggest  
H. more large  
J. larger
51. A. NO CHANGE  
B. water; the tumultuous rapids of swift-moving rivers,  
C. water, the tumultuous rapids of swift-moving rivers,  
D. water the tumultuous rapids of swift-moving rivers,



[2] Designed to maneuver through rapids and around treacherous rocks, many white-water kayaks are only six to nine feet long. [3] Because the center of gravity of the paddler rides low in the water, kayaks are stable boats not easily capsized. [4] White-water kayakers are, at last,<sup>52</sup> advised to wear helmets and flotation vests to prevent injury. [5] The longer sea kayaks are designed for distance and speed rather than maneuverability. [6] Some models have two or three seats. [7] Sea or coastal kayaking offers easy access to wetlands, marshes, and wildlife habitats along shores.

[8] Kayaks can float in less than a foot of water, so<sup>53</sup>

a nature watcher<sup>54</sup> can quietly paddle through shallows

frequented by shorebirds and other wildlife. 55

Equipment for both types of kayaks are<sup>56</sup> similar, and

fairly simple. Kayakers use a short, double-bladed paddle,<sup>57</sup> an elasticized sprayskirt fits snugly around the waist of the seated paddler to keep water out of the boat. In fact, a kayak can roll over and be brought back upright without taking on water.

52. F. NO CHANGE  
G. for example,  
H. therefore,  
J. nevertheless,

53. Which of the following alternatives to the underlined portion would be LEAST acceptable?

- A. water. Thus,  
B. water. Consequently,  
C. water, and, as a result,  
D. water. Yet

54. Which choice fits most specifically with the information at the end of this sentence?

- F. NO CHANGE  
G. person  
H. paddler  
J. fun seeker

55. If the writer were to divide the preceding paragraph into two shorter paragraphs in order to differentiate between the two types of kayaks discussed in the essay, the new paragraph should begin with Sentence:

- A. 3.  
B. 4.  
C. 5.  
D. 6.

56. F. NO CHANGE  
G. is  
H. were  
J. was

57. A. NO CHANGE  
B. paddle, and  
C. paddle, so  
D. paddle





Propelling a kayak works the upper-body muscles.

The paddler pulls one end through the water of the paddle on alternating sides of the boat. Skilled kayakers sense the nuances of water movement by means of the kayak hull and adjust their stroke force and pace to keep the kayak on course. But all kayakers can appreciate the nuances of nature as they travel on water in this simple, but

versatile boat. 60

58. The best placement for the underlined portion would be:

- F. where it is now.
- G. after the word *paddler*.
- H. after the word *pulls*.
- J. after the word *paddle*.

59. A. NO CHANGE

- B. simple
- C. simple—
- D. simple;

60. If the writer were to delete this final paragraph from the essay, which of the following would be lost?

- F. A detailed description of the muscles involved in kayaking
- G. A comment on the relationships among kayakers, kayaks, and water
- H. A scientific explanation of how water moves around the hull of a kayak
- J. A plea to kayakers to be careful of the environment

#### PASSAGE V

#### Extremophiles: Amazing Microbial Survivors

[1]

Some live in airless seams of burning rock; miles beneath Earth's surface and around the hydrothermal vents of deep-sea volcanoes. Others, salt-encrusted, "sleep" in ancient caverns, waking after centuries

to feed and to be bred. Radioactive pools of toxic

waste are okay for others to live in; even acid cannot kill them. In lightless vacuums and locales once

thought to hot, to cold or to poisonous, to sustain life, there exists a wealth of microbial organisms.

61. A. NO CHANGE  
B. seams, of burning rock  
C. seams of burning rock  
D. seams, of burning rock,

62. Which of the following alternatives to the underlined portion would NOT be acceptable?

- F. caverns. Then they wake
- G. caverns and then wake
- H. caverns, only to wake
- J. caverns. Waking

63. A. NO CHANGE  
B. for breeding.  
C. to breed.  
D. breeding.

64. F. NO CHANGE  
G. are all right for others to live in;  
H. are home to still others;  
J. suit others to a tee;

65. A. NO CHANGE  
B. too hot, too cold, or too poisonous  
C. too hot, too cold, or too poisonous,  
D. to hot, to cold, or to poisonous



These single-celled survivors called extremophiles,  
 don't merely endure environments too severe for

other life forms; they thrive in them.

[2]

Heat-loving extremophiles, or  
 thermophiles, flourished in temperatures over  
 150 degrees Celsius. Scientists have collected  
 them from the Yellowstone National Park's thermal  
pools, the park abounding with geysers like Old Faithful,  
 and from radioactive rock deep within South African  
 gold mines.

[3]

In the hot waters surrounding Juan de  
 Fuca Ridge in the Pacific Ocean, thermophiles  
 ensure the survival of other marine life. 70

Here, the ocean floor is scarred by  
 earthquakes and underwater volcanoes.

66. **F.** NO CHANGE  
**G.** survivors, called extremophiles,  
**H.** survivors, called extremophiles  
**J.** survivors called extremophiles;
67. Which of the following alternatives to the underlined portion would NOT be acceptable?  
**A.** forms; rather, they  
**B.** forms—they  
**C.** forms. They  
**D.** forms they
68. **F.** NO CHANGE  
**G.** were flourishing  
**H.** had flourished  
**J.** flourish
69. **A.** NO CHANGE  
**B.** pools, in contrast to the cool depths of Scandinavian fjords,  
**C.** pools, natural wonders formed by geologic magic,  
**D.** pools
70. The writer is considering deleting the following phrase from the preceding sentence (and revising the capitalization accordingly):  
 In the hot waters surrounding Juan de Fuca Ridge in the Pacific Ocean,  
 Should this phrase be kept or deleted?  
**F.** Kept, because it clarifies that thermophiles live in both the Pacific Ocean and Juan de Fuca Ridge.  
**G.** Kept, because it provides specific details about the "Here" referred to in the next sentence.  
**H.** Deleted, because it contradicts the preceding paragraph, which makes it clear that thermophiles do not live in water only.  
**J.** Deleted, because this information is provided later in this paragraph.
71. Given that all the choices are true, which one most specifically and vividly describes the underwater terrain?  
**A.** NO CHANGE  
**B.** there are signs of both seismic and volcanic activity.  
**C.** the results of earthquakes and volcanic eruptions are evident.  
**D.** the effect of earthquake and volcanic activity is apparent.

Poisonous waters from cracks at temperatures up to 360 degrees Celsius gush in the ocean floor, and thermophiles convert the toxic chemicals into food for crabs, giant worms, and other deep-sea life.

[4]

Psychrophiles live in harsh and inhospitable places on our planet. One ancient breed of psychrophile lives in million-year-old ice miles below an Antarctic glacier. In the ice of the South Pole, psychrophiles survive not only darkness and subzero temperatures but also ultraviolet radiation.

[5]

If life can persist in extreme environments on Earth, scientists speculate that life may endure under similar conditions elsewhere, perhaps in the frozen seas or the exploding volcanoes of Jupiter's moons, or beneath the barren landscape of Mars. 74

Nevertheless, findings suggest that life—at least on the microbial level—may flourish throughout the universe in places we have yet to look.

72. The best placement for the underlined portion would be:

- F. where it is now.
- G. after the word *temperatures*.
- H. after the word *Celsius*.
- J. after the word *gush*.

73. Given that all the choices are true, which one would LEAST effectively introduce the subject of Paragraph 4?

- A. NO CHANGE
- B. According to researchers, the environment of a cold-loving extremophile, or psychrophile, is as extreme as that of a heat-loving thermophile.
- C. Certain extremophiles, called psychrophiles, thrive in cold environments rather than hot ones.
- D. Other types of extremophiles—cold-loving psychrophiles—have been found in temperatures as low as  $-17$  degrees Celsius.

74. The writer is considering deleting the following clause from the preceding sentence (revising the capitalization accordingly):

If life can persist in extreme environments on Earth,

Should this clause be kept or deleted?

- F. Kept, because it clarifies for readers that life in extreme environments on Earth may not exist.
- G. Kept, because it makes the connection between life on Earth and the possibility of life on other planets.
- H. Deleted, because it contradicts the essay's main point by implying that life may not exist in extreme environments.
- J. Deleted, because it misleads readers into thinking the paragraph is about life on Earth rather than life on other planets.

75. A. NO CHANGE  
 B. On the other hand,  
 C. However,  
 D. Indeed,

**END OF TEST 1**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**



## MATHEMATICS TEST

60 Minutes—60 Questions

**DIRECTIONS:** Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

1.  $|7 - 3| - |3 - 7| = ?$

- A. -8
- B. -6
- C. -4
- D. 0
- E. 8

2. A consultant charges \$45 for each hour she works on a consultation, plus a flat \$30 consulting fee. How many hours of work are included in a \$210 bill for a consultation?

- F.  $2\frac{4}{5}$
- G. 4
- H.  $4\frac{2}{3}$
- J.  $5\frac{1}{2}$
- K. 7

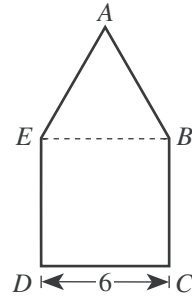
3. Vehicle A averages 14 miles per gallon of gasoline, and Vehicle B averages 36 miles per gallon of gasoline. At these rates, how many more gallons of gasoline does Vehicle A need than Vehicle B to make a 1,008-mile trip?

- A. 25
- B. 28
- C. 44
- D. 50
- E. 72

4.  $t^2 - 59t + 54 - 82t^2 + 60t$  is equivalent to:

- F.  $-26t^2$
- G.  $-26t^6$
- H.  $-81t^4 + t^2 + 54$
- J.  $-81t^2 + t + 54$
- K.  $-82t^2 + t + 54$

5. The figure below is composed of square  $BCDE$  and equilateral triangle  $\triangle ABE$ . The length of  $\overline{CD}$  is 6 inches. What is the perimeter of  $ABCDE$ , in inches?



- A. 18
- B. 24
- C. 30
- D. 42
- E. 45

6. The expression  $(4z + 3)(z - 2)$  is equivalent to:

- F.  $4z^2 - 5$
- G.  $4z^2 - 6$
- H.  $4z^2 - 3z - 5$
- J.  $4z^2 - 5z - 6$
- K.  $4z^2 + 5z - 6$

7. If 40% of a given number is 8, then what is 15% of the given number?

- A. 1.2
- B. 1.8
- C. 3.0
- D. 5.0
- E. 6.5

8. The 6 consecutive integers below add up to 447.

$$\begin{aligned} &x - 2 \\ &x - 1 \\ &x \\ &x + 1 \\ &x + 2 \\ &x + 3 \end{aligned}$$

What is the value of  $x$ ?

- F. 72
- G. 73
- H. 74
- J. 75
- K. 76

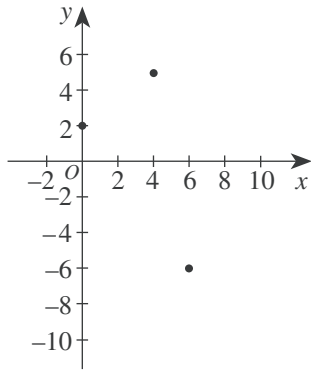
**GO ON TO THE NEXT PAGE.**



9. In the standard  $(x,y)$  coordinate plane, point  $M$  with coordinates  $(5,4)$  is the midpoint of  $\overline{AB}$ , and  $B$  has coordinates  $(7,3)$ . What are the coordinates of  $A$  ?

- A.  $(17,11)$
- B.  $(9, 2)$
- C.  $(6, 3.5)$
- D.  $(3, 5)$
- E.  $(-3,-5)$

10. Rectangle  $ABCD$  has vertices  $A(4,5)$ ,  $B(0,2)$ , and  $C(6,-6)$ . These vertices are graphed below in the standard  $(x,y)$  coordinate plane. What are the coordinates of vertex  $D$  ?

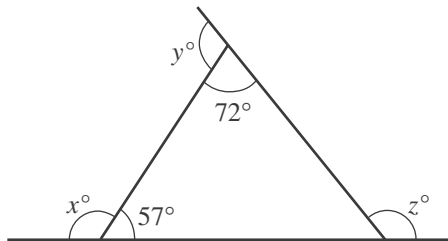


- F.  $(10,-3)$
- G.  $(9,-2)$
- H.  $(8, 2)$
- J.  $(7, 1)$
- K.  $(2,-9)$

11. Daisun owns 2 sportswear stores (X and Y). She stocks 3 brands of T-shirts (A, B, and C) in each store. The matrices below show the numbers of each type of T-shirt in each store and the cost for each type of T-shirt. The value of Daisun's T-shirt inventory is computed using the costs listed. What is the total value of the T-shirt inventory for Daisun's 2 stores?

$$\begin{matrix} & \begin{matrix} A & B & C \end{matrix} & & \text{Cost} \\ \begin{matrix} X \\ Y \end{matrix} & \begin{bmatrix} 100 & 200 & 150 \\ 120 & 50 & 100 \end{bmatrix} & \begin{matrix} A \\ B \\ C \end{matrix} & \begin{bmatrix} \$ 5 \\ \$10 \\ \$15 \end{bmatrix} \end{matrix}$$

- A. \$2,200
  - B. \$2,220
  - C. \$4,965
  - D. \$5,450
  - E. \$7,350
12. Given the triangle shown below with exterior angles that measure  $x^\circ$ ,  $y^\circ$ , and  $z^\circ$  as shown, what is the sum of  $x$ ,  $y$ , and  $z$  ?



- F. 180
- G. 231
- H. 309
- J. 360
- K. Cannot be determined from the given information

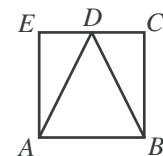
Use the following information to answer questions 13–15.

A poll of 200 registered voters was taken before the election for mayor of Springdale. All 200 voters indicated which 1 of the 4 candidates they would vote for. The results of the poll are given in the table below.

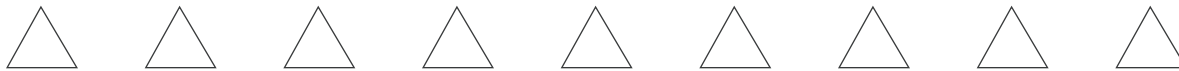
Candidate	Number of voters
Blackcloud	50
Lue	80
Gomez	40
Whitney	30

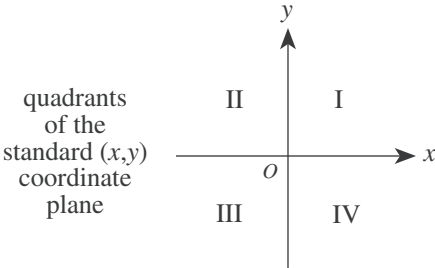
13. What percent of the voters polled chose Whitney in the poll?
- A. 15%
  - B. 20%
  - C. 25%
  - D. 30%
  - E. 40%
14. If the poll is indicative of how the 10,000 registered voters of Springdale will actually vote in the election, which of the following is the best estimate of the number of votes Lue will receive in the election?
- F. 1,500
  - G. 2,500
  - H. 4,000
  - J. 5,000
  - K. 8,000
15. If the information in the table were converted into a circle graph (pie chart), then the central angle of the sector for Gomez would measure how many degrees?
- A.  $54^\circ$
  - B.  $72^\circ$
  - C.  $90^\circ$
  - D.  $108^\circ$
  - E.  $144^\circ$

16. In square  $ABCE$  shown below,  $D$  is the midpoint of  $\overline{CE}$ . Which of the following is the ratio of the area of  $\triangle ADE$  to the area of  $\triangle ADB$  ?



- F. 1:1
- G. 1:2
- H. 1:3
- J. 1:4
- K. 1:8

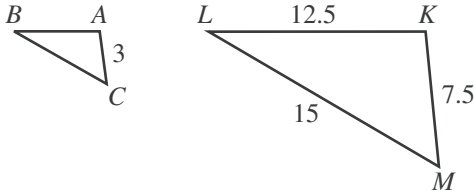


17. Which of the following is the slope of a line parallel to the line  $y = \frac{2}{3}x - 4$  in the standard  $(x,y)$  coordinate plane?
- A.  $-4$   
 B.  $-\frac{3}{2}$   
 C.  $2$   
 D.  $\frac{3}{2}$   
 E.  $\frac{2}{3}$
18. Janelle cut a board 30 feet long into 2 pieces. The ratio of the lengths of the 2 pieces is 2:3. What is the length, to the nearest foot, of the shorter piece?
- F. 5  
 G. 6  
 H. 12  
 J. 15  
 K. 18
19. What is the smallest integer greater than  $\sqrt{58}$ ?
- A. 4  
 B. 7  
 C. 8  
 D. 10  
 E. 30
20. Sergio plans to paint the 4 walls of his room with 1 coat of paint. The walls are rectangular, and, according to his measurements, each wall is 10 feet by 15 feet. He will not need to paint the single 3-foot-by-5-foot rectangular window in his room and the  $3\frac{1}{2}$ -foot-by-7-foot rectangular door. Sergio knows that each gallon of paint covers between 300 and 350 square feet. If only 1-gallon cans of paint are available, which of the following is the minimum number of cans of paint Sergio needs to buy to paint his walls?
- F. 1  
 G. 2  
 H. 3  
 J. 4  
 K. 5
21. What values of  $x$  are solutions for  $x^2 + 2x = 8$ ?
- A.  $-4$  and  $2$   
 B.  $-2$  and  $0$   
 C.  $-2$  and  $4$   
 D.  $0$  and  $2$   
 E.  $6$  and  $8$
22. For all  $a > 1$ , the expression  $\frac{3a^4}{3a^6}$  equals:
- F.  $\frac{1}{2}$   
 G.  $-a^2$   
 H.  $a^2$   
 J.  $-\frac{1}{a^2}$   
 K.  $\frac{1}{a^2}$
23. If point  $M$  has a nonzero  $x$ -coordinate and a nonzero  $y$ -coordinate and the coordinates have opposite signs, then point  $M$  *must* be located in which of the 4 quadrants labeled below?
- 
- A. I only  
 B. III only  
 C. I or III only  
 D. I or IV only  
 E. II or IV only
24. The fixed costs of manufacturing basketballs in a factory are \$1,400.00 per day. The variable costs are \$5.25 per basketball. Which of the following expressions can be used to model the cost of manufacturing  $b$  basketballs in 1 day?
- F.  $\$1,405.25b$   
 G.  $\$5.25b - \$1,400.00$   
 H.  $\$1,400.00b + \$5.25$   
 J.  $\$1,400.00 - \$5.25b$   
 K.  $\$1,400.00 + \$5.25b$



25. In the figure below, where  $\triangle ABC \sim \triangle KLM$ , lengths given are in centimeters. What is the perimeter, in centimeters, of  $\triangle ABC$ ?

(Note: The symbol  $\sim$  means "is similar to.")



- A. 12  
 B. 14  
 C.  $21\frac{1}{2}$   
 D. 35  
 E.  $71\frac{3}{4}$
26. If  $\frac{3\sqrt{7}}{a\sqrt{7}} = \frac{3\sqrt{7}}{7}$  is true, then  $a =$  ?  
 F. 1  
 G.  $\sqrt{7}$   
 H. 7  
 J. 21  
 K. 49
27. A hot-air balloon 70 meters above the ground is falling at a constant rate of 6 meters per second while another hot-air balloon 10 meters above the ground is rising at a constant rate of 15 meters per second. To the nearest tenth of a second, after how many seconds will the 2 balloons be the same height above the ground?  
 A. 8.9  
 B. 6.7  
 C. 2.9  
 D. 0.4  
 E. 0.2
28. A hiking group will go from a certain town to a certain village by van on 1 of 4 roads, from the village to a waterfall by riding bicycles on 1 of 2 bicycle paths, and then from the waterfall to their campsite by hiking on 1 of 6 trails. How many routes are possible for the hiking group to go from the town to the village to the waterfall to their campsite?  
 F. 6  
 G. 12  
 H. 24  
 J. 48  
 K. 220

29. Cube A has an edge length of 2 inches. Cube B has an edge length double that of Cube A. What is the volume, in cubic inches, of Cube B ?

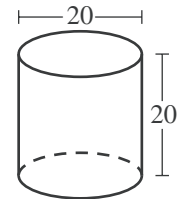
- A. 4  
 B. 8  
 C. 16  
 D. 32  
 E. 64

30. A formula used to compute the current value of a savings account is  $A = P(1 + r)^n$ , where  $A$  is the current value;  $P$  is the amount deposited;  $r$  is the rate of interest for 1 compounding period, expressed as a decimal; and  $n$  is the number of compounding periods. Which of the following is closest to the value of a savings account after 5 years if \$10,000 is deposited at 4% annual interest compounded yearly?

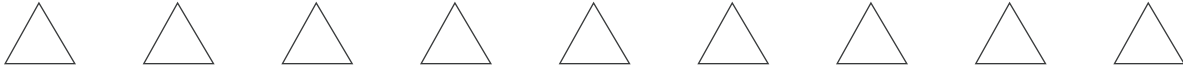
- F. \$10,400  
 G. \$12,167  
 H. \$42,000  
 J. \$52,000  
 K. \$53,782

31. A right circular cylinder is shown in the figure below, with dimensions given in centimeters. What is the total surface area of this cylinder, in square centimeters?

(Note: The total surface area of a cylinder is given by  $2\pi r^2 + 2\pi rh$  where  $r$  is the radius and  $h$  is the height.)



- A.  $300\pi$   
 B.  $400\pi$   
 C.  $500\pi$   
 D.  $600\pi$   
 E.  $1,600\pi$
32. Given  $f(x) = 4x + 1$  and  $g(x) = x^2 - 2$ , which of the following is an expression for  $f(g(x))$  ?  
 F.  $-x^2 + 4x + 1$   
 G.  $x^2 + 4x - 1$   
 H.  $4x^2 - 7$   
 J.  $4x^2 - 1$   
 K.  $16x^2 + 8x - 1$

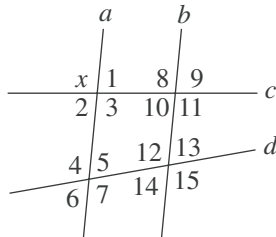


33. The table below shows the total number of goals scored in each of 43 soccer matches in a regional tournament. What is the average number of goals scored per match, to the nearest 0.1 goal?

Total number of goals in a match	Number of matches with this total
0	4
1	10
2	5
3	9
4	7
5	5
6	1
7	2

- A. 1.0
- B. 2.8
- C. 3.0
- D. 6.1
- E. 17.1

34. Lines  $a$ ,  $b$ ,  $c$ , and  $d$  are shown below and  $a \parallel b$ . Which of the following is the set of all angles that *must* be supplementary to  $\angle x$ ?



- F. {1, 2}
- G. {1, 2, 5, 6}
- H. {1, 2, 9, 10}
- J. {1, 2, 5, 6, 9, 10}
- K. {1, 2, 5, 6, 9, 10, 13, 14}

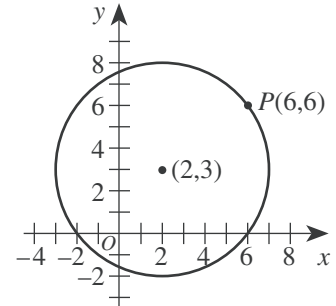
35.  $(3x^3)^3$  is equivalent to:

- A.  $x$
- B.  $9x^6$
- C.  $9x^9$
- D.  $27x^6$
- E.  $27x^9$

36. Which of the following is equivalent to the inequality  $4x - 8 > 8x + 16$ ?

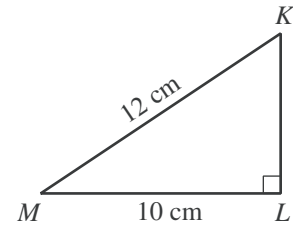
- F.  $x < -6$
- G.  $x > -6$
- H.  $x < -2$
- J.  $x > 2$
- K.  $x < 6$

37. As shown in the standard  $(x,y)$  coordinate plane below,  $P(6,6)$  lies on the circle with center  $(2,3)$  and radius 5 coordinate units. What are the coordinates of the image of  $P$  after the circle is rotated  $90^\circ$  clockwise ( $C$ ) about the center of the circle?



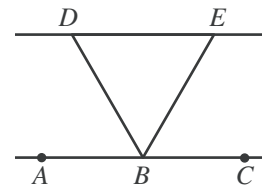
- A. (2, 3)
- B. (3, 2)
- C. (5, -1)
- D. (6, 0)
- E. (7, 3)

38. For right triangle  $\triangle KLM$  below, what is  $\sin \angle M$ ?



- F.  $\frac{10}{12}$
- G.  $\frac{12}{10}$
- H.  $\frac{\sqrt{44}}{10}$
- J.  $\frac{10}{\sqrt{44}}$
- K.  $\frac{\sqrt{44}}{12}$

39. In the figure below,  $B$  lies on  $\overline{AC}$ ,  $\overline{BD}$  bisects  $\angle ABE$ , and  $\overline{BE}$  bisects  $\angle CBD$ . What is the measure of  $\angle DBE$ ?



- A.  $90^\circ$
- B.  $60^\circ$
- C.  $45^\circ$
- D.  $30^\circ$
- E. Cannot be determined from the given information

40. If there are  $8 \times 10^{12}$  hydrogen molecules in a volume of  $4 \times 10^4$  cubic centimeters, what is the average number of hydrogen molecules per cubic centimeter?

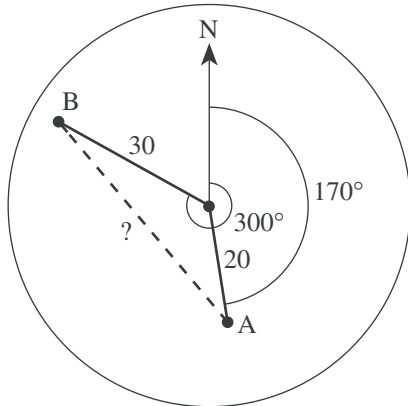
- F.  $5 \times 10^{-9}$
- G.  $2 \times 10^3$
- H.  $2 \times 10^8$
- J.  $32 \times 10^{16}$
- K.  $32 \times 10^{48}$



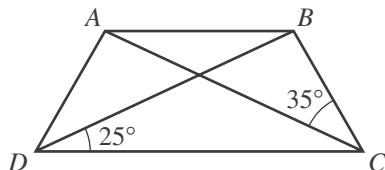


41. In the figure below, a radar screen shows 2 ships. Ship A is located at a distance of 20 nautical miles and bearing  $170^\circ$ , and Ship B is located at a distance of 30 nautical miles and bearing  $300^\circ$ . Which of the following is an expression for the straight-line distance, in nautical miles, between the 2 ships?

(Note: For  $\triangle ABC$  with side of length  $a$  opposite  $\angle A$ , side of length  $b$  opposite  $\angle B$ , and side of length  $c$  opposite  $\angle C$ , the law of cosines states  $c^2 = a^2 + b^2 - 2ab \cos \angle C$ .)

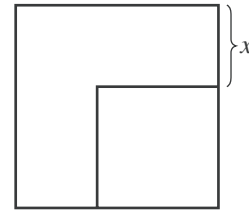


- A.  $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 60^\circ}$   
 B.  $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 130^\circ}$   
 C.  $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 170^\circ}$   
 D.  $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 300^\circ}$   
 E.  $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 470^\circ}$
42. What rational number is halfway between  $\frac{1}{5}$  and  $\frac{1}{3}$ ?
- F.  $\frac{1}{2}$   
 G.  $\frac{1}{4}$   
 H.  $\frac{2}{15}$   
 J.  $\frac{4}{15}$   
 K.  $\frac{8}{15}$
43. In isosceles trapezoid  $ABCD$ ,  $\overline{AB}$  is parallel to  $\overline{DC}$ ,  $\angle BDC$  measures  $25^\circ$ , and  $\angle BCA$  measures  $35^\circ$ . What is the measure of  $\angle DBC$ ?



- A.  $85^\circ$   
 B.  $95^\circ$   
 C.  $105^\circ$   
 D.  $115^\circ$   
 E.  $125^\circ$

44. In the figure below, the area of the larger square is 50 square centimeters and the area of the smaller square is 18 square centimeters. What is  $x$ , in centimeters?



- F. 2  
 G.  $2\sqrt{2}$   
 H.  $4\sqrt{2}$   
 J. 16  
 K. 32
45. Which of the following is a rational number?

- A.  $\sqrt{2}$   
 B.  $\sqrt{\pi}$   
 C.  $\sqrt{7}$   
 D.  $\sqrt{\frac{5}{25}}$   
 E.  $\sqrt{\frac{64}{49}}$

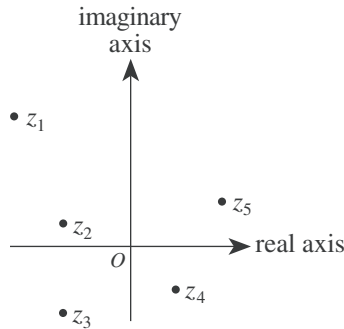
46. If  $a < b$ , then  $|a - b|$  is equivalent to which of the following?
- F.  $a + b$   
 G.  $-(a + b)$   
 H.  $\sqrt{a - b}$   
 J.  $a - b$   
 K.  $-(a - b)$

47. Tom has taken 5 of the 8 equally weighted tests in his U.S. History class this semester, and he has an average score of exactly 78.0 points. How many points does he need to earn on the 6th test to bring his average score up to exactly 80.0 points?

- A. 90  
 B. 88  
 C. 82  
 D. 80  
 E. 79



48. In the complex plane, the horizontal axis is called the *real axis* and the vertical axis is called the *imaginary axis*. The complex number  $a + bi$  graphed in the complex plane is comparable to the point  $(a,b)$  graphed in the standard  $(x,y)$  coordinate plane. The *modulus* of the complex number  $a + bi$  is given by  $\sqrt{a^2 + b^2}$ . Which of the complex numbers  $z_1$ ,  $z_2$ ,  $z_3$ ,  $z_4$ , and  $z_5$  below has the greatest modulus?

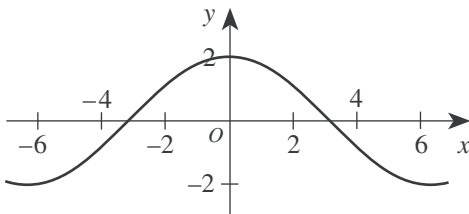


- F.  $z_1$   
G.  $z_2$   
H.  $z_3$   
J.  $z_4$   
K.  $z_5$

49. In the real numbers, what is the solution of the equation  $8^{2x+1} = 4^{1-x}$ ?

- A.  $-\frac{1}{3}$   
B.  $-\frac{1}{4}$   
C.  $-\frac{1}{8}$   
D. 0  
E.  $\frac{1}{7}$

50. The graph of the trigonometric function  $y = 2 \cos\left(\frac{1}{2}x\right)$  is shown below.



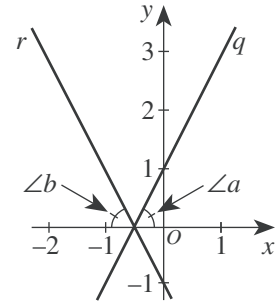
The function is:

- F. even (that is,  $f(x) = f(-x)$  for all  $x$ ).  
G. odd (that is,  $f(-x) = -f(x)$  for all  $x$ ).  
H. neither even nor odd.  
J. the inverse of a cotangent function.  
K. undefined at  $x = \pi$ .

51. An integer from 100 through 999, inclusive, is to be chosen at random. What is the probability that the number chosen will have 0 as at least 1 digit?

- A.  $\frac{19}{900}$   
B.  $\frac{81}{900}$   
C.  $\frac{90}{900}$   
D.  $\frac{171}{900}$   
E.  $\frac{271}{1,000}$

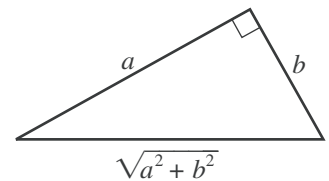
52. In the figure below, line  $q$  in the standard  $(x,y)$  coordinate plane has equation  $-2x + y = 1$  and intersects line  $r$ , which is distinct from line  $q$ , at a point on the  $x$ -axis. The angles,  $\angle a$  and  $\angle b$ , formed by these lines and the  $x$ -axis are congruent. What is the slope of line  $r$ ?



- F. -2  
G.  $-\frac{1}{2}$   
H.  $\frac{1}{2}$   
J. 2  
K. Cannot be determined from the given information

53. In the right triangle below,  $0 < b < a$ . One of the angle measures in the triangle is  $\tan^{-1}\left(\frac{a}{b}\right)$ . What is  $\cos\left[\tan^{-1}\left(\frac{a}{b}\right)\right]$ ?

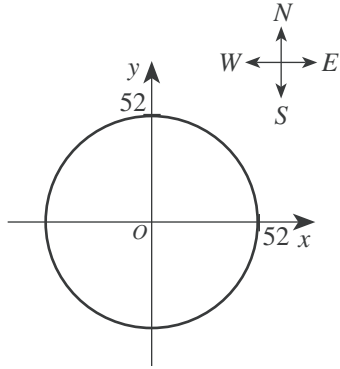
- A.  $\frac{a}{b}$   
B.  $\frac{b}{a}$   
C.  $\frac{a}{\sqrt{a^2 + b^2}}$   
D.  $\frac{b}{\sqrt{a^2 + b^2}}$   
E.  $\frac{\sqrt{a^2 + b^2}}{a}$





Use the following information to answer questions 54–56.

The radio signal from the transmitter site of radio station WGGW can be received only within a radius of 52 miles in all directions from the transmitter site. A map of the region of coverage of the radio signal is shown below in the standard  $(x,y)$  coordinate plane, with the transmitter site at the origin and 1 coordinate unit representing 1 mile.



54. Which of the following is closest to the area, in square miles, of the region of coverage of the radio signal?

F. 2,120  
G. 2,700  
H. 4,250  
J. 8,500  
K. 16,990

55. Which of the following is an equation of the circle shown on the map?

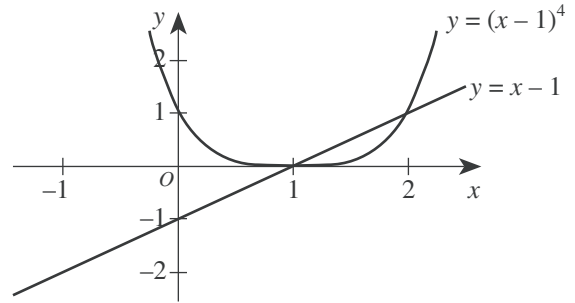
A.  $x + y = 52$   
B.  $(x + y)^2 = 52$   
C.  $(x + y)^2 = 52^2$   
D.  $x^2 + y^2 = 52$   
E.  $x^2 + y^2 = 52^2$

56. The transmitter site of radio station WGGW and the transmitter site of another radio station, WGWB, are on the same highway 100 miles apart. The radio signal from the transmitter site of WGWB can be received only within a radius of 60 miles in all directions from the WGWB transmitter site. For how many miles along the highway can the radio signals of *both* stations be received?

(Note: Assume the highway is straight.)

F. 8  
G. 12  
H. 40  
J. 44  
K. 48

57. The graphs of the equations  $y = x - 1$  and  $y = (x - 1)^4$  are shown in the standard  $(x,y)$  coordinate plane below. What real values of  $x$ , if any, satisfy the inequality  $(x - 1)^4 < (x - 1)$ ?

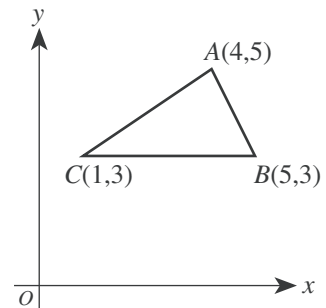


A. No real values  
B.  $x < 0$  and  $x > 1$   
C.  $x < 1$  and  $x > 2$   
D.  $0 < x < 1$   
E.  $1 < x < 2$

58. For every positive 2-digit number,  $x$ , with tens digit  $t$  and units digit  $u$ , let  $y$  be the 2-digit number formed by reversing the digits of  $x$ . Which of the following expressions is equivalent to  $x - y$ ?

F.  $9(t - u)$   
G.  $9(u - t)$   
H.  $9t - u$   
J.  $9u - t$   
K. 0

59. In the figure below, the vertices of  $\triangle ABC$  have  $(x,y)$  coordinates  $(4,5)$ ,  $(5,3)$ , and  $(1,3)$ , respectively. What is the area of  $\triangle ABC$ ?



A. 4  
B.  $4\sqrt{2}$   
C.  $4\sqrt{3}$   
D. 8  
E.  $8\sqrt{2}$

60. The sum of an infinite geometric series with first term  $a$  and common ratio  $r < 1$  is given by  $\frac{a}{1-r}$ . The sum of a given infinite geometric series is 200, and the common ratio is 0.15. What is the second term of this series?

F. 25.5  
G. 30  
H. 169.85  
J. 170  
K. 199.85

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

## READING TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are four passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

## Passage I

**PROSE FICTION:** This passage is adapted from the short story “The Threshold” by Cristina Peri Rossi (original Spanish version ©1986 by Cristina Peri Rossi; translation ©1993 by Mary Jane Treacy).

The woman never dreams and this makes her intensely miserable. She thinks that by not dreaming she is unaware of things about herself that dreams would surely give her. She doesn’t have the door of  
5 dreams that opens every night to question the certainties of the day. She stays at the threshold, and the door is always closed, refusing her entrance. I tell her *that* in itself is a dream, a nightmare: to be in front of a door which will not open no matter how much we push at the latch or pound the knocker. But in truth, the door to that  
10 nightmare doesn’t have a latch or a knocker; it is total surface, brown, high and smooth as a wall. Our blows strike a body without an echo.

“There’s no such thing as a door without a key,”  
15 she tells me, with the stubborn resistance of one who does not dream.

“There are in dreams,” I tell her. In dreams, doors don’t open, rivers run dry, mountains turn around in circles, telephones are made of stone. Elevators stop in the  
20 middle of floors, and when we go to the movies all the seats have their backs to the screen. Objects lose their functionality in dreams in order to become obstacles, or they have their own laws that we don’t know anything about.

25 She thinks that the woman who does not dream is the enemy of the waking woman because she robs her of parts of herself, takes away the wild excitement of revelation when we think we have discovered something that we didn’t know before or that we had  
30 forgotten.

“A dream is a piece of writing,” she says sadly, “a work that I don’t know how to write and that makes me different from others, all the human beings and animals who dream.”

35 She is like a tired traveler who stops at the threshold and stays there, stationary as a plant.

In order to console her, I tell her that perhaps she is too tired to cross through the doorway; maybe she

spends so much time looking for her dreams before  
40 falling asleep that she doesn’t see the images when they appear because her exhaustion has made her close those eyes that are inside of her eyes. When we sleep we have two pairs of eyes: the more superficial eyes, which are accustomed to seeing only the appearance of things and  
45 of dealing with light, and dream’s eyes; when the former close, the latter open up. She is the traveler on a long trip who stops at the threshold, half dead with fatigue, and can no longer pass over to the other side or cross the river or the border because she has closed  
50 both pairs of eyes.

“I wish I could open them,” she says simply.

Sometimes she asks me to tell her my dreams, and I know that later, in the privacy of her room with the light out, hiding, she’ll try to dream my dream. But to  
55 dream someone else’s dream is harder than writing someone else’s story, and her failures fill her with irritation. She thinks I have a power that she doesn’t have and this brings out her envy and bad humor. She thinks that the world of dreams is an extra life that some of us  
60 have, and her curiosity is only halfway satisfied when I am finished telling her the last one. (To tell dreams is one of the most difficult arts; perhaps only author Franz Kafka was able to do so without spoiling their mystery, trivializing their symbols or making them rational.)

65 Just as children can’t stand any slight change and love repetition, she insists that I tell her the same dream two or three times, a tale full of people I don’t know, strange forms, unreal happenings on the road, and she becomes annoyed if in the second version there are  
70 some elements that were not in the first.

The one she likes best is the amniotic dream, the dream of water. I am walking under a straight line that is above my head, and everything underneath is clear water that doesn’t make me wet or have any weight;  
75 you don’t see it or feel it, but you know it is there. I am walking on a ground of damp sand, wearing a white shirt and dark pants, and fish are swimming all around me. I eat and drink under the water but I never swim or float because the water is just like air, and I breathe it  
80 naturally. The line above my head is the limit that I never cross, nor do I have any interest in going beyond it.

She, in turn, would like to dream of flying, of slipping from tree to tree way above the rooftops.

GO ON TO THE NEXT PAGE.

1. Which of the following best describes the structure of the passage?
  - A. A dialogue between two people in which both relate their dreams in an almost equal amount of detail
  - B. An account of the narrator's perspective on the woman revealed primarily through the narrator's report of their conversations
  - C. A character sketch of two people as related by a narrator who knows both of them and their thoughts
  - D. A detailed narration of several of the narrator's dreams accompanied by a description of the woman's reactions to them
2. Based on the passage, which of the following statements best describes the overall attitudes of the narrator and the woman?
  - F. The woman is frustrated and despairing, while the narrator is supportive and reassuring.
  - G. The woman is bitter and resentful, while the narrator is detached and uninterested.
  - H. The woman is lonely and resigned, while the narrator is optimistic and relaxed.
  - J. The woman is dismayed and miserable, while the narrator is discontented and angry.
3. It can reasonably be inferred from the passage that the woman most strongly desires to attain which of the following qualities from dreaming?
  - A. Relaxation
  - B. Self-awareness
  - C. Entertainment
  - D. Self-control
4. Throughout the passage, the image of the door is used primarily as a metaphor for the boundary between:
  - F. alertness and fatigue.
  - G. dreams and nightmares.
  - H. wakefulness and sleeping.
  - J. not-dreaming and dreaming.
5. In relation to the first paragraph's earlier description of the nightmare, the narrator's comments in lines 10–13 primarily serve to:
  - A. reveal how to alter a dream in progress.
  - B. explain what caused the nightmare.
  - C. intensify the sense of hopelessness.
  - D. suggest the possibility of escape.
6. Which of the following statements about the amniotic dream is best supported by the passage?
  - F. It is the narrator's favorite dream.
  - G. The woman is particularly fond of hearing it related.
  - H. The narrator has dreamed this dream many times.
  - J. It is the dream the woman most strongly desires to dream.
7. According to the passage, one of the woman's worries about her present situation is that she:
  - A. will begin to dream too much.
  - B. suspects the narrator will desert her.
  - C. will watch her dreams become nightmares.
  - D. stands out as different from others.
8. Based on the narrator's account, the woman's approach to dreaming the narrator's dreams is best described as:
  - F. confrontational and powerful.
  - G. enthusiastic and playful.
  - H. precise and confident.
  - J. self-conscious and secretive.
9. As it is used in line 58, the word *humor* most nearly means:
  - A. personality.
  - B. whim.
  - C. mood.
  - D. comedy.
10. In the passage, the narrator most nearly describes Kafka as someone who:
  - F. diminished dreams by trying to unravel their mysteries.
  - G. explained the underlying rationality of dream symbols.
  - H. conveyed the essence of dreams in his writing.
  - J. found it too difficult to describe dreams artfully.

## Passage II

**SOCIAL SCIENCE:** This passage is adapted from *The Little Ice Age: How Climate Made History, 1300–1850* by Brian Fagan (©2000 by Brian Fagan).

Speak the words “ice age,” and the mind turns to Cro-Magnon mammoth hunters on windswept European plains devoid of trees. But the Little Ice Age (approximately A.D. 1300–1850) was far from a deep freeze. Think instead of an irregular seesaw of rapid climatic shifts, driven by complex and still little understood interactions between the atmosphere and the ocean. The seesaw brought cycles of intensely cold winters and easterly winds, then switched abruptly to years of heavy spring and early summer rains, mild winters, and frequent Atlantic storms, or to periods of droughts, light northeasterly winds, and summer heat waves that baked growing corn fields under a shimmering haze. The Little Ice Age was an endless zigzag of climatic shifts, few lasting more than a quarter century. Today’s prolonged warming is an anomaly.

Reconstructing the climate changes of the past is extremely difficult, because reliable instrument records are but a few centuries old. For earlier times, we have but what are called proxy records reconstructed from incomplete written accounts, tree rings, and ice cores. Country clergy and amateur scientists with time on their hands sometimes kept weather records over long periods. Chronicles like those of the eighteenth-century diarist John Evelyn or monastery scribes are invaluable for their remarks on unusual weather, but their usefulness in making comparisons is limited. Remarks like “the worst rain storm in memory,” or “hundreds of fishing boats overwhelmed by mighty waves” do not an accurate meteorological record make, even if they made a deep impression at the time. The traumas of extreme weather events fade rapidly from human consciousness. Many New Yorkers still vividly remember the great heat wave of Summer 1999, but it will soon fade from collective memory, just like the great New York blizzard of 1888, which stranded hundreds of people in Grand Central station and froze dozens to death in deep snowdrifts.

A generation ago, we had a generalized impression of Little Ice Age climate compiled with painstaking care from a bewildering array of historical sources and a handful of tree-ring sequences. Today, the scatter of tree-ring records has become hundreds from throughout the Northern Hemisphere and many from south of the equator, too, amplified with a growing body of temperature data from ice cores drilled in Antarctica, Greenland, the Peruvian Andes, and other locations. We can now track the Little Ice Age as an intricate tapestry of short-term climatic shifts that rippled through European society during times of remarkable change—centuries that saw Europe emerge from medieval fiefdom and pass by stages through the Renaissance, the Age of Discovery, the Enlightenment, the French and Industrial revolutions, and the making of modern Europe.

To what extent did those climatic shifts alter the course of European history? Many archaeologists and historians are suspicious of the role of climate change in changing human societies—and with good reason. Environmental determinism, the notion that climate change was a primary cause of major developments like, say, agriculture, has been a dirty word in academia for generations. You certainly cannot argue that climate drove history in a direct and causative way to the point of toppling governments. Nor, however, can you contend that climate change is something that you can totally ignore. Throughout the Little Ice Age, into the nineteenth century, millions of European peasants lived at the subsistence level. Their survival depended on crop yields: cycles of good and poor harvests, of cooler and wetter spring weather, could make a crucial difference between hunger and plenty, life and death. The sufficiency or insufficiency of food was a powerful motivator of human action, sometimes on a national or even continent-wide scale, with consequences that could take decades to unfold.

Consider, for instance, the food crises that engulfed Europe during the Little Ice Age—the great hunger of 1315 to 1319, the food dearths of 1741, and 1816, “the year without a summer”—to mention only a few. These crises in themselves did not threaten the continued existence of Western civilization, but they surely played an important role in the formation of modern Europe. Some of these crises resulted from climatic shifts, others from human ineptitude or disastrous economic or political policy; many from a combination of all three. Environmental determinism may be intellectually bankrupt, but climate change is the ignored player on the historical stage.

11. The author most nearly characterizes the role of climate change in the course of history as one that:
- A. is neither all important nor safely disregarded.
  - B. is rightly ignored by archaeologists and scientists.
  - C. was greater in medieval Europe than it is today.
  - D. will eventually be seen as direct and causative.
12. The main idea of the first paragraph is that the Little Ice Age:
- F. was a period defined by prolonged global cooling.
  - G. occurred during the era of Cro-Magnon mammoth hunters.
  - H. was marked by frequent and short-term climate shifts.
  - J. resulted from interactions between the atmosphere and ocean.

13. The author uses the remark “the worst rain storm in memory” (line 28) primarily as an example of:
- A. the kind of well-meaning but ultimately useless records of unusual weather that Evelyn kept.
  - B. how people in the eighteenth century were deeply impressed by unusual weather.
  - C. people’s preoccupation with carefully rating and comparing unusual weather events.
  - D. how notes people in the past kept about unusual weather are of limited meteorological value today.
14. The author indicates that the common factor in the events and periods listed in lines 50–54 is that they:
- F. took place during the Little Ice Age.
  - G. were the result of the Little Ice Age.
  - H. were unaffected by the Little Ice Age.
  - J. occurred after the Little Ice Age.
15. By his statement in lines 71–75, the author most nearly means that during the Little Ice Age:
- A. food or the lack thereof could have far-reaching and long-lasting effects.
  - B. the difference between hunger and plenty was a very small one.
  - C. food shortages were relatively rare at the national or continental level.
  - D. the insufficiency of food motivated peasant farmers to work harder.
16. The author uses the events listed in lines 77–79 primarily to:
- F. show how weather-related disasters threatened the survival of Western civilization.
  - G. criticize subsistence-level agriculture as being too dependent on the weather.
  - H. illustrate how environmental determinism operated in the Little Ice Age.
  - J. suggest the part that climate shifts may have had in producing modern Europe.
17. The author cites all of the following as causes of the European food crises during the Little Ice Age EXCEPT:
- A. human ineptitude.
  - B. bad economic policy.
  - C. poor political policy.
  - D. bankrupt intellectualism.
18. The author calls the interactions that produced the Little Ice Age climate shifts:
- F. powerful and relatively straightforward.
  - G. complex and not yet well understood.
  - H. frequent and not often studied today.
  - J. intricate and generally beneficial to humans.
19. Which of the following is NOT listed in the passage as an element of the Little Ice Age?
- A. Heavy spring and early summer rains
  - B. Intensely cold winters and easterly winds
  - C. Droughts and light northeasterly winds
  - D. Mild winters and an unusually calm ocean
20. The author calls which of the following an anomaly?
- F. The daily weather of the Little Ice Age
  - G. Today’s prolonged warming
  - H. The climatic seesaw of the last hundred years
  - J. Little Ice Age corn yields

## Passage III

**HUMANITIES:** This passage is adapted from the article “Wherever He Went, Joy Was Sure to Follow” by Stanley Crouch (©2000 by The New York Times Company). *Tin Pan Alley* is a district famous for its composers and publishers of popular music.

As a jazz trumpeter and a singer, Louis Armstrong asserted a level of individuality in musical interpretation, recomposition and embellishment far more radical than any that had preceded it in Western music. When  
5 faced with a musical theme, Armstrong improvised an arrangement that boldly rephrased it, dropping notes he didn’t want to play and adding others. His featured improvisations brought the role of the jazz soloist to the fore. The immaculate logic of his improvised melodies,  
10 full of rhythmic surprises and virtuosic turns, influenced show-tune writers, jazz composers, big band arrangers and tap dancers. His harmonic innovations, as fellow trumpeter Wynton Marsalis has noted, were the most brilliant in the history of jazz: Armstrong figured  
15 out how to articulate the sound of the blues through Tin Pan Alley popular-music tunes without abandoning their harmonic underpinnings. “Louis Armstrong took two different musics and fused them so that they sounded perfectly compatible,” Mr. Marsalis says.

20 It was during the 1920’s and 30’s that Armstrong’s reputation took off. He set the music scene in his home town of New Orleans on fire before traveling to Chicago in 1921 to join his mentor, the cornetist King Oliver. For a year he went to New York, where he  
25 joined Fletcher Henderson’s jazz orchestra and turned the rhythm of the music around with his conception of playing with a swinging beat. Now almost a national musical terror, Armstrong returned to Chicago, then finally settled in New York in 1929.

30 From 1925 through the early 1930’s, he recorded dozens of masterpieces with large and small bands, popularized scat singing (jazz singing that uses non-sense syllables) and took on Tin Pan Alley, introducing  
35 one tune after another into jazz, where they became part of his repertory. His tone could be broad, soft and luminous or vocal or comical, or suddenly and indelibly noble, and when his music conquered Europe in the 30’s, it carried the tragic optimism of the American sensibility into the world at large. Wherever he went,  
40 swing was sure to follow. He almost single-handedly began a new spirit of freewheeling but perfectly controlled improvisation, tinged with playfulness, sorrow and sardonic irony.

Like all innovators, Armstrong was also called  
45 upon to perform superhuman feats. Armstrong had endless energy and could play and play and play with the evangelical fire and charisma that brings a new art into being. He extended the range of his instrument, asserted unprecedented rhythmic fluidity and had the  
50 greatest endurance of any trumpet player who ever lived. As a young man, he could play five shows in a theater a day, be the featured soloist on virtually every piece and end each show with 100 high C notes. His

glissandos—rapid slides up or down a musical scale—  
55 were so pronounced that trumpeters of the London Philharmonic Orchestra had to inspect his horn to be convinced that it was not made differently from theirs.

By his death in 1971, Armstrong had influenced  
the entirety of American music, instrumentally and  
60 vocally, inspiring his own generation and successive ones. I can recall some 30 years ago talking with a concert percussionist who knew Armstrong and the rest of the people who were rising to the top during the middle and late 20’s. Referring to a certain concert piece,  
65 which had a more extensive drum part than usual, he said, “When I get that going, I can put my Louis Armstrong influence in and, without them even knowing it, the orchestra starts to swing for a bit.” On a more recent occasion, unless I was imagining it, I even heard  
70 rapper Heavy D slip a phrase over the mechanical hip-hop beat that had an Armstrong arch to it.

To get right down to it, no one in jazz ever played  
with greater emotional range than Armstrong, whose  
New Orleans experiences meant that he worked every-  
75 thing from christenings to funerals. In the streets, he picked up all the folk chants and songs. While traveling around town, he heard traces of French and Italian opera that suffused his sensibility and his memory. But beyond all that, what Armstrong wanted to give his  
80 listeners was the kind of pleasure music gave him, which is what most artists are after. When he wrote or talked of New Orleans, of being out there with his horn or following the parades or listening to mentors like Joe Oliver, Armstrong never failed to project a joy so profound that it became an antidote to the blues of daily  
85 living. He had a determination to swallow experience whole and taste it all and only then to spit out the bitter parts.

21. Which of the following statements best expresses the main idea of the passage?
- A. Armstrong was an exceedingly gifted musician whose emotional range was nonetheless somewhat narrow.
  - B. One of the greatest jazz trumpeters of all time, Armstrong is best known for his soft and luminous tone.
  - C. Armstrong has had a profound effect on music, one that has been both wide ranging and long lasting.
  - D. A pioneering jazz trumpeter and singer, Armstrong recorded numerous masterpieces in the mid to late 1920s.



22. Which of the following questions is NOT answered in the passage?
- F. In terms of Western music history, what was so radical about Armstrong's playing and singing?
  - G. What aspect of Armstrong's music brought the role of the jazz soloist to the fore?
  - H. What style of jazz singing did Armstrong popularize?
  - J. Which of Armstrong's recorded masterpieces most changed American music?
23. The passage suggests that Armstrong's most important contribution to jazz was his:
- A. musical conquest of Europe.
  - B. emphasis on improvisation.
  - C. work with King Oliver.
  - D. invention of the blues sound.
24. The main function of the second paragraph (lines 20–29) is to:
- F. identify some of Armstrong's mentors, such as King Oliver.
  - G. list some of the early events in Armstrong's developing career.
  - H. contrast Armstrong's opinions of King Oliver and Fletcher Henderson.
  - J. describe the musical style Armstrong developed jointly with Fletcher Henderson.
25. All of the following details are used in the passage to demonstrate Armstrong's endurance as a young musician EXCEPT that he:
- A. would be the featured soloist on almost every piece in a show.
  - B. ended shows with a long series of high notes.
  - C. once managed to play for an entire night.
  - D. could play five shows a day.
26. The last paragraph establishes all of the following about Armstrong EXCEPT:
- F. his strong desire to reshape American music.
  - G. his cheerful demeanor and sense of mission.
  - H. the range of influences on his music.
  - J. the varied settings in which he performed.
27. One of the main points in the last paragraph is that through his music, Armstrong attempted to promote in his listeners a sense of:
- A. awe.
  - B. determination.
  - C. pleasure.
  - D. nostalgia.
28. According to the passage, which of the following cities is the last one Armstrong is said to have lived in?
- F. New Orleans
  - G. New York
  - H. Chicago
  - J. Paris
29. The author most likely includes the information in lines 53–57 to suggest:
- A. Armstrong's highly developed skill.
  - B. Armstrong's unease with orchestral music.
  - C. that Armstrong used an unusual trumpet.
  - D. that Armstrong invented the glissando.
30. Which of the following words best describes how the orchestra referred to in the fifth paragraph (lines 58–71) is said to have started to swing?
- F. Reluctantly
  - G. Intentionally
  - H. Unconsciously
  - J. Optimistically

## Passage IV

**NATURAL SCIENCE:** This passage is adapted from the article “Needles & Nerves” by Catherine Dold (©1999 by The Walt Disney Company).

Acupuncture and other forms of traditional Chinese medicine have been around for more than 4,000 years. Yet the explanation for how acupuncture—and Chinese medicine as a whole—works has long been a mystery for most Western doctors. The basic theory is outlined in a text from 200 B.C. It recognizes in people and in nature a vital energy or life force known as qi. Qi is the source of movements ranging from voluntary muscle action to blood flow; it protects the body from external influences, and it generates warmth. Qi flows through the body and to the organs by way of an extensive system of channels known as meridians. If the flow of the force is disturbed, the theory goes, the resulting deficiency, excess, or stagnation of qi causes bodily malfunction and thus illness.

Acupuncture, in which needles are inserted into specific points along the meridians and manipulated, is said to restore the proper flow of qi and thereby return the body to health. Practitioners recognize some 1,500 acupoints, most of which have no obvious relationship to their intended targets. For example, a point on the second toe is used to treat headaches and toothaches, while a point near the elbow enhances the immune system.

Another integral concept is the tension between two ever-present, complementary forces of nature, yin and yang. When their balance is disturbed, the theory goes, people get sick. Yin conditions reflect a lack of qi: pale face, cold extremities, slow pulse, depression. Yang conditions result from an excess of qi: red face, fever, fast pulse, agitation.

Doctors and licensed practitioners administer between 9 and 12 million acupuncture treatments each year in the United States, commonly for pain control.

According to neuroscientist Bruce Pomeranz, of the University of Toronto, numerous studies over the past 20 years have shown that inserting needles into acupoints stimulates nerves in the underlying muscles. That stimulation, researchers believe, sends impulses up the spinal cord to a relatively primitive part of the brain known as the limbic system, as well as to the mid-brain and the pituitary gland. Somehow this signaling leads to the release of endorphins and monoamines, chemicals that block pain signals in the spinal cord and the brain.

“The endorphin story is really nailed down,” says Pomeranz. “The acupoints that have been mapped over thousands of years are likely the spots where nerves are concentrated.” But the endorphin story “doesn’t explain many of the other claims of acupuncture,” he continues. “There have been a number of clinical trials showing that acupuncture is extremely useful for the nausea

caused by chemotherapy and early pregnancy. That’s not the endorphin system.”

Nor does the endorphin story explain what physicist Zang-Hee Cho found when exploring acupoints that are traditionally used to treat vision problems. The points are not found near the eyes but on the outside of the foot, running from the little toe to the ankle. Acupuncturists hold that stimulation of these points with needles will affect the eyes via the system of meridians rather than through the central nervous system.

To test that premise, Cho strapped student volunteers into an fMRI (functional magnetic resonance imaging) machine, the results from which can be viewed as colorful brain activation maps. Cho first stimulated the eyes of the volunteers by flashing a light in front of them. The resulting images, as expected, showed a concentration of color—an increase in activity—in the visual cortex, the portion of the brain that is known to be involved in eye function. Then Cho had an acupuncturist stimulate one of the vision-related acupoints. In one person after another, the very same region of the brain lit up on the fMRI image. The magnitude of brain activity seen on acupuncture stimulation was nearly as strong as that elicited by the flash of light. To eliminate the possibility of a placebo effect, Cho also stimulated a nonacupoint, in the big toe. There was no response in the visual cortex.

Like many preliminary scientific reports, Cho’s study raises more questions than it answers. Still, he has demonstrated new functional effects of acupuncture. “Classically, acupuncture was the ultimate in experimentation; people collected data for thousands of years,” says Joie Jones, professor of radiological sciences at the University of California at Irvine and coauthor of the study. “With these studies, we’ve demonstrated that for at least some acupuncture points [a connection] goes through the brain.”

31. The passage mentions that the onset of illness would be caused by any of the following EXCEPT:

- A. a shortage of qi.
- B. an excess of qi.
- C. a change in the temperature of qi.
- D. a disruption in the flow of qi.

32. According to the fifth paragraph (lines 35–45), studies have shown that the insertion of acupuncture needles into acupoints causes nerve stimulation that results in:
- F. signals being sent to the brain and pituitary gland, which leads to the release of chemicals.
  - G. signals being sent to the spinal cord, which immediately blocks the release of chemicals.
  - H. chemicals being released that amplify signals to the spinal cord.
  - J. chemicals being released that numb the spinal cord and prevent signals being sent to the brain and pituitary gland.
33. The studies of acupuncture described in the fifth paragraph (lines 35–45) can best explain the success of acupuncture in treating which of the following conditions?
- A. Blurred vision
  - B. Nausea
  - C. Headaches
  - D. Impaired immune system
34. According to the passage, the study by Cho showed that volunteers experienced an increase in visual cortex activity when they:
- F. viewed brain activation maps.
  - G. were exposed to high concentrations of color.
  - H. received acupoint stimulation to their big toes.
  - J. underwent acupoint stimulation of the outside of the foot.
35. Information in the last paragraph indicates that acupuncture research has given results that:
- A. thoroughly explain the mechanisms by which acupuncture functions.
  - B. explain some aspects of how acupuncture functions while leaving other aspects open to further study.
  - C. explain some aspects of how acupuncture functions while questioning the methods used in previous studies.
  - D. do not explain any of the mechanisms by which acupuncture functions.
36. The passage indicates that the balance between yin and yang in a person depends on that person's:
- F. emotional state.
  - G. blood flow.
  - H. pulse.
  - J. level of qi.
37. According to the passage, a person with a yang condition might exhibit all of the following EXCEPT:
- A. pale face.
  - B. agitation.
  - C. fast pulse.
  - D. fever.
38. As it is used in line 49, the word *concentrated* most nearly means:
- F. extracted.
  - G. paid attention to.
  - H. gathered together.
  - J. directed to one topic.
39. According to the passage, Cho would have determined that volunteers had experienced a placebo effect if which of the following procedures had created increased activity in the visual cortex of the brain?
- A. Flashing a light in front of them
  - B. Stimulating one of their vision-related acupoints
  - C. Having them read an eye-examination chart
  - D. Stimulating a place that was not a visual acupoint
40. In the last paragraph, the author expresses the belief that scientists who open a new line of research on a topic are likely to:
- F. quickly discover the answers to the questions they raise.
  - G. find that new questions arise as old ones are answered.
  - H. receive answers far different than they anticipated.
  - J. learn that they have often asked the wrong questions.

**END OF TEST 3**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**

**DO NOT RETURN TO A PREVIOUS TEST.**



## SCIENCE TEST

35 Minutes—40 Questions

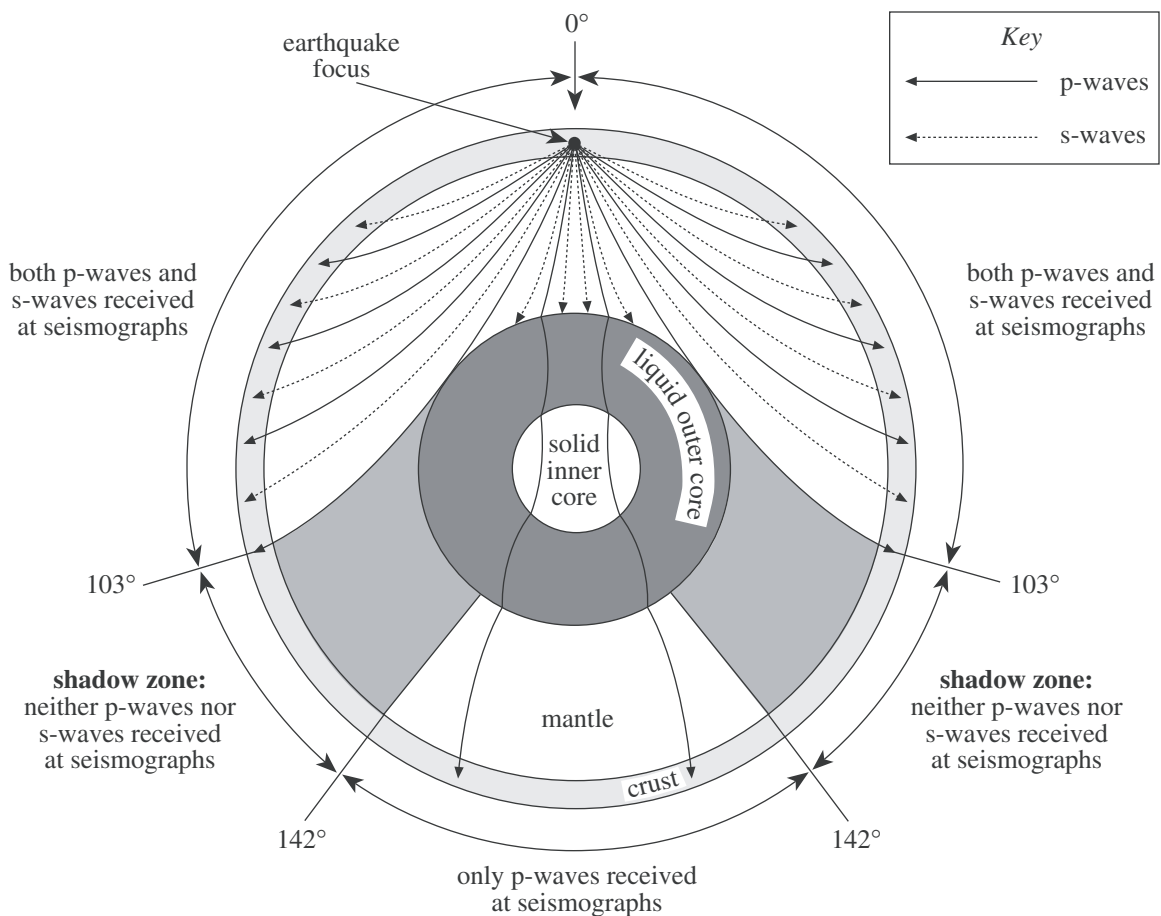
**DIRECTIONS:** There are seven passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

## Passage I

Earthquakes produce seismic waves that can travel long distances through Earth. Two types of seismic waves are *p-waves* and *s-waves*. P-waves typically travel 6–13 km/sec and s-waves typically travel 3.5–7.5 km/sec. Figure 1 shows how p-waves and s-waves move and are

*refracted* (bent) as they travel through different layers of Earth's interior. Figure 2 shows a *seismograph* (an instrument that detects seismic waves) recording of p-waves and s-waves from an earthquake. Figure 3 shows, in general, how long it takes p-waves and s-waves to travel given distances along the surface from an earthquake *focus* (point of origin of seismic waves).



Note: The figure is not to scale.

Figure 1

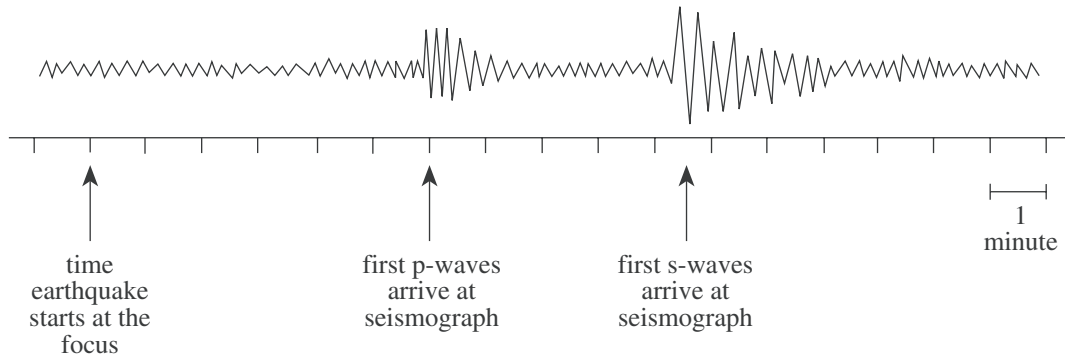
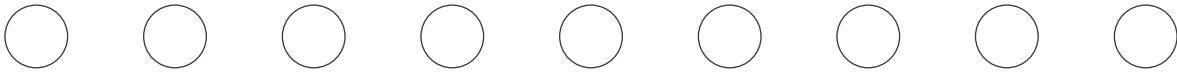


Figure 2

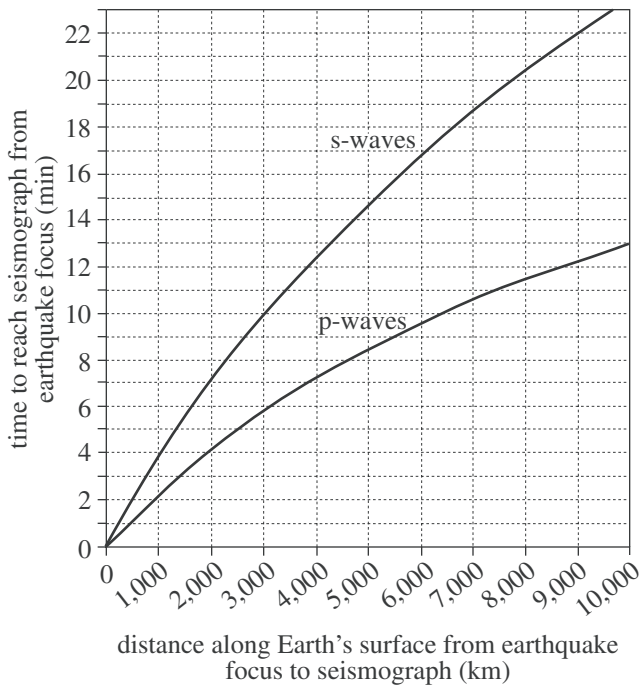


Figure 3

1. Figure 1 shows that a seismograph located at a point  $125^\circ$  around Earth from an earthquake's focus would receive which type(s) of seismic waves, if either, from that earthquake?

- A. P-waves only
- B. S-waves only
- C. Both p-waves and s-waves
- D. Neither p-waves nor s-waves

2. According to Figure 1, when p-waves encounter the boundary between the mantle and the core, the p-waves most likely:

- F. stop and do not continue into the core.
- G. enter the core and are refracted.
- H. change to s-waves.
- J. change to a third type of seismic wave.

3. Based on Figure 3, for a given seismograph, the time elapsed between the arrival of the first p-waves and the arrival of the first s-waves from an earthquake focus 10,500 km away would most likely be:

- A. less than 5 min.
- B. between 5 min and 7 min.
- C. between 8 min and 10 min.
- D. more than 10 min.

4. Based on the information provided, the "time earthquake starts at the focus" in Figure 2 corresponds to which of the following points on Figure 3?

- F. 0 km, 0 min
- G. 2,000 km, 5 min
- H. 5,000 km, 12 min
- J. 10,000 km, 20 min

5. According to Figure 2, which of the following statements best describes the relative amplitudes of the first p-waves to arrive at the seismograph and the first s-waves to arrive at the seismograph? The amplitude of the first p-waves to arrive at the seismograph is:

- A. smaller than the amplitude of the first s-waves to arrive at the seismograph.
- B. larger than the amplitude of the first s-waves to arrive at the seismograph.
- C. nonzero, and the same as the amplitude of the first s-waves to arrive at the seismograph.
- D. zero, as is the amplitude of the first s-waves to arrive at the seismograph.

Passage II

Lake Agassiz existed between 11,700 and 9,500 years ago in North America (see Figure 1). The lake was formed when a large glacier dammed several rivers. Groundwater trapped in lake and glacial sediments provides information about the climate at the time the sediments were deposited. Figure 2 shows a cross section of the sediments (lake clay and glacial till) and bedrock in the area. Figure 3 shows the  $\delta^{18}\text{O}$  values of groundwater taken from samples of the top 40 m of sediment at 3 sites along the same cross section.  $\delta^{18}\text{O}$  is calculated from a ratio of 2 oxygen isotopes ( $^{18}\text{O}$  and  $^{16}\text{O}$ ) in the groundwater. Smaller  $\delta^{18}\text{O}$  values indicate cooler average temperatures.



Figure 1

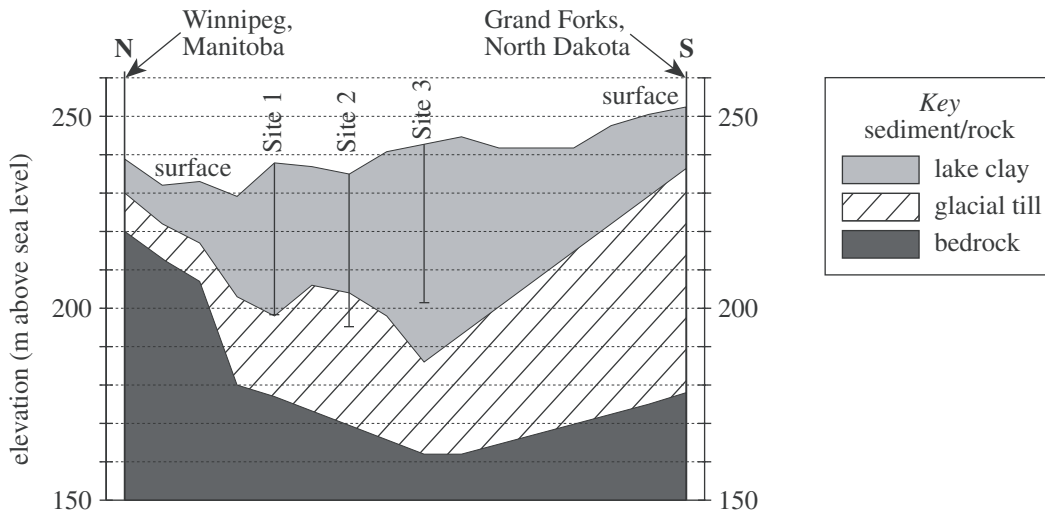
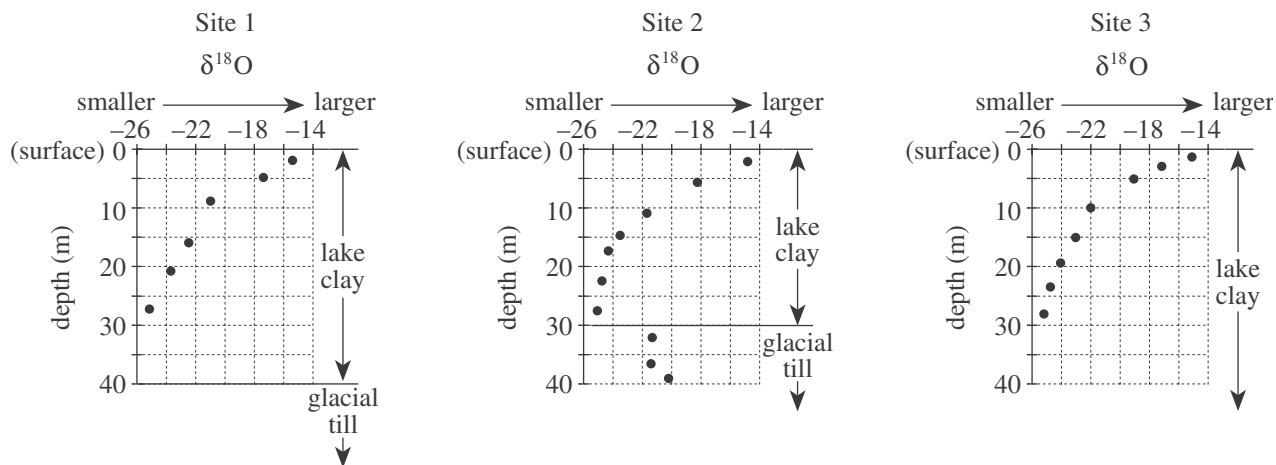


Figure 2



$$\text{Note: } \delta^{18}\text{O} = \left[ \left( \frac{{}^{18}\text{O}/{}^{16}\text{O} \text{ of groundwater sample}}{{}^{18}\text{O}/{}^{16}\text{O} \text{ of standard water sample}} \right) - 1 \right] \times 1,000$$

Figure 3

Figures adapted from V. H. Remenda, J. A. Cherry, and T. W. D. Edwards, "Isotopic Composition of Old Ground Water from Lake Agassiz: Implications for Late Pleistocene Climate." ©1994 by the American Association for the Advancement of Science.

6. According to Figure 2, the lake clay deposit is thinnest at which of the following cities or sites?

- F. Winnipeg
- G. Site 1
- H. Site 2
- J. Grand Forks

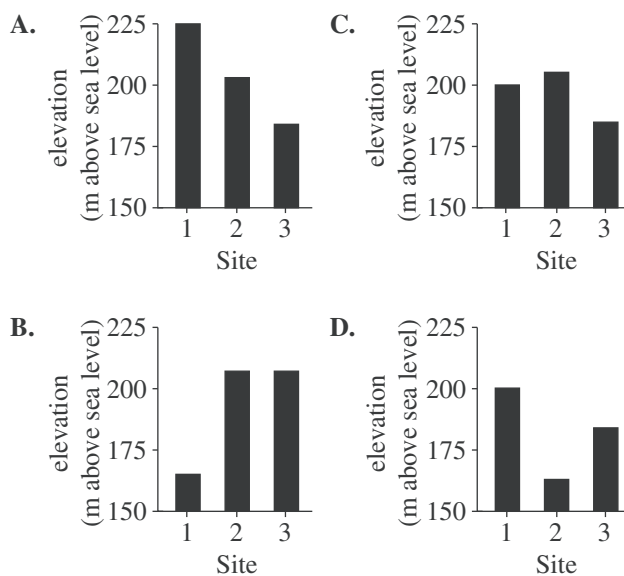
7. According to Figure 3, at Sites 1, 2, and 3, the smallest  $\delta^{18}\text{O}$  value of the groundwater in the lake clay was recorded at a depth between:

- A. 0 m and 10 m.
- B. 10 m and 20 m.
- C. 20 m and 30 m.
- D. 30 m and 40 m.

8. According to Figure 2, as the thickness of the lake clay deposit increases from Grand Forks to Site 3, the thickness of the glacial till beneath it:

- F. increases.
- G. remains the same.
- H. first increases and then decreases.
- J. decreases.

9. According to Figure 2, which of the following graphs best represents the elevations, in m above sea level, of the top of the glacial till layer at Sites 1, 2, and 3?



10. Precipitation that falls at Sites 1, 2, and 3 soaks into the soil until it reaches the groundwater table about 3 m below the surface. Based on Figure 3, and assuming no alteration of the precipitation, the  $\delta^{18}\text{O}$  value of present-day precipitation in the study area is closest to:

- F. -26.
- G. -23.
- H. -20.
- J. -15.

**Passage III**

Some students tested their hypothesis that the presence of bubbles in cans of various liquids would affect the *roll time* (the time it took a can to roll, without slipping, down an incline between 2 fixed points; see Figure 1).

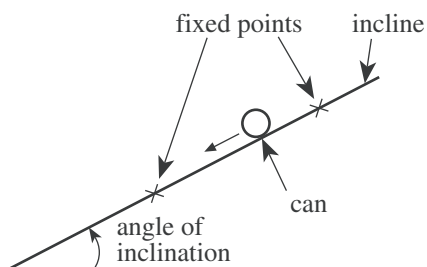


Figure 1

Identical 1.2 L aluminum cans were used in the first two experiments. The angle of inclination of the incline was  $2.3^\circ$  in all three experiments.

*Experiment 1*

The students added 1 L of a liquid—tap water containing no bubbles—to an empty can, sealed the can, and found its roll time. Next, they added 1 L of the tap water to a second empty can, sealed it, shook it, and immediately found its roll time. They repeated these procedures using soapy water containing many bubbles, and a carbonated beverage that contained no bubbles and that tasted flat, having lost most of its carbonation. The results are shown in Table 1.

Trial	Liquid	Roll time	
		before shaking (sec)	after shaking (sec)
1	tap water	1.75	1.75
2	soapy water	1.97	2.15
3	flat-tasting beverage	1.75	1.96

*Experiment 2*

The students added 1 L of the flat-tasting beverage to an empty can. They sealed the can, shook it, and set it aside. Fifteen minutes later they found the roll time of the can before and immediately after shaking it (Trial 4). Again they set the can aside. Two hours later they found the roll time of the can before and immediately after shaking it (Trial 5). The results are shown in Table 2.

Trial	Roll time	
	before shaking (sec)	after shaking (sec)
4	1.86	1.96
5	1.75	1.93

*Experiment 3*

The students added 1 L of the flat-tasting beverage to an empty 2 L clear plastic bottle and sealed the bottle. When they rolled the bottle down the incline, no bubbles formed. They shook the bottle, causing bubbles to form, and set the bottle aside. Fifteen minutes later, some bubbles were still visible, but after 2 hours, no bubbles could be seen.

Adapted from David Kagan, "The Shaken-Soda Syndrome." ©2001 by The American Association of Physics Teachers.

11. In Experiment 3, what is the most likely reason the students used the plastic bottle rather than an aluminum can? Compared to an aluminum can, the plastic bottle:
  - A. rolled more rapidly down the incline.
  - B. made bubbles in the liquid easier to see.
  - C. contained a greater quantity of liquid.
  - D. had thicker walls and was less likely to break.
12. Based on the results of Experiments 1 and 2, in which of the following trials, before shaking, were the average speeds of the cans the same?
  - F. Trials 1 and 2
  - G. Trials 2 and 3
  - H. Trials 2 and 4
  - J. Trials 3 and 5





13. In Experiment 2, a result of shaking the can of flat-tasting beverage was that the:
- A. number of bubbles in the beverage immediately decreased.
  - B. mass of the can of beverage increased.
  - C. roll time of the can of beverage decreased.
  - D. roll time of the can of beverage increased.
14. In Trial 5, is it likely that bubbles were present in large numbers immediately before the can was shaken?
- F. Yes; based on the results of Experiment 1, the bubbles produced in Trial 4 probably lasted for less than 15 min.
  - G. Yes; based on the results of Experiment 1, the bubbles produced in Trial 4 probably lasted for more than 2 hr.
  - H. No; based on the results of Experiment 3, the bubbles produced in Trial 4 probably lasted for less than 2 hr.
  - J. No; based on the results of Experiment 3, the bubbles produced in Trial 4 probably lasted for more than 3 hr.
15. Suppose that in Experiment 2, two hours after the completion of Trial 5, the students had measured the roll time of the can of liquid without first shaking the can. Based on the results of Trials 4 and 5, the roll time would most likely have been:
- A. less than 1.86 sec.
  - B. between 1.86 sec and 1.93 sec.
  - C. between 1.94 sec and 1.96 sec.
  - D. greater than 1.96 sec.
16. Based on the results of Trials 3–5 and Experiment 3, if the students had added 1 L of the flat-tasting beverage to one of the empty aluminum cans, sealed the can, and shaken it, how long would it most likely have taken for the number of bubbles in the beverage to become too few to affect the roll time?
- F. Less than 5 min
  - G. Between 5 min and 14 min
  - H. Between 15 min and 2 hr
  - J. Over 2 hr

**Passage IV**

The chemical reactions associated with photosynthesis can be summarized with the following chemical equation:

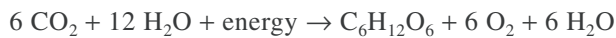


Table 1 lists wavelength ranges for visible light and the color frequently associated with each range.

Table 1	
Color	Wavelength (nm)
Violet	380–430
Blue	430–500
Green	500–565
Yellow	565–585
Orange	585–630
Red	630–750

Table 1 adapted from Neil A. Campbell, Jane B. Reece, and Lawrence G. Mitchell, *Biology*, 5th ed. ©1999 by Benjamin/Cummings.

Figure 1 shows the relative absorption of light by chlorophyll *a* and chlorophyll *b* versus the wavelength of light from 400 nm to 750 nm.

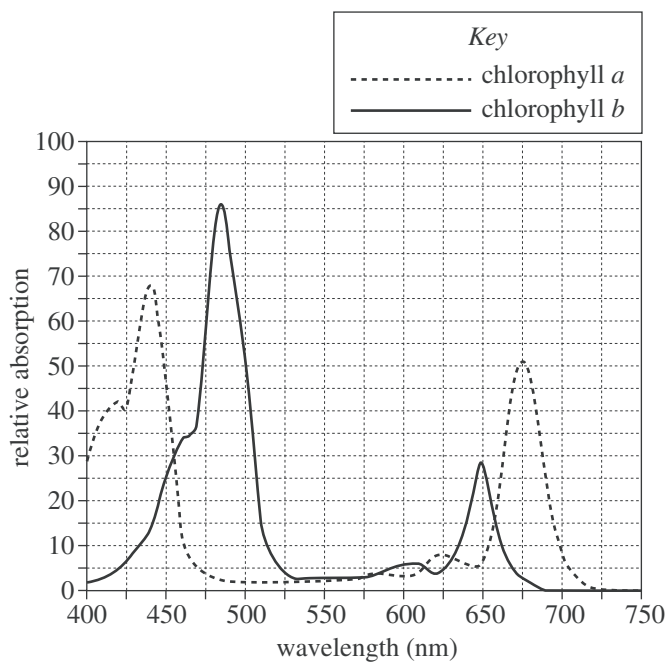


Figure 1

Figure 2 shows the average rate of photosynthesis at various wavelengths as a percent of the average rate of photosynthesis at 670 nm.

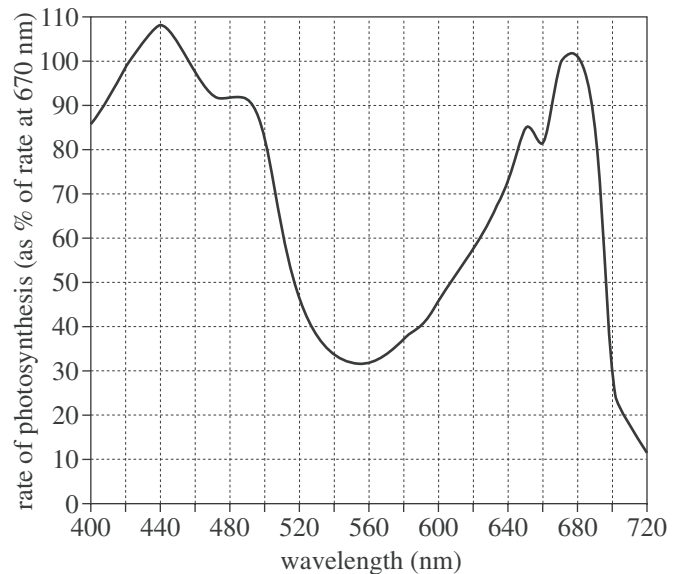


Figure 2

Figures 1 and 2 adapted from Peter H. Raven, Ray F. Evert, and Susan E. Eichhorn, *Biology of Plants*, 4th ed. ©1986 by Worth Publishers, Inc.

17. Based on Table 1 and Figure 1, which color of light is associated with the wavelength of light that results in the greatest absorption by chlorophyll *b* ?

- A. Blue
- B. Green
- C. Yellow
- D. Red

**GO ON TO THE NEXT PAGE.**



18. In eukaryotic organisms, the chemical reactions associated with the chemical equation shown in the passage typically occur within which of the following structures?
- F. Chloroplasts
  - G. Mitochondria
  - H. Lysosomes
  - J. Nuclei
19. In Figure 2, at which of the following wavelengths does the rate of photosynthesis exceed the rate of photosynthesis at 670 nm ?
- A. 400 nm
  - B. 430 nm
  - C. 630 nm
  - D. 700 nm
20. In the chemical equation shown in the passage, the carbon in  $\text{CO}_2$  becomes part of which of the following types of molecules?
- F. Fat
  - G. Sugar
  - H. Protein
  - J. Nucleic acid
21. Which of the following conclusions is best supported by Figures 1 and 2 ? The wavelength that results in the highest rate of photosynthesis also results in the:
- A. lowest relative absorption by chlorophyll *a*.
  - B. lowest relative absorption by chlorophyll *b*.
  - C. highest relative absorption by chlorophyll *a*.
  - D. highest relative absorption by chlorophyll *b*.

**Passage V**

Students performed the following experiments to determine the density of common plastics.

*Experiment 1*

A dry 100 mL graduated cylinder was placed on an electronic balance and *tared* (the balance was reset to 0.000 g). H<sub>2</sub>O was added to the graduated cylinder until a certain mass was obtained. Ethanol was added to the graduated cylinder until the volume of liquid was 50.0 mL. The density of the liquid was then calculated. The procedure was repeated with different amounts of ethanol and H<sub>2</sub>O (see Table 1).

Liquid	Mass of H <sub>2</sub> O (g)	Mass of ethanol (g)	Total mass (g)	Density (g/mL)
1	0	39.67	39.67	0.793
2	10.24	32.43	42.67	0.853
3	19.79	25.23	45.02	0.900
4	35.42	12.47	47.89	0.958
5	49.96	0	49.96	0.999

*Experiment 2*

A known mass of potassium iodide (KI) was dissolved in a known mass of H<sub>2</sub>O. A dry 100 mL graduated cylinder was placed on the balance and tared. The solution was added to the graduated cylinder until the volume was 50.0 mL. The density of the liquid was then calculated. The procedure was repeated with different amounts of KI and H<sub>2</sub>O (see Table 2).

Liquid	Mass of H <sub>2</sub> O in solution (g)	Mass of KI in solution (g)	Mass of solution in graduated cylinder (g)	Density (g/mL)
6	97.66	7.36	52.51	1.05
7	95.41	15.52	55.70	1.11
8	94.38	20.68	57.53	1.15
9	92.18	29.08	60.63	1.21
10	87.77	41.31	64.64	1.29

*Experiment 3*

A solid plastic bead was placed at the bottom of a sample of each of Liquids 1–10 from Experiments 1 and 2. If the bead stayed at the bottom, “S” was recorded in Table 3. If the bead rose, “R” was recorded in Table 3. The procedure was repeated for various plastics.

Plastic	Liquid									
	1	2	3	4	5	6	7	8	9	10
Polybutylene	R	R	R	R	R	R	R	R	R	R
VLDPE	S	R	R	R	R	R	R	R	R	R
LDPE	S	S	S	R	R	R	R	R	R	R
HDPE	S	S	S	S	R	R	R	R	R	R
PA-11	S	S	S	S	S	R	R	R	R	R
PA-6	S	S	S	S	S	S	S	R	R	R
Polycarbonate	S	S	S	S	S	S	S	S	R	R
PVC	S	S	S	S	S	S	S	S	S	S

22. In Experiment 1, the density of ethanol was found to be:

- F. less than 0.793 g/mL.
- G. 0.793 g/mL.
- H. 0.999 g/mL.
- J. greater than 0.999 g/mL.

23. Based on the results of Experiments 1–3, the density of PA-11 is most likely:

- A. less than 0.793 g/mL.
- B. between 0.853 g/mL and 0.958 g/mL.
- C. between 0.999 g/mL and 1.05 g/mL.
- D. greater than 1.11 g/mL.



24. Suppose that a sixth KI/H<sub>2</sub>O solution had been measured in Experiment 2 and the mass of the solution in the graduated cylinder was 67.54 g. The density of this solution would most likely have been closest to which of the following?

- F. 1.25 g/mL
- G. 1.30 g/mL
- H. 1.35 g/mL
- J. 1.40 g/mL

25. A plastic bead was tested as in Experiment 3 using Liquids 1–4. Which of the following is NOT a plausible set of results for the plastic?

Liquid			
1	2	3	4

- A. R R R R
- B. R R S S
- C. S S R R
- D. S S S S

26. In Experiments 1 and 2, the students tared the graduated cylinder in each trial so they could more easily determine:

- F. the mass of the substances added to the graduated cylinder.
- G. the density of the graduated cylinder.
- H. when the total volume of the added substances was equal to 50.0 mL.
- J. when all of the KI was dissolved in the H<sub>2</sub>O.

27. A student claimed that polycarbonate is more dense than PA-6. Do the results of Experiments 1–3 support his claim?

- A. No, because in Liquid 8, polycarbonate stayed at the bottom and PA-6 rose.
- B. Yes, because in Liquid 8, polycarbonate stayed at the bottom and PA-6 rose.
- C. No, because in Liquid 8, polycarbonate rose and PA-6 stayed at the bottom.
- D. Yes, because in Liquid 8, polycarbonate rose and PA-6 stayed at the bottom.

**Passage VI**

Bacteria break down sugars by *fermentation*. To study 2 fermentation pathways, researchers performed 2 experiments using broth that contained either the sugar *sucrose* or the sugar *lactose*. One of the fermentation pathways produces  $\text{CO}_2$  gas and increases the acidity (lowers the pH) of the solution. The other pathway produces acid but not  $\text{CO}_2$ .

*Experiment 1*

Sucrose broth was added to 5 large test tubes. Next, *phenol red* (a pH indicator that is yellow if  $\text{pH} < 7$ , red if  $\text{pH} \geq 7$ ) was added to each large test tube. A *Durham tube* (a small test tube) was placed, inverted, in each large test tube to collect  $\text{CO}_2$  (see Figure 1).

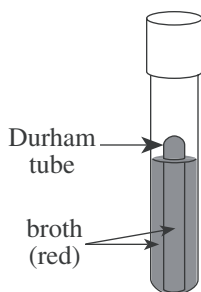


Figure 1

The large test tubes were capped, heated until the solutions were sterile, then cooled. One of 4 bacterial species (Species A–D) was added to each of 4 of the large test tubes. The procedure was repeated using lactose broth instead of sucrose broth. The 10 large test tubes (all containing solutions at a pH of 7) were then incubated at  $37^\circ\text{C}$  for 48 hr.

The large test tubes and Durham tubes were examined. If acid was produced, the solution was yellow. If no acid was produced, the solution remained red. If  $\text{CO}_2$  was produced, a gas bubble was observed at the top of the Durham tube (see Table 1).

Species added	Sucrose broth		Lactose broth	
	acid	$\text{CO}_2$	acid	$\text{CO}_2$
A	–	–	–	–
B	–	–	+	+
C	+	+	–	–
D	+	–	+	–
None	–	–	–	–

*Experiment 2*

*Synergism* occurs when 2 bacterial species act together to ferment a sugar by using a pathway that neither species can use alone. To investigate synergism, Experiment 1 was repeated, except that different pairs of bacterial species were added to each large test tube (see Table 2).

Species added	Sucrose broth		Lactose broth	
	acid	$\text{CO}_2$	acid	$\text{CO}_2$
A and B	–	–	+	+
A and C	+	+	–	–
B and D	+	+	+	+
C and D	+	+	+	+

28. In Experiment 1, which of the bacterial species fermented lactose?

F. Species B only  
 G. Species C only  
 H. Species B and Species D only  
 J. Species C and Species D only

29. Suppose that in Experiment 2 both Species B and Species C had been added to a large test tube containing sucrose broth and to a large test tube containing lactose broth. Which of the following would most likely depict the results?

	Sucrose broth		Lactose broth	
	acid	$\text{CO}_2$	acid	$\text{CO}_2$

A. – – + +  
 B. + + – –  
 C. + + + +  
 D. – – – –



30. Suppose a scientist isolates a bacterial species that is 1 of the 4 species used in Experiment 1. She adds the species to sucrose broth and observes that neither acid nor  $\text{CO}_2$  is produced. She then adds the species to lactose broth and observes that both acid and  $\text{CO}_2$  are produced. Based on the results of Experiment 1, the species is most likely:

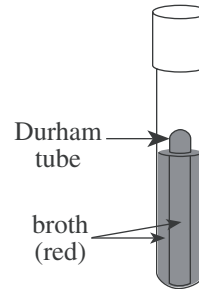
- F. Species A.
- G. Species B.
- H. Species C.
- J. Species D.

31. What is the evidence from Experiments 1 and 2 that Species C and Species D acted synergistically in Experiment 2?

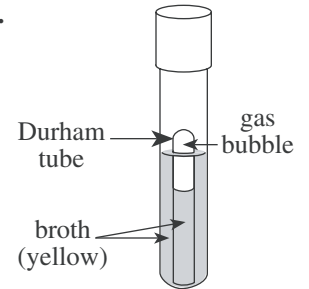
- A. No acid was produced when each species was alone in the sucrose broth, but acid was produced when the 2 species were together in the sucrose broth.
- B. No acid was produced when each species was alone in the lactose broth, but acid was produced when the 2 species were together in the sucrose broth.
- C. No  $\text{CO}_2$  was produced when each species was alone in the sucrose broth, but  $\text{CO}_2$  was produced when the 2 species were together in the sucrose broth.
- D. No  $\text{CO}_2$  was produced when each species was alone in the lactose broth, but  $\text{CO}_2$  was produced when the 2 species were together in the lactose broth.

32. Which of the following figures best illustrates the results of Experiment 1 for Species D in the sucrose broth?

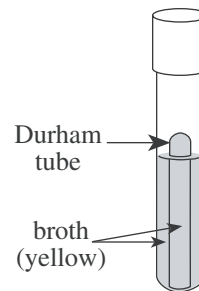
F.



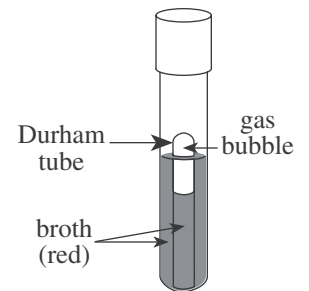
H.



G.



J.

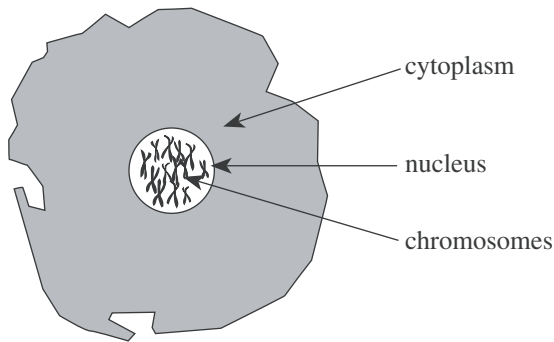


33. Is the hypothesis that Species A and Species C acted synergistically supported by the results of Experiment 2?

- A. Yes, because both acid and  $\text{CO}_2$  were produced from sucrose.
- B. Yes, because both acid and  $\text{CO}_2$  were produced from lactose.
- C. No, because only acid, not  $\text{CO}_2$ , was produced from both sucrose and lactose.
- D. No, because neither acid nor  $\text{CO}_2$  was produced from lactose.

**Passage VII**

In the 1940s, scientists thought all genetic material was contained in structures called *chromosomes* and that chromosomes had been found only in the nucleus of a cell (not in the cytoplasm):



Chromosomes are composed of 2 types of molecules, proteins and deoxyribonucleic acid (DNA). Proteins are composed of subunits called *amino acids*. DNA consists of chains of subunits called *nucleotides*. The parts of chromosomes that are responsible for the transmission of genetic information are called *genes*.

Two scientists in the 1940s debate whether genes are made of proteins or DNA.

**Protein Hypothesis**

Genes are made only of proteins. Proteins make up 50% or more of a cell's dry weight. Cells contain 20 different amino acids that can be arranged in a virtually infinite number of ways to make different proteins. The number and arrangement of different amino acids within a protein form the codes that contain hereditary information.

In contrast, only 4 different nucleotides make up the DNA found in cells, and they are believed to form chains only in certain ratios. As a result, the number of different combinations that DNA can carry is much smaller than the number that proteins can carry.

**DNA Hypothesis**

Genes are made only of DNA. DNA is found exclusively in the cell's nucleus, whereas proteins are found throughout the nucleus and cytoplasm. Additionally, the amount of protein in a cell varies from cell type to cell type, even within the same animal.

Though DNA is less abundant than proteins, the amount is consistent from cell type to cell type within the same animal, except for the *gametes* (the reproductive cells). Gametes have half the amount of DNA as other cells in the body. Gametes also have half the typical number of chromosomes. Thus, the amount of DNA in a cell is correlated with the number of chromosomes in the cell. No such correlation is found for proteins.

34. Which of the following statements is most consistent with the DNA Hypothesis? The amount of DNA will generally increase from cell type to cell type as the number of:

- F. amino acids in the nucleus increases from cell type to cell type.
- G. amino acids in the cytoplasm increases from cell type to cell type.
- H. chromosomes in the nucleus increases from cell type to cell type.
- J. chromosomes in the cytoplasm increases from cell type to cell type.

35. By referring to the observation that DNA is found exclusively in the nucleus while proteins are found throughout the cell, the scientist supporting the DNA Hypothesis implies that genes are made only of DNA because which of the following are also found only in the nucleus?

- A. Amino acids
- B. Proteins
- C. Gametes
- D. Chromosomes

36. According to the passage, a similarity between DNA and proteins is that both types of molecules:

- F. are found only in gametes.
- G. are abundant in the cytoplasm.
- H. contain 20 different amino acids.
- J. are composed of smaller subunits.

37. According to the Protein Hypothesis, which of the following observations provides the strongest evidence that genes are NOT composed of DNA ?

- A. DNA is composed of only 4 types of nucleotides.
- B. DNA is composed of smaller subunits than are proteins.
- C. DNA is abundant in both the nucleus and the cytoplasm.
- D. The concentration of DNA is generally consistent from cell to cell.

38. *Mitochondria* are organelles located in the cytoplasm that are responsible for energy transformation in a cell. After the 1940s, it was observed that mitochondria contain their own genes. This observation contradicts evidence stated in which hypothesis?

- F. The DNA Hypothesis, because if genes are made of DNA, the observation would show that DNA is present outside the nucleus.
- G. The DNA Hypothesis, because if genes are made of DNA, the observation would show that DNA is present inside the nucleus.
- H. The Protein Hypothesis, because if genes are made of proteins, the observation would show that proteins are present outside the nucleus.
- J. The Protein Hypothesis, because if genes are made of proteins, the observation would show that proteins are present inside the nucleus.

**GO ON TO THE NEXT PAGE.**





39. The scientist who describes the DNA Hypothesis implies that the Protein Hypothesis is *weakened* by which of the following observations?
- For a given organism, the amount of protein in the gametes is half that found in other types of cells.
  - For a given organism, the amount of protein in different types of cells is not the same.
  - Protein molecules are composed of many subunits.
  - Proteins are found only in the nucleus.

40. Which of the following illustrations of a portion of a DNA molecule is consistent with the description in the passage?

<p><i>Key</i>  AA - amino acid  N - nucleotide</p>
--

- F. } (AA) — (N) — (AA) — (N) }
- G. } (N) — (AA) — (AA) — (N) }
- H. } (AA) — (AA) — (AA) — (AA) }
- J. } (N) — (N) — (N) — (N) }

**END OF TEST 4**

**STOP! DO NOT RETURN TO ANY OTHER TEST.**

[See Note on page 56.]

**If you plan to take the ACT Plus Writing, sharpen your pencils and continue with the Writing Test on page 57.**

**If you do not plan to take the ACT Plus Writing, skip to page 59 for instructions on scoring your multiple-choice tests.**

# Practice Writing Test

Your Signature (do not print): \_\_\_\_\_

Print Your Name Here: \_\_\_\_\_

Your Date of Birth:									
<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Month		Day		Year					

## Form 13G

# The ACT<sup>®</sup> Writing Test Booklet

**You must take the multiple-choice tests before you take the Writing Test.**

## Directions

This is a test of your writing skills. You will have thirty (30) minutes to write an essay in English. Before you begin planning and writing your essay, read the writing prompt carefully to understand exactly what you are being asked to do. Your essay will be evaluated on the evidence it provides of your ability to express judgments by taking a position on the issue in the writing prompt; to maintain a focus on the topic throughout the essay; to develop a position by using logical reasoning and by supporting your ideas; to organize ideas in a logical way; and to use language clearly and effectively according to the conventions of standard written English.

You may use the unlined pages in this test booklet to plan your essay. These pages will not be scored. ***You must write your essay in pencil on the lined pages in the answer folder.*** Your writing on those lined pages will be scored. You may not need all the lined pages, but to ensure you have enough room to finish, do NOT skip lines. You may write corrections or additions neatly between the lines of your essay, but do NOT write in the margins of the lined pages. ***Illegible essays cannot be scored, so you must write (or print) clearly.***

If you finish before time is called, you may review your work. Lay your pencil down immediately when time is called.

**DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.**

## ACT Writing Test Prompt

At some high schools, teachers have considered allowing each student to choose the books he or she will read for English class rather than requiring all students in class to read the same books. Some teachers support such a policy because they think students will greatly improve their reading skills if they read books they find interesting. Other teachers do not support such a policy because they think that students will learn more by participating in class discussion with others who have read the same books. In your opinion, should each individual student be allowed to choose the books he or she reads for English class?

In your essay, take a position on this question. You may write about either one of the two points of view given, or you may present a different point of view on this question. Use specific reasons and examples to support your position.

### Note

- Your test booklet will have blank space for you to plan your essay. For this practice test, use scratch paper.
- You may wish to remove pages 75–78 to respond to this prompt.
- When you have completed your essay, read pages 66–72 for information and instructions on scoring your practice Writing Test.

# 5 Scoring Your Tests

## How to Score the Multiple-Choice Tests

Follow the instructions below and on the following pages to score your practice multiple-choice tests and to evaluate your performance.

### Raw Scores

The number of questions you answered correctly on each test and in each subscore area is your raw score. Because there are many forms of the ACT, each containing different questions, some forms will be slightly easier (and some slightly harder) than others. A raw score of 67 on one form of the English Test, for example, may be about as difficult to earn as a raw score of 70 on another form of that test.

To compute your raw scores, check your answers with the scoring keys on pages 60–62. Count the number of correct answers for each of the four tests and seven subscore areas, and enter the number in the blanks provided on those pages. These numbers are your raw scores on the tests and subscore areas.

### Scale Scores

To adjust for the small differences that occur among different forms of the ACT, the raw scores for tests and subscore areas are converted into *scale scores*. Scale scores are printed on the reports sent to you and your college and scholarship choices.

When your raw scores are converted into scale scores, it becomes possible to compare your scores with those of examinees who took different test forms. For example, a scale score of 26 on the English Test has the same meaning regardless of the form of the ACT on which it is based.

To determine the scale scores corresponding to your raw scores on the practice test, use the score conversion tables on pages 63–64. Table 1 on page 63 shows the raw-to-scale score conversions for each test, and Table 2 on page 64 shows the raw-to-scale score conversions for the subscore areas. Because each form of the ACT is unique, each form has somewhat different conversion tables. Consequently, these tables provide only approximations of the raw-to-scale score conversions that would apply if a different form of the ACT were taken. Therefore, the scale scores obtained from the practice tests don't match precisely the scale scores received from an actual administration of the ACT.

### Computing the Composite Score

The Composite score is the average of the four scale scores in English, Mathematics, Reading, and Science. If you left any of these tests blank, do not calculate a Composite score. If you take the ACT Plus Writing, your Writing results do **not** affect your Composite score.

### Comparing Your Scores

Even scale scores don't tell the whole story of your test performance. You may want to know how your scores compare to the scores of other students who took the ACT.

The multiple-choice norms table (Table 3A on page 65) enables you to compare your scores on the practice multiple-choice tests with the scores of recent high school graduates who took the ACT. The numbers reported in Table 3A are cumulative percents. A cumulative percent is the percent of students who scored *at or below* a given score. For example, a Composite score of 20 has a cumulative percent of 48. This means that 48% of the ACT-tested high school students had a Composite score of 20 or lower.

Remember that your scores and percent at or below on the practice test are only *estimates* of the scores that you will obtain during an actual administration of the ACT. Test scores are only one indicator of your level of academic knowledge and skills. Consider your scores in connection with your grades, your performance in outside activities, and your career interests.

### College Readiness Standards™

To add to the information you receive about your performance on the ACT, we have developed College Readiness Standards. These standards help you to more fully understand what your total test score means for each academic area assessed: English, Mathematics, Reading, Science, and Writing. The College Readiness Standards describe the types of skills, strategies, and understandings you will need to make a successful transition from high school to college. For English, Mathematics, Reading, and Science, standards are provided for six score ranges that reflect the progression and complexity of the skills in each of the academic areas measured by the ACT tests. For Writing, standards are provided for five score ranges. The College Readiness Standards and benchmark scores for each test can be found at [www.act.org/standard](http://www.act.org/standard).

## Reviewing Your Performance on the Practice Multiple-Choice Tests

After you have determined your scale scores, consider the following as you evaluate your performance.

- Did you run out of time? If so, reread the information in this booklet on pacing yourself. Perhaps you need to adjust the way you used your time in responding to the questions. It is to your advantage to answer every question. There is no penalty for guessing.
- Did you spend too much time trying to understand the directions for the tests? The directions for the practice tests are the same directions that will appear in your test booklet on test day. Make sure you understand them now, so you won't have to spend too much time studying them on test day.
- Review the questions that you missed. Did you select a response that was an incomplete answer or that did not directly respond to the question being asked? Try to figure out what you overlooked in answering the questions.
- Did a particular type of question confuse you? Did the questions you missed come from a particular subscore area? In reviewing your responses, check to see whether a particular type of question or a particular subscore area was more difficult for you or took more time.

## Scoring Keys for the ACT Practice Tests

Use the scoring key for each test to score your answer document for the multiple-choice tests. Mark a “1” in the blank for each question you answered correctly. Add up the numbers in each subscore area and enter the total number correct for each subscore area in the blanks provided. Also enter the total number correct for each test in the blanks provided. The total number correct for each test is the sum of the number correct in each subscore area.

### Test 1: English—Scoring Key

	Key	Subscore Area*		Key	Subscore Area*		Key	Subscore Area*	
		UM	RH		UM	RH		UM	RH
1.	D	_____		26.	G	_____	51.	C	_____
2.	H		_____	27.	D	_____	52.	J	_____
3.	A	_____		28.	F	_____	53.	D	_____
4.	G	_____		29.	A	_____	54.	F	_____
5.	D		_____	30.	G	_____	55.	C	_____
6.	H	_____		31.	B	_____	56.	G	_____
7.	B		_____	32.	F	_____	57.	B	_____
8.	F	_____		33.	B	_____	58.	J	_____
9.	B	_____		34.	J	_____	59.	B	_____
10.	F		_____	35.	C	_____	60.	G	_____
11.	D	_____		36.	H	_____	61.	C	_____
12.	F	_____		37.	C	_____	62.	J	_____
13.	C		_____	38.	H	_____	63.	C	_____
14.	J	_____		39.	D	_____	64.	H	_____
15.	A	_____		40.	F	_____	65.	B	_____
16.	J		_____	41.	A	_____	66.	G	_____
17.	C	_____		42.	G	_____	67.	D	_____
18.	F	_____		43.	D	_____	68.	J	_____
19.	B		_____	44.	J	_____	69.	D	_____
20.	F	_____		45.	A	_____	70.	G	_____
21.	C	_____		46.	J	_____	71.	A	_____
22.	F		_____	47.	C	_____	72.	J	_____
23.	B	_____		48.	G	_____	73.	A	_____
24.	H	_____		49.	C	_____	74.	G	_____
25.	B	_____		50.	J	_____	75.	D	_____

Number Correct (Raw Score) for:	
Usage/Mechanics (UM) Subscore Area	_____ (40)
Rhetorical Skills (RH) Subscore Area	_____ (35)
Total Number Correct for English Test (UM + RH)	_____ (75)

\* UM = Usage/Mechanics  
RH = Rhetorical Skills

0964E

**Test 2: Mathematics—Scoring Key**

		Subscore Area*					Subscore Area*		
	Key	EA	AG	GT		Key	EA	AG	GT
1.	D	_____			31.	D			_____
2.	G	_____			32.	H		_____	
3.	C	_____			33.	B	_____		
4.	J	_____			34.	H			_____
5.	C			_____	35.	E		_____	
6.	J	_____			36.	F		_____	
7.	C	_____			37.	C		_____	
8.	H	_____			38.	K			_____
9.	D		_____		39.	B			_____
10.	F		_____		40.	H	_____		
11.	E		_____		41.	B			_____
12.	J			_____	42.	J	_____		
13.	A	_____			43.	B			_____
14.	H	_____			44.	G			_____
15.	B			_____	45.	E	_____		
16.	G			_____	46.	K	_____		
17.	E		_____		47.	A	_____		
18.	H	_____			48.	F		_____	
19.	C	_____			49.	C		_____	
20.	G			_____	50.	F			_____
21.	A	_____			51.	D	_____		
22.	K		_____		52.	F		_____	
23.	E		_____		53.	D			_____
24.	K	_____			54.	J			_____
25.	B			_____	55.	E		_____	
26.	G		_____		56.	G			_____
27.	C	_____			57.	E		_____	
28.	J	_____			58.	F	_____		
29.	E			_____	59.	A		_____	
30.	G	_____			60.	F		_____	

Number Correct (Raw Score) for:	
Pre-Alg./Elem. Alg. (EA) Subscore Area	_____ (24)
Inter. Alg./Coord. Geo. (AG) Subscore Area	_____ (18)
Plane Geo./Trig. (GT) Subscore Area	_____ (18)
Total Number Correct for Math Test (EA + AG + GT)	_____ (60)

\* EA = Pre-Algebra/Elementary Algebra  
 AG = Intermediate Algebra/Coordinate Geometry  
 GT = Plane Geometry/Trigonometry

**Test 3: Reading—Scoring Key**

		Subscore Area*				Subscore Area*				Subscore Area*	
	Key	SS	AL		Key	SS	AL		Key	SS	AL
1.	B		_____	15.	A	_____		29.	A		_____
2.	F		_____	16.	J	_____		30.	H		_____
3.	B		_____	17.	D	_____		31.	C	_____	
4.	J		_____	18.	G	_____		32.	F	_____	
5.	C		_____	19.	D	_____		33.	C	_____	
6.	G		_____	20.	G	_____		34.	J	_____	
7.	D		_____	21.	C		_____	35.	B	_____	
8.	J		_____	22.	J		_____	36.	J	_____	
9.	C		_____	23.	B		_____	37.	A	_____	
10.	H		_____	24.	G		_____	38.	H	_____	
11.	A	_____		25.	C		_____	39.	D	_____	
12.	H	_____		26.	F		_____	40.	G	_____	
13.	D	_____		27.	C		_____				
14.	F	_____		28.	G		_____				

Number Correct (Raw Score) for:	
Social Studies/Sciences (SS) Subscore Area	_____ (20)
Arts/Literature (AL) Subscore Area	_____ (20)
Total Number Correct for Reading Test (SS + AL)	_____ (40)

\* SS = Social Studies/Sciences  
AL = Arts/Literature

**Test 4: Science—Scoring Key**

Key		Key		Key				
1.	D	_____	15.	A	_____	29.	C	_____
2.	G	_____	16.	H	_____	30.	G	_____
3.	D	_____	17.	A	_____	31.	D	_____
4.	F	_____	18.	F	_____	32.	G	_____
5.	A	_____	19.	B	_____	33.	D	_____
6.	F	_____	20.	G	_____	34.	H	_____
7.	C	_____	21.	C	_____	35.	D	_____
8.	J	_____	22.	G	_____	36.	J	_____
9.	C	_____	23.	C	_____	37.	A	_____
10.	J	_____	24.	H	_____	38.	F	_____
11.	B	_____	25.	B	_____	39.	B	_____
12.	J	_____	26.	F	_____	40.	J	_____
13.	D	_____	27.	B	_____			
14.	H	_____	28.	H	_____			

Number Correct (Raw Score) for:	
Total Number Correct for Science Test	_____ (40)

0964E



**TABLE 1****Explanation of Procedures Used to Obtain Scale Scores from Raw Scores**

On each of the four multiple-choice tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it off to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

<b>ACT Test 64E</b>	<b>Your Scale Score</b>
English	_____
Mathematics	_____
Reading	_____
Science	_____
<b>Sum of scores</b>	_____
<b>Composite score (sum ÷ 4)</b>	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

<b>Scale Score</b>	<b>Raw Scores</b>				<b>Scale Score</b>
	<b>Test 1 English</b>	<b>Test 2 Mathematics</b>	<b>Test 3 Reading</b>	<b>Test 4 Science</b>	
36	75	60	40	40	36
35	73-74	59	39	39	35
34	71-72	58	38	—	34
33	70	56-57	37	38	33
32	69	55	36	37	32
31	67-68	54	35	—	31
30	66	52-53	34	36	30
29	65	50-51	32-33	35	29
28	63-64	48-49	31	33-34	28
27	62	45-47	30	32	27
26	60-61	42-44	29	30-31	26
25	58-59	40-41	27-28	28-29	25
24	56-57	37-39	26	26-27	24
23	54-55	35-36	24-25	25	23
22	52-53	33-34	23	23-24	22
21	49-51	31-32	22	21-22	21
20	46-48	29-30	20-21	19-20	20
19	43-45	26-28	19	18	19
18	41-42	24-25	18	16-17	18
17	39-40	21-23	16-17	15	17
16	36-38	17-20	15	14	16
15	33-35	14-16	14	13	15
14	30-32	11-13	12-13	12	14
13	28-29	9-10	11	11	13
12	26-27	7-8	9-10	10	12
11	24-25	6	8	9	11
10	22-23	5	6-7	7-8	10
9	20-21	4	—	6	9
8	17-19	3	5	5	8
7	14-16	—	4	4	7
6	11-13	2	3	3	6
5	8-10	—	—	—	5
4	6-7	1	2	2	4
3	4-5	—	—	1	3
2	3	—	1	—	2
1	0-2	0	0	0	1

# TABLE 2

ACT Test 64E Your Scale Subscore

## Explanation of Procedures Used to Obtain Scale Subscores from Raw Scores

For each of the seven subscore areas, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale subscores. For each of the seven subscore areas, locate and circle either the raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale subscore that corresponds to that raw score. As you determine your scale subscores, enter them in the blanks provided on the right. The highest possible scale subscore is 18. The lowest possible scale subscore is 1.

If you left a test completely blank and marked no responses, do not list any scale subscores for that test.

<b>English</b>	_____
Usage/Mechanics	_____
Rhetorical Skills	_____
<b>Mathematics</b>	_____
Pre-Algebra/Elementary Algebra	_____
Intermed. Algebra/Coord. Geometry	_____
Plane Geometry/Trigonometry	_____
<b>Reading</b>	_____
Social Studies/Sciences	_____
Arts/Literature	_____

Scale Subscore	Raw Scores										Scale Subscore
	Test 1 English			Test 2 Mathematics				Test 3 Reading			
	Usage/Mechanics	Rhetorical Skills	Pre-Algebra/Elem. Algebra	Inter. Algebra/Coord. Geometry	Plane Geometry/Trigonometry	Social Studies/Sciences	Arts/Literature	Social Studies/Sciences	Arts/Literature	Social Studies/Sciences	
18	38-40	35	23-24	18	18	18	20	20	20	20	18
17	37	33-34	22	17	—	—	18-19	18-19	19	19	17
16	35-36	32	21	16	17	17	17	17	18	18	16
15	34	30-31	20	14-15	16	15-16	15-16	15-16	17	17	15
14	33	29	18-19	13	14-15	14	14	14	16	16	14
13	31-32	27-28	17	11-12	12-13	13	13	13	15	15	13
12	29-30	25-26	16	10	10-11	11-12	11-12	11-12	13-14	13-14	12
11	27-28	23-24	14-15	8-9	9	10	10	10	12	12	11
10	25-26	20-22	13	7	7-8	8	9	9	11	11	10
9	23-24	18-19	11-12	5-6	6	6-7	6-7	6-7	10	10	9
8	20-22	15-17	9-10	4	5	5	5	5	9	9	8
7	18-19	13-14	7-8	—	4	4	4	4	8	8	7
6	16-17	11-12	5-6	3	3	3	—	—	6-7	6-7	6
5	13-15	9-10	4	2	2	—	—	—	4-5	4-5	5
4	11-12	7-8	3	—	—	2	3	3	3	3	4
3	9-10	5-6	2	1	1	—	2	2	2	2	3
2	5-8	3-4	1	—	—	1	1	1	1	1	2
1	0-4	0-2	0	0	0	0	0	0	0	0	1

# TABLES 3A and 3B

## Norms Tables

Use the norms tables below (3A and 3B) to determine your estimated percent at or below for each of your multiple-choice scale scores (3A), and for your Writing scores (3B), if applicable.

In the far left column of the multiple-choice norms table (3A), circle your scale score for the English Test (from page 63). Then read across to the percent at or below column for that test; circle or put a check mark beside the corresponding percent at or below. Use the same procedure for each test and subscore area. Use the far right column of scale scores in Table 3A, for your Science Test and Composite scores. Follow the same procedure on the Writing Test norms to get your estimated percent at or below for your Writing subscore and Combined English/Writing score.

As you mark your percents at or below, enter them in the blanks provided at the right. You may also find it helpful to compare your performance with the national mean (average) score for each of the tests, subscore areas, and the Composite as shown at the bottom of the norms tables.

**Your Estimated Percent At or Below on Practice Test**

<b>English</b>	_____
Usage/Mechanics	_____
Rhetorical Skills	_____
<b>Mathematics</b>	_____
Pre-Algebra/Elem. Alg.	_____
Alg./Coord. Geometry	_____
Plane Geometry/Trig.	_____
<b>Reading</b>	_____
Soc. Studies/Sciences	_____
Arts/Literature	_____
<b>Science</b>	_____
<b>Composite</b>	_____
<b>Combined English/Writing</b>	_____
<b>Writing</b>	_____

### 3A

**National Distributions of Cumulative Percents for ACT Test Scores  
ACT-Tested High School Graduates from 2007, 2008, and 2009**

Score	ENGLISH		MATHEMATICS			READING			SCIENCE		COMPOSITE	Score	
	Usage/Mechanics	Rhetorical Skills	Pre-Algebra/Elem. Alg.	Alg./Coord. Geometry	Plane Geometry/Trig.	Soc. Studies/Sciences	Arts/Literature						
36	99		99			99		99	99	99	36		
35	99		99			99		99	99	99	35		
34	99		99			99		99	99	99	34		
33	97		98			97		99	99	99	33		
32	96		97			95		98	99	99	32		
31	95		96			93		97	97	97	31		
30	93		95			91		97	96	96	30		
29	91		93			88		95	94	94	29		
28	89		91			85		94	91	91	28		
27	86		88			81		92	88	88	27		
26	83		84			78		89	84	84	26		
25	79		79			74		85	80	80	25		
24	74		74			70		78	75	75	24		
23	69		68			65		72	69	69	23		
22	64		62			59		65	62	62	22		
21	57		57			54		56	55	55	21		
20	50		52			47		48	48	48	20		
19	42		47			41		38	40	40	19		
18	36	99	99	40	99	99	99	34	99	99	33	18	
17	32	97	99	33	96	99	99	30	98	97	22	26	17
16	27	93	97	24	92	98	98	24	93	92	17	20	16
15	22	89	93	14	87	96	95	19	88	85	13	14	15
14	16	84	86	06	81	92	90	14	82	77	10	09	14
13	12	78	80	02	74	84	83	09	76	70	07	05	13
12	10	72	71	01	66	75	73	06	69	64	05	02	12
11	07	64	60	01	57	66	63	03	59	55	03	01	11
10	05	55	48	01	48	53	52	01	50	46	01	01	10
09	03	44	36	01	39	36	37	01	39	38	01	01	09
08	02	34	26	01	31	23	25	01	28	29	01	01	08
07	01	26	16	01	19	13	15	01	17	21	01	01	07
06	01	18	10	01	08	08	09	01	10	15	01	01	06
05	01	11	06	01	03	05	06	01	05	09	01	01	05
04	01	06	03	01	01	02	03	01	03	03	01	01	04
03	01	03	01	01	01	01	02	01	01	01	01	01	03
02	01	01	01	01	01	01	01	01	01	01	01	01	02
01	01	01	01	01	01	01	01	01	01	01	01	01	01
<b>Mean</b>	<b>20.6</b>	<b>10.3</b>	<b>10.7</b>	<b>21.0</b>	<b>11.0</b>	<b>10.5</b>	<b>10.5</b>	<b>21.4</b>	<b>10.8</b>	<b>11.0</b>	<b>20.9</b>	<b>21.1</b>	
<b>S.D.</b>	<b>6.1</b>	<b>3.8</b>	<b>3.2</b>	<b>5.2</b>	<b>3.5</b>	<b>2.9</b>	<b>3.1</b>	<b>6.1</b>	<b>3.5</b>	<b>3.8</b>	<b>4.9</b>	<b>5.0</b>	

Note: These norms are the source of national and state norms, for multiple-choice tests, printed on ACT score reports during the 2009–2010 testing year. Sample size: 4,188,909.

### 3B

**National Distributions of Cumulative Percents  
for ACT Writing Test Scores  
ACT-Tested High School Graduates  
from 2007, 2008, and 2009**

Score	Combined English/Writing	Writing
36	99	
35	99	
34	99	
33	99	
32	99	
31	97	
30	95	
29	93	
28	90	
27	87	
26	83	
25	78	
24	73	
23	67	
22	59	
21	53	
20	44	
19	38	
18	31	
17	26	
16	21	
15	16	
14	12	
13	9	
12	6	99
11	4	99
10	3	98
9	2	91
8	1	81
7	1	47
6	1	33
5	1	10
4	1	6
3	1	2
2	1	1
1	1	
<b>Mean</b>	<b>21.1</b>	<b>7.3</b>
<b>S.D.</b>	<b>5.5</b>	<b>1.6</b>

Note: These norms are the source of the Writing Test norms printed on the ACT score reports of students who take the optional Writing Test during 2009–2010. Sample size: 2,116,524.

## Six-Point Holistic Scoring Rubric for the ACT Writing Test

Papers at each level exhibit *all* or *most* of the characteristics described at each score point.

### Score = 6

**Essays within this score range demonstrate effective skill in responding to the task.**

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a critical context for discussion. The essay addresses complexity by examining different perspectives on the issue, or by evaluating the implications and/or complications of the issue, or by fully responding to counterarguments to the writer's position. Development of ideas is ample, specific, and logical. Most ideas are fully elaborated. A clear focus on the specific issue in the prompt is maintained. The organization of the essay is clear: the organization may be somewhat predictable or it may grow from the writer's purpose. Ideas are logically sequenced. Most transitions reflect the writer's logic and are usually integrated into the essay. The introduction and conclusion are effective, clear, and well developed. The essay shows a good command of language. Sentences are varied and word choice is varied and precise. There are few, if any, errors to distract the reader.

### Score = 5

**Essays within this score range demonstrate competent skill in responding to the task.**

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a broad context for discussion. The essay shows recognition of complexity by partially evaluating the implications and/or complications of the issue, or by responding to counterarguments to the writer's position. Development of ideas is specific and logical. Most ideas are elaborated, with clear movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained. The organization of the essay is clear, although it may be predictable. Ideas are logically sequenced, although simple and obvious transitions may be used. The introduction and conclusion are clear and generally well developed. Language is competent. Sentences are somewhat varied and word choice is sometimes varied and precise. There may be a few errors, but they are rarely distracting.

### Score = 4

**Essays within this score range demonstrate adequate skill in responding to the task.**

The essay shows an understanding of the task. The essay takes a position on the issue and may offer some context for discussion. The essay may show some recognition of complexity by providing some response to counterarguments to the writer's position. Development of ideas is adequate, with some movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained throughout most of the essay. The organization of the essay is apparent but predictable. Some evidence of logical sequencing of ideas is apparent, although most transitions are simple and obvious. The introduction and conclusion are clear and somewhat developed. Language is adequate, with some sentence variety and appropriate word choice. There may be some distracting errors, but they do not impede understanding.

### Score = 3

**Essays within this score range demonstrate some developing skill in responding to the task.**

The essay shows some understanding of the task. The essay takes a position on the issue but does not offer a context for discussion. The essay may acknowledge a counterargument to the writer's position, but its development is brief or unclear. Development of ideas is limited and may be repetitious, with little, if any, movement between general statements and specific reasons, examples, and details. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. The organization of the essay is simple. Ideas are logically grouped within parts of the essay, but there is little or no evidence of logical sequencing of ideas. Transitions, if used, are simple and obvious. An introduction and conclusion are clearly discernible but underdeveloped. Language shows a basic control. Sentences show a little variety and word choice is appropriate. Errors may be distracting and may occasionally impede understanding.

### Score = 2

**Essays within this score range demonstrate inconsistent or weak skill in responding to the task.**

The essay shows a weak understanding of the task. The essay may not take a position on the issue, or the essay may take a position but fail to convey reasons to support that position, or the essay may take a position but fail to maintain a stance. There is little or no recognition of a counterargument to the writer's position. The essay is thinly developed. If examples are given, they are general and may not be clearly relevant. The essay may include extensive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. There is some indication of an organizational structure, and some logical grouping of ideas within parts of the essay is apparent. Transitions, if used, are simple and obvious, and they may be inappropriate or misleading. An introduction and conclusion are discernible but minimal. Sentence structure and word choice are usually simple. Errors may be frequently distracting and may sometimes impede understanding.

### Score = 1

**Essays within this score range show little or no skill in responding to the task.**

The essay shows little or no understanding of the task. If the essay takes a position, it fails to convey reasons to support that position. The essay is minimally developed. The essay may include excessive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is usually maintained, but focus on the specific issue in the prompt may not be maintained. There is little or no evidence of an organizational structure or of the logical grouping of ideas. Transitions are rarely used. If present, an introduction and conclusion are minimal. Sentence structure and word choice are simple. Errors may be frequently distracting and may significantly impede understanding.

### No Score

**Blank, Off-Topic, Illegible, Not in English, or Void**

## How to Score the Writing Test

Two trained readers will score your essay on the actual Writing Test. These readers are trained by reading examples of papers at each score point and by scoring many practice papers. They are given detailed feedback on the correctness of their scores during practice. During actual scoring, score differences of more than one point will be evaluated by a third trained reader to resolve discrepancies. This method is designed to be as objective and impartial as possible. So—how can you rate your *own* practice Writing Test?

It is difficult to be objective about one's own work, and you have not had the extensive training provided to actual readers of the ACT Writing Test. However, it is to your advantage to read your own writing critically. Becoming your own editor helps you grow as a writer and as a reader. So it makes sense for you to evaluate your own practice essay. It may also be helpful for you to give your practice essay to another reader to get another perspective: perhaps that of a classmate, a parent, or an English teacher, for example. Thinking and talking with others about writing is good preparation for the ACT Writing Test. To rate your essay, you and your reader(s) should read the scoring guidelines and example essays, which begin below and continue through page 71, and then assign your practice essay a score of 1 through 6.

For an actual administration, each essay will be scored on a scale from 1 (low) through 6 (high). The score is based on the overall impression that is created by all the elements of the writing. The scores given by the two readers are added together, yielding the Writing subscore range 2–12 shown in Table 4 on page 72.

## Example Essays and Scoring Explanations

Readers for the ACT Writing Test are trained by scoring many essays before they score “live” essays. Although we cannot provide you with the same extensive training these readers receive, reading the example essays that follow will help you better understand some of the characteristics of essays at each score point. You will also be able to read a brief explanation of how each essay was scored. The example essays are in response to the practice prompt on page 58.

---

### Score = 1

I think we should consider because not everybody likes the same books. There are people who like, cartoon stories, stories that talk about the olden days. We would not complain so much if we actually had a book to read that we enjoy. We could improve our reading skill if we could choose the books we want to read. If we had the same book, some people have already read in the past and they could tell the ending. I think if we have to read books then we should read books that we feel comfortable with.

### Scoring Guidelines (see page 66)

These are the guidelines that will be used to score your essay. These guidelines are also called a “rubric.” Many papers do not fit the exact description at each score point. You should note that the rubric says: “Papers at each level exhibit *all* or *most* of the characteristics in the descriptors.” To score your paper, read your response and try to determine which score point and paragraph in the rubric best describes most of the characteristics of your essay.

Then (because your Writing Test subscore is the sum of two readers’ ratings of your essay), you should multiply your 1–6 score by 2 when you use Table 4, on page 72, to find your Combined English/Writing score. Or, if both you and someone else read and score your practice essay, add those scores together.

### Comparing Your Scores

The Writing Test norms table (Table 3B on page 65) allows you to compare your score on the practice Writing Test with the scores of recent high school graduates who took the ACT Plus Writing. The norms for the Writing Test are reported the same way as the norms for the multiple-choice tests (see page 59). For example, a Writing subscore of 8 has a cumulative percent of 81. This means that 81% of students had a Writing subscore of 8 or lower. Remember that your scores and percents at or below are only *estimates* of the scores you will obtain on an actual administration of the ACT Plus Writing. They should be considered in connection with your performance on other essay tests and your planned college curriculum.

### College Readiness Standards

The College Readiness Standards for Writing (see page 59) can be found at [www.act.org/standard](http://www.act.org/standard).

### Score Point 1 Scoring Explanation

Essays that earn a score of 1 show little or no skill in responding to the writing task. This essay shows little engagement with the prompt task. The writer takes a position (*I think we should consider because not everybody likes the same books*), but ideas are not developed beyond single-sentence assertions and therefore remain unelaborated and unexplained (*We would not complain so much if we actually had a book to read that we enjoy. We could improve our reading skill if we could choose the books we want to read. If we had the same book, some people have already read in the past and they could tell the ending*). There is no discernible organization present. Transitions are not used, and ideas are not logically grouped. No introduction or conclusion is present, unless the position statement is considered an introduction to the response. Sentence structure and word choice are simple. Most sentences begin with a simple subject-verb construction (*I think...*, *We would...*, *We could...*). Errors, such as an unnecessary comma, are distracting but do not impede understanding.

---

**Score = 2**

I think that students should not be allowed to pick their own book out in class. I think that students would get a lot more out of reading the same book as everyone else in the class. Some students I think would probably get easier books to read than others and that wouldn't be fair. It would probably just cause conflict. What would they do in class just sit and read their books!

I think that if they had the same books that they could have discussions in class. It would keep the whole class interested and they would probably keep reading. Then maybe when they're done reading the class can watch the movie. I also think by keeping the class working on the same book together that they will learn more and be able to help each other out. I think if they read the same book they will greatly improve their reading skills. That's what my policy would be.

---

**Score Point 2  
Scoring Explanation**

Essays that earn a 2 demonstrate inconsistent or weak skill in responding to the task. This writer takes a clear position (*I think students should not be allowed to pick their own book out in class*) and offers specific supporting reasons (*I think that students would get a lot more out of reading the same book as everyone else in the class. Some students I think would probably get easier books to read than others and that wouldn't be fair. It would probably just cause conflict*), but development of these reasons is thin, and the relevance of some of the ideas is not made clear (*What would they do in class just sit and read their books!* and *Then maybe when they're done reading the class can watch the movie*). There is some indication of an organizational structure, and ideas seem to be logically grouped—the first paragraph briefly discusses why having students read different books wouldn't work and the second paragraph briefly discusses the benefits of having students read the same book. A few simple transitions are used (*Then maybe... I also think...*). However, the writer includes no discernible introduction beyond the one-sentence position statement, and the conclusion consists of only the essay's final sentence (*That's what my policy would be*). Sentence structure and word choice are simple, with an overreliance on the use of *I think...* to open sentences. Errors are rarely distracting (for example, using *there* for *their*) and do not interfere with meaning.

---

**Score = 3**

It is a great idea for students to choose the books they read. They will be more interested, more understanding, and more reliable to do so.

The students will be more interested to read the books they chose rather than a book they know nothing about. They will also be interested in a book they actually like. Students like the feeling that they can be trusted to do something right. People are often excited by reading a book on a topic they like, however if it is a topic they care nothing about, they will often put it off.

Also, the students will be more understanding of their topic. If the student chooses their own book they are most likely common with the story behind the book, or the meaning of the story. Now days, many teenagers are reading books about the war in Iraq and the economy, because it is what they hear about everyday on the news, or local radio station.

Students will also be more reliable of reading their books if it is something they actually care about. The teacher can actually rely on them to go home and read the pages assigned for homework the night before. Rather than giving them a book on a topic which they have no feelings about, and expecting them to give up the time they have away from school to actually work on it. Students who chose their own books would be more likely to actually do the assignment.

Students choosing their own books or topics for class is a great idea. The student will be more reliable, more interested, and definitely more understanding of the book.

---

**Score Point 3  
Scoring Explanation**

Essays that earn a 3 demonstrate some developing skill in responding to the task. This essay opens with a position statement that outlines the writer's three supporting points, but the writer does not provide any context for the discussion. Development of the three ideas is limited, with little movement between general statements and specific reasons or examples (*The students will be more interested to read the books they chose rather than a book they know nothing about. They will also be interested in a book they actually like. Students like the feeling that they can be trusted to do something right. People are often excited by reading a book on a topic they like, however if it is a topic they care nothing about, they will often put it off*). Although the writer provides specific examples in the third paragraph (*Now days, many teenagers are reading books about the war in Iraq and the economy, because it is what they hear about everyday on the news, or local radio station*), more explanation is needed to clearly connect these supporting examples to the writer's point. The essay is organized simply—the structure of the essay follows the order of points in the writer's opening statement. Ideas are logically grouped, but there is little evidence of logical sequencing of ideas. The writer uses a single transition (*Also*) throughout the essay to connect ideas. Although the introduction and conclusion are clearly discernible, they are underdeveloped and consist only of the writer's position statement as the introduction and a reiteration of that position statement in the conclusion. Language demonstrates a basic control. Sentence structure shows little variety (for example, the repetition of the phrase *students will be more...* throughout the essay). Word choice is also usually simple and sometimes lacks clarity (for example, using *common* when *familiar* would be clearer, and the misuse of the word *reliable*). Errors are occasionally distracting, but generally do not interfere with meaning.

---

**Score = 4**

At some high schools, teachers are now allowing students to choose the books they want to read for class rather than requiring that all students read the same book. These teachers feel that students will be more likely to read the book if they find the book interesting; and as a result, increasing their reading skills. While some may believe this is a good idea, I completely disagree. Allowing students to choose their own books would not only create problems, but it would be very hard for teachers to help students and it would irradicate the whole idea of class discussion.

Allowing students to chose their own books could create many problems. Some books may not be school appropriate, or may contain information that is irrelevant to the area of study. Question as to whether the book is appropriate would be up to the discretion of teacher. This may lead to negative teacher-student interaction, and create an even larger number of complications for a student choosing his or her book.

If students were allowed to choose their own book, teachers may not be able to guide the student through it properly. Questions from students may be left unanswered if the teacher is unfamiliar with the book or hasn't read it at all. If this were to be the scenario, the student might be unable to complete an assignment; therefore, he or she would be at a disadvantage compared to someone who chose a book that the teacher was familiar with.

Allowing students to choose their books would also eliminate class discussions. While class discussions concerning works of literature are very important, these students would be missing out. They would not receive the input from the teacher that is needed to understand to full meaning of a book. They may also not be able to discuss points or topics among their classmates that may otherwise be helpful if they were all reading the same book.

Although some of the books assigned by teachers may seem boring, it is very beneficial to a student that everyone is reading the same book at all times. This gives every student a fair chance to obtain help from the teacher and engage in helpful class discussions. It also eliminates problems associated with choosing a book. In the classroom setting, the teacher should always assign the same book, and if the student wishes to read another book than he or she may do it on their own time.

---

**Score Point 4  
Scoring Explanation**

Essays that earn a 4 demonstrate adequate skill in responding to the task. This essay takes a clear position (*Allowing students to choose their own books would not only create problems, but it would be very hard for teachers to help students and it would irradicate the whole idea of class discussion*) and provides some context by reiterating a portion of the prompt. The writer demonstrates some complexity by briefly acknowledging counterarguments (*While some may believe this is a good idea, I completely disagree and Although some of the books assigned by teachers may seem boring, it is very beneficial to a student that everyone is reading the same book at all times*). Development of the writer's three ideas is adequate, with some movement between general statements and specific reasons (*Allowing students to chose their own books could create many problems. Some books may not be school appropriate, or may contain information that is irrelevant to the area of study. Question as to whether the book is appropriate would be up to the discretion of teacher. This may lead to negative teacher-student interaction, and create an even larger number of complications for a student choosing his or her book*). The organization of the essay is apparent, but predictable. The writer uses a five-paragraph framework to organize the three ideas mentioned in the introduction. Some evidence of logically sequenced ideas is apparent, although the writer does not use transitions to show the connection between ideas. The introduction and conclusion are clear and somewhat developed—the introduction establishes some context and the conclusion reaffirms the writer's main points. Language is adequate, with some sentence variety and mostly appropriate word choice. The rare distracting errors (*irradicate, Question as to whether, and helpful*) do not impede understanding.

---

**Score = 5**

Reading is stressed as the most important requirement during a child's early years of development. From birth, the ability to read is seen as both a mark of education and aptitude. By the time a student reaches the high school level they have probably read a wide variety of novels, biographies, historical accounts, and other types of literature. Many high school students, because of the excessive exposure to literature, lose interest in reading because it has become a common factor in their lives. For this reason high school students should be allowed to choose which books they wish to read, although it stands to reason that the choices should be monitored by teachers.

In my life I have read about fifty to one hundred books, from *Reader Rabbit* to *The Scarlet Letter*. In the books I have read, those that I most enjoyed are those that I chose for myself. While they may not have been the most provocative or best written books, I found them to be more valuable than those that had been forced upon me. If I had been asked to discuss or analyze the novel I would have done so willingly and with more fervor than if I were asked to discuss a book required for my English class. The fact is that students, especially teens, don't like to be told what to do. Teachers should respect this and allow their students to select what they want to read, knowing that consequences will ensue if the chosen book is inappropriate or poorly analyzed. By doing this teachers will allow their pupils to gain a sense of independence and also learn to teach themselves about a book, instead of relying on the teacher to instruct them in their learning.

Class discussion, although helpful, is not vital to a students' success. In fact, it may give lazier students an opportunity to sit back and copy all of the answers down from more dedicated students as they tell what they've learned. If each student read a different book, this problem would be solved. Not only that, but if the student isn't familiar with what everyone else is reading, they will be more likely to ask about the other books people are reading in class. If they find them interesting, an opportunity to connect the concepts from other stories to their own and draw parallels will be opened up. Whereas if everyone reads exactly the same thing, no parallels can be drawn.

While teaching a set curriculum and reading agenda for students has succeeded in teaching certain principles to high school students, the chances are that more students would be willing to learn about a book if they chose it for themselves. Hopefully, with this process, more students will read more often and gain a better interest in literature and class discussion, which would benefit both the student and the teachers.

---

**Score Point 5  
Scoring Explanation**

Essays that earn a 5 demonstrate competent skill in responding to the task. This writer begins by establishing a broad context for the discussion (*Reading is stressed as the most important requirement during a child's early years of development. From birth, the ability to read is seen as both a mark of education and aptitude. By the time a student reaches the high school level...*) and then takes a clear position on the prompt's issue (*For this reason high school students should be allowed to choose which books they wish to read, although it stands to reason that the choices should be monitored by teachers*). The essay shows recognition of complexity by weaving a response to counterarguments through several parts of the essay (*In the books I have read, those that I most enjoyed are those that I chose for myself. While they many not have been the most provocative or best written books, I found them to be more valuable than those that had been forced upon me... and While teaching a set curriculum and reading agenda for students has succeeded in teaching certain principles to high school students, the chances are that more students would be willing to learn about a book if they chose it for themselves*). Development of the writer's ideas is specific, with clear movement between general statements and specific supporting reasons (*Class discussion, although helpful, is not vital to a students' success. In fact, it may give lazier students an opportunity to sit back and copy all of the answers down from more dedicated students as they tell what they've learned*). Organization of the essay is logical and clear, with some integrated transitions (*For this reason..., Not only that...*) that show the connection of ideas. The introduction and conclusion are both clear and generally well developed. The introduction offers context, and the conclusion adds emphasis to clarify the writer's argument. Language is competent. Sentences are varied and word choice is varied and sometimes precise (*a mark of education and aptitude, willingly and with more fervor*). The few errors present (such as a misplaced apostrophe and a sentence fragment) do not distract.



---

**Score = 6**

The words “Crime and Punishment” glared at me from the cover of my new book for English class. As my teacher announced our new reading assignment, our class released a simultaneous groan—no one wanted to read Doestoevsky. Nevertheless, after spending my days delving into this dense Russian literature, I unexpectedly found Doestoevsky’s masterpiece to become one of my favorite books. If teachers exclusively allow students to choose their own reading material, students education will be impaired and progress of their reading abilities stagnated. Students need a broad foundation of literary works and therefore cannot be responsible for determining the content of their education.

To begin, the literature selections of English class should function, in effect, as a microcosm of the studies of the school itself. Students are required to complete courses not just in subjects that interest them, but instead in all areas of study such as science, social studies, English, and math. While it is true that permitting students to choose their own book will allow them to choose books they wish to read, it is detrimental to students’ education to assume that this would be beneficial. Were students allowed to choose their favorite novels or genres, they would perpetually fall back on what they know, which would leave them utterly unprepared to encounter the works of literature that they will be asked to read in college, where students don’t have a say in selecting the materials for their courses. To ensure that students are able to persist through literary challenges, there should be a diversity in the collection of literature students read, which will not be achieved if a student only reads what he or she desires.

Furthermore, the abundant rules and regulations present in schools should serve as a blattent warning. Teens clearly need to be guided to perform to the best of their abilities. Even if many teens might benefit from their book selections, an equal or greater number may not choose challenging literature. Reading only elementary literature stagnates the progress of reading skills and would be deleterious to the quality of students education. It is difficult enough to force students to complete homework, allowing the student to choose the difficulty of the homework would not produce the desired results of learning and progress—the sole reason students attend school to begin with. In addition, while some students may select unchallenging books because they are apathetic or lazy, others may choose certain books because they do not know what else is out there. It is the inherent responsibility of the teacher to expose their students to all types of material, even unfamiliar works. This way, other students too, have the opportunity to be pleasantly surprised by the intricacies of Doestoevsky. Thankfully, my teacher had the ability and wherewithal to provide me with such new and exciting literature.

Thus, it is vital that students not be given the control over their education in English class. This would proliferate undiverse and single-minded teens who would likely not choose challenging literature. Such a class would be devoid of enlightening discussion and would not produce the knowledgeable and well-rounded individuals schools should strive for. A better solution to this problem would be to allow the class as a group to pick among a selection of books proposed by the English teacher herself. This would produce a more democratic medium and stimulate interest, while avoiding the problems that would result from their own selections.

---

**Score Point 6  
Scoring Explanation**

Essays that earn a 6 demonstrate effective skill in responding to the task. This essay opens with a broad context (*The words “Crime and Punishment” glared at me from the cover of my new book for English class. As my teacher announced our new reading assignment, our class released a simultaneous groan—no one wanted to read Doestoevsky*) and then critically and persuasively argues that “students need a broad foundation of literary works and therefore cannot be responsible for determining the content of their education.”

The essay demonstrates complexity by responding to a counterargument to the writer’s position (*While it is true that permitting students to choose their own book will allow them to choose books they wish to read, it is detrimental to students’ education to assume that this would be beneficial*). The writer further demonstrates complexity by examining some of the long-term implications of allowing students to select their own novels (*Were students allowed to choose their favorite novels or genres, they would perpetually fall back on what they know, which would leave them utterly unprepared to encounter the works of literature that they will be asked to read in college, where students don’t have a say in selecting the materials for their courses*).

Development of ideas is ample, specific, and logical. The writer elaborates on general statements (*Teens clearly need to be guided to perform to the best of their abilities*) by supporting such statements with more specific reasons and examples (*Even if many teens might benefit from their book selections, an equal or greater number may not choose challenging literature. Reading only elementary literature stagnates the progress of reading skills and would be deleterious to the quality of students education. It is difficult enough to force students to complete homework, allowing the student to choose the difficulty of the homework would not produce the desired results of learning and progress—the sole reason students attend school to begin with*).

The organization of the essay is clear and grows from the writer’s purpose instead of being predictable. Ideas are logically sequenced, and transitions are used to show the connection between ideas (*To begin..., Furthermore..., In addition..., Thus...*). The introduction and conclusion are effective, clear, and well developed. The introduction provides a narrative to establish context for the discussion, and the conclusion goes beyond merely summarizing the essay’s main points into a discussion of additional implications of the prompt’s proposal (*This would proliferate undiverse and single-minded teens who would likely not choose challenging literature. Such a class would be devoid of enlightening discussion and would not produce the knowledgeable and well-rounded individuals schools should strive for*).

The essay shows a good command of language. Sentences are varied and word choice is varied and precise (*delving, microcosm, deleterious, apathetic*). Although there are a few minor errors present in the essay (for example, a comma splice and an occasional missing apostrophe), they do not distract the reader.

# TABLE 4

## Calculating Your Combined English/Writing Score

Complete these steps to calculate your Combined English/Writing score for your practice tests.

1. Locate your scale score for the English Test on page 63 and enter it here: \_\_\_\_\_.
2. Enter your Writing Test score (1–6) here \_\_\_\_\_ and double it to get your Writing subscore (2–12): \_\_\_\_\_  
(If two people read and scored your Writing Test, add those two scores to get your Writing subscore.)
3. Use the table below to find your Combined English/Writing score.
  - First, circle your ACT English Test score in the left column.
  - Second, circle your ACT Writing subscore at the top of the table.

- Finally, follow the English Test score row across and the Writing subscore column down until the two meet. Circle the Combined English/Writing score where the row and column meet. (For example, for an English Test score of 19 and a Writing subscore of 6, the Combined English/Writing score is 18.)
4. Using the number you circled in the table below, write your Combined English/Writing score here: \_\_\_\_\_.  
(The highest possible Combined English/Writing score is 36 and the lowest possible score is 1.)

ACT English Test score \_\_\_\_\_

Writing subscore \_\_\_\_\_

---

**Combined English/Writing Score** \_\_\_\_\_  
(from table below)

Combined English/Writing Scale Scores											
English Test Score	Writing Subscore										
	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	6	7	8	9	10	11
3	2	3	4	5	6	7	8	9	10	11	12
4	3	4	5	6	7	8	9	10	11	12	13
5	4	5	6	7	8	9	10	11	12	12	13
6	5	6	7	7	8	9	10	11	12	13	14
7	5	6	7	8	9	10	11	12	13	14	15
8	6	7	8	9	10	11	12	13	14	15	16
9	7	8	9	10	11	12	13	13	14	15	16
10	8	9	9	10	11	12	13	14	15	16	17
11	8	9	10	11	12	13	14	15	16	17	18
12	9	10	11	12	13	14	15	16	17	18	19
13	10	11	12	13	14	14	15	16	17	18	19
14	10	11	12	13	14	15	16	17	18	19	20
15	11	12	13	14	15	16	17	18	19	20	21
16	12	13	14	15	16	17	18	19	20	20	21
17	13	14	15	16	16	17	18	19	20	21	22
18	13	14	15	16	17	18	19	20	21	22	23
19	14	15	16	17	18	19	20	21	22	23	24
20	15	16	17	18	19	20	21	21	22	23	24
21	16	17	17	18	19	20	21	22	23	24	25
22	16	17	18	19	20	21	22	23	24	25	26
23	17	18	19	20	21	22	23	24	25	26	27
24	18	19	20	21	22	23	23	24	25	26	27
25	18	19	20	21	22	23	24	25	26	27	28
26	19	20	21	22	23	24	25	26	27	28	29
27	20	21	22	23	24	25	26	27	28	28	29
28	21	22	23	24	24	25	26	27	28	29	30
29	21	22	23	24	25	26	27	28	29	30	31
30	22	23	24	25	26	27	28	29	30	31	32
31	23	24	25	26	27	28	29	30	30	31	32
32	24	25	25	26	27	28	29	30	31	32	33
33	24	25	26	27	28	29	30	31	32	33	34
34	25	26	27	28	29	30	31	32	33	34	35
35	26	27	28	29	30	31	31	32	33	34	35
36	26	27	28	29	30	31	32	33	34	35	36



**Marking Directions:** Mark only **one** oval for each question. Fill in response completely. Erase errors cleanly without smudging.

**Correct mark:**

**Do NOT use these incorrect or bad marks.**

Incorrect marks:

Overlapping mark:

Cross-out mark:

Smudged erasure:

Mark is too light:

**BOOKLET NUMBER**

1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
0	0	0	0	0	0

**FORM**

--	--	--

**BE SURE TO FILL IN THE CORRECT FORM OVAL.**

64E

Print your 3-character **Test Form** in the boxes above and fill in the corresponding oval at the right.

**TEST 1**

- |              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D)  | 14 (F G H J) | 27 (A B C D) | 40 (F G H J) | 53 (A B C D) | 66 (F G H J) |
| 2 (F G H J)  | 15 (A B C D) | 28 (F G H J) | 41 (A B C D) | 54 (F G H J) | 67 (A B C D) |
| 3 (A B C D)  | 16 (F G H J) | 29 (A B C D) | 42 (F G H J) | 55 (A B C D) | 68 (F G H J) |
| 4 (F G H J)  | 17 (A B C D) | 30 (F G H J) | 43 (A B C D) | 56 (F G H J) | 69 (A B C D) |
| 5 (A B C D)  | 18 (F G H J) | 31 (A B C D) | 44 (F G H J) | 57 (A B C D) | 70 (F G H J) |
| 6 (F G H J)  | 19 (A B C D) | 32 (F G H J) | 45 (A B C D) | 58 (F G H J) | 71 (A B C D) |
| 7 (A B C D)  | 20 (F G H J) | 33 (A B C D) | 46 (F G H J) | 59 (A B C D) | 72 (F G H J) |
| 8 (F G H J)  | 21 (A B C D) | 34 (F G H J) | 47 (A B C D) | 60 (F G H J) | 73 (A B C D) |
| 9 (A B C D)  | 22 (F G H J) | 35 (A B C D) | 48 (F G H J) | 61 (A B C D) | 74 (F G H J) |
| 10 (F G H J) | 23 (A B C D) | 36 (F G H J) | 49 (A B C D) | 62 (F G H J) | 75 (A B C D) |
| 11 (A B C D) | 24 (F G H J) | 37 (A B C D) | 50 (F G H J) | 63 (A B C D) |              |
| 12 (F G H J) | 25 (A B C D) | 38 (F G H J) | 51 (A B C D) | 64 (F G H J) |              |
| 13 (A B C D) | 26 (F G H J) | 39 (A B C D) | 52 (F G H J) | 65 (A B C D) |              |

**TEST 2**

- |                |                |                |                |                |                |
|----------------|----------------|----------------|----------------|----------------|----------------|
| 1 (A B C D E)  | 11 (A B C D E) | 21 (A B C D E) | 31 (A B C D E) | 41 (A B C D E) | 51 (A B C D E) |
| 2 (F G H J K)  | 12 (F G H J K) | 22 (F G H J K) | 32 (F G H J K) | 42 (F G H J K) | 52 (F G H J K) |
| 3 (A B C D E)  | 13 (A B C D E) | 23 (A B C D E) | 33 (A B C D E) | 43 (A B C D E) | 53 (A B C D E) |
| 4 (F G H J K)  | 14 (F G H J K) | 24 (F G H J K) | 34 (F G H J K) | 44 (F G H J K) | 54 (F G H J K) |
| 5 (A B C D E)  | 15 (A B C D E) | 25 (A B C D E) | 35 (A B C D E) | 45 (A B C D E) | 55 (A B C D E) |
| 6 (F G H J K)  | 16 (F G H J K) | 26 (F G H J K) | 36 (F G H J K) | 46 (F G H J K) | 56 (F G H J K) |
| 7 (A B C D E)  | 17 (A B C D E) | 27 (A B C D E) | 37 (A B C D E) | 47 (A B C D E) | 57 (A B C D E) |
| 8 (F G H J K)  | 18 (F G H J K) | 28 (F G H J K) | 38 (F G H J K) | 48 (F G H J K) | 58 (F G H J K) |
| 9 (A B C D E)  | 19 (A B C D E) | 29 (A B C D E) | 39 (A B C D E) | 49 (A B C D E) | 59 (A B C D E) |
| 10 (F G H J K) | 20 (F G H J K) | 30 (F G H J K) | 40 (F G H J K) | 50 (F G H J K) | 60 (F G H J K) |

**TEST 3**

- |             |              |              |              |              |              |
|-------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D) | 8 (F G H J)  | 15 (A B C D) | 22 (F G H J) | 29 (A B C D) | 36 (F G H J) |
| 2 (F G H J) | 9 (A B C D)  | 16 (F G H J) | 23 (A B C D) | 30 (F G H J) | 37 (A B C D) |
| 3 (A B C D) | 10 (F G H J) | 17 (A B C D) | 24 (F G H J) | 31 (A B C D) | 38 (F G H J) |
| 4 (F G H J) | 11 (A B C D) | 18 (F G H J) | 25 (A B C D) | 32 (F G H J) | 39 (A B C D) |
| 5 (A B C D) | 12 (F G H J) | 19 (A B C D) | 26 (F G H J) | 33 (A B C D) | 40 (F G H J) |
| 6 (F G H J) | 13 (A B C D) | 20 (F G H J) | 27 (A B C D) | 34 (F G H J) |              |
| 7 (A B C D) | 14 (F G H J) | 21 (A B C D) | 28 (F G H J) | 35 (A B C D) |              |

**TEST 4**

- |             |              |              |              |              |              |
|-------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D) | 8 (F G H J)  | 15 (A B C D) | 22 (F G H J) | 29 (A B C D) | 36 (F G H J) |
| 2 (F G H J) | 9 (A B C D)  | 16 (F G H J) | 23 (A B C D) | 30 (F G H J) | 37 (A B C D) |
| 3 (A B C D) | 10 (F G H J) | 17 (A B C D) | 24 (F G H J) | 31 (A B C D) | 38 (F G H J) |
| 4 (F G H J) | 11 (A B C D) | 18 (F G H J) | 25 (A B C D) | 32 (F G H J) | 39 (A B C D) |
| 5 (A B C D) | 12 (F G H J) | 19 (A B C D) | 26 (F G H J) | 33 (A B C D) | 40 (F G H J) |
| 6 (F G H J) | 13 (A B C D) | 20 (F G H J) | 27 (A B C D) | 34 (F G H J) |              |
| 7 (A B C D) | 14 (F G H J) | 21 (A B C D) | 28 (F G H J) | 35 (A B C D) |              |

**ACT STUDENT REVIEW:** The test administrator will give you instructions for completing this section.



**Student Review:** Your responses to these items will assist ACT and your test center in providing the best possible conditions for testing and planning for the future. Fill in the oval indicating your response to each item printed on the back of your test booklet.

- |                         |                       |                          |                       |                          |                       |
|-------------------------|-----------------------|--------------------------|-----------------------|--------------------------|-----------------------|
| Yes                     | No                    | Yes                      | No                    | Yes                      | No                    |
| 1 <input type="radio"/> | <input type="radio"/> | 6 <input type="radio"/>  | <input type="radio"/> | 11 <input type="radio"/> | <input type="radio"/> |
| 2 <input type="radio"/> | <input type="radio"/> | 7 <input type="radio"/>  | <input type="radio"/> | 12 <input type="radio"/> | <input type="radio"/> |
| 3 <input type="radio"/> | <input type="radio"/> | 8 <input type="radio"/>  | <input type="radio"/> | 13 <input type="radio"/> | <input type="radio"/> |
| 4 <input type="radio"/> | <input type="radio"/> | 9 <input type="radio"/>  | <input type="radio"/> | 14 <input type="radio"/> | <input type="radio"/> |
| 5 <input type="radio"/> | <input type="radio"/> | 10 <input type="radio"/> | <input type="radio"/> | 15 <input type="radio"/> | <input type="radio"/> |

Please enter the information at the right before beginning the Writing Test.

Use a soft lead No. 2 pencil only. Do NOT use a mechanical pencil, ink, ballpoint, or felt-tip pen.

WRITING TEST BOOKLET NUMBER

Print your 6-digit Booklet Number in the boxes at the right.

Grid of 6 boxes for booklet number

WRITING TEST FORM

○ 13G

Grid of 3 boxes for test form

Print your 3-character Test Form in the boxes above and fill in the corresponding oval at the right.

Begin WRITING TEST here.

Main writing area with horizontal lines

If you need more space, please continue on the next page.

Do not write in this shaded area.

Cut Here

**WRITING TEST**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

2

**If you need more space, please continue on the back of this page.**

**Do not write in this shaded area.**







# Practice Test #4



## ENGLISH TEST

45 Minutes—75 Questions

**DIRECTIONS:** In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose “NO CHANGE.” In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

### PASSAGE I

#### The Music of the O’odham

[1]

For some people, traditional American Indian music is associated and connected<sup>1</sup> with high penetrating vocals accompanied by a steady drumbeat. In tribal communities in the southwestern United States, however, one is likely to hear something similar to the polka-influenced dance music of northern Mexico. The music is called “waila.” Among the O’odham tribes of Arizona, waila has been popular for<sup>2</sup> more than a century. The music is mainly instrumental—the bands generally<sup>3</sup> consist of guitar, bass guitar, saxophones, accordion, and drums.

[2]

Unlike some traditional tribal music, waila does not serve a religious or spiritual purpose. It is a social music that performed<sup>4</sup> at weddings, birthday parties,

1. **A.** NO CHANGE  
**B.** connected by some of them  
**C.** linked by association  
**D.** associated
2. **F.** NO CHANGE  
**G.** popular, one might say, for  
**H.** really quite popular for  
**J.** popular for the duration of
3. Which of the following alternatives to the underlined portion would NOT be acceptable?  
**A.** instrumental; in general, the bands  
**B.** instrumental, the bands generally  
**C.** instrumental. The bands generally  
**D.** instrumental; the bands generally
4. **F.** NO CHANGE  
**G.** music in which it is performed  
**H.** music, performing  
**J.** music, performed



and feasts. The word itself<sup>5</sup> comes from the Spanish

word for dance, *baile*. Cheek to cheek, the dance is<sup>6</sup>  
performed to the relaxed two-step tempo, and the bands<sup>6</sup>

often play long past<sup>7</sup> midnight. As the dancers step to the

music, they were also stepping<sup>8</sup> in time to a sound that

embodies their<sup>9</sup> unique history and suggests the influence

of outside cultures on their music. 10

[3]

The O'odham in the 1700s<sup>11</sup> first encountered the  
guitars of Spanish missionaries. In the 1850s the O'odham

have borrowed<sup>12</sup> from the waltzes and mazurkas of  
people of European descent on their way to California.

5. A. NO CHANGE  
B. word, itself,  
C. word, itself  
D. word itself,
6. F. NO CHANGE  
G. Couples dance cheek to cheek to the relaxed two-step tempo,  
H. A relaxed two-step tempo, the couples dance cheek to cheek,  
J. Cheek to cheek, the two-step tempo relaxes dancing couples,
7. A. NO CHANGE  
B. play long, past,  
C. play, long past,  
D. play, long past
8. F. NO CHANGE  
G. are also stepping  
H. have also stepped  
J. will also step
9. A. NO CHANGE  
B. they're  
C. it's  
D. its'
10. At this point, the writer is considering adding the following true statement:  
The agricultural practices of the O'odham are similar to those of the Maya.  
Should the writer make this addition here?  
F. Yes, because the sentence establishes that the O'odham often borrowed ideas from other groups.  
G. Yes, because the sentence provides important information about the O'odham people.  
H. No, because the sentence is not supported by evidence of a connection between the O'odham and the Maya.  
J. No, because the sentence distracts from the paragraph's focus on waila's uses and influences.
11. All of the following would be acceptable placements for the underlined portion EXCEPT:  
A. where it is now.  
B. at the beginning of the sentence (revising the capitalization accordingly).  
C. after the word *guitars*.  
D. after the word *missionaries* (ending the sentence with a period).
12. F. NO CHANGE  
G. have been borrowing  
H. were borrowed  
J. borrowed



In the early 1900s the O’odham became acquainted with marching bands and woodwind instruments (which explains the presence of saxophones in waila).<sup>13</sup> Around this time the polka music and button accordion

played by German immigrant railroad workers; left their mark on waila.<sup>14</sup>

[4]

It should be no surprise that musicians these days are adding touches of rock, country, and reggae to waila. Some listeners fear that an American musical form may soon be lost. But the O’odham are playing waila with as much energy and devotion as ever. A unique blend of traditions, waila will probably continue changing for as long as the O’odham use it to express their own sense of harmony and tempo.

---

**PASSAGE II**

**How Old Am I?**

Many people might be surprised to learn that the American way of computing a person’s age differs from the traditional Korean way. In Korean tradition, a person is considered to be already one year old at the time of his or her birth.

As a child growing up in two cultures, I found this contest a bit confusing. When I was in the fifth grade, was I ten or eleven years old? To add to the confusion, every New Year’s Day a person according to this Korean counting system, becomes a year

13. Given that all of the choices are true, which one is most relevant to the focus of this paragraph?
- A. NO CHANGE
  - B. (although fiddles were once widely used in waila bands).
  - C. (even though they’re now often constructed of metal).
  - D. (which are frequently found in jazz bands also).
14. F. NO CHANGE
- G. workers
  - H. workers;
  - J. workers,

Question 15 asks about the preceding passage as a whole.

15. Upon reviewing this essay and finding that some information has been left out, the writer composes the following sentence incorporating that information:
- Those same German influences helped spawn a similar musical form in northern Mexico known as *norteño*.
- This sentence would most logically be placed after the last sentence in Paragraph:
- A. 1.
  - B. 2.
  - C. 3.
  - D. 4.

16. F. NO CHANGE
- G. change
  - H. dispute
  - J. difference
17. A. NO CHANGE
- B. person,
  - C. person;
  - D. person who,



older, regardless of his or her actual birthday.

Birthdays are important throughout the world. A person <sup>18</sup> who is sixteen years old on his or her birthday in March would become seventeen years old on the following New Year's Day, even though he or she isn't expected to turn seventeen (in "American" years) until that next birthday in March. Perhaps the celebration of New Year's Day in Korean culture is heightened because it is thought of as <sup>19</sup>

everyone's birthday party. 20

Today, after many birthdays and New Year's Days, I now find meaningful the difference I once found confusing. Otherwise, this difference points <sup>21</sup>

to significant underlying cultural values. The practice of <sup>22</sup>

advancing a person's age seems to me to reflect the value a <sup>23</sup>

society places on life experience and longevity. Their idea <sup>24</sup>

was demonstrated often when my elderly relatives, who <sup>25</sup> took pride in reminding younger folk of their "Korean

age." With great enthusiasm, they added on a year every <sup>26</sup>

18. F. NO CHANGE  
G. Most cultures celebrate birthdays.  
H. Birthdays focus attention on a culture's youth.  
J. DELETE the underlined portion.

19. A. NO CHANGE  
B. raised  
C. lifted  
D. lighted

20. Upon reviewing this paragraph, the writer considers deleting the preceding sentence. If the writer were to delete the sentence, the paragraph would primarily lose:  
F. a comment on the added significance of the Korean New Year celebration.  
G. a repetitive reminder of what happens every birthday.  
H. a defense of the case for celebrating every birthday.  
J. an illustration of the Korean counting system.

21. A. NO CHANGE  
B. Though,  
C. In fact,  
D. Then,

22. F. NO CHANGE  
G. on  
H. at  
J. DELETE the underlined portion.

23. A. NO CHANGE  
B. persons' age  
C. persons age  
D. person's age,

24. F. NO CHANGE  
G. One's  
H. Its  
J. This

25. A. NO CHANGE  
B. by  
C. while  
D. as if

26. Which choice would most clearly communicate the elderly relatives' positive attitude toward this practice?  
F. NO CHANGE  
G. Duplicating an accepted practice,  
H. Living with two birthdays themselves,  
J. Obliging,



New Year's Day. By contrast American society has often been described as one that values the vibrant energy of

27

youth over the wisdom and experience gained with age. After a certain age, many Americans I know would

28

balk, refuse, and hesitate at the idea of adding a year or two to what they regard as their actual age.

29

Even something as visibly simple or natural as computing a person's age can prove to be not so clear-cut. Traditions like celebrating birthdays reveal how deeply we are affected by the culture we live in.

30

27. A. NO CHANGE

B. whose

C. this

D. whom

28. If the writer were to delete the phrases "the vibrant energy of" and "the wisdom and experience gained with" from the preceding sentence, the sentence would primarily lose:

F. its personal and reflective tone.

G. an element of humor.

H. details that illustrate the contrast.

J. the preference expressed by the writer.

29. A. NO CHANGE

B. balk and hesitate

C. refuse and balk

D. balk

30. F. NO CHANGE

G. apparently

H. entirely

J. fully

### PASSAGE III

#### Wearing Jeans in School

In 1970, the school board in Pittsfield, New Hampshire, approved a dress code that prohibited students from wearing certain types of clothing. The school board members believed that wearing "play clothes" to school made the students

31

inefficient toward their school work, while more formal attire established a positive educational climate. When twelve-year-old Kevin Bannister wore a pair of blue jeans to school, he was sent home for violating the dress code.

32

31. Given that all of the choices are true, which one would best illustrate the term *dress code* as it is used in this sentence?

A. NO CHANGE

B. clothing that was inappropriate.

C. clothing, including sandals, bell-bottom pants, and "dungarees" (blue jeans).

D. clothing that is permitted in some schools today.

32. F. NO CHANGE

G. lazy and bored to tears with

H. blow off

J. lax and indifferent toward



Kevin and his parents believed that his constitutional  
rights had been violated. <sup>33</sup> The United States District  
<sup>33</sup>

Court of New Hampshire; agreed to hear Kevin's case.  
<sup>34</sup>  
His claim was based on the notion of personal liberty—the  
right of every individual to the control of his or her own  
person—protected by the Constitution's Fourteenth  
Amendment. The court agreed with Kevin that a person's  
right for wearing clothing of his or her own choosing is,  
<sup>35</sup>  
in fact, protected by the Fourteenth Amendment.

The court noted, however that restrictions may be justified  
<sup>36</sup>  
in some circumstances, such as in the school setting.

So did Kevin have a right to wear blue jeans to  
school? The court determined that the school board had  
failed to show that wearing jeans actually inhibited the  
educational process, which is guided by authority figures.  
<sup>37</sup>

Furthermore, the board offered no evidence to back up it's  
<sup>38</sup>

claim that such clothing created a negative educational  
<sup>39</sup>  
environment. Certainly the school board would  
be justified in prohibiting students from wearing  
clothing that was unsanitary, revealing, or obscene.

33. Given that all of the choices are true, which one would most effectively introduce the main idea of this paragraph?

- A. NO CHANGE
- B. The principal said dungarees and blue jeans were the same thing, so Kevin should have known better.
- C. If Kevin's jeans had been dirty and torn, the principal might have been justified in expelling him.
- D. These events occurred in a time of social unrest, and emotions were running high.

34. F. NO CHANGE  
G. Court, of New Hampshire  
H. Court of New Hampshire  
J. Court of New Hampshire,

35. A. NO CHANGE  
B. of wearing  
C. to wear  
D. wearing

36. F. NO CHANGE  
G. court noted, however,  
H. court, noted however,  
J. court noted however,

37. A. NO CHANGE  
B. process, which has undergone changes since the 1970s.  
C. process, a process we all know well.  
D. process.

38. F. NO CHANGE  
G. they're  
H. its  
J. ones

39. A. NO CHANGE  
B. where  
C. which  
D. in which



The court remained unconvinced, therefore, that

40

when wearing jeans would actually impair the learning  
process of Kevin or of his fellow classmates.

41

Kevin Bannister's case was significant in that it  
was the first in the United States to address clothing  
prohibitions of a school dress code. His challenge

42

initiated a review, of students' rights and administrative

43

responsibility in public education.

44

40. F. NO CHANGE  
G. thus,  
H. moreover,  
J. however,

41. A. NO CHANGE  
B. by wearing  
C. wearing  
D. having worn

42. Which choice would most effectively open this paragraph and convey the importance of this case?  
F. NO CHANGE  
G. Therefore, Kevin's case reminds us that you should stand up for your rights, no matter how old you are.  
H. The case for personal liberty means the right to speak up must be taken seriously by the courts.  
J. All in all, clothing is an important part of our identity.

43. A. NO CHANGE  
B. review, of students' rights,  
C. review of students' rights  
D. review of students' rights,

44. F. NO CHANGE  
G. on  
H. with  
J. about

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer's goal had been to write a brief persuasive essay urging students to exercise their constitutional rights. Would this essay fulfill that goal?  
A. Yes, because the essay focuses on how Kevin encouraged other students to exercise their constitutional rights.  
B. Yes, because the essay focuses on various types of clothing historically worn by students as a freedom of expression.  
C. No, because the essay suggests that the right to wear blue jeans was not a substantial constitutional right in the 1970s.  
D. No, because the essay objectively reports on one case of a student exercising a particular constitutional right.





## PASSAGE IV

**The Case of the Trick Photographs**

You might think that Sir Arthur Conan Doyle, the writer who invented Sherlock Holmes, the most logical of detectives, would have harbored strictly logical beliefs himself. But the author entertained a variety of fanciful ideas, including a belief in the mythical beings known as fairies. Since that belief, he was fooled in 1920 by two

46

schoolgirl cousins. 47

One day, Elsie Wright and Frances Griffiths returned from a walk in the English countryside with news that they had seen fairies. They had even taken photographs that showed several of the tiny sprites, some dancing in a ring in the grass, some fluttering in front of the girl's faces.

48

Many people were excited when they heard about

this seemingly true and factual proof of the existence of

49

fairies, but Conan Doyle was more excited than most.

To make sure that he wasn't being deceived, Conan Doyle had the original photographic plates examined by experts, however, they found no evidence of double exposures. He then wrote an enthusiastic article for *Strand* magazine, being the place in which most of his Sherlock Holmes stories had first appeared, and later wrote a book on the subject titled *The Coming of the Fairies.*

51

46. F. NO CHANGE  
G. Because of  
H. Concerning  
J. For
47. If the writer were to delete the opening sentence of this paragraph (beginning the essay with "Sir Arthur Conan Doyle entertained a variety of fanciful..."), the essay would primarily lose:  
A. information that sets up a contrast that follows.  
B. an irrelevant but humorous digression.  
C. information that explains Doyle's motivations.  
D. an important description of the setting.
48. F. NO CHANGE  
G. girls' faces.  
H. girls faces.  
J. girls face's.
49. A. NO CHANGE  
B. this seemingly evident but apparent  
C. what seemed to be an apparent  
D. this apparent
50. F. NO CHANGE  
G. who  
H. which  
J. they
51. A. NO CHANGE  
B. in which the magazine where  
C. in which  
D. being where



Conan Doyle sent a copy of one of the photographs to his friend Harry Houdini, the famous magician and escape artist. Houdini, who devoted considerable effort to exposing hoaxes involving spiritualism and was

52

skeptical about the existence of supernatural beings. 53

When Houdini remained unconvinced by the evidence, Conan Doyle became angry. Though the two

remained cordial, but their friendship was damaged

54

due to the fact that they had the disagreement.

55

Some sixty years later, an elderly Frances Griffiths

56

publicly admitted that her and her cousin had staged the photographs as a practical joke. Shortly after her revelation, computer enhancement revealed the hatpins that were used to prop up the cardboard-cutout fairies.

58

Scientific analysis, since photography was a new art, finally closed the Case of the Trick Photographs.

59

52. F. NO CHANGE  
 G. spiritualism, being  
 H. spiritualism, was  
 J. spiritualism and
53. If the writer were to delete the preceding sentence, the paragraph would primarily lose:  
 A. details that provide an explanation for the friendship between Conan Doyle and Houdini.  
 B. information that helps set the stage for what happens next in the essay.  
 C. a description of the reasons behind Houdini's skepticism about the supernatural.  
 D. nothing at all, since this sentence provides irrelevant information.
54. F. NO CHANGE  
 G. cordial and  
 H. cordial that  
 J. cordial,
55. A. NO CHANGE  
 B. because of the fact that they had a  
 C. due to the fact of their  
 D. by the
56. F. NO CHANGE  
 G. (Do NOT begin new paragraph) After some  
 H. (Begin new paragraph) Since some  
 J. (Begin new paragraph) Some
57. A. NO CHANGE  
 B. her cousin and herself  
 C. she and her cousin  
 D. her cousin and her
58. Which of the following alternatives to the underlined portion would NOT be acceptable?  
 F. that had been used  
 G. the girls used  
 H. using  
 J. used
59. Which choice would best tie the conclusion of this essay to its opening sentence?  
 A. NO CHANGE  
 B. of the kind a modern-day Sherlock Holmes might use,  
 C. which the great Houdini himself would have appreciated,  
 D. a methodology that was still in its infancy,



Question 60 asks about the preceding passage as a whole.

60. Suppose the writer had decided to write an essay that summarizes how beliefs in the supernatural have influenced the writing of famous authors. Would this essay fulfill the writer's goal?
- F. Yes, because the essay makes the point that Conan Doyle's belief in fairies clearly influenced his Sherlock Holmes stories.
  - G. Yes, because the essay indicates that Conan Doyle's disagreement with Houdini motivated him to write about the supernatural.
  - H. No, because the essay argues that the author's belief in fairies and the supernatural did not in any way affect his writing.
  - J. No, because the essay limits its focus to the particular events surrounding one author's reaction to evidence of the supernatural.

PASSAGE V

**Her Letters to the World**

Emily Dickinson, one of America's great nineteenth-century poets, was a prolific letter writer. Although her physical contact with the world was limited by caring for her invalid mother and by her own poor health, whose correspondence was

61

extensive: over one thousand letters to upwards of one hundred correspondents. These letters provide insight into her daily life and her poetry.

62

Dickinson's lifetime of letters range from playful to serious. As a young woman she wrote, of pining for a

63

valentine and of visiting the Chinese Museum in Boston. Her letters in later years reveal that she missed friends and

64

61. A. NO CHANGE  
B. their  
C. Dickinson's  
D. who's
62. F. NO CHANGE  
G. extensive, and over  
H. extensive; over  
J. extensive. Over
63. A. NO CHANGE  
B. (Do NOT begin new paragraph) As a young woman, she wrote  
C. (Begin new paragraph) As a young woman, she wrote,  
D. (Begin new paragraph) As a young woman, she wrote
64. F. NO CHANGE  
G. visiting to  
H. of her visiting to  
J. of her visiting at



encouraged them to visit. Dickinson stayed in contact with correspondents for many years. In a teasing letter to her brother, she bemoaned the fact that a big barn fire couldn't have waited until he returned to see it, since he "enjoyed

such things so much." Other letters are solemn; speaking

of relatives and friends whom had died.

Perhaps the correspondent who came to know Dickinson best through their thirty-six-year exchange of letters was Emily's friend, sister-in-law, and neighbor, Susan Gilbert Dickinson. Susan was a spiritual, social, and intellectual companion for Emily. In fact, in one letter, Emily stated that Shakespeare was the only person who had taught her more than Susan had.

One significant aspect of this relationship was: that Susan was perhaps the only reader of Emily's poems-in-progress. Letters between the two suggest that Susan might frequently have given feedback on her work, including some of her most famous

poems, composed at her home in Amherst, Massachusetts.

At one point, Emily sent a draft of her poem "Safe in Their

Alabaster Chambers" to Susan, who read the poem. As

65. Given that all of the choices are true, which one best develops the paragraph's focus on the roles that letters played in Emily Dickinson's life?

- A. NO CHANGE
- B. Her personal interests also included keen observation of the natural world around her.
- C. Though she produced volumes of letters, none were shared publicly until after her death.
- D. She enjoyed hearing their news and reflecting with them on political events.

66. F. NO CHANGE  
G. solemn they speak  
H. solemn, speaking  
J. solemn. Speaking

67. A. NO CHANGE  
B. who  
C. who they  
D. of whom

68. F. NO CHANGE  
G. was that Susan  
H. was, that Susan  
J. was that Susan,

69. A. NO CHANGE  
B. her feedback on Emily's  
C. Emily feedback on her  
D. her feedback on her

70. F. NO CHANGE  
G. poems, which varied in form, style, and line length.  
H. poems, most without obvious rhyme.  
J. poems.

71. Given that all the choices are true, which one would most clearly describe an interaction between Susan and Emily during Emily's writing process?

- A. NO CHANGE
- B. liked the poem tremendously.
- C. considered and thought about the poem.
- D. praised the poem but suggested revisions.



a result, Emily wrote two other versions of the second stanza.

72

Dickinson's last twenty years of letters—many over 1,500 words in length—reveals the breadth and depth of

73

one's connection to the world through a wide circle of

74

correspondents. Perhaps, this legacy of letters, explains what she meant when she said that her friends were her “estate.”

75

72. F. NO CHANGE  
 G. rewrote two other alternate  
 H. rewrote two additional alternate  
 J. wrote two alternate revised

73. A. NO CHANGE  
 B. reveal  
 C. will of revealed  
 D. would of revealed

74. F. NO CHANGE  
 G. people's  
 H. her  
 J. their

75. A. NO CHANGE  
 B. Perhaps this, legacy of letters,  
 C. Perhaps this legacy of letters,  
 D. Perhaps this legacy of letters

**END OF TEST 1**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**



## MATHEMATICS TEST

60 Minutes—60 Questions

**DIRECTIONS:** Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

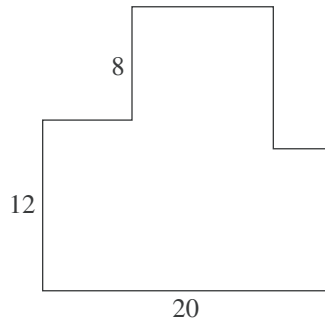
Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

1. Two enterprising college students decide to start a business. They will make up and deliver helium balloon bouquets for special occasions. It will cost them \$39.99 to buy a machine to fill the balloons with helium. They estimate that it will cost them \$2.00 to buy the balloons, helium, and ribbons needed to make each balloon bouquet. Which of the following expressions could be used to model the total cost for producing  $b$  balloon bouquets?
  - A.  $\$ 2.00b + \$39.99$
  - B.  $\$37.99b$
  - C.  $\$39.99b + \$ 2.00$
  - D.  $\$41.99b$
  - E.  $\$79.98b$
2. What is the value of the expression  $(x - y)^2$  when  $x = 5$  and  $y = -1$ ?
  - F. 4
  - G. 6
  - H. 16
  - J. 24
  - K. 36
3. On the first day of school, Mr. Vilani gave his third-grade students 5 new words to spell. On each day of school after that, he gave the students 3 new words to spell. In the first 20 days of school, how many new words had he given the students to spell?
  - A. 28
  - B. 62
  - C. 65
  - D. 68
  - E. 152
4. Which of the following is equivalent to  $(4x^2)^3$ ?
  - F.  $64x^8$
  - G.  $64x^6$
  - H.  $12x^6$
  - J.  $12x^5$
  - K.  $4x^6$
5. Which of the following lists all the positive factors of 8?
  - A. 1, 8
  - B. 2, 4
  - C. 2, 4, 6
  - D. 8, 16, 32
  - E. 1, 2, 4, 8
6. Which of the following is an equivalent simplified expression for  $2(4x + 7) - 3(2x - 4)$ ?
  - F.  $x + 2$
  - G.  $2x + 2$
  - H.  $2x + 26$
  - J.  $3x + 10$
  - K.  $3x + 11$
7. To determine a student's overall test score for the semester, Ms. Lopez throws out the lowest test score and takes the average of the remaining test scores. Victor earned the following test scores in Ms. Lopez's class this semester: 62, 78, 83, 84, and 93. What overall test score did Victor earn in Ms. Lopez's class this semester?
  - A. 67.6
  - B. 80.0
  - C. 83.0
  - D. 83.5
  - E. 84.5
8. Uptown Cable, a cable TV provider, charges each customer \$120 for installation, plus \$25 per month for cable programming. Uptown's competitor, Downtown Cable, charges each customer \$60 for installation, plus \$35 per month for cable programming. A customer who signs up with Uptown will pay the same total amount for cable TV as a customer who signs up with Downtown if each pays for installation and cable programming for how many months?
  - F. 3
  - G. 6
  - H. 10
  - J. 18
  - K. 30



9. In the 8-sided figure below, adjacent sides meet at right angles and the lengths given are in meters. What is the perimeter of the figure, in meters?



- A. 40  
B. 80  
C. 120  
D. 160  
E. 400
10. The sum of the real numbers  $x$  and  $y$  is 11. Their difference is 5. What is the value of  $xy$ ?

- F. 3  
G. 5  
H. 8  
J. 24  
K. 55

11. For all  $x$ ,  $(3x + 7)^2 = ?$

- A.  $6x + 14$   
B.  $6x^2 + 14$   
C.  $9x^2 + 49$   
D.  $9x^2 + 21x + 49$   
E.  $9x^2 + 42x + 49$

12. What is the slope of the line through  $(-5, 2)$  and  $(6, 7)$  in the standard  $(x, y)$  coordinate plane?

- F. 9  
G. 5  
H. -5  
J.  $\frac{5}{11}$   
K.  $-\frac{5}{11}$

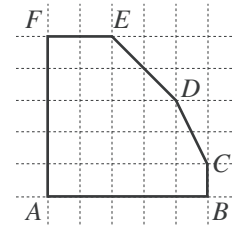
13. When  $\frac{1}{3}k + \frac{1}{4}k = 1$ , what is the value of  $k$ ?

- A.  $\frac{1}{7}$   
B.  $\frac{12}{7}$   
C.  $\frac{7}{2}$   
D. 6  
E. 12

14. What is the length, in feet, of the hypotenuse of a right triangle with legs that are 6 feet long and 7 feet long, respectively?

- F.  $\sqrt{13}$   
G.  $\sqrt{85}$   
H. 13  
J. 21  
K. 42

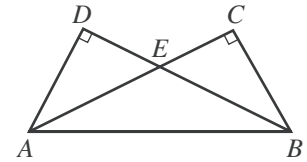
15. Hexagon  $ABCDEF$  shown below was drawn on a grid with unit squares. Each vertex is at the intersection of 2 grid lines. What is the area of the hexagon, in square units?



- A. 18  
B. 19  
C. 20  
D. 22  
E. 25

16. In the figure below,  $\overline{AD}$  is perpendicular to  $\overline{BD}$ ,  $\overline{AC}$  is perpendicular to  $\overline{BC}$ , and  $AD \cong BC$ . Which of the following congruences is NOT necessarily true?

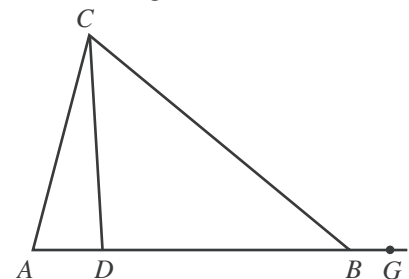
- F.  $\overline{AC} \cong \overline{BD}$   
G.  $\overline{AD} \cong \overline{AE}$   
H.  $\overline{AE} \cong \overline{BE}$   
J.  $\angle DAB \cong \angle CBA$   
K.  $\angle EAB \cong \angle EBA$



17. Leticia went into Discount Music to price CDs. All CDs were discounted 23% off the marked price. Leticia wanted to program her calculator so she could input the marked price and the discounted price would be the output. Which of the following is an expression for the discounted price on a marked price of  $p$  dollars?

- A.  $p - 0.23p$   
B.  $p - 0.23$   
C.  $p - 23p$   
D.  $p - 23$   
E.  $0.23p$

18. In the figure below,  $A, D, B,$  and  $G$  are collinear. If  $\angle CAD$  measures  $76^\circ$ ,  $\angle BCD$  measures  $47^\circ$ , and  $\angle CBG$  measures  $140^\circ$ , what is the degree measure of  $\angle ACD$ ?



- F.  $12^\circ$   
G.  $14^\circ$   
H.  $17^\circ$   
J.  $36^\circ$   
K.  $43^\circ$

GO ON TO THE NEXT PAGE.



19. Ms. Lewis plans to drive 900 miles to her vacation destination, driving an average of 50 miles per hour. How many miles per hour faster must she average, while driving, to reduce her total driving time by 3 hours?

A. 5  
B. 8  
C. 10  
D. 15  
E. 18

20. For all positive integers  $x$ , what is the greatest common factor of the 2 numbers  $216x$  and  $180x$ ?

F. 6  
G. 72  
H.  $x$   
J.  $12x$   
K.  $36x$

21. The table below shows the price of different quantities of standard-sized lemons at Joe's Fruit Stand. What is the least amount of money needed to purchase exactly 20 standard-sized lemons if the bags must be sold intact and there is no tax charged for lemons?

Number of lemons:	1	bag of 6	bag of 12
Total price:	\$0.30	\$1.20	\$2.10

A. \$3.60  
B. \$3.90  
C. \$4.20  
D. \$4.50  
E. \$6.00

22. The diameter,  $d$  centimeters, of the metal poles Goodpole Manufacturing produces must satisfy the inequality  $|d - 3| \leq 0.001$ . What is the maximum diameter, in centimeters, such a metal pole may have?

F. 1.4995  
G. 1.5005  
H. 2.999  
J. 3.000  
K. 3.001

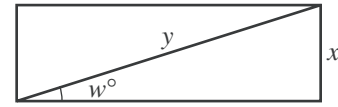
23. Which of the following is a factored form of the expression  $5x^2 - 13x - 6$ ?

A.  $(x - 3)(5x + 2)$   
B.  $(x - 2)(5x - 3)$   
C.  $(x - 2)(5x + 3)$   
D.  $(x + 2)(5x - 3)$   
E.  $(x + 3)(5x - 2)$

24. A bag contains 6 red marbles, 5 yellow marbles, and 7 green marbles. How many additional red marbles must be added to the 18 marbles already in the bag so that the probability of randomly drawing a red marble is  $\frac{3}{5}$ ?

F. 12  
G. 16  
H. 18  
J. 24  
K. 36

25. Which of the following trigonometric equations is valid for the side measurement  $x$  inches, diagonal measurement  $y$  inches, and angle measurement  $w^\circ$  in the rectangle shown below?

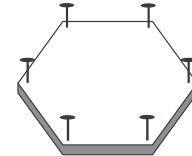


A.  $\cos w^\circ = \frac{x}{y}$   
B.  $\cot w^\circ = \frac{x}{y}$   
C.  $\sec w^\circ = \frac{x}{y}$   
D.  $\sin w^\circ = \frac{x}{y}$   
E.  $\tan w^\circ = \frac{x}{y}$

26. The slope of the line with equation  $y = ax + b$  is greater than the slope of the line with equation  $y = cx + b$ . Which of the following statements *must* be true about the relationship between  $a$  and  $c$ ?

F.  $a \leq c$   
G.  $a < c$   
H.  $a = c$   
J.  $a > c$   
K.  $a \geq c + 1$

27. Minh cuts a board in the shape of a regular hexagon and pounds in a nail at an equal distance from each vertex, as shown in the figure below. How many rubber bands will she need in order to stretch a different rubber band across every possible pair of nails?



A. 15  
B. 14  
C. 12  
D. 9  
E. 6

28. There are 280 runners registered for a race, and the runners are divided into 4 age categories, as shown in the table below.

Age category:	under 16	16–25	26–35	over 35
Number of runners:	40	76	112	52

The prize committee has 60 prizes to award and wants the prizes to be awarded in proportion to the number of runners registered in each category. How many prizes should be designated for the 26–35 age category?

F. 15  
G. 17  
H. 24  
J. 36  
K. 40

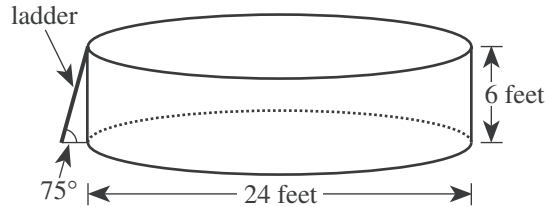
GO ON TO THE NEXT PAGE.





Use the following information to answer questions 29–32.

The youth center has installed a swimming pool on level ground. The pool is a right circular cylinder with a diameter of 24 feet and a height of 6 feet. A diagram of the pool and its entry ladder is shown below.

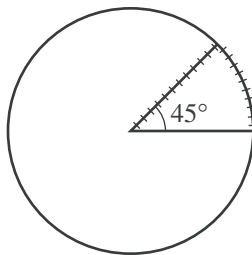


29. To the nearest cubic foot, what is the volume of water that will be in the pool when it is filled with water to a depth of 5 feet?

(Note: The volume of a cylinder is given by  $\pi r^2 h$ , where  $r$  is the radius and  $h$  is the height.)

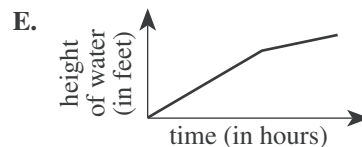
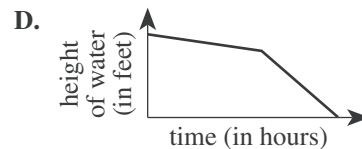
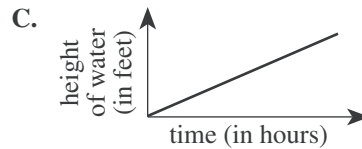
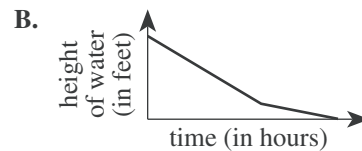
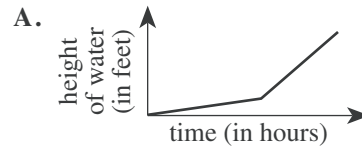
- A. 942  
B. 1,885  
C. 2,262  
D. 9,047  
E. 11,310

30. A plastic cover is made for the pool. The cover will rest on the top of the pool and will include a wedge-shaped flap that forms a  $45^\circ$  angle at the center of the cover, as shown in the figure below. A zipper will go along 1 side of the wedge-shaped flap and around the arc. Which of the following is closest to the length, in feet, of the zipper?



- F. 17  
G. 22  
H. 24  
J. 29  
K. 57

31. Two hoses are used to fill the pool. Twice as many gallons of water per minute flow through one of the hoses as through the other. Both hoses had been on for 12 hours and had filled the pool to the 4-foot mark when the hose with the faster flow stopped working. The hose with the slower flow then finished filling the pool to the 5-foot mark. Which of the following graphs shows the relationship between the time spent filling the pool and the height of the water in the pool?



32. The directions for assembling the pool state that the ladder should be placed at an angle of  $75^\circ$  relative to level ground. Which of the following expressions involving tangent gives the distance, in feet, that the bottom of the ladder should be placed away from the bottom edge of the pool in order to comply with the directions?

F.  $\frac{6}{\tan 75^\circ}$

G.  $\frac{\tan 75^\circ}{6}$

H.  $\frac{1}{6 \tan 75^\circ}$

J.  $6 \tan 75^\circ$

K.  $\tan(6 \cdot 75^\circ)$

GO ON TO THE NEXT PAGE.



33. For a population that grows at a constant rate of  $r\%$  per year, the formula  $P(t) = p_0\left(1 + \frac{r}{100}\right)^t$  models the population  $t$  years after an initial population of  $p_0$  people is counted.

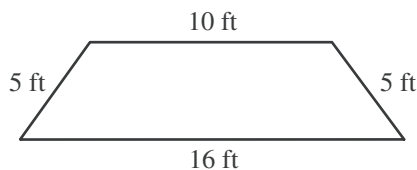
The population of the city of San Jose was 782,000 in 1990. Assume the population grows at a constant rate of 5% per year. According to this formula, which of the following is an expression for the population of San Jose in the year 2000?

- A.  $782,000(6)^{10}$   
 B.  $782,000(1.5)^{10}$   
 C.  $782,000(1.05)^{10}$   
 D.  $(782,000 \times 1.5)^{10}$   
 E.  $(782,000 \times 1.05)^{10}$
34. Tom's long-distance service charges \$0.10 per minute from 7:00 P.M. to 7:00 A.M. on weekdays, all day on Saturdays, and all day on holidays; \$0.05 per minute all day on Sundays; and \$0.25 per minute at all other times. The table below gives his long-distance calls for 1 week, including the date and day of each call, the time it was placed, and the number of minutes it lasted.

Date and day	Time	Number of minutes
11/22 Tuesday	5:00 P.M.	8
11/23 Wednesday	10:30 A.M.	10
11/24 Thursday Thanksgiving holiday	11:30 A.M.	15
11/26 Saturday	9:30 A.M.	17
11/27 Sunday	12:15 P.M.	22

What did Tom's long-distance service charge him for the calls in the table?

- F. \$7.30  
 G. \$7.60  
 H. \$7.95  
 J. \$8.80  
 K. \$9.90
35. The parallel sides of the isosceles trapezoid shown below are 10 feet long and 16 feet long, respectively. What is the distance, in feet, between these 2 sides?



- A. 3  
 B. 4  
 C. 5  
 D. 10  
 E. 16

36. The inequality  $3(x + 2) > 4(x - 3)$  is equivalent to which of the following inequalities?

- F.  $x < -6$   
 G.  $x < 5$   
 H.  $x < 9$   
 J.  $x < 14$   
 K.  $x < 18$

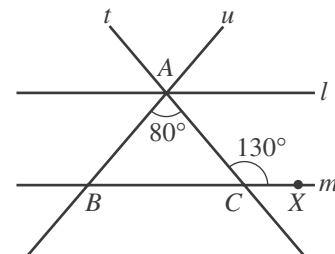
37. In the standard  $(x,y)$  coordinate plane, the midpoint of  $\overline{AB}$  is  $(4,-3)$  and  $A$  is located at  $(1,-5)$ . If  $(x,y)$  are the coordinates of  $B$ , what is the value of  $x + y$ ?

- A. 19  
 B. 8  
 C. 6  
 D.  $-1.5$   
 E.  $-3$

38. For all  $x$  in the domain of the function  $\frac{x+1}{x^3-x}$ , this function is equivalent to:

- F.  $\frac{1}{x^2} - \frac{1}{x^3}$   
 G.  $\frac{1}{x^3} - \frac{1}{x}$   
 H.  $\frac{1}{x^2-1}$   
 J.  $\frac{1}{x^2-x}$   
 K.  $\frac{1}{x^3}$

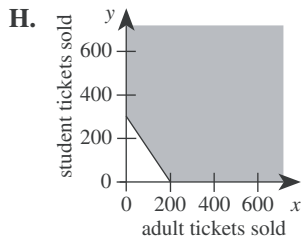
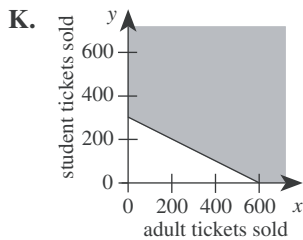
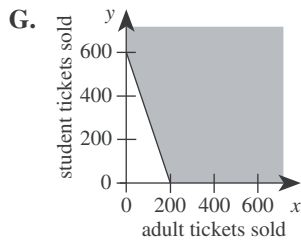
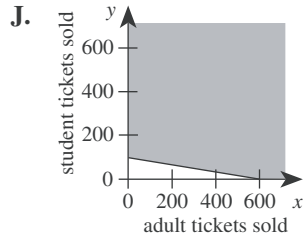
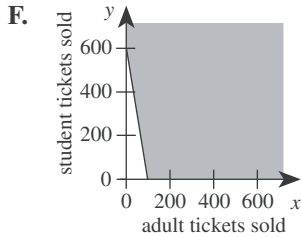
39. In the figure below, line  $l$  is parallel to line  $m$ . Transversals  $t$  and  $u$  intersect at point  $A$  on  $l$  and intersect  $m$  at points  $C$  and  $B$ , respectively. Point  $X$  is on  $m$ , the measure of  $\angle ACX$  is  $130^\circ$ , and the measure of  $\angle BAC$  is  $80^\circ$ . How many of the angles formed by rays of  $l$ ,  $m$ ,  $t$ , and  $u$  have measure  $50^\circ$ ?



- A. 4  
 B. 6  
 C. 8  
 D. 10  
 E. 12



40. Tickets for the Senior Talent Show at George Washington Carver High School are \$3 for adults and \$2 for students. To cover expenses, a total of \$600 must be collected from ticket sales for the show. One of the following graphs in the standard  $(x,y)$  coordinate plane, where  $x$  is the number of adult tickets sold and  $y$  is the number of student tickets sold, represents all the possible combinations of ticket sales that cover at least \$600 in expenses. Which graph is it?



41. What is the median of the following 7 scores?

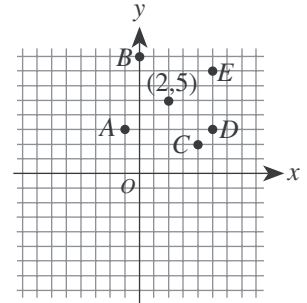
42, 67, 33, 79, 33, 89, 21

- A. 42
- B. 52
- C. 54.5
- D. 56
- E. 79

42. What are the real solutions to the equation  $|x|^2 + 2|x| - 3 = 0$ ?

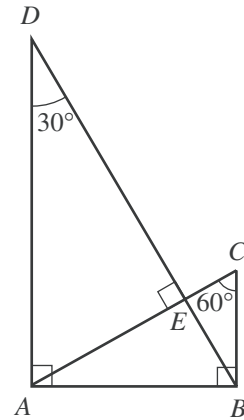
- F.  $\pm 1$
- G.  $\pm 3$
- H. 1 and 3
- J. -1 and -3
- K.  $\pm 1$  and  $\pm 3$

43. The point  $(2,5)$  is shown in the standard  $(x,y)$  coordinate plane below. Which of the following is another point on the line through the point  $(2,5)$  with a slope of  $-\frac{2}{3}$ ?



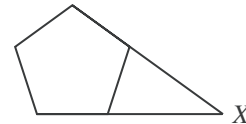
- A.  $A(-1,3)$
- B.  $B(0,8)$
- C.  $C(4,2)$
- D.  $D(5,3)$
- E.  $E(5,7)$

44. For the triangles in the figure below, which of the following ratios of side lengths is equivalent to the ratio of the perimeter of  $\triangle ABC$  to the perimeter of  $\triangle DAB$ ?



- F.  $AB:AD$
- G.  $AB:BD$
- H.  $AD:BD$
- J.  $BC:AD$
- K.  $BC:BD$

45. In the figure below, 2 nonadjacent sides of a regular pentagon (5 congruent sides and 5 congruent interior angles) are extended until they meet at point X. What is the measure of  $\angle X$ ?



- A.  $18^\circ$
- B.  $30^\circ$
- C.  $36^\circ$
- D.  $45^\circ$
- E.  $72^\circ$

46. The edges of a cube are each 3 inches long. What is the surface area, in square inches, of this cube?

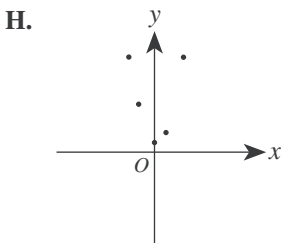
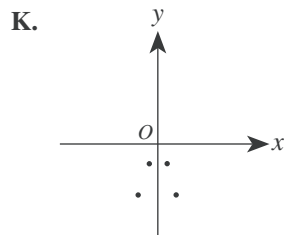
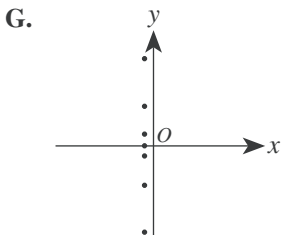
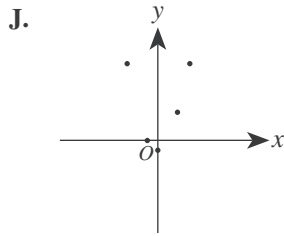
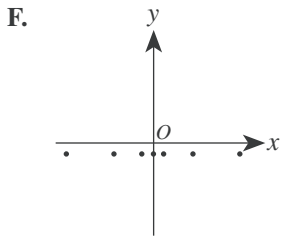
- F. 9
- G. 18
- H. 27
- J. 36
- K. 54



47. A number is increased by 25% and the resulting number is then decreased by 20%. The final number is what percent of the original number?
- A. 90%  
B. 95%  
C. 100%  
D. 105%  
E. 120%
48. Two numbers are *reciprocals* if their product is equal to 1. If  $x$  and  $y$  are reciprocals and  $x > 1$ , then  $y$  must be:
- F. less than  $-1$ .  
G. between 0 and  $-1$ .  
H. equal to 0.  
J. between 0 and 1.  
K. greater than 1.
49. The number line graph below is the graph of which of the following inequalities?



- A.  $-1 \leq x$  and  $3 \leq x$   
B.  $-1 \leq x$  and  $3 \geq x$   
C.  $-1 \leq x$  or  $3 \leq x$   
D.  $-1 \geq x$  or  $3 \leq x$   
E.  $-1 \geq x$  or  $3 \geq x$
50. All of the following graphs have equal scales on the axes. One of the graphs shows only points for which the  $y$ -coordinate is 1 less than the square of the  $x$ -coordinate. Which one?



51. In teaching a lesson on the concept of thirds, Ms. Chu uses a divide-and-set-aside procedure. She starts with a certain number of colored disks, divides them into 3 equal groups, and sets 1 group aside to illustrate  $\frac{1}{3}$ . She repeats the procedure by taking the disks she had NOT set aside, dividing them into 3 equal groups, and setting 1 of these groups aside. If Ms. Chu wants to be able to complete the divide-and-set-aside procedure at least 4 times (without breaking any of the disks into pieces), which of the following is the minimum number of colored disks she can start with?

- A. 12  
B. 15  
C. 27  
D. 54  
E. 81

52. Which of the following is true for all consecutive integers  $m$  and  $n$  such that  $m < n$ ?
- F.  $m$  is odd  
G.  $n$  is odd  
H.  $n - m$  is even  
J.  $n^2 - m^2$  is odd  
K.  $m^2 + n^2$  is even

53. A function  $P$  is defined as follows:

$$\begin{aligned} \text{for } x > 0, P(x) &= x^5 + x^4 - 36x - 36 \\ \text{for } x < 0, P(x) &= -x^5 + x^4 + 36x - 36 \end{aligned}$$

What is the value of  $P(-1)$ ?

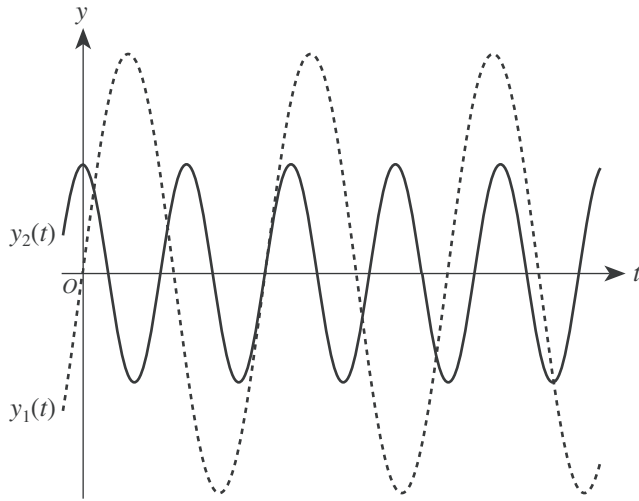
- A.  $-70$   
B.  $-36$   
C.  $0$   
D.  $36$   
E.  $70$

54. For a project in Home Economics class, Kirk is making a tablecloth for a circular table 3 feet in diameter. The finished tablecloth needs to hang down 5 inches over the edge of the table all the way around. To finish the edge of the tablecloth, Kirk will fold under and sew down 1 inch of the material all around the edge. Kirk is going to use a single piece of rectangular fabric that is 60 inches wide. What is the shortest length of fabric, in inches, Kirk could use to make the tablecloth without putting any separate pieces of fabric together?

- F. 15  
G. 24  
H. 30  
J. 42  
K. 48



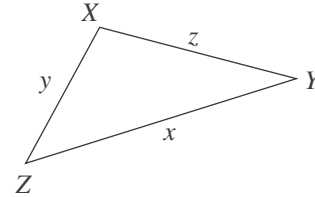
55. The equations of the 2 graphs shown below are  $y_1(t) = a_1 \sin(b_1t)$  and  $y_2(t) = a_2 \cos(b_2t)$ , where the constants  $b_1$  and  $b_2$  are both positive real numbers.



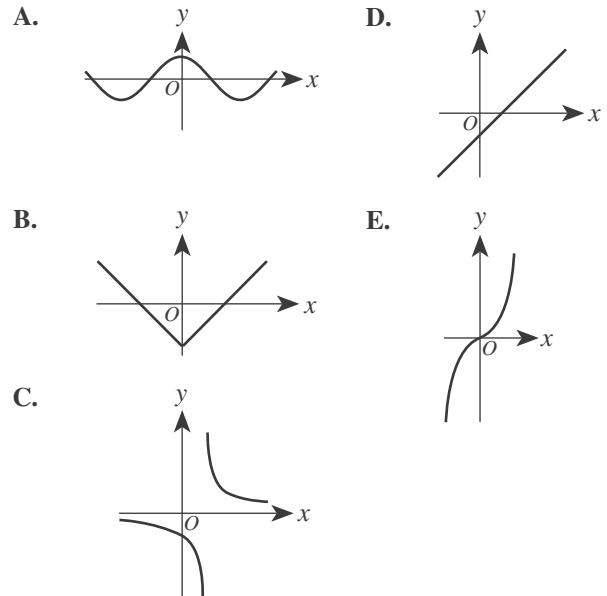
Which of the following statements is true of the constants  $a_1$  and  $a_2$ ?

- A.  $0 < a_1 < a_2$   
 B.  $0 < a_2 < a_1$   
 C.  $a_1 < 0 < a_2$   
 D.  $a_1 < a_2 < 0$   
 E.  $a_2 < a_1 < 0$
56. For  $x$  such that  $0 < x < \frac{\pi}{2}$ , the expression  $\frac{\sqrt{1 - \cos^2 x}}{\sin x} + \frac{\sqrt{1 - \sin^2 x}}{\cos x}$  is equivalent to:
- F. 0  
 G. 1  
 H. 2  
 J.  $-\tan x$   
 K.  $\sin 2x$
57. Consider the functions  $f(x) = \sqrt{x}$  and  $g(x) = 7x + b$ . In the standard  $(x,y)$  coordinate plane,  $y = f(g(x))$  passes through  $(4,6)$ . What is the value of  $b$ ?
- A. 8  
 B. -8  
 C. -25  
 D. -26  
 E.  $4 - 7\sqrt{6}$

58. The triangle,  $\triangle XYZ$ , that is shown below has side lengths of  $x$ ,  $y$ , and  $z$  inches and is not a right triangle. Let  $X'$  be the image of  $X$  when the triangle is reflected across  $\overline{YZ}$ . Which of the following is an expression for the perimeter, in inches, of quadrilateral  $X'YXZ$ ?



- F.  $2(y + z) + x$   
 G.  $2(x + y + z)$   
 H.  $2(x + y)$   
 J.  $2(x + z)$   
 K.  $2(y + z)$
59. A function  $f$  is an *odd* function if and only if  $f(-x) = -f(x)$  for every value of  $x$  in the domain of  $f$ . One of the functions graphed in the standard  $(x,y)$  coordinate plane below is an odd function. Which one?



60. What is the real value of  $x$  in the equation  $\log_2 24 - \log_2 3 = \log_5 x$ ?
- F. 3  
 G. 21  
 H. 72  
 J. 125  
 K. 243

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

## READING TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are four passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

## Passage I

**PROSE FICTION:** This passage is adapted from the short story “American History” by Judith Ortiz-Cofer (©1992 by Judith Ortiz-Cofer). The story appeared in the anthology *Iguana Dreams: New Latino Fiction*.

There was only one source of beauty and light for me my ninth grade year. The only thing I had anticipated at the start of the semester. That was seeing Eugene. In August, Eugene and his family had moved  
5 into the only house on the block that had a yard and trees. I could see his place from my bedroom window in El Building. In fact, if I sat on the fire escape I was literally suspended above Eugene’s backyard. It was my favorite spot to read my library books in the summer.  
10 Until that August the house had been occupied by an old couple. Over the years I had become part of their family, without their knowing it, of course. I had a view of their kitchen and their backyard, and though I could not hear what they said, I knew when they were arguing,  
15 when one of them was sick, and many other things. I knew all this by watching them at mealtimes. I could see their kitchen table, the sink, and the stove. During good times, he sat at the table and read his newspapers while she fixed the meals. If they argued, he would leave and  
20 the old woman would sit and stare at nothing for a long time. When one of them was sick, the other would come and get things from the kitchen and carry them out on a tray. The old man had died in June. The house had stood empty for weeks. I had had to resist the temptation to  
25 climb down into the yard and water the flowers the old lady had taken such good care of.

By the time Eugene’s family moved in, the yard was a tangled mass of weeds. The father had spent several days mowing, and when he finished, from where I sat, I didn’t see the red, yellow, and purple clusters that meant flowers to me. I didn’t see this family sit down at the kitchen table together. It was just the mother, a red-headed tall woman who wore a white uniform; the father was gone before I got up in the morning and was  
35 never there at dinner time. I only saw him on weekends when they sometimes sat on lawn-chairs under the oak tree, each hidden behind a section of the newspaper; and there was Eugene. He was tall and blond, and he wore glasses. I liked him right away because he sat at  
40 the kitchen table and read books for hours. That summer, before we had even spoken one word to each other, I kept him company on my fire escape.

Once school started I looked for him in all my classes, but P. S. 13 was a huge place and it took me  
45 days and many discreet questions to discover Eugene. After much maneuvering I managed “to run into him” in the hallway where his locker was—on the other side of the building from mine—and in study hall at the library where he first seemed to notice me, but did not  
50 speak; and finally, on the way home after school one day when I decided to approach him directly, though my stomach was doing somersaults.

I was ready for rejection, snobbery, the worst. But when I came up to him and blurted out: “You’re  
55 Eugene. Right?” he smiled, pushed his glasses up on his nose, and nodded. I saw then that he was blushing deeply. Eugene liked me, but he was shy. I did most of the talking that day. He nodded and smiled a lot. In the weeks that followed, we walked home together. He  
60 would linger at the corner of El Building for a few minutes then walk down to his house.

I did not tell Eugene that I could see inside his kitchen from my bedroom. I felt dishonest, but I liked my secret sharing of his evenings, especially now that I  
65 knew what he was reading since we chose our books together at the school library.

I also knew my mother was unhappy in Paterson, New Jersey, but my father had a good job at the blue-jeans factory in Passaic and soon, he kept assuring us,  
70 we would be moving to our own house there. I had learned to listen to my parents’ dreams, which were spoken in Spanish, as fairy tales, like the stories about life in Puerto Rico before I was born. I had been to the island once as a little girl. We had not been back there  
75 since then, though my parents talked constantly about buying a house on the beach someday, retiring on the island—that was a common topic among the residents of El Building. As for me, I was going to go to college and become a teacher.

But after meeting Eugene I began to think of the present more than of the future. What I wanted now was to enter that house I had watched for so many years. I wanted to see the other rooms where the old people had lived, and where the boy spent his time. Most of all, I  
85 wanted to sit at the kitchen table with Eugene like two adults, like the old man and his wife had done, maybe drink some coffee and talk about books.

GO ON TO THE NEXT PAGE.

1. The main theme of this passage concerns the:
  - A. difficulty of first starting and then maintaining a friendship.
  - B. process of making a new friend and how the friendship changes the narrator.
  - C. problems the narrator has dealing with the loss of her former neighbors.
  - D. differences in the lives led by two pairs of adults who at different times lived in the same house.
2. Which of the following questions is NOT answered by information in the passage?
  - F. Has the narrator ever walked around inside Eugene's house?
  - G. What hobby or interest do Eugene and the narrator share?
  - H. What makes Eugene's house different from other houses on the block?
  - J. What careers other than teaching has the narrator considered pursuing?
3. The narrator draws which of the following comparisons between the old couple and Eugene's parents?
  - A. The old couple were more socially outgoing and had many more friends than Eugene's parents.
  - B. Eugene's parents are just as interested in tending the lawn and flowers as the old couple were.
  - C. Eugene's parents are less nurturing of each other and spend less time together than the old couple did.
  - D. Just like the old man and old woman, both of Eugene's parents appear to have jobs outside the home.
4. In terms of developing the narrative, the last two paragraphs (lines 67–87) primarily serve to:
  - F. provide background details about the narrator and her family in order to highlight the narrator's unique and shifting perspective.
  - G. describe the narrator's family in order to establish a contrast between her parents and Eugene's parents.
  - H. portray the narrator's family in order to show how her friendship with Eugene affected the various members of her family.
  - J. depict the hopes and dreams of the narrator's parents in order to show how her parents' aspirations changed over time.
5. It can most reasonably be inferred from the passage that when the narrator says, "I didn't see the red, yellow, and purple clusters that meant flowers to me" (lines 30–31), she is most nearly indicating that:
  - A. from her current position, she couldn't see the old woman's flowers, which were still growing near the house.
  - B. the flowers grown by the old woman had died because the narrator had stopped watering them.
  - C. the flowers grown by the old woman had been cut down when Eugene's father mowed the lawn.
  - D. the weeds that had grown up in the old couple's lawn had intertwined with the flowers, making the flowers hard to see.
6. According to the narrator, which of the following statements was true about Eugene at the moment when she first talked to him?
  - F. Due to the size of the school, he had not even noticed the narrator until she started talking to him.
  - G. He had searched unsuccessfully for the narrator's locker several different times and had been too shy to ask someone where it was.
  - H. He had first noticed the narrator in study hall but had been uninterested in her until she introduced herself.
  - J. He had apparently taken notice of the narrator at school and had come to like her but felt nervous about introducing himself.
7. When the narrator says, "I began to think of the present more than of the future" (lines 80–81), she most likely means that meeting Eugene led her to:
  - A. shift some of her attention away from her career plans and onto the developing friendship.
  - B. think more about her own work interests than about the career her parents thought she should pursue.
  - C. put off her plans of returning to Puerto Rico for a visit in favor of continuing to prepare for college.
  - D. want to spend more time with him instead of helping her parents plan a vacation to Puerto Rico.
8. The narrator most nearly portrays her parents' dreams as:
  - F. close to being realized because of her father's good job.
  - G. somewhat uncommon among the other residents of the family's building.
  - H. ones she has heard about many times but that seem far off and remote to her.
  - J. ones she shares with her parents and longs to fulfill.
9. The narrator claims that she felt close to the old couple because she had:
  - A. listened in on so many of their conversations over the years.
  - B. helped take care of the old woman's flowers after the woman's husband had died.
  - C. been able to watch them as they moved through their entire house.
  - D. regularly observed them during their mealtimes.
10. Which of the following best describes the narrator's feelings about secretly observing Eugene at his home?
  - F. Joy tinged with suspicion
  - G. Enjoyment mixed with guilt
  - H. Happiness overwhelmed by a sense of betrayal
  - J. Pleasure lessened by having actually met him

## Passage II

**SOCIAL SCIENCE:** This passage is adapted from volume 2 of Blanche Wiesen Cook's biography *Eleanor Roosevelt* (©1999 by Blanche Wiesen Cook).

Eleanor Roosevelt [ER] is the most controversial First Lady in United States history. Her journey to greatness, her voyage out beyond the confines of good wife and devoted mother, involved determination and  
5 amazing courage. It also involved one of history's most unique partnerships. Franklin Delano Roosevelt [FDR] admired his wife, appreciated her strengths, and depended on her integrity.

However, ER and FDR had different priorities, occasionally competing goals, and often disagreed. In the White House they ran two distinct and separate courts.

By 1933 [her first year as First Lady], ER was an accomplished woman who had achieved several of her  
15 life's goals. With her partners, ER was a businesswoman who co-owned the Val-Kill crafts factory, a political leader who edited and copublished the *Women's Democratic News*, and an educator who co-owned and taught at a New York school for girls.

As First Lady, Eleanor Roosevelt did things that had never been done before. She upset race traditions, championed a New Deal for women, and on certain issues actually ran a parallel administration. On housing and the creation of model communities, for  
25 example, ER made decisions and engineered policy.

At the center of a network of influential women who ran the Women's Committee of the Democratic Party led by Molly Dewson, ER worked closely with the women who had dominated the nation's social reform struggles for decades. With FDR's election, the goals of the great progressive pioneers, Jane Addams, Florence Kelley, and Lillian Wald, were at last at the forefront of the country's agenda. ER's mentors since 1903, they had battled on the margins of national politics since the 1880s for public health, universal education, community centers, sanitation programs, and government responsibility for the welfare of the nation's poor and neglected people.

Now their views were brought directly into the  
40 White House. ER lobbied for them personally with her new administrative allies, in countless auditoriums, as a radio broadcaster, and in monthly, weekly, and, by 1936, daily columns. Called "Eleanor Everywhere," she was interested in everyone.

Every life was sacred and worthy, to be improved by education, employment, health care, and affordable housing. Her goal was simple, a life of dignity and decency for all. She was uninterested in complex theories, and demanded action for betterment. She feared  
50 violent revolution, but was not afraid of socialism—and she courted radicals.

As fascism and communism triumphed in Europe and Asia, ER and FDR were certain that there was a middle way, what ER called an American "revolution without bloodshed." Her abiding conviction, however,  
55 was that nothing good would happen to promote the people's interest unless the people themselves organized to demand government responses. A people's movement required active citizen participation, and  
60 ER's self-appointed task was to agitate and inspire community action, encourage united democratic movements for change.

Between 1933 and 1938, while the Depression raged and the New Deal unfolded, ER worked with the  
65 popular front. She called for alliances of activists to fight poverty and racism at home, and to oppose isolationism internationally.

Active with the women's peace movement, ER spoke regularly at meetings of the Women's International League for Peace and Freedom, and the Conference on the Cause and Cure of War. She departed, however, from pacifist and isolationist positions and encouraged military preparedness, collective security, and ever-widening alliances.

Between 1933 and 1938 ER published countless articles and six books. She wrote in part for herself, to clear her mind and focus her thoughts. But she also wrote to disagree with her husband. From that time to this, no other First Lady has actually rushed for her pen to jab her husband's public decisions. But ER did so routinely, including in her 1938 essay *This Troubled World*, which was a point-by-point rejection of FDR's major international decisions.

To contemplate ER's life of example and responsibility is to forestall gloom. She understood, above all, that politics is not an isolated individualist adventure. She sought alliances, created community, worked with movements for justice and peace. Against great odds, and under terrific pressure, she refused to withdraw  
90 from controversy. She brought her network of agitators and activists into the White House, and never considered a political setback a permanent defeat. She enjoyed the game, and weathered the abuse.

11. As she is revealed in the passage, ER is best described as:
- A. socially controversial but quietly cooperative.
  - B. politically courageous and socially concerned.
  - C. morally strong and deeply traditional.
  - D. personally driven but calmly moderate.



12. The author presents ER's accomplishments as exceptional because ER:
- F. brought politically unpopular views to the forefront of the nation's politics.
  - G. was the first public figure to introduce political roles for women.
  - H. was a political pioneer struggling alone for social reform.
  - J. replaced community action with more powerful White House networks.
13. According to the passage, ER believed that social reform should include all of the following EXCEPT:
- A. promoting community action.
  - B. developing universal education.
  - C. supporting affordable housing.
  - D. establishing involved theories.
14. Based on the passage, ER's approach to social reform can best be characterized as:
- F. passionate and theoretical.
  - G. patient and flexible.
  - H. simplistic and isolationist.
  - J. progressive and determined.
15. It can reasonably be inferred from the passage that at the time ER began working for social reform, the United States was:
- A. deeply committed to reforms in education and health care.
  - B. experiencing a time of national prosperity that contributed to ER's ideals concerning the public welfare.
  - C. concentrating on affairs at home due to isolationist policies and the spread of democracy overseas.
  - D. unsupportive of the idea that the government was responsible for the welfare of its poor and neglected.
16. According to the last paragraph, which of the following statements would the author most likely make with regard to ER's vision and ideals?
- F. ER considered politics a game and played only when she knew she could win.
  - G. ER worked with agitators and remained dedicated to the pursuit of justice and peace in victory and defeat.
  - H. ER placed herself in the position of president, making decisions that determined White House policy.
  - J. ER saw herself as the country's role model and personally responsible for bringing about change.
17. In terms of the passage as a whole, one of the main functions of the third paragraph (lines 13–19) is to suggest that:
- A. ER's successes in various professional pursuits helped prepare her to take action in the political world.
  - B. ER had avoided the political spotlight in her personal pursuits.
  - C. ER had competing and conflicting interests during her first year as first lady.
  - D. while ER had many personal accomplishments, little could have prepared her for life as the first lady.
18. According to the passage, the primary principle underlying ER's goals was that:
- F. every person deserved a dignified and decent life.
  - G. as first lady, she could talk about things that had never been discussed before.
  - H. through radio and columns, she could show she was interested in every person.
  - J. she must lead a bloodless American revolution.
19. The passage states that ER believed the relationship between a people and their government should be:
- A. begun and carried out as if it were an isolated, individualist adventure.
  - B. formed and modeled by the White House.
  - C. based on organized, widespread citizen participation.
  - D. controlled through radio broadcasts and formal channels.
20. In the context of the passage, the author's statement that ER "enjoyed the game, and weathered the abuse" (line 93) most nearly means that ER:
- F. enjoyed her individualist adventure in politics even if criticized.
  - G. preferred to be a team player rather than take the lead.
  - H. embraced the political life and accepted criticism as part of her work.
  - J. understood political games and so did not take politics or criticism very seriously.

## Passage III

**HUMANITIES:** This passage is adapted from the essay “The Interior Life” by Annie Dillard, which appeared in her book *An American Childhood* (©1987 by Annie Dillard).

The interior life is often stupid. Its egoism blinds it and deafens it; its imagination spins out ignorant tales, fascinated. It fancies that the western wind blows on the Self, and leaves fall at the feet of the Self for a reason, and people are watching. A mind risks real ignorance for the sometimes paltry prize of an imagination enriched. The trick of reason is to get the imagination to seize the actual world—if only from time to time.

When I was five, I would not go to bed willingly because something came into my room. My sister Amy, two years old, was asleep in the other bed. What did she know? She was innocent of evil. There was no messiness in her, no roughness for things to cling to, only a charming and charmed innocence that seemed then to protect her, an innocence I needed but couldn't muster. Since Amy was asleep, furthermore, and since when I needed someone most I was afraid to stir enough to wake her, she was useless.

I lay alone and was almost asleep when the thing entered the room by flattening itself against the open door and sliding in. It was a transparent, luminous oblong. I could see the door whiten at its touch; I could see the blue wall turn pale where it raced over it, and see the maple headboard of Amy's bed glow. It was a swift spirit; it was an awareness. It made noise. It had two joined parts, a head and a tail. It found the door, wall, and headboard; and it swiped them, charging them with its luminous glance. After its fleet, searching passage, things looked the same, but weren't.

I dared not blink or breathe. If it found another awareness, it would destroy it.

Every night before it got to me it gave up. It hit my wall's corner and couldn't get past. It shrank completely into itself and vanished. I heard the rising roar it made when it died or left. I still couldn't breathe. I knew that it could return again alive that same night.

Sometimes it came back, sometimes it didn't. Most often, restless, it came back. The light stripe slipped in the door, ran searching over Amy's wall, stopped, stretched lunatic at the first corner, raced wailing toward my wall, and vanished into the second corner with a cry. So I wouldn't go to bed.

It was a passing car whose windshield reflected the corner streetlight outside. I figured it out one night.

Figuring it out was as memorable as the oblong itself. Figuring it out was a long and forced ascent to the very rim of being, to the membrane of skin that both separates and connects the inner life and the outer world. I climbed deliberately from the depths like a diver who releases the monster in his arms and hauls

himself hand over hand up an anchor chain till he meets the ocean's sparkling membrane and bursts through it; he sights the sunlit, becalmed hull of his boat, which had bulked so ominously from below.

I recognized the noise it made when it left. That is, the noise it made called to mind, at last, my daytime sensations when a car passed—the sight and noise together. A car came roaring down hushed Edgerton Avenue in front of our house, stopped, and passed on shrieking as its engine shifted up the gears. What, precisely, came into the bedroom? A reflection from the car's oblong windshield. Why did it travel in two parts? The window sash split the light and cast a shadow.

Night after night I labored up the same long chain of reasoning, as night after night the thing burst into the room where I lay awake.

There was a world outside my window and contiguous to it. Why did I have to keep learning this same thing over and over? For I had learned it a summer ago, when men with jackhammers broke up Edgerton Avenue. I had watched them from the yard. When I lay to nap, I listened. One restless afternoon I connected the new noise in my bedroom with the jackhammer men I had been seeing outside. I understood abruptly that these worlds met, the outside and the inside. “Outside,” then, was conceivably just beyond my windows.

The world did not have me in mind. It was a coincidental collection of things and people, of items, and I myself was one such item—a child walking up the sidewalk, whom anyone could see or ignore. The things in the world did not necessarily cause my overwhelming feelings; the feelings were inside me, beneath my skin, behind my ribs, within my skull. They were even, to some extent, under my control.

I could be connected to the outer world by reason, if I chose, or I could yield to what amounted to a narrative fiction, to a show in light projected on the room's blue walls.

21. Which of the following statements best describes the structure of this passage?

- A. It begins and ends with a series of assertions that surround a story used by the narrator to support and elaborate on those assertions.
- B. It contains a highly detailed anecdote that the narrator uses to show how the claims she makes in the first paragraph are wrong.
- C. It compares and contrasts the narrator's perspective on an incident in her life with the perspectives of several other people, such as her parents.
- D. It consists mainly of a story about a recent event in the narrator's life that she feels taught her an interesting but ultimately insignificant lesson.

22. In terms of mood, which of the following best describes lines 9–44?
- F. A steadily increasing feeling of tension
  - G. A consistently high level of tension
  - H. A growing feeling of tension that is finally broken
  - J. A feeling of tension frequently undermined by the narrator’s use of irony and humor
23. The narrator develops the third paragraph (lines 19–29) mainly through:
- A. detached philosophical musings on the nature of the object she sees.
  - B. a detailed description of what she did to try to keep the object out of her room.
  - C. sensory details vividly depicting the object and its movements.
  - D. imaginative speculation on what might be causing the object to appear.
24. The narrator indicates that one reason she did not wake her sister Amy when “something” came into their room was because:
- F. Amy had previously asked the narrator to stop waking her up during the night.
  - G. the narrator knew she could muster her own charmed innocence.
  - H. Amy had already figured out what the thing was before going to sleep.
  - J. the narrator was afraid of alerting the thing to her own presence.
25. It can reasonably be inferred from the passage that the narrator regards her initial discovery of the truth about the object entering her bedroom as:
- A. deflating, because the object turned out to be so ordinary.
  - B. disappointing, because she felt she should have solved the mystery many years ago.
  - C. satisfying, because she could at last ignore the object and go to sleep.
  - D. significant, because solving the mystery led to important insights.
26. It can most reasonably be inferred that for the narrator, the image of the diver bursting through “the ocean’s sparkling membrane” (line 52) symbolizes her:
- F. fear of monsters and of the object in her bedroom.
  - G. crossing of the boundary separating her inner and outer lives.
  - H. struggle to maintain the separation between her inner and outer worlds.
  - J. bitterness at entering reality and leaving behind her comforting memories.
27. As it is used in line 87, the phrase “a show in light” most nearly refers to:
- A. a fictional story the narrator has read.
  - B. a movie the narrator saw at a theater.
  - C. the work of reason in linking a person to the outer world.
  - D. a fantasy created by the mind.
28. The narrator uses the images in lines 3–5 primarily to depict the interior life’s tendency to engage in:
- F. deceptive self-absorption.
  - G. vital self-examination.
  - H. useful analysis of nature.
  - J. fierce debates with itself.
29. Which of the following statements best paraphrases lines 5–8?
- A. The imagination lacks value and should be ignored in favor of paying attention to the actual world.
  - B. Reason can enhance the imagination but at the expense of experience in the actual world.
  - C. Rather than become isolated, the imagination should connect to the actual world at least occasionally.
  - D. Reason, not the imagination, is the best way to appreciate and enrich the actual world.
30. By her statements in lines 77–80, the narrator is most nearly asserting that:
- F. in her world, adults are generally considered more important than children.
  - G. she, like everyone and everything else, was a small part of a larger world.
  - H. it still mattered greatly whether people saw or ignored her.
  - J. she was less valuable than other people in her world.

## Passage IV

**NATURAL SCIENCE:** This passage is adapted from “Publish and Punish: Science’s Snowball Effect” by Jon Van (©1997 by The Chicago Tribune Company).

It’s a scientific finding so fundamental that it certainly will make the history books and maybe snag a Nobel Prize if it pans out, but the notion that cosmic snowballs are constantly pelting Earth is something  
5 Louis Frank just as soon would have ducked.

Frank is the University of Iowa physicist whose research led him to declare more than a decade ago that Earth is being bombarded by hundreds of house-sized comets day after day that rain water on our planet and  
10 are the reason we have oceans. That weather report caused the widely respected scientist to acquire a certain reputation among his colleagues as a bit unstable, an otherwise estimable fellow whose hard work may have pushed him over the edge.

Frank and his associate, John Sigwarth, probably went a way toward salvaging their reputations when they presented new evidence that leaves little doubt Earth is indeed being bombarded by *something* in a manner consistent with Frank’s small-comet theory.  
20 Rather than gloating or anticipating glory, Frank seemed relieved that part of a long ordeal was ending. “I knew we’d be in for it when we first put forth the small-comet theory,” Frank conceded, “but I was naive about just how bad it would be. We were outvoted by  
25 about 10,000 to 1 by our colleagues. I thought it would have been more like 1,000 to 1.”

To the non-scientist this may seem a bit strange. After all, the point of science is to discover information and insights about how nature works. Shouldn’t every  
30 scientist be eager to overturn existing ideas and replace them with his or her own? In theory, that is the case, but in practice, scientists are almost as loath to embrace radically new ideas as the rest of us.

“Being a scientist puts you into a constant schizophrenic existence,” contends Richard Zare, chairman of the National Science Board. “You have to believe and yet question beliefs at the same time. If you are a complete cynic and believe nothing, you do nothing and get  
40 nowhere, but if you believe too much, you fool yourself.”

It was in the early 1980s when the small-comet theory started to haunt Frank and Sigwarth, who was Frank’s graduate student studying charged particles called plasmas, which erupt from the sun and cause the  
45 aurora borealis (northern lights). As they analyzed photos of the electrical phenomena that accompany sunspots, they noted dark specks appearing in several images from NASA’s Dynamics Explorer 1 satellite. They assumed these were caused by static in the transmission.  
50

After a while their curiosity about the dark spots grew into a preoccupation, then bordered on obsession.

Try as they did, the scientists couldn’t find any plausible explanation of the pattern of dark spots that  
55 appeared on their images. The notion that the equipment was picking up small amounts of water entering Earth’s upper atmosphere kept presenting itself as the most likely answer.

Based on their images, the Iowa scientists estimated 20 comets an hour—each about 30 feet or so  
60 across and carrying 100 tons of water—were bombarding the Earth. At that rate, they would produce water vapor that would add about an inch of water to the planet every 10,000 years, Frank concluded. That may  
65 not seem like much, but when talking about a planet billions of years old, it adds up.

Such intimate interaction between Earth and space suggests a fundamentally different picture of human evolution—which depends on water—than is commonly presented by scientists. Frank had great difficulty getting his ideas into a physics journal 11 years ago and was almost hooted from the room when he presented his theory at scientific meetings. Despite the derision, colleagues continued to respect Frank’s main-  
70 stream work on electrically charged particles in space and the imaging cameras he designed that were taken aboard recent NASA spacecraft to explore Earth’s polar regions.

Unbeknown to most, in addition to gathering information on the northern lights, Frank and Sigwarth designed the equipment to be able to snatch better views of any small comets the spacecraft might happen upon. It was those images from the latest flights that caused even harsh critics of the small-comet theory to  
80 concede that some water-bearing objects appear to be entering Earth’s atmosphere with regularity.

To be sure, it has not been proved that they are comets, let alone that they have anything to do with the oceans. But Frank’s evidence opens the matter up to  
90 study. Had he been a researcher of lesser standing, his theory probably would have died long ago.

31. Which of the following conclusions about new theories in science can reasonably be drawn from the passage?
- A. Important new theories will eventually be accepted, no matter how controversial they are or who proposes them.
  - B. Important but unusual new theories have a better chance at acceptance when they are proposed by well-respected scientists.
  - C. Research on new, nontraditional theories is widely respected within the scientific community.
  - D. Scientists welcome the opportunity to overturn existing ideas in favor of useful new theories.

32. Which of the following best describes how Frank's colleagues perceived him after he first presented the small-comet theory?
- F. Their doubts about the theory led them to also question his work on particles in space.
  - G. They felt his theory had ruined his reputation as a widely respected scientist.
  - H. He acquired a reputation among them as someone who had worked hard to develop his theory.
  - J. They still respected his traditional research but felt he was overly committed to an improbable theory.
33. The passage indicates that at the time Frank and Sigwarth presented new evidence supporting the small-comet theory, Frank most nearly felt:
- A. relieved but bitter about how he had been treated.
  - B. grateful that ridicule of his work would end.
  - C. proud that he had been proved right.
  - D. satisfied and filled with anticipation of glory.
34. The author uses the fourth paragraph (lines 27–33) primarily to:
- F. continue his earlier criticisms of scientists.
  - G. reveal the role science serves in society.
  - H. present then undermine common perceptions of scientists.
  - J. explain the difference between theoretical and practical scientific research.
35. According to the passage, the research that led to the development of the small-comet theory began with a project originally intended to study:
- A. the electrical activity accompanying sunspots.
  - B. water entering Earth's upper atmosphere.
  - C. static in satellite transmissions.
  - D. specks in satellite images.
36. The main function of lines 64–66 in terms of the eighth paragraph (lines 59–66) as a whole is to:
- F. give a sense of proportion to the numbers provided earlier in the paragraph.
  - G. point out the limitations of the evidence provided by the Iowa scientists.
  - H. supplement the paragraph's description of the comets with additional details about their size and capacity.
  - J. provide readers with a sense of how old the planet really is.
37. It can reasonably be inferred from the passage that within the scientific community the year the passage was published, the small-comet theory was:
- A. tremendously unpopular and condemned for its incompleteness.
  - B. widely accepted and seen as conclusive.
  - C. regarded as tentative but deemed worthy of consideration.
  - D. seen as correct by most scientists but was highly criticized by some.
38. The author italicizes the word *something* in line 18 most likely to emphasize the:
- F. great skepticism with which critics regard Frank and Sigwarth's new evidence.
  - G. remaining uncertainty about what exactly is bombarding Earth.
  - H. lack of doubt among scientists about the small-comet theory's practical value.
  - J. concern among scientists about the usefulness of Frank and Sigwarth's methods of collecting evidence.
39. When Richard Zare says that scientists lead a "constant schizophrenic existence" (lines 34–35), he most nearly means that they:
- A. often suffer psychologically from the demands of their work.
  - B. tend to be either complete cynics or people who believe too much.
  - C. are often guilty of either doing nothing or of fooling themselves.
  - D. have to maintain a balance between accepting and challenging ideas.
40. It can reasonably be inferred that Frank and Sigwarth conducted the study of the dark specks they found with a:
- F. detached, scientific mindset.
  - G. casual interest that developed into a mild curiosity.
  - H. steadily increasing level of involvement.
  - J. great intensity that began when they discovered the specks.

**END OF TEST 3**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.  
DO NOT RETURN TO A PREVIOUS TEST.**



## SCIENCE TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are seven passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

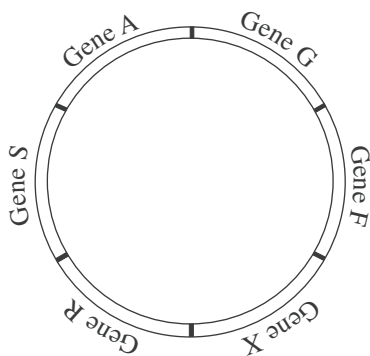
You are NOT permitted to use a calculator on this test.

## Passage I

Many bacteria contain *plasmids* (small, circular DNA molecules). Plasmids can be transferred from 1 bacterium to another. For this to occur, the plasmid *replicates* (produces a linear copy of itself). The relative position of the genes is the same on the original plasmid and on the linear copy, except that the 2 ends of the linear copy do not immediately connect.

While replication is occurring, 1 end of the linear copy leaves the donor bacterium and enters the recipient bacterium. Thus, the order in which the genes are replicated is the same as the order in which they are transferred. Unless this process is interrupted, the entire plasmid is transferred, and its 2 ends connect in the recipient bacterium.

Four students studied the way in which 6 genes (F, X, R, S, A, and G) on a specific plasmid were donated by a type of bacterium (see the figure). The students determined that the entire plasmid is transferred in 90 min and that the rate of transfer is constant. They also determined that the genes are evenly spaced around the plasmid, so 1 gene is transferred every 15 min. They disagreed, however, about the order in which the genes are replicated and thus transferred. Four models are presented.



## Student 1

Replication always begins between Gene F and Gene X. Gene X is replicated first and Gene F is replicated last.

## Student 2

Replication always begins between Gene F and Gene X. However, the direction of replication varies. If Gene F is replicated first, Gene X is replicated last. Conversely, if Gene X is replicated first, Gene F is replicated last.

## Student 3

Replication can begin between any 2 genes. Replication then proceeds around the plasmid in a clockwise direction (with respect to the figure). Thus, if Gene S is replicated first, Gene A is replicated second, and Gene R is replicated last.

## Student 4

Replication can begin between any 2 genes. Likewise, replication can proceed in either direction. So the order of replication varies.

- Based on the information presented, if the transfer of the linear copy was interrupted 50 min after transfer began, how many complete genes would have been transferred to the recipient bacterium?

A. 2  
B. 3  
C. 4  
D. 5

- Based on the model presented by Student 3, if all 6 genes are replicated and the first gene replicated is Gene G, the third gene replicated would be:

F. Gene F.  
G. Gene A.  
H. Gene S.  
J. Gene X.

GO ON TO THE NEXT PAGE.



3. Which students believe that any of the 6 genes on the plasmid can be the first gene transferred to a recipient bacterium?
- A. Students 2 and 3
  - B. Students 2 and 4
  - C. Students 3 and 4
  - D. Students 2, 3, and 4
4. Suppose that the model presented by Student 1 is correct and that the transfer of genes between 2 bacteria was interrupted after 45 min. Based on the information provided, which of the following genes would NOT have been transferred from the donor bacterium to the recipient bacterium?
- F. Gene G
  - G. Gene X
  - H. Gene R
  - J. Gene S
5. Suppose that Student 2's model is correct and that the transfer of genes between 2 bacteria was interrupted after 30 min. Under these conditions, which of the following genes would definitely NOT be transferred from the donor bacterium to the recipient bacterium?
- A. Gene A
  - B. Gene R
  - C. Gene G
  - D. Gene X
6. Suppose that all 6 genes are transferred from a donor bacterium to a recipient bacterium. Under this condition, which student(s) would argue that Gene A could be the last gene transferred?
- F. Student 2 only
  - G. Student 4 only
  - H. Students 2 and 4 only
  - J. Students 3 and 4 only
7. Suppose that the transfer of genes between 2 bacteria was interrupted, that the last gene transferred was Gene A, and that no incomplete copies of a gene were transferred. Based on this information, Student 1 would say that transfer was most likely interrupted how many minutes after the transfer began?
- A. 15
  - B. 30
  - C. 45
  - D. 60

**Passage II**

Color images of the surface of Io, one of Jupiter's moons, show plumes of gas that resemble Earth's geysers and active volcanoes that emit flows of molten material. The materials ejected from Io's volcanoes and plumes rapidly solidify at Io's cold surface temperatures. Scientists believe that these materials may be one of several *allotropes* (forms) of sulfur (S), or a sulfur compound. The following studies were performed to determine the composition of these materials.

*Study 1*

In a laboratory, scientists measured the *reflectances* (the fraction of light striking a surface that is reflected by that surface) of 4 allotropes of S (red, white, orange, and brown) and of a sulfur compound (sulfur dioxide [ $\text{SO}_2$ ]). Reflectances were measured at visible-light wavelengths between  $0.35 \mu\text{m}$  (micrometers) and  $0.60 \mu\text{m}$ . Figure 1 shows the data for the various S allotropes and for  $\text{SO}_2$ .

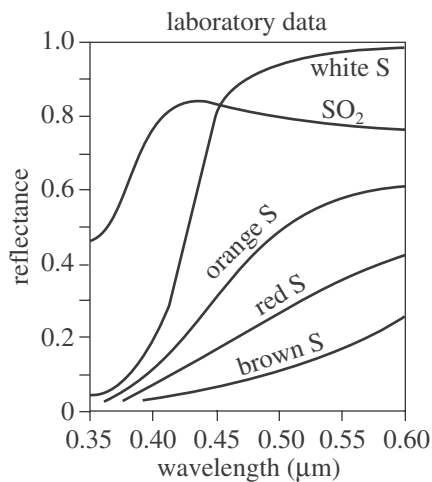


Figure 1

Io's *whole-disk reflectance* (the reflectance of Io's entire visible surface measured all at once) was measured at 2 different times. Figure 2 shows these data along with reflectance data calculated using a computer model. This model shows what combination of materials from Figure 1 would produce the closest match to the measured reflectance data. According to the model, the overall composition of Io's surface is 15%  $\text{SO}_2$ , 50% orange S, 20% red S, and 15% white S.

whole-disk data and computer model

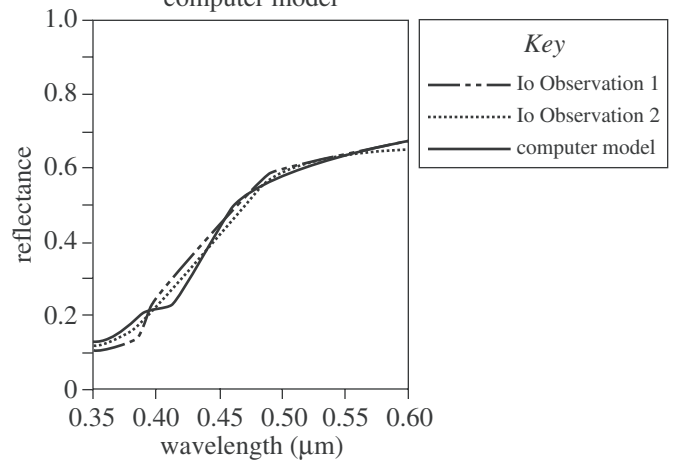


Figure 2

*Study 2*

At 2 different times, reflectances were measured of the crater floors of 2 volcanoes on Io: Pele and Surt. Figure 3 shows the reflectance data.

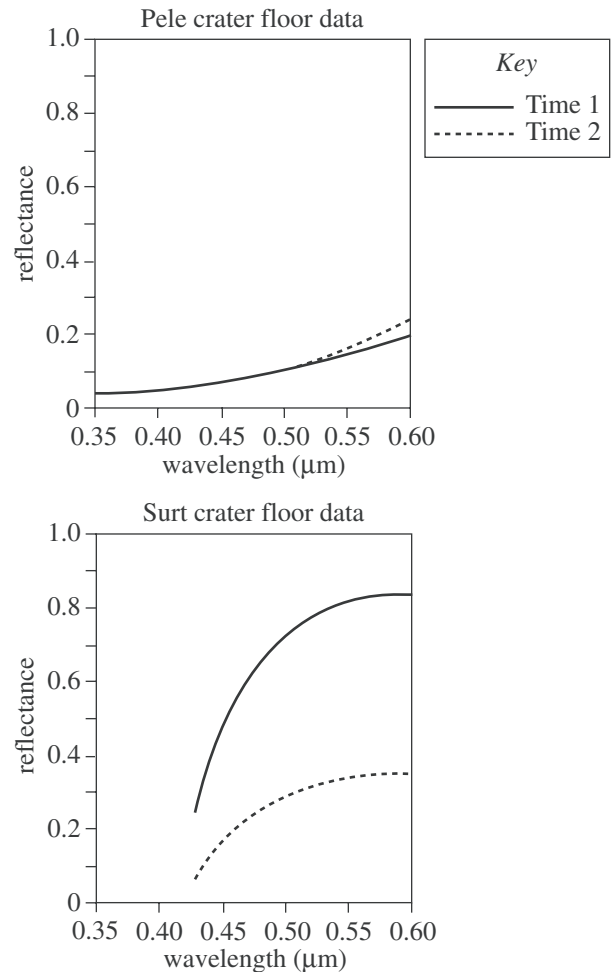


Figure 3





## Study 3

Reflectance data were taken from several large plumes and several small plumes on Io. The averaged data are in Figure 4.

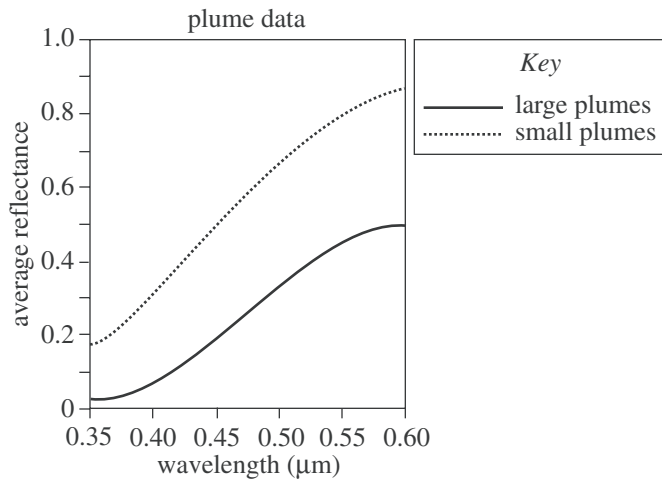


Figure 4

Figures 1, 3, and 4 adapted from Alfred McEwen and Laurence Soderblom, "Two Classes of Volcanic Plumes on Io." ©1983 by Academic Press, Inc.

Figure 2 adapted from Julianne Moses and Douglas Nash, "Phase Transformations and the Spectral Reflectance of Solid Sulfur: Can Metastable Sulfur Allotropes Exist on Io?" ©1991 by Academic Press, Inc.

8. At the wavelengths used in Study 1, as the wavelength of the light increases, the reflectances of the S allotropes and of SO<sub>2</sub> do which of the following?

	S allotropes	SO <sub>2</sub>
F.	Increase only	Increase only
G.	Increase only	Increase, then decrease
H.	Decrease only	Decrease only
J.	Decrease only	Increase, then decrease

9. According to Study 3, compared with the corresponding average reflectance for small plumes, large plumes on Io have an average reflectance at a given wavelength that is:

- A. always higher.  
 B. always the same.  
 C. always lower.  
 D. sometimes higher and sometimes lower.

10. According to Study 1, the reflectance of white S at a wavelength of 0.40 μm is closest to which of the following?

- F. 0.0  
 G. 0.1  
 H. 0.2  
 J. 0.3

11. According to Study 1 and Study 2, the crater floor of the volcano Pele has reflectances most similar to which of the following S allotropes?

- A. White S  
 B. Orange S  
 C. Red S  
 D. Brown S

12. If the averaged reflectances for large plumes and for small plumes had been measured at a wavelength of 0.61 μm in Study 3, those reflectances would have been closest to which of the following?

	Large plumes	Small plumes
F.	0.2	0.5
G.	0.5	0.2
H.	0.5	0.9
J.	0.9	0.5

13. According to Study 1, white S has a reflectance of 0.98 at a wavelength of 0.60 μm. This means that white S reflects:

- A. 2% of the 0.60 μm wavelength light that strikes its surface.  
 B. 98% of the 0.60 μm wavelength light that strikes its surface.  
 C. 2% of all the visible light that strikes its surface.  
 D. 98% of all the visible light that strikes its surface.

**Passage III**

An electrical circuit contained a 12-volt (V) battery, a *resistor* (a device that resists the flow of electricity), a *capacitor* (a device that stores electrical charge and electrical energy), a *voltmeter* (an instrument for measuring voltage), and a switch, as shown in Figure 1.

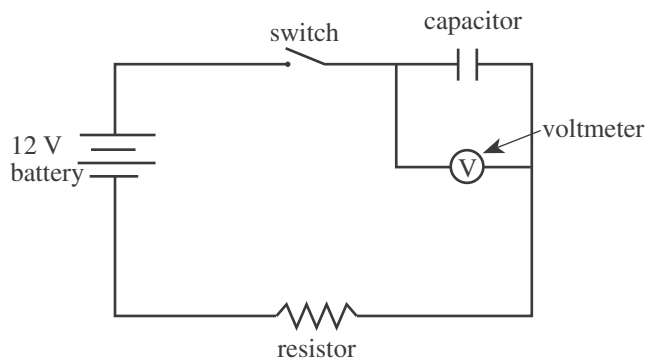


Figure 1

Some students studied the behavior of the circuit.

**Experiment 1**

The students used a  $1 \times 10^7$  ohm ( $\Omega$ ) resistor and a capacitor with a *capacitance* of  $1 \times 10^{-6}$  farad (F). (Capacitance is a measure of the maximum amount of electrical charge and electrical energy a capacitor can store.) The capacitor was initially uncharged. At time zero, the students simultaneously closed the switch and started a stopwatch. At time zero and at 12 sec intervals thereafter, they recorded the voltage across the capacitor. Their results are shown in Table 1.

Time (sec)	Voltage across capacitor (V)
0	0.0
12	8.4
24	10.9
36	11.7
48	11.9
60	12.0

**Experiment 2**

Using the  $1 \times 10^7 \Omega$  resistor and several different capacitors, the students determined the length of time from when the switch was closed until the voltage across the capacitor reached 6 V. Their results are shown in Table 2.

Capacitance ( $\times 10^{-6}$ F)	Time to reach 6 V across capacitor (sec)
1.2	8.3
0.6	4.2
0.3	2.1
0.1	0.7

**Experiment 3**

The students conducted the same procedure described in Experiment 2, except that they used a constant capacitance of  $1 \times 10^{-6}$  F and several different resistors. Their results are shown in Table 3.

Resistance ( $\times 10^7 \Omega$ )	Time to reach 6 V across capacitor (sec)
0.75	5.2
0.50	3.5
0.25	1.7

14. In Experiment 1, the *time constant* of the circuit was the time required for the voltage across the capacitor to reach approximately 7.6 V. The time constant of the circuit used in Experiment 1 was:

- F. less than 12 sec.
- G. between 12 sec and 24 sec.
- H. between 24 sec and 36 sec.
- J. greater than 36 sec.

15. If, in Experiment 2, a  $1.5 \times 10^{-6}$  F capacitor had been used, the time required for the voltage across the capacitor to reach 6 V would have been closest to:

- A. 4.2 sec.
- B. 7.0 sec.
- C. 10.5 sec.
- D. 15.0 sec.

**GO ON TO THE NEXT PAGE.**

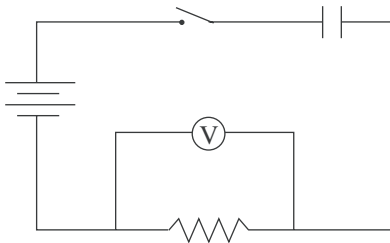


16. The main purpose of Experiment 3 was to determine how varying the:

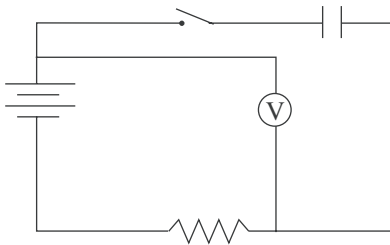
- F. battery's voltage affected the resistor's resistance at a given time.
- G. capacitor's capacitance affected the time required for the voltage across the capacitor to reach a set value.
- H. capacitor's capacitance affected the voltage across the battery at a given time.
- J. resistor's resistance affected the time required for the voltage across the capacitor to reach a set value.

17. Based on Figure 1, to measure the voltage across the resistor only, which of the following circuits should one use?

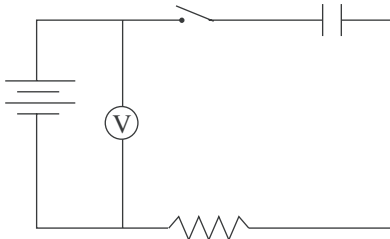
A.



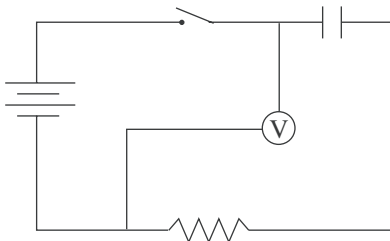
B.



C.



D.



18. Consider a circuit like that shown in Figure 1. Based on Experiments 2 and 3, the voltage across the capacitor will reach a given value in the shortest amount of time if the circuit contains which of the following capacitances and resistances, respectively?

- F.  $0.1 \times 10^{-6}$  F,  $0.3 \times 10^7 \Omega$
- G.  $0.1 \times 10^{-6}$  F,  $1.0 \times 10^7 \Omega$
- H.  $1.2 \times 10^{-6}$  F,  $0.3 \times 10^7 \Omega$
- J.  $1.2 \times 10^{-6}$  F,  $1.0 \times 10^7 \Omega$

19. Consider the following hypothesis: In a circuit arranged as in Figure 1 containing a battery, a capacitor, and a constant resistance, as capacitance increases, the time required to reach a given voltage across the capacitor increases. Do the experiments support this hypothesis?

- A. Yes; in Experiment 1, as capacitance increased, the time required to reach a given voltage increased.
- B. Yes; in Experiment 2, as capacitance increased, the time required to reach a given voltage increased.
- C. No; in Experiment 1, as capacitance increased, the time required to reach a given voltage decreased.
- D. No; in Experiment 2, as capacitance increased, the time required to reach a given voltage decreased.

## Passage IV

A *bomb calorimeter* is used to determine the amount of heat released when a substance is burned in oxygen (Figure 1). The heat, measured in kilojoules (kJ), is calculated from the change in temperature of the water in the bomb calorimeter. Table 1 shows the amounts of heat released when different foods were burned in a bomb calorimeter. Table 2 shows the amounts of heat released when different amounts of sucrose (table sugar) were burned. Table 3 shows the amounts of heat released when various chemical compounds were burned.

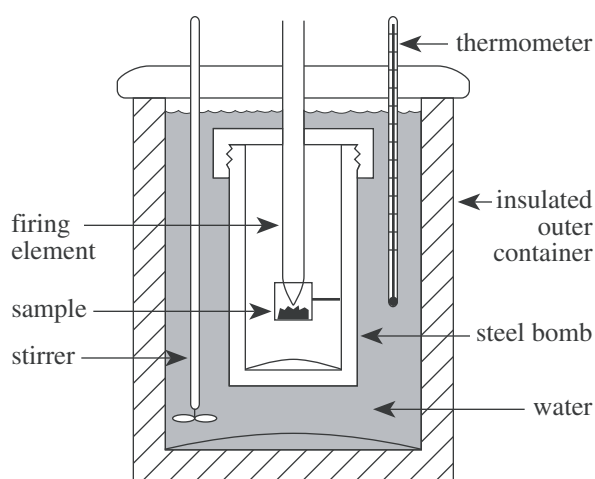


Figure 1

Figure 1 adapted from Antony C. Wilbraham, Dennis D. Staley, and Michael S. Matta, *Chemistry*. ©1995 by Addison-Wesley Publishing Company, Inc.

Food	Mass (g)	Change in water temperature (°C)	Heat released (kJ)
Bread	1.0	8.3	10.0
Cheese	1.0	14.1	17.0
Egg	1.0	5.6	6.7
Potato	1.0	2.7	3.2

Table 1 adapted from American Chemical Society, *ChemCom: Chemistry in the Community*. ©1993 by American Chemical Society.

Amount of sucrose (g)	Heat released (kJ)
0.1	1.6
0.5	8.0
1.0	16.0
2.0	32.1
4.0	64.0

Chemical compound	Molecular formula	Mass (g)	Heat released (kJ)
Methanol	CH <sub>3</sub> OH	0.5	11.4
Ethanol	C <sub>2</sub> H <sub>5</sub> OH	0.5	14.9
Benzene	C <sub>6</sub> H <sub>6</sub>	0.5	21.0
Octane	C <sub>8</sub> H <sub>18</sub>	0.5	23.9

20. According to Tables 1 and 2, as the mass of successive sucrose samples increased, the change in the water temperature produced when the sample was burned most likely:

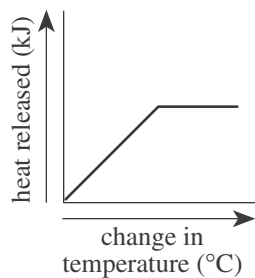
F. increased only.  
 G. decreased only.  
 H. increased, then decreased.  
 J. remained the same.

GO ON TO THE NEXT PAGE.

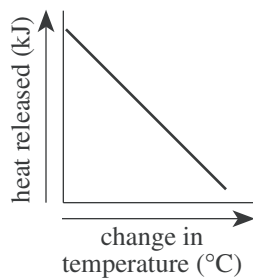


21. Which of the following graphs best illustrates the relationship between the heat released by the foods listed in Table 1 and the change in water temperature?

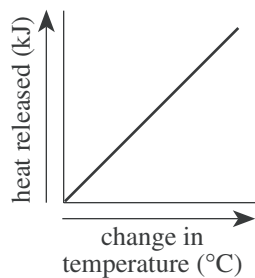
A.



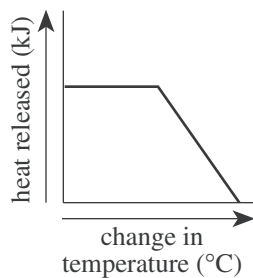
C.



B.



D.



22. Based on the data in Table 2, one can conclude that when the mass of sucrose is decreased by one-half, the amount of heat released when it is burned in a bomb calorimeter will:

- F. increase by one-half.
- G. decrease by one-half.
- H. increase by one-fourth.
- J. decrease by one-fourth.

23. Which of the following lists the foods from Tables 1 and 2 in increasing order of the amount of heat released per gram of food?

- A. Potato, egg, bread, sucrose, cheese
- B. Sucrose, cheese, bread, egg, potato
- C. Bread, cheese, egg, potato, sucrose
- D. Sucrose, potato, egg, bread, cheese

24. Based on the information in Tables 1 and 2, the heat released from the burning of 5.0 g of potato in a bomb calorimeter would be closest to which of the following?

- F. 5 kJ
- G. 10 kJ
- H. 15 kJ
- J. 20 kJ

**Passage V**

*Density* is defined as the mass of a substance divided by its volume:

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Table 1 lists the phases and the densities, in grams per cubic centimeter ( $\text{g}/\text{cm}^3$ ), of various pure substances at  $25^\circ\text{C}$  and 1 atmosphere (atm) of pressure.

Table 1		
Substance	Phase	Density ( $\text{g}/\text{cm}^3$ )
Arsenic	solid	5.73
Glucose	solid	1.56
Iron	solid	7.86
Lead	solid	11.34
Zinc	solid	7.14
Ethanol	liquid	0.79
Ethyl ether	liquid	0.71
Glycerol	liquid	1.26
Mercury	liquid	13.59
Freon-12	gas	0.00495
Krypton	gas	0.00343
Methane	gas	0.00065

Figure 1 shows how the density of liquid water changes with temperature.

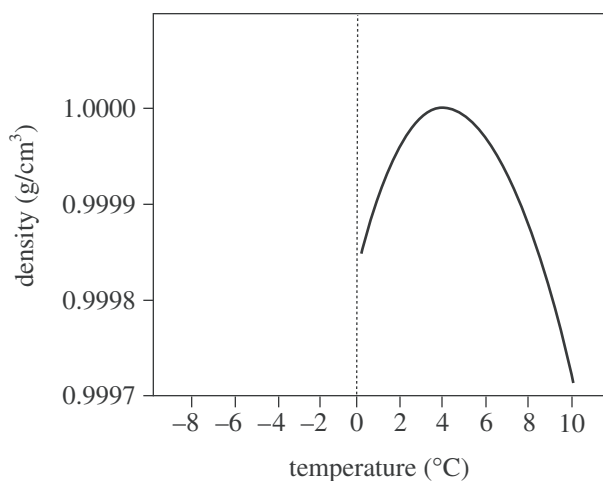


Figure 1

Figure 2 shows how the density of solid water changes with temperature.

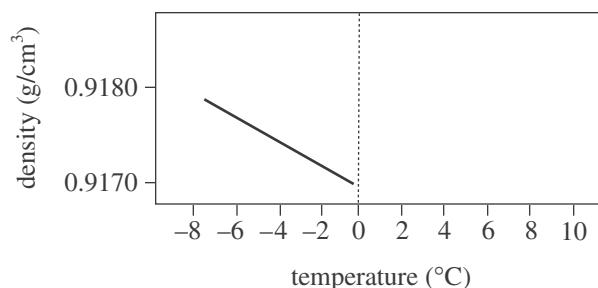


Figure 2

Figures adapted from John C. Kotz and Keith F. Purcell, *Chemistry & Chemical Reactivity*. ©1987 by CBS College Publishing.

25. According to Figure 1, as the temperature of liquid water decreases from  $10^\circ\text{C}$  to  $0^\circ\text{C}$ , the density:
- increases only.
  - decreases only.
  - decreases, then increases.
  - increases, then decreases.
26. A student claimed that "If the masses of  $1\text{ cm}^3$  of any solid and  $1\text{ cm}^3$  of any liquid are compared, the mass of the solid will be greater." Do the data in Table 1 support his claim?
- No; lead has a higher density than any of the liquids listed.
  - No; mercury has a higher density than any of the solids listed.
  - Yes; lead has a higher density than any of the liquids listed.
  - Yes; mercury has a higher density than any of the solids listed.
27. Which of the following hypotheses about the relationship between the temperature and the density of a solid is best supported by the data in Figure 2? As the temperature of a solid increases, the density of the solid:
- increases only.
  - decreases only.
  - increases, then decreases.
  - decreases, then increases.



28. Equal amounts of ethyl ether, mercury, and water (density =  $0.9971 \text{ g/cm}^3$ ) at  $25^\circ\text{C}$  are poured into a single beaker. Three distinct layers of liquid form in the beaker. Based on the data in Table 1, which of the following diagrams represents the order, from top to bottom, of the liquids in the beaker?

F.

Ethyl ether
Water
Mercury

G.

Ethyl ether
Mercury
Water

H.

Mercury
Water
Ethyl ether

J.

Water
Ethyl ether
Mercury

29. According to Figure 1, 100 g of water at  $4^\circ\text{C}$  would exactly fill a container having which of the following volumes?

- A.  $1 \text{ cm}^3$   
 B.  $10 \text{ cm}^3$   
 C.  $100 \text{ cm}^3$   
 D.  $1,000 \text{ cm}^3$

**Passage VI**

The clearing of rain forests results in *forest fragmentation* (the breakup of large forest tracts into small patches). Researchers predicted that fragmentation would result in a decrease in animal populations and *aboveground tree biomass* (AGTB) in the resulting fragments. They did 4 studies to test this prediction.

**Study 1**

The researchers monitored the AGTB of twenty-five 100 m × 100 m forest plots near areas that had recently been cleared of vegetation. The distance from the center of each plot to the nearest clearing was measured. Figure 1 shows the average change per plot in AGTB in metric tons per year (t/yr) over 17 yr.

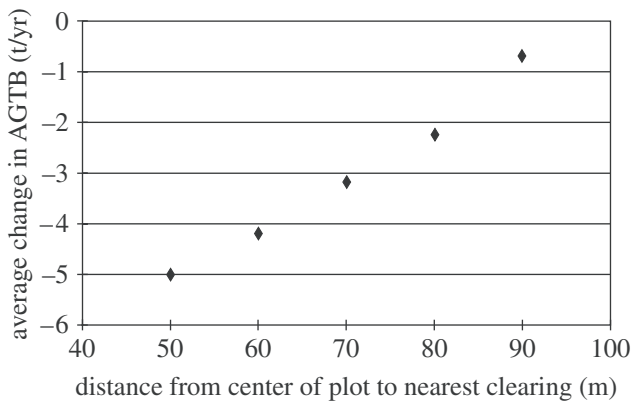


Figure 1

**Study 2**

Twenty-five 100 m × 100 m forest plots were monitored as in Study 1. The center of each of these plots was at least 500 m from the nearest clearing. The average change in AGTB over 17 yr for these 25 plots was 0 t/yr.

**Study 3**

Researchers monitored sixteen 100 m × 100 m forest plots near areas that had recently been cleared of vegetation. Each plot was bordered on 1 side by a clearing. Figure 2 shows the average cumulative percent change in AGTB at these plots following fragmentation. (Note: Year 0 represents results prior to fragmentation.)

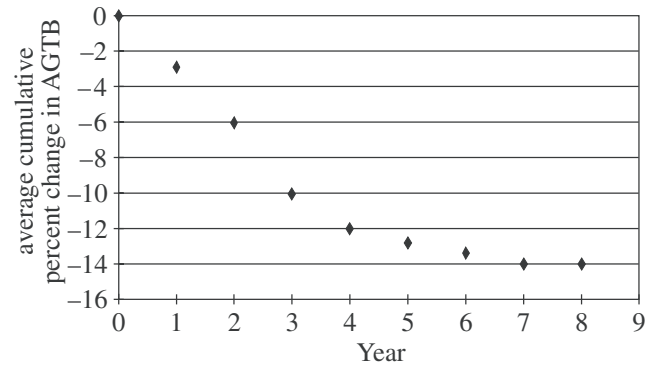


Figure 2

**Study 4**

Researchers trapped and released birds in 10 forest fragments adjacent to areas that had recently been cleared of vegetation. Three types of birds were monitored: insectivores, frugivores (fruit eaters), and hummingbirds. Figure 3 shows the number of captures per 1,000 hours (hr) of trapping. (Note: Year 0 represents results prior to fragmentation.)

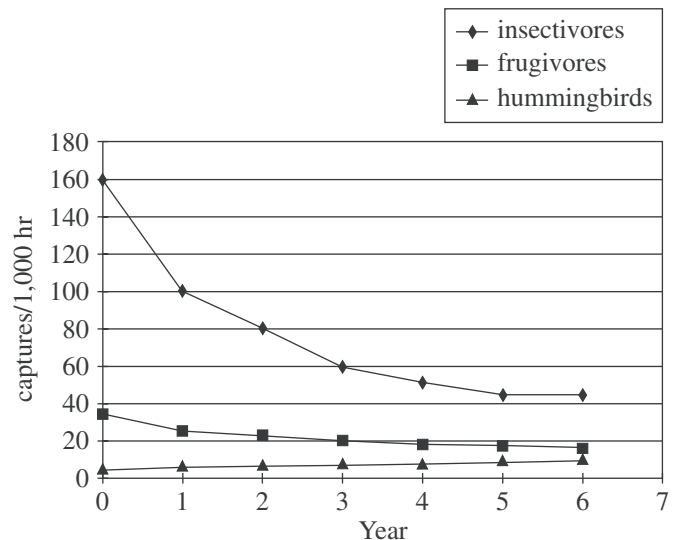


Figure 3

Figures adapted from William F. Laurance et al., "Biomass Collapse in Amazonian Forest Fragments." ©1998 by the American Association for the Advancement of Science.





30. In Study 4, as time increased from Year 0 to Year 6, the captures/1,000 hr of frugivores:
- F. decreased only.
  - G. increased only.
  - H. decreased, then increased.
  - J. increased, then decreased.
31. Based on the results of Study 4, how did fragmentation most likely affect the population sizes of insectivores and hummingbirds in the fragments studied?
- A. Fragmentation increased the population sizes of both insectivores and hummingbirds.
  - B. Fragmentation decreased the population sizes of both insectivores and hummingbirds.
  - C. Fragmentation increased the population size of insectivores and decreased the population size of hummingbirds.
  - D. Fragmentation decreased the population size of insectivores and increased the population size of hummingbirds.
32. Based on the results of Study 1, if the distance from the center of a  $100\text{ m} \times 100\text{ m}$  plot were 75 m from the nearest clearing, the expected average change in AGTB at the plot over 17 yr would be closest to which of the following values?
- F.  $-1.1\text{ t/yr}$
  - G.  $-2.6\text{ t/yr}$
  - H.  $+1.1\text{ t/yr}$
  - J.  $+2.6\text{ t/yr}$
33. After examining the results of Study 2, a student concluded that the AGTB at each of the 25 plots remained constant. Which of the following alternative explanations is also consistent with the results?
- A. The AGTB at all 25 plots increased.
  - B. The AGTB at all 25 plots decreased.
  - C. The AGTB at some of the plots increased and the AGTB at some of the plots decreased.
  - D. The AGTB at plots bounded by forest increased and the AGTB at plots bounded by clearings remained constant.
34. Which of the following sets of results from the studies is *least* consistent with the prediction proposed by the researchers?
- F. The results of Study 1 for AGTB
  - G. The results of Study 3 for AGTB
  - H. The results of Study 4 for frugivores
  - J. The results of Study 4 for hummingbirds
35. In Study 4, the researchers trapped birds for 10,000 hr per year. Thus, how many insectivores were trapped in Year 2 ?
- A. 80
  - B. 100
  - C. 800
  - D. 1,000

Passage VII

Glaciers deposit *till* (a poorly sorted sediment). If glaciers repeatedly advance over an area and then melt back, thick till deposits may form. Figure 1 shows a vertical core taken through layers of till, non-glacial sediments, and bedrock at a site in Canada. The *resistivity* (an electrical property of a material) and CO<sub>2</sub> measurements taken along the core are also shown. Resistivity is related to a sediment's particle sizes, compaction, and mineral composition. Table 1 shows the average percent sand, silt, and clay contents and descriptions of the various till layers.

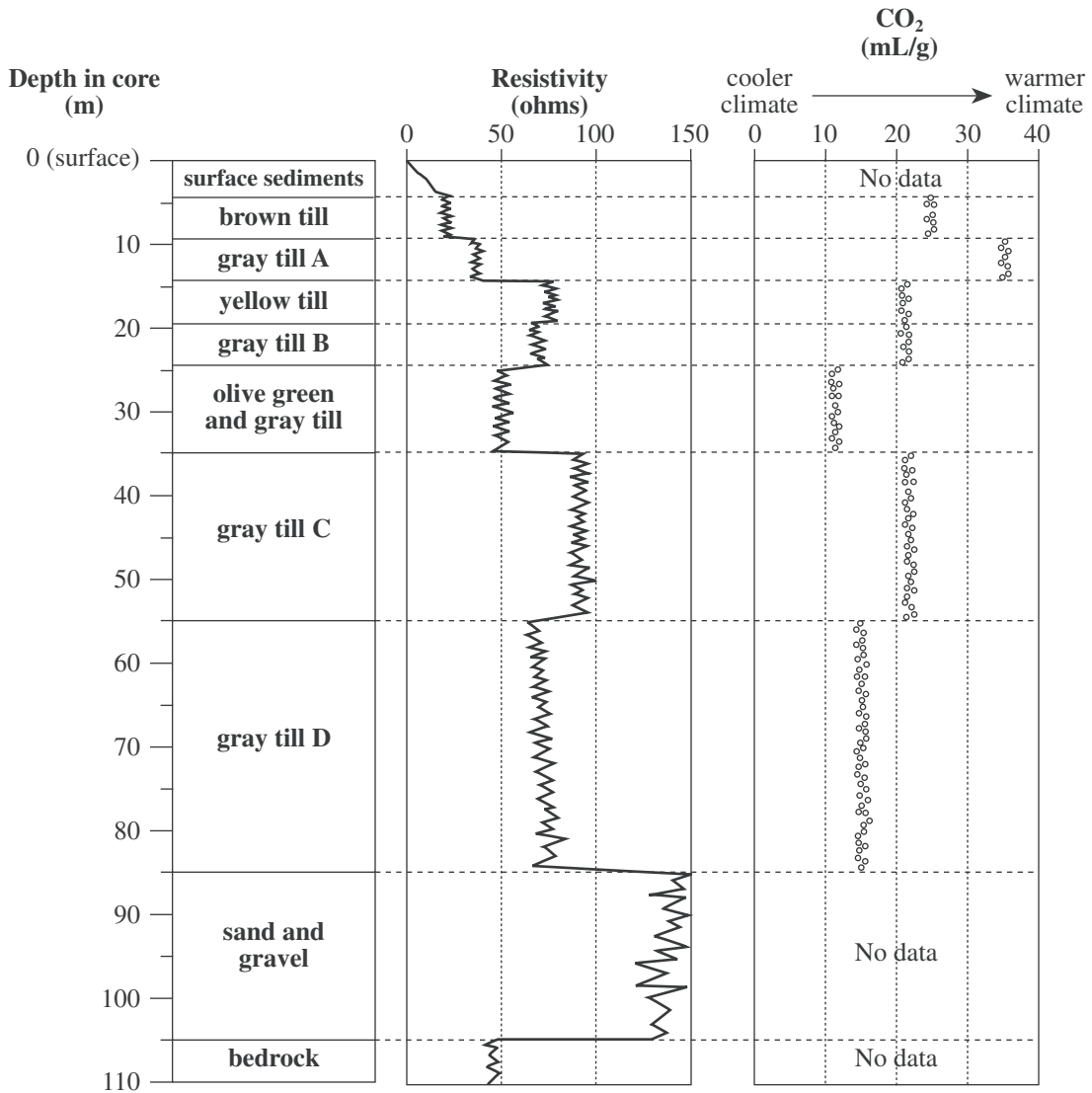


Figure 1



Depth of till layer (m)	Description of till	Average percent by volume of:		
		larger particle → smaller particle		
		sand	silt	clay
4–9	brown (oxidized*)	54.1	31.7	14.2
9–14	gray A	44.8	36.6	18.6
14–19	yellow (oxidized)	43.5	31.7	24.8
19–24	gray B	37.4	34.3	28.3
24–35	olive green and gray	25.5	34.3	40.2
35–55	gray C	31.7	33.6	34.7
55–85	gray D	37.5	31.7	30.8

\*Oxidized sediments have at some time been exposed to the air. Sediments that have been *deprived* of oxygen will be gray or green.

Figure 1 and Table 1 adapted from E. A. Christiansen, "Pleistocene Stratigraphy of the Saskatoon Area, Saskatchewan, Canada: An Update." ©1992 by the Geological Association of Canada.

36. A sample of gray till was recovered from another core taken from a nearby area. The table below shows the results of an analysis of the sample.

Percent by volume of:			Resistivity (ohms)	CO <sub>2</sub> content (mL/g)
sand	silt	clay		
31.5	33.7	34.8	85	22

Based on these data and the data provided in Figure 1 and Table 1, the sample of gray till corresponds most closely with which till from Figure 1 ?

- F. Gray till A  
 G. Gray till B  
 H. Gray till C  
 J. Gray till D
37. According to Figure 1, the *oldest* glacial advance in this area deposited which of the following till layers?  
 A. Gray till A  
 B. Yellow till  
 C. Olive green and gray till  
 D. Gray till D
38. According to Figure 1, which of the following statements best describes how the resistivity of the sand and gravel layer compares to the resistivity of the till layers? The resistivity measured in the sand and gravel layer is:  
 F. lower than the resistivities measured in any of the till layers.  
 G. higher than the resistivities measured in any of the till layers.  
 H. the same as the resistivities measured in the surface sediments.  
 J. lower than the resistivities measured in the bedrock.
39. The average resistivity of the bedrock in the core is most similar to the average resistivity of which of the following till layers?  
 A. Yellow till  
 B. Gray till B  
 C. Olive green and gray till  
 D. Gray till C
40. The sediments being deposited at the present time at the site where the core was taken have a much higher CO<sub>2</sub> content than any of the tills. Given this information and the information in Figure 1, the CO<sub>2</sub> content of sediments recently deposited at the site would most likely be in which of the following ranges?  
 F. Less than 10 mL/g  
 G. Between 10 mL/g and 25 mL/g  
 H. Between 25 mL/g and 35 mL/g  
 J. Greater than 35 mL/g

**END OF TEST 4**

**STOP! DO NOT RETURN TO ANY OTHER TEST.**

[See Note on page 56.]

**Note:** If you plan to take the ACT Plus Writing, take a 5-minute break and then continue with the Writing Test on page 57.

If you do not plan to take the ACT Plus Writing, turn to page 59 for instructions on scoring your multiple-choice tests.

# Practice Writing Test

Your Signature (do not print): \_\_\_\_\_

Print Your Name Here: \_\_\_\_\_

Your Date of Birth:									
<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Month		Day		Year					

## Form 06A

# The ACT<sup>®</sup> Writing Test Booklet

You must take the multiple-choice tests before you take the Writing Test.

## Directions

This is a test of your writing skills. You will have thirty (30) minutes to write an essay in English. Before you begin planning and writing your essay, read the writing prompt carefully to understand exactly what you are being asked to do. Your essay will be evaluated on the evidence it provides of your ability to express judgments by taking a position on the issue in the writing prompt; to maintain a focus on the topic throughout the essay; to develop a position by using logical reasoning and by supporting your ideas; to organize ideas in a logical way; and to use language clearly and effectively according to the conventions of standard written English.

You may use the unlined pages in this test booklet to plan your essay. These pages will not be scored. ***You must write your essay in pencil on the lined pages in the answer folder.*** Your writing on those lined pages will be scored. You may not need all the lined pages, but to ensure you have enough room to finish, do NOT skip lines. You may write corrections or additions neatly between the lines of your essay, but do NOT write in the margins of the lined pages. ***Illegible essays cannot be scored, so you must write (or print) clearly.***

If you finish before time is called, you may review your work. Lay your pencil down immediately when time is called.

**DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.**

## ACT Assessment Writing Test Prompt

Many high school libraries use some of their limited funding to subscribe to popular magazines with articles that are interesting to students. Despite limited funding, some educators support this practice because they think having these magazines available encourages students to read. Other educators think school libraries should not use limited funds to subscribe to these magazines because they may not be related to academic subjects. In your opinion, should high school libraries subscribe to popular magazines?

In your essay, take a position on this question. You may write about either one of the two points of view given, or you may present a different point of view on this question. Use specific reasons and examples to support your position.

### Note

- Your test booklet will have blank space for you to plan your essay. For this practice test, use scratch paper.
- You may wish to remove pages 75–78 to respond to this prompt.
- When you have completed your essay, read pages 66–71 for information and instructions on scoring your practice Writing Test.

# 5 Scoring Your Tests

## How to Score the Multiple-Choice Tests

Follow the instructions below and on the following pages to score your practice multiple-choice tests and to evaluate your performance.

### Raw Scores

The number of questions you answered correctly on each test and in each subscore area is your raw score. Because there are many forms of the ACT, each containing different questions, some forms will be slightly easier (and some slightly harder) than others. A raw score of 67 on one form of the English Test, for example, may be about as difficult to earn as a raw score of 70 on another form of that test.

To compute your raw scores, check your answers with the scoring keys on pages 60–62. Count the number of correct answers for each of the four tests and seven subscore areas, and enter the number in the blanks provided on those pages. These numbers are your raw scores on the tests and subscore areas.

### Scale Scores

To adjust for the small differences that occur among different forms of the ACT, the raw scores for tests and subscore areas are converted into *scale scores*. Scale scores are printed on the reports sent to you and your college and scholarship choices.

When your raw scores are converted into scale scores, it becomes possible to compare your scores with those of examinees who took different test forms. For example, a scale score of 26 on the English Test has the same meaning regardless of the form of the ACT on which it is based.

To determine the scale scores corresponding to your raw scores on the practice test, use the score conversion tables on pages 63–64. Table 1 on page 63 shows the raw-to-scale score conversions for each test, and Table 2 on page 64 shows the raw-to-scale score conversions for the subscore areas. Because each form of the ACT is unique, each form has somewhat different conversion tables. Consequently, these tables provide only approximations of the raw-to-scale score conversions that would apply if a different form of the ACT were taken. Therefore, the scale scores obtained from the practice tests don't match precisely the scale scores received from a national administration of the ACT.

### Computing the Composite Score

The Composite score is the average of the four scale scores in English, Mathematics, Reading, and Science. If you left any of these tests blank, a Composite score cannot be calculated. If you take the ACT Plus Writing, your Writing results do **not** affect your Composite score.

### Comparing Your Scores

Even scale scores don't tell the whole story of your test performance. You may want to know how your scores compare to the scores of other students who took the ACT.

The multiple-choice norms table (Table 3A on page 65) enables you to compare your scores on the practice multiple-choice tests with the scores of recent high school graduates who tested as sophomores, juniors, or seniors. The numbers reported in Table 3A are cumulative percents. A cumulative percent is the percent of students who scored *at or below* a given score. For example, a Composite score of 20 has a cumulative percent of 48. This means that 48% of the ACT-tested high school students had a Composite score of 20 or lower.

Remember that your scores and percent at or below on the practice test are only *estimates* of the scores that you will obtain during an actual administration of the ACT. Test scores are only one indicator of your level of academic knowledge and skills. Consider your scores in connection with your grades, your performance in outside activities, and your career interests.

### College Readiness Standards™

To add to the information you receive about your performance on the ACT, we have developed College Readiness Standards. These standards help you to more fully understand what your total test score means for each academic area assessed: English, Mathematics, Reading, Science, and Writing. The College Readiness Standards describe the types of skills, strategies, and understandings you will need to make a successful transition from high school to college. For English, Mathematics, Reading, and Science, standards are provided for six score ranges that reflect the progression and complexity of the skills measured by the ACT tests. For Writing, standards are provided for five score ranges. The College Readiness Standards and benchmark scores for each test can be found at [www.act.org/standard](http://www.act.org/standard).

## Reviewing Your Performance on the Practice Multiple-Choice Tests

After you have determined your scale scores, consider the following as you evaluate your performance.

- Did you run out of time? If so, reread the information in this booklet on pacing yourself. Perhaps you need to adjust the way you used your time in responding to the questions. It is to your advantage to answer every question. There is no penalty for guessing.
- Did you spend too much time trying to understand the directions for the tests? The directions for the practice tests are exactly like the directions that will appear in your test booklet on test day. Make sure you understand them now, so you won't have to spend too much time studying them on test day.
- Review the questions that you missed. Did you select a response that was an incomplete answer or that did not directly respond to the question being asked? Try to figure out what you overlooked in answering the questions.
- Did a particular type of question confuse you? Did the questions you missed come from a particular subscore area? In reviewing your responses, check to see whether a particular type of question or a particular subscore area was more difficult for you or took more time.

### Scoring Keys for the ACT Practice Tests

Use the scoring key for each test to score your answer document for the multiple-choice tests. Mark a "1" in the blank for each question you answered correctly. Add up the numbers in each subscore area and enter the total number correct for each subscore area in the blanks provided. Also enter the total number correct for each test in the blanks provided. The total number correct for each test is the sum of the number correct in each subscore area.

#### Test 1: English—Scoring Key

		Subscore Area*				Subscore Area*				Subscore Area*	
	Key	UM	RH		Key	UM	RH		Key	UM	RH
1.	D		_____	26.	F		_____	51.	C		_____
2.	F		_____	27.	A	_____	_____	52.	H	_____	_____
3.	B	_____	_____	28.	H	_____	_____	53.	B	_____	_____
4.	J	_____	_____	29.	D	_____	_____	54.	J	_____	_____
5.	A	_____	_____	30.	G	_____	_____	55.	D	_____	_____
6.	G	_____	_____	31.	C	_____	_____	56.	J	_____	_____
7.	A	_____	_____	32.	J	_____	_____	57.	C	_____	_____
8.	G	_____	_____	33.	A	_____	_____	58.	H	_____	_____
9.	A	_____	_____	34.	H	_____	_____	59.	B	_____	_____
10.	J		_____	35.	C	_____	_____	60.	J	_____	_____
11.	C	_____	_____	36.	G	_____	_____	61.	C	_____	_____
12.	J	_____	_____	37.	D	_____	_____	62.	F	_____	_____
13.	A		_____	38.	H	_____	_____	63.	B	_____	_____
14.	G	_____	_____	39.	A	_____	_____	64.	F	_____	_____
15.	C		_____	40.	J	_____	_____	65.	D	_____	_____
16.	J		_____	41.	C	_____	_____	66.	H	_____	_____
17.	B	_____	_____	42.	F	_____	_____	67.	B	_____	_____
18.	J		_____	43.	C	_____	_____	68.	G	_____	_____
19.	A		_____	44.	F	_____	_____	69.	C	_____	_____
20.	F		_____	45.	D	_____	_____	70.	J	_____	_____
21.	C		_____	46.	G	_____	_____	71.	D	_____	_____
22.	F	_____	_____	47.	A	_____	_____	72.	F	_____	_____
23.	A	_____	_____	48.	G	_____	_____	73.	B	_____	_____
24.	J	_____	_____	49.	D	_____	_____	74.	H	_____	_____
25.	B	_____	_____	50.	G	_____	_____	75.	D	_____	_____

Number Correct (Raw Score) for:	
Usage/Mechanics (UM) Subscore Area	_____ (40)
Rhetorical Skills (RH) Subscore Area	_____ (35)
Total Number Correct for English Test (UM + RH)	_____ (75)

\* UM = Usage/Mechanics  
RH = Rhetorical Skills



**Test 2: Mathematics—Scoring Key**

		Subscore Area*					Subscore Area*		
	Key	EA	AG	GT		Key	EA	AG	GT
1.	A	_____			31.	E		_____	
2.	K	_____			32.	F			_____
3.	B	_____			33.	C	_____		
4.	G		_____		34.	J	_____		
5.	E	_____			35.	B			_____
6.	H	_____			36.	K		_____	
7.	E	_____			37.	C		_____	
8.	G	_____			38.	J		_____	
9.	B			_____	39.	C			_____
10.	J		_____		40.	H		_____	
11.	E	_____			41.	A	_____		
12.	J		_____		42.	F		_____	
13.	B	_____			43.	D		_____	
14.	G			_____	44.	F			_____
15.	C			_____	45.	C			_____
16.	G			_____	46.	K			_____
17.	A	_____			47.	C	_____		
18.	H			_____	48.	J	_____		
19.	C	_____			49.	D		_____	
20.	K	_____			50.	J		_____	
21.	B	_____			51.	E	_____		
22.	K		_____		52.	J	_____		
23.	A	_____			53.	A		_____	
24.	F	_____			54.	K			_____
25.	D			_____	55.	B			_____
26.	J		_____		56.	H			_____
27.	A	_____			57.	A		_____	
28.	H	_____			58.	K			_____
29.	C			_____	59.	E		_____	
30.	G			_____	60.	J		_____	

<b>Number Correct (Raw Score) for:</b>	
Pre-Alg./Elem. Alg. (EA) Subscore Area	_____ (24)
Inter. Alg./Coord. Geo. (AG) Subscore Area	_____ (18)
Plane Geo./Trig. (GT) Subscore Area	_____ (18)
Total Number Correct for Math Test (EA + AG + GT)	_____ (60)

\* EA = Pre-Algebra/Elementary Algebra  
 AG = Intermediate Algebra/Coordinate Geometry  
 GT = Plane Geometry/Trigonometry

0661C

### Test 3: Reading—Scoring Key

	Key	Subscore Area*		Key	Subscore Area*		Key	Subscore Area*	
		SS	AL		SS	AL		SS	AL
1.	B		_____	15.	D	_____	29.	C	_____
2.	J		_____	16.	G	_____	30.	G	_____
3.	C		_____	17.	A	_____	31.	B	_____
4.	F		_____	18.	F	_____	32.	J	_____
5.	C		_____	19.	C	_____	33.	B	_____
6.	J		_____	20.	H	_____	34.	H	_____
7.	A		_____	21.	A	_____	35.	A	_____
8.	H		_____	22.	H	_____	36.	F	_____
9.	D		_____	23.	C	_____	37.	C	_____
10.	G		_____	24.	J	_____	38.	G	_____
11.	B	_____		25.	D	_____	39.	D	_____
12.	F	_____		26.	G	_____	40.	H	_____
13.	D	_____		27.	D	_____			
14.	J	_____		28.	F	_____			

Number Correct (Raw Score) for:	
Social Studies/Sciences (SS) Subscore Area	_____ (20)
Arts/Literature (AL) Subscore Area	_____ (20)
Total Number Correct for Reading Test (SS + AL)	_____ (40)

\* SS = Social Studies/Sciences  
AL = Arts/Literature

### Test 4: Science—Scoring Key

Key	Key	Key
1. B	15. C	29. C
2. J	16. J	30. F
3. C	17. A	31. D
4. F	18. F	32. G
5. A	19. B	33. C
6. J	20. F	34. J
7. D	21. B	35. C
8. G	22. G	36. H
9. C	23. A	37. D
10. H	24. H	38. G
11. D	25. D	39. C
12. H	26. G	40. J
13. B	27. B	
14. F	28. F	

Number Correct (Raw Score) for:	
Total Number Correct for Science Test	_____ (40)

0661C

**TABLE 1****Procedures Used to Obtain Scale Scores From Raw Scores for the ACT Practice Tests**

On each of the four multiple-choice tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any response is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it off to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

	<b><u>Your Scale Score</u></b>
English	_____
Mathematics	_____
Reading	_____
Science	_____
<b>Sum of scores</b>	_____
<b>Composite score (sum ÷ 4)</b>	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

Scale Score	Raw Scores				Scale Score
	Test 1 English	Test 2 Mathematics	Test 3 Reading	Test 4 Science	
36	75	60	38-40	40	36
35	73-74	58-59	37	—	35
34	71-72	56-57	36	39	34
33	70	55	35	—	33
32	69	54	34	38	32
31	68	52-53	—	—	31
30	67	50-51	33	37	30
29	65-66	48-49	32	36	29
28	64	46-47	30-31	35	28
27	62-63	43-45	29	34	27
26	60-61	41-42	28	32-33	26
25	57-59	39-40	27	30-31	25
24	55-56	37-38	26	29	24
23	53-54	35-36	25	27-28	23
22	50-52	33-34	24	25-26	22
21	47-49	31-32	23	23-24	21
20	44-46	30	22	21-22	20
19	42-43	27-29	21	18-20	19
18	39-41	25-26	20	16-17	18
17	37-38	22-24	19	14-15	17
16	34-36	18-21	17-18	13	16
15	30-33	15-17	16	12	15
14	28-29	12-14	14-15	10-11	14
13	26-27	09-11	12-13	09	13
12	24-25	08	10-11	08	12
11	22-23	06-07	08-09	07	11
10	20-21	05	07	06	10
9	18-19	04	06	05	9
8	15-17	—	05	04	8
7	13-14	03	—	03	7
6	10-12	02	04	—	6
5	08-09	—	03	02	5
4	06-07	—	02	—	4
3	04-05	01	—	01	3
2	02-03	—	01	—	2
1	00-01	00	00	00	1

# TABLE 2

Your Scale Subscore

## Procedures Used to Obtain Scale Subscores from Raw Scores for the ACT Practice Tests

For each of the seven subscore areas, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale subscores. For each of the seven subscore areas, locate and circle either the raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale subscore that corresponds to that raw score. As you determine your scale subscores, enter them in the blanks provided on the right. The highest possible scale subscore is 18. The lowest possible scale subscore is 1.

If you left a test completely blank and marked no responses, do not list any scale subscores for that test.

### English

Usage/Mechanics (UM)

Rhetorical Skills (RH)

### Mathematics

Pre-Algebra/Elem. Algebra (EA)

Inter. Algebra/Coord. Geometry (AG)

Plane Geometry/Trigonometry (GT)

### Reading

Social Studies/Sciences (SS)

Arts/Literature (AL)

Scale Subscore	Raw Scores										Scale Subscore
	Test 1 English			Test 2 Mathematics			Test 3 Reading				
	Usage/Mechanics	Rhetorical Skills	Pre-Algebra/Elem. Algebra	Inter. Algebra/Coord. Geometry	Plane Geometry/Trigonometry	Social Studies/Sciences	Arts/Literature	Social Studies/Sciences	Arts/Literature	Social Studies/Sciences	
18	39-40	35	23-24	18	18	18	19-20	20	18	18	18
17	38	33-34	22	17	17	17	17-18	19	17	17	17
16	36-37	31-32	21	16	16	16	16	18	16	16	16
15	35	30	20	14-15	14-15	14-15	15	17	15	15	15
14	33-34	28-29	18-19	13	13	13	13-14	16	13-14	13-14	14
13	31-32	26-27	17	11-12	11-12	11-12	12	15	12	12	13
12	29-30	24-25	16	10	10	10	—	14	—	—	12
11	27-28	21-23	14-15	9	9	9	11	13	11	11	11
10	25-26	19-20	13	07-08	07-08	07-08	10	12	10	10	10
9	23-24	16-18	12	6	6	6	09	11	9	9	9
8	20-22	14-15	09-11	5	5	5	07-08	10	8	8	8
7	17-19	12-13	07-08	4	4	4	6	09	7	7	7
6	15-16	10-11	05-06	3	3	3	5	07-08	6	6	6
5	13-14	08-09	03-04	2	2	2	4	05-06	5	5	5
4	10-12	06-07	02	—	—	—	3	04	4	4	4
3	08-09	04-05	—	01	—	—	2	03	3	3	3
2	05-07	02-03	01	—	—	—	1	02	2	2	2
1	00-04	00-01	00	00	00	00	00	01-02	1	1	1

# TABLES 3A and 3B

## Norms Tables

Use the norms tables below (3A and 3B) to determine your estimated percent at or below for each of your multiple-choice scale scores (3A), and for your Writing scores (3B), if applicable.

In the far left column of the multiple-choice norms table (3A), circle your scale score for the English Test (from page 63). Then read across to the percent at or below column for that test; circle or put a check mark beside the corresponding percent at or below. Use the same procedure for each test and subscore area. Use the far right column of scale scores in Table 3A, for your Science Test and Composite scores. Follow the same procedure on the Writing Test norms to get your estimated percent at or below for your Writing subscore and Combined English/Writing score.

As you mark your percents at or below, enter them in the blanks provided at the right. You may also find it helpful to compare your performance with the national mean (average) score for each of the tests, subscore areas, and the Composite as shown at the bottom of the norms tables.

**Your Estimated Percent At or Below on Practice Test**

<b>English</b>	_____
Usage/Mechanics	_____
Rhetorical Skills	_____
<b>Mathematics</b>	_____
Pre-Algebra/Elem. Alg.	_____
Alg./Coord. Geometry	_____
Plane Geometry/Trig.	_____
<b>Reading</b>	_____
Soc. Studies/Sciences	_____
Arts/Literature	_____
<b>Science</b>	_____
<b>Composite</b>	_____
<b>Combined English/Writing</b>	_____
<b>Writing</b>	_____

### 3A

**National Distributions of Cumulative Percents for ACT Test Scores  
ACT-Tested High School Graduates from 2005, 2006, and 2007**

Score	ENGLISH			MATHEMATICS			READING			SCIENCE		COMPOSITE	Score
	Usage/Mechanics	Rhetorical Skills		Pre-Algebra/Elem. Alg.	Alg./Coord. Geometry	Plane Geometry/Trig.	Soc. Studies/Sciences	Arts/Literature					
36	99			99			99		99	99		36	
35	99			99			99		99	99		35	
34	99			99			99		99	99		34	
33	98			99			97		99	99		33	
32	97			98			95		98	99		32	
31	96			97			94		98	98		31	
30	94			96			91		97	97		30	
29	92			94			89		96	95		29	
28	90			92			86		94	92		28	
27	87			89			82		92	89		27	
26	84			85			78		90	85		26	
25	80			80			74		85	81		25	
24	74			75			70		79	75		24	
23	69			69			64		73	69		23	
22	64			63			58		65	63		22	
21	58			58			53		57	56		21	
20	51			53			48		48	48		20	
19	43			47			41		38	40		19	
18	36	99	99	41	99	99	34	99	33	33		18	
17	31	98	99	33	97	99	30	98	21	26		17	
16	26	93	98	24	94	98	24	93	16	19		16	
15	21	90	94	14	88	96	19	89	12	13		15	
14	15	85	88	07	83	93	15	83	08	08		14	
13	11	78	80	02	75	85	09	76	06	05		13	
12	09	72	72	01	66	77	06	69	04	02		12	
11	06	64	62	01	57	65	03	59	02	01		11	
10	04	55	49	01	48	54	01	49	01	01		10	
09	03	44	37	01	39	39	01	39	01	01		09	
08	02	34	25	01	30	23	01	28	01	01		08	
07	01	25	16	01	19	14	01	17	01	01		07	
06	01	17	10	01	08	09	01	10	01	01		06	
05	01	10	06	01	03	05	01	06	01	01		05	
04	01	06	03	01	01	02	01	03	01	01		04	
03	01	02	01	01	01	01	01	01	01	01		03	
02	01	01	01	01	01	01	01	01	01	01		02	
01	01	01	01	01	01	01	01	01	01	01		01	
<b>Mean</b>	<b>20.6</b>	<b>10.3</b>	<b>10.6</b>	<b>20.8</b>	<b>10.9</b>	<b>10.4</b>	<b>10.4</b>	<b>21.4</b>	<b>10.8</b>	<b>10.9</b>	<b>20.9</b>	<b>21.1</b>	
<b>S.D.</b>	<b>5.9</b>	<b>3.7</b>	<b>3.1</b>	<b>5.1</b>	<b>3.4</b>	<b>2.9</b>	<b>3.0</b>	<b>6.1</b>	<b>3.5</b>	<b>3.8</b>	<b>4.7</b>	<b>4.9</b>	

**Note:** These norms are the source of national and state norms, for multiple-choice tests, printed on ACT score reports during the 2007–2008 testing year. Sample size: 3,668,596.

### 3B

**ACT Writing Test Norms**

Score	Combined English/Writing	Writing
36	99	
35	99	
34	99	
33	99	
32	99	
31	97	
30	95	
29	93	
28	90	
27	86	
26	82	
25	77	
24	72	
23	66	
22	57	
21	51	
20	42	
19	35	
18	29	
17	23	
16	19	
15	14	
14	10	
13	7	
12	5	99
11	4	99
10	2	98
9	1	89
8	1	77
7	1	44
6	1	29
5	1	9
4	1	5
3	1	1
2	1	1
1	1	
<b>Mean</b>	<b>21.4</b>	<b>7.5</b>
<b>S.D.</b>	<b>5.4</b>	<b>1.7</b>

**Note:** These norms are the source of the Writing Test norms printed on the ACT score reports of students who take the optional Writing Test during 2007–2008. Sample size: 1,718,228.

## Six-Point Holistic Scoring Rubric for the ACT Writing Test

Papers at each level exhibit *all* or *most* of the characteristics described at each score point.

### Score = 6

**Essays within this score range demonstrate effective skill in responding to the task.**

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a critical context for discussion. The essay addresses complexity by examining different perspectives on the issue, or by evaluating the implications and/or complications of the issue, or by fully responding to counterarguments to the writer's position. Development of ideas is ample, specific, and logical. Most ideas are fully elaborated. A clear focus on the specific issue in the prompt is maintained. The organization of the essay is clear: the organization may be somewhat predictable or it may grow from the writer's purpose. Ideas are logically sequenced. Most transitions reflect the writer's logic and are usually integrated into the essay. The introduction and conclusion are effective, clear, and well developed. The essay shows a good command of language. Sentences are varied and word choice is varied and precise. There are few, if any, errors to distract the reader.

### Score = 5

**Essays within this score range demonstrate competent skill in responding to the task.**

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a broad context for discussion. The essay shows recognition of complexity by partially evaluating the implications and/or complications of the issue, or by responding to counterarguments to the writer's position. Development of ideas is specific and logical. Most ideas are elaborated, with clear movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained. The organization of the essay is clear, although it may be predictable. Ideas are logically sequenced, although simple and obvious transitions may be used. The introduction and conclusion are clear and generally well developed. Language is competent. Sentences are somewhat varied and word choice is sometimes varied and precise. There may be a few errors, but they are rarely distracting.

### Score = 4

**Essays within this score range demonstrate adequate skill in responding to the task.**

The essay shows an understanding of the task. The essay takes a position on the issue and may offer some context for discussion. The essay may show some recognition of complexity by providing some response to counterarguments to the writer's position. Development of ideas is adequate, with some movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained throughout most of the essay. The organization of the essay is apparent but predictable. Some evidence of logical sequencing of ideas is apparent, although most transitions are simple and obvious. The introduction and conclusion are clear and somewhat developed. Language is adequate, with some sentence variety and appropriate word choice. There may be some distracting errors, but they do not impede understanding.

### Score = 3

**Essays within this score range demonstrate some developing skill in responding to the task.**

The essay shows some understanding of the task. The essay takes a position on the issue but does not offer a context for discussion. The essay may acknowledge a counterargument to the writer's position, but its development is brief or unclear. Development of ideas is limited and may be repetitious, with little, if any, movement between general statements and specific reasons, examples, and details. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. The organization of the essay is simple. Ideas are logically grouped within parts of the essay, but there is little or no evidence of logical sequencing of ideas. Transitions, if used, are simple and obvious. An introduction and conclusion are clearly discernible but underdeveloped. Language shows a basic control. Sentences show a little variety and word choice is appropriate. Errors may be distracting and may occasionally impede understanding.

### Score = 2

**Essays within this score range demonstrate inconsistent or weak skill in responding to the task.**

The essay shows a weak understanding of the task. The essay may not take a position on the issue, or the essay may take a position but fail to convey reasons to support that position, or the essay may take a position but fail to maintain a stance. There is little or no recognition of a counterargument to the writer's position. The essay is thinly developed. If examples are given, they are general and may not be clearly relevant. The essay may include extensive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. There is some indication of an organizational structure, and some logical grouping of ideas within parts of the essay is apparent. Transitions, if used, are simple and obvious, and they may be inappropriate or misleading. An introduction and conclusion are discernible but minimal. Sentence structure and word choice are usually simple. Errors may be frequently distracting and may sometimes impede understanding.

### Score = 1

**Essays within this score range show little or no skill in responding to the task.**

The essay shows little or no understanding of the task. If the essay takes a position, it fails to convey reasons to support that position. The essay is minimally developed. The essay may include excessive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is usually maintained, but focus on the specific issue in the prompt may not be maintained. There is little or no evidence of an organizational structure or of the logical grouping of ideas. Transitions are rarely used. If present, an introduction and conclusion are minimal. Sentence structure and word choice are simple. Errors may be frequently distracting and may significantly impede understanding.

### No Score

**Blank, Off-Topic, Illegible, Not in English, or Void**

## How to Score the Writing Test

Two trained readers will score each essay on the actual Writing Test. These readers are trained by reading examples of papers at each score point and by scoring many practice papers. They are given detailed feedback on the correctness of their scores during practice. During actual scoring, score differences of more than one point will be evaluated by a third trained reader to resolve discrepancies. This method is designed to be as objective and impartial as possible. So—how can you rate your *own* practice Writing Test?

It is difficult to be objective about one's own work, and you have not had the extensive training provided to actual readers of the ACT Writing Test. However, it is to your advantage to read your own writing critically. Becoming your own editor helps you grow as a writer and as a reader. So it makes sense for you to evaluate your own practice essay. It may also be helpful for you to give your practice essay to another reader to get another perspective: perhaps that of a classmate, a parent, or an English teacher, for example. Thinking and talking with others about writing is good preparation for the ACT Writing Test. To rate your essay, you and your reader(s) should read the scoring guidelines and examples, which begin below and continue through page 71, and then assign your practice essay a score of 1 through 6.

In an actual test, each essay will be scored on a scale from 1 (low) through 6 (high). The score is based on the overall impression that is created by all the elements of the writing. The scores given by the two readers are added together, yielding the Writing subscore range 2–12 shown in Table 4 on page 72.

## Scoring Guidelines (see page 66)

These are the guidelines that will be used to score your essay. These guidelines are also called a “rubric.” Many papers do not fit the exact description at each score point. You should note that the rubric says: “Papers at each level exhibit *all* or *most* of the characteristics in the descriptors.” To score your paper, read it and try to determine which score point and paragraph in the rubric best describes most of the characteristics of your essay.

Then (because your Writing Test subscore is the sum of two readers' ratings of your essay), you should multiply your 1–6 score by 2 when you use Table 4, on page 72, to find your Combined English/Writing score. Or, if both you and someone else read and score your practice essay, add those scores together.

## Comparing Your Scores

The Writing Test norms table (Table 3B on page 65) allows you to compare your score on the practice Writing Test with the scores of recent high school graduates who took the ACT Plus Writing as sophomores, juniors, or seniors. The norms for the Writing Test are reported the same way as the norms for the multiple-choice tests (see page 59). For example, a Writing subscore of 8 has a cumulative percent of 77. This means that 77% of students had a Writing subscore of 8 or lower. Remember that your scores and percents at or below are only *estimates* of the scores you will obtain on an actual administration of the ACT Plus Writing. They should be considered in connection with your performance on other essay tests and your planned college curriculum.

## College Readiness Standards

The College Readiness Standards for Writing (see page 59) can be found at [www.act.org/standard](http://www.act.org/standard).

## Example Essays and Scoring Explanations

Readers for the ACT Writing Test practice by scoring many essays before they score “live” essays. Although we cannot provide you with the same extensive training these readers receive, reading the example essays that follow will help you better understand some of the characteristics of essays at each score point. You will also be able to read a brief explanation of how each essay was scored. The example essays are in response to the practice prompt on page 58.

---

### Score = 1

The funding should be used to buy magazines. Some magazines are only for entertainment but some talk about politics and the world. Even the more popular magazine for kids will be chosen, its still the best thing to do. Students like to read about what tells them what movie stars lives are like.

### Score Point 1 Scoring Explanation

This essay shows little engagement with the prompt task. The writer does take a clear position (*The funding should be used to buy magazines*) but little is developed in support of that position. Two ideas are offered (*Some magazines are only for entertainment but some talk about politics and the world* and *Students like to read about what tells them what movie stars lives are like*). Both ideas are left unexplored and unexplained. No organization is evident. Transitions (*even, still*) are used but are unclear. No introduction or conclusion is present, unless the statement of position is considered an introduction. The essay's language is clear at the beginning, but later becomes hard to understand. Language errors and a lack of logical sequencing of ideas are also problems.

---

**Score = 2**

Popular magazines would be a good thing, it would pull students into the library and encourage them to read. Some articles in magazines have nothing to do with school, but it still encourages students to read more. Reading is education, no matter if its talking about academics or not.

Many of the subjects in the magazine are school related. If an article is about a girl from another country talking about how she lives, that's school related because it has to do with geography. If it's an article about some part of the body, then that has to do with science.

**Score Point 2  
Scoring Explanation**

Essays that earn a score of 2 demonstrate either weak or inconsistent skill in responding to the task. In this essay, the writer takes a clear position (*Popular magazines would be a good thing*) and offers specific supporting reasons (*it would pull students into the library and encourage them to read, and Many of the subjects in the magazine are school related*) but development of these reasons is thin. The writer does attempt to explain the second claim with examples (*If an article is about a girl from another country . . . that's . . . geography. If it's . . . the body, then . . . science*), but much more explanation is needed. The second paragraph might be understood to be responding to a counterargument from the prompt that the magazines aren't related to academic subjects. If so, it is a faint reference that should be clearer. The essay indicates organizational structure by separating the two ideas into two separate paragraphs. However, there is no discernible introduction or conclusion. Language use in the essay contains a variety of errors that distract the reader, including a run-on sentence, disagreements of subject and verb, and several misspellings.

---

**Score = 3**

I feel that schools should not subscribe to popular magazines. Sometimes the magazine articles are misleading and don't tell the truth. And some students may not know between right and wrong. I get Seventeen magazine every month. There are some subjects in the articles that I feel should not be allowed, or maybe edited. They put in college searches which are helpful, but other articles have girls talking about things that are not right. Not everybody should be reading them. Why should schools subscribe to magazines that have articles that are not right. These articles could make teenagers spend too much time thinking about things that are misleading or not right or a waist of time. Teenagers are sometimes too young to read some of the articles that the popular magazines have.

Also, popular magazines will not help students to be encouraged to read. Popular magazines have short articles that are based on opinion and gossip and they are filled with quizzes and advertisements and how to loose weight. The advertisements show skinny girls and the articles about loosing weight are not good. They are bad for teenagers to see and to read. And the other articles are a waist of time too because they are full of gossip and mostly pictures. If school libraries really want to help students, they need to subscribe to magazines that are academic, like Time and National Geographic.

There is no reason to subscribe to any other kind of popular magazines. If schools libraries did, they would find that popular magazines give students something to do instead of the research they should use the library for. It would be a perfect excuse for hanging out to just look at magazines with their friends. School libraries should not subscribe to popular magazines, especially when funding is limited.

**Score Point 3  
Scoring Explanation**

Essays that earn a score of 3 show some developing skill in responding to the task. This essay takes a clear position but does not provide any context for the discussion. A counterargument taken from the prompt is vaguely referenced and refuted (*popular magazines will not help students to be encouraged to read*), but further clarification is needed to explain why short, gossipy articles are of no use in encouraging students to read. The essay contains limited movement between general statements and specific examples (*They put in college searches which are helpful, but other articles have girls talking about things that are not right.*). Focus on the specific issue in the prompt wavers because of the somewhat vague discussion the writer gives on the general, negative aspects of popular magazines (*These articles could make teenagers spend too much time thinking about things that are misleading or not right or a waist of time*). All the ideas would benefit from more development. This writer's ideas are grouped logically throughout the essay. There is only a single use of a transition (*Also*). The opening and closing sentences clearly signal an introduction and conclusion, but they lack development. The language usage in this essay demonstrates basic control. Sentences are somewhat varied in length and structure, and words are used correctly. Language errors are at times distracting.



---

**Score = 4**

High school libraries have only a very limited fund. The big question is how do they spend the fund. Some people think only the magazines that are about academics should be bought, but others point out that if students are interested in what is being read, they will read more, learn more and like school more. This second group is exactly right.

First, anytime someone reads, their learning. Studies show that students who read thirty minutes a day in their free time perform better than those who don't. Students are not going to want to pick up Shakespeare in their study hall, they're going to pick up "Seventeen." If you want them to get in that thirty minutes, you have to give them something they will actually open and look at. Remember its not what we're reading, its just the reading that counts.

Also, popular magazines can help students learn about current events. Its important to keep up with information that hasn't had time to get in the textbooks yet. Many popular magazines contain articles about new health discoveries, wars and events in other countries, and can even provide resources for research papers. This is important for our education.

Most importantly, popular magazines offer a break from the stress of schoolwork. After hours of listening to lectures and taking tests, people need to relax by reading something fun. If their is nothing fun to read, a bad attitude could develop toward libraries and school. This could hurt students much more than it would "hurt" us to read about movie stars and new music during study hall.

In conclusion, for student's mental health, knowledge, and love of reading, popular magazines should stay in our library. While some people may want to debate the issue, the right decision is clear. Interesting magazines are important for students in lots of ways.

---

**Score Point 4  
Scoring Explanation**

Essays that earn a score of 4 demonstrate adequate skill in responding to the task. This essay takes a position on the issue presented in the prompt, but first offers a context for the discussion, and recognizes two different perspectives. The essay offers three ideas to support the writer's position (*anytime someone reads, their learning; popular magazines can help students learn about current events; and popular magazines offer a break*) with adequate development of each idea. The writer moves ably between general statements and some specific details (*Shakespeare/"Seventeen", health discoveries, wars, hours listening to lectures and taking tests*) and maintains focus throughout the discussion. The essay is clearly organized around a simple five-paragraph framework. The sequencing of ideas is logical, though predictable, and indicated by transitions (*First, Also, Most importantly, In conclusion*). While the transitions are simple and obvious, they are at least effective in moving the reader through the essay systematically. The introduction and conclusion are clear and somewhat developed, with the introduction offering much necessary information to set up the discussion. The conclusion makes very clear the writer's position and reasoning. Language is adequate, with a variety of sentence constructions and correct word usage. Language errors—mostly spelling—are somewhat distracting.

---

**Score = 5**

High school libraries have a dilemma on their hands. Should they buy popular magazines as well as academic books and publications? In a perfect world, our school library would be able to offer everything that's possible and appropriate. But with budget limits throughout the school system, the administration must be sure they're making the best choices of books and magazines, so magazines like "Teen People" and "YM" should not be paid for instead of educational books and publications.

The purpose of school, and school libraries, is learning. Supporters of popular magazines argue that there is something to be learned from any reading material, but I believe some kinds of learning are more important to students futures than other kinds. If the school library has to choose between teaching teenage girls about the achievements of Harriet Tubman and letting them read about their favorite movie star, I know which one I would vote for.

Furthermore, one of the school library's most important functions is offering students the learning resources they might not be able to find or afford on their own. Everybody would agree the school library should have Internet access for the people who don't have a computer at home. Shouldn't the library also offer full sets of encyclopedia, hard cover books and high quality magazines like "National Geographic" to students who can't buy all these materials, especially when they may only need them for one paper all year? On the other hand, anybody can spend \$3.99 at the drugstore to find out about Justin Timberlake's love life if they want to. The school library shouldn't have to finance that. If you're in study hall and you have an urgent celebrity trivia question that just can't wait, you can always use the Internet, at no extra cost to the school.

Reading for pleasure is a great thing, and one of my personal favorite leisure activities, but magazines just for entertainment shouldn't be a priority for school libraries. Learning is the reason for school, and should be first in mind as this decision is made. When funding is so limited, the school library must always put learning materials first.

**Score Point 5  
Scoring Explanation**

Essays that earn a score of 5 show a clear understanding of the task. This writer takes a position ("*Teen People*" and "*YM*" should not be paid for instead of educational books and publications) after establishing a broad context for discussion (*In a perfect world, our school library would be able to offer everything that's possible and appropriate. But with budget limits throughout the school system, the administration must be sure they're making the best choices*). The essay shows recognition of complexity by responding succinctly to counterarguments to the writer's position (*Supporters of popular magazines argue that there is something to be learned from any reading material, but I believe some kinds of learning are more important to students futures than other kinds*). Development of the discussion is specific, with clear movement between claims and the details that explain and support them. Development is also logical, assisted by strong, integrated transitions (*Furthermore, On the other hand*) and carefully sequenced ideas. The introduction and conclusion are both clear and generally well developed, offering necessary context and adding emphasis to clarify the argument. Language is highly competent and engaging, with a lot of sentence variety and some precise word choice (*urgent celebrity trivia question*). Language errors are minimally distracting.

---

**Score = 6**

High schools nowadays are struggling to draw the line between what is “educational” and what is not. School programs are cut based on how much educational content they’re perceived to have. Now the administration is trying to purge the libraries of popular magazines because they contain non academic subjects. It’s important that the library buy dictionaries and encyclopedias, but education purists need to be reminded that if you separate “academic” from “non-academic” too strictly, you separate school from the real world it’s supposed to prepare us for.

Educators are the ones who tell us we should spend more time reading. The only way to build the reading comprehension and vocabulary skills so important for getting into and through college is to practice, and that means reading things other than school assignments. No one ever gained reading proficiency from daily struggles through their Chemistry or History textbooks. We read these because we have to, but we would continue reading—even during precious homework free moments—if we had something interesting to turn to. The magazines that teenagers enjoy reading are the ones that cover our interests and address our concerns, like “Seventeen” or “Teen People”. These are the magazines that some would banish from the library.

It’s true that not every page in youth magazines is an intellectual challenge. Many pages show models selling zit cream, or contain “dream date” quizzes. But the critics of popular magazines should take a closer look at them. These same magazines have articles on suicide prevention, the spread of AIDS among teens, and college comparisons—subjects that the adult oriented news media doesn’t cover.

Even the frivolous features have something to teach the reader who wants to learn. All those “Great Looks Cheap” may be a first step toward becoming a smarter consumer. The silly quiz may open up questions about the nature of “scientific proof” or lead to more self-knowledge.

Learning is where you find it, and students may find it in places administrators and librarians might not think to look. Learning can be found in popular magazines as well as approved academic texts. There should be room in the school library for both.

---

**Score Point 6  
Scoring Explanation**

Essays that earn a score of 6 demonstrate effective skill in responding to the task. This writer takes a clear position, develops it throughout the essay, and states it directly in the conclusion (*Learning can be found in popular magazines as well as approved academic texts*). This position is placed in a wider context without disrupting the essay’s focus (*High schools nowadays are struggling to draw the line between what is “educational” and what is not. School programs are cut based on how much educational content they’re perceived to have*).

The essay addresses complexity by anticipating counterarguments to the writer’s position (*It’s true that not every page in youth magazines is an intellectual challenge*) and fully responding to those counterarguments by showing specifically where they are weak (*These same magazines have articles on suicide prevention, the spread of AIDS among teens, and college comparisons—subjects that the adult oriented news media doesn’t cover*).

The writer’s ideas may not be developed evenly throughout all the paragraphs, but their development is succinct and logical. The essay elaborates on general statements (*Even the frivolous features have something to teach the reader who wants to learn*) by moving to more specific details and examples (*All those “Great Looks Cheap” may be a first step toward becoming a smarter consumer*).

The organization of the essay is clear and the logical sequence of ideas grows out of the writer’s intent to persuade. Transitions help the essay flow smoothly from one paragraph to the next (*It’s true that not every page in youth magazines is an intellectual challenge.... Even the frivolous features have something to teach the reader who wants to learn*). The introduction is clear and especially well developed, connecting the writer’s position to a strong critical claim (*if you separate “academic” from “non-academic” too strictly, you separate school from the real world it’s supposed to prepare us for*).

This essay shows a good command of language. Word choice is precise and persuasive (*purge the libraries, frivolous features*). Facility with words and sentence structure enables the writer to maintain a light, amused tone (*The silly quiz may open up questions about the nature of “scientific proof” or lead to more self-knowledge*). There are few language errors in this essay, and they rarely distract the reader.

## TABLE 4

### Calculating Your Combined English/Writing Score

Complete these steps to calculate your Combined English/Writing score for your practice tests.

1. Locate your scale score for the English Test on page 63 and enter it here: \_\_\_\_\_.
2. Enter your Writing Test score (1–6) here \_\_\_\_\_ and double it to get your Writing subscore (2–12): \_\_\_\_\_  
(If two people read and scored your Writing Test, add those two scores to get your Writing subscore.)
3. Use the table below to find your Combined English/Writing score.

- First, circle your ACT English Test score in the left column.
- Second, circle your ACT Writing subscore at the top of the table.

- Finally, follow the English Test score row across and the Writing subscore column down until the two meet. Circle the Combined English/Writing score where the row and column meet. (For example, for an English Test score of 19 and a Writing subscore of 6, the Combined English/Writing score is 18.)
4. Using the number you circled in the table below, write your Combined English/Writing score here: \_\_\_\_\_.  
(The highest possible Combined English/Writing score is 36 and the lowest possible score is 1.)

ACT English Test score \_\_\_\_\_

Writing subscore \_\_\_\_\_

**Combined English/Writing Score** \_\_\_\_\_  
(from table below)

<b>Combined English/Writing Scale Scores</b>											
English Test Score	Writing Subscore										
	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	6	7	8	9	10	11
3	2	3	4	5	6	7	8	9	10	11	12
4	3	4	5	6	7	8	9	10	11	12	13
5	4	5	6	7	8	9	10	11	12	12	13
6	5	6	7	7	8	9	10	11	12	13	14
7	5	6	7	8	9	10	11	12	13	14	15
8	6	7	8	9	10	11	12	13	14	15	16
9	7	8	9	10	11	12	13	13	14	15	16
10	8	9	9	10	11	12	13	14	15	16	17
11	8	9	10	11	12	13	14	15	16	17	18
12	9	10	11	12	13	14	15	16	17	18	19
13	10	11	12	13	14	14	15	16	17	18	19
14	10	11	12	13	14	15	16	17	18	19	20
15	11	12	13	14	15	16	17	18	19	20	21
16	12	13	14	15	16	17	18	19	20	20	21
17	13	14	15	16	16	17	18	19	20	21	22
18	13	14	15	16	17	18	19	20	21	22	23
19	14	15	16	17	18	19	20	21	22	23	24
20	15	16	17	18	19	20	21	21	22	23	24
21	16	17	17	18	19	20	21	22	23	24	25
22	16	17	18	19	20	21	22	23	24	25	26
23	17	18	19	20	21	22	23	24	25	26	27
24	18	19	20	21	22	23	23	24	25	26	27
25	18	19	20	21	22	23	24	25	26	27	28
26	19	20	21	22	23	24	25	26	27	28	29
27	20	21	22	23	24	25	26	27	28	28	29
28	21	22	23	24	24	25	26	27	28	29	30
29	21	22	23	24	25	26	27	28	29	30	31
30	22	23	24	25	26	27	28	29	30	31	32
31	23	24	25	26	27	28	29	30	30	31	32
32	24	25	25	26	27	28	29	30	31	32	33
33	24	25	26	27	28	29	30	31	32	33	34
34	25	26	27	28	29	30	31	32	33	34	35
35	26	27	28	29	30	31	31	32	33	34	35
36	26	27	28	29	30	31	32	33	34	35	36

# The ACT® PLUS WRITING 2008-2009 Answer Folder

**A NAME, MAILING ADDRESS, AND TELEPHONE**  
(Please print.)

Last Name \_\_\_\_\_ First Name \_\_\_\_\_ MI (Middle Initial) \_\_\_\_\_

House Number & Street (Apt. No.) or PO Box & No.; or RR & No. \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_ ZIP/Postal Code \_\_\_\_\_

Area Code \_\_\_\_\_ Number \_\_\_\_\_ Country \_\_\_\_\_

**B MATCH NAME**  
(First 5 letters of last name)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A	A	A	A	A
B	B	B	B	B
C	C	C	C	C
D	D	D	D	D
E	E	E	E	E
F	F	F	F	F
G	G	G	G	G
H	H	H	H	H
I	I	I	I	I
J	J	J	J	J
K	K	K	K	K
L	L	L	L	L
M	M	M	M	M
N	N	N	N	N
O	O	O	O	O
P	P	P	P	P
Q	Q	Q	Q	Q
R	R	R	R	R
S	S	S	S	S
T	T	T	T	T
U	U	U	U	U
V	V	V	V	V
W	W	W	W	W
X	X	X	X	X
Y	Y	Y	Y	Y
Z	Z	Z	Z	Z

**C MATCH NUMBER**  
(Registered examinees only)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
0	0	0	0	0	0	0	0	0	0

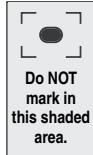
**D DATE OF BIRTH**

Month	Day	Year
<input type="radio"/> Jan.		
<input type="radio"/> Feb.		
<input type="radio"/> March	<input type="radio"/> 1	<input type="radio"/> 1
<input type="radio"/> April	<input type="radio"/> 2	<input type="radio"/> 2
<input type="radio"/> May	<input type="radio"/> 3	<input type="radio"/> 3
<input type="radio"/> June	<input type="radio"/> 4	<input type="radio"/> 4
<input type="radio"/> July	<input type="radio"/> 5	<input type="radio"/> 5
<input type="radio"/> Aug.	<input type="radio"/> 6	<input type="radio"/> 6
<input type="radio"/> Sept.	<input type="radio"/> 7	<input type="radio"/> 7
<input type="radio"/> Oct.	<input type="radio"/> 8	<input type="radio"/> 8
<input type="radio"/> Nov.	<input type="radio"/> 9	<input type="radio"/> 9
<input type="radio"/> Dec.	<input type="radio"/> 0	<input type="radio"/> 0

Read the directions below before you begin.

**REGISTERED examinees MUST complete blocks A, B, C, and D.** Print the requested information in block A. Then, enter the **MATCHING INFORMATION** in blocks B, C, and D **EXACTLY** as it appears on your admission ticket, even if any of the information is missing or incorrect. Fill in the corresponding ovals. If you do not complete these blocks to match your admission ticket **EXACTLY**, your scores will be delayed up to 7 weeks. Leave blocks E and F blank.

**STANDBY examinees (U.S. and Canada only) MUST complete blocks A, B, D, E, and F.** Print the requested information in block A. Then, enter your identifying information in blocks B and D and fill in the corresponding ovals. Leave block C blank. Enter your Social Security number (SSN) in block E and fill in the corresponding ovals. The SSN will be used to help match your answer document to the registration folder you turned in today. It will be included on reports issued to your college choices. If you do not know your SSN or do not wish to provide it, leave it blank. Fill in the Standby Testing oval in block F.



↓ **STANDBY TESTING ONLY** ↓

**E SOCIAL SECURITY NUMBER**  
(Standby examinees only)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
0	0	0	0	0	0	0	0	0	0

**F STANDBY TESTING**

Fill in the oval below **ONLY** if you turned in a standby registration folder at the test center today.

Yes, I am testing as a standby.

**USE A SOFT LEAD NO. 2 PENCIL ONLY.**  
(Do NOT use a mechanical pencil, ink, ballpoint, correction fluid, or felt-tip pen.)

**EXAMINEE STATEMENT AND SIGNATURE:** After testing, the test administrator will instruct you to complete this section. Read the statement below.

**Statement:** I agree to the conditions set forth in the ACT registration booklet or website instructions for this exam, including the arbitration and dispute remedy provisions. I understand that I cannot share any test questions, responses, or essay topics with anyone by any form of communication.

Now, copy only the certification below on the lines provided in cursive (do not print) and sign your name as you would any official document. If you cannot copy the certification in cursive, your test administrator will give you instructions.

**Certification:** *I agree to the statement above and certify that I am the person whose name and address appear on this form.*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Your Signature

Today's Date



PLEASE DO NOT WRITE IN THIS AREA.

**SERIAL #**

Cut Here

**Marking Directions:** Mark only **one** oval for each question. Fill in response completely. Erase errors cleanly without smudging.

**Correct mark:**

**Do NOT use these incorrect or bad marks.**

Incorrect marks:

Overlapping mark:

Cross-out mark:

Smudged erasure:

Mark is too light:

**BOOKLET NUMBER**

1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
0	0	0	0	0	0

**FORM**

--	--	--

**BE SURE TO FILL IN THE CORRECT FORM OVAL.**

0661C

Print your 3-character **Test Form** in the boxes above and fill in the corresponding oval at the right.

**TEST 1**

- |              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D)  | 14 (F G H J) | 27 (A B C D) | 40 (F G H J) | 53 (A B C D) | 66 (F G H J) |
| 2 (F G H J)  | 15 (A B C D) | 28 (F G H J) | 41 (A B C D) | 54 (F G H J) | 67 (A B C D) |
| 3 (A B C D)  | 16 (F G H J) | 29 (A B C D) | 42 (F G H J) | 55 (A B C D) | 68 (F G H J) |
| 4 (F G H J)  | 17 (A B C D) | 30 (F G H J) | 43 (A B C D) | 56 (F G H J) | 69 (A B C D) |
| 5 (A B C D)  | 18 (F G H J) | 31 (A B C D) | 44 (F G H J) | 57 (A B C D) | 70 (F G H J) |
| 6 (F G H J)  | 19 (A B C D) | 32 (F G H J) | 45 (A B C D) | 58 (F G H J) | 71 (A B C D) |
| 7 (A B C D)  | 20 (F G H J) | 33 (A B C D) | 46 (F G H J) | 59 (A B C D) | 72 (F G H J) |
| 8 (F G H J)  | 21 (A B C D) | 34 (F G H J) | 47 (A B C D) | 60 (F G H J) | 73 (A B C D) |
| 9 (A B C D)  | 22 (F G H J) | 35 (A B C D) | 48 (F G H J) | 61 (A B C D) | 74 (F G H J) |
| 10 (F G H J) | 23 (A B C D) | 36 (F G H J) | 49 (A B C D) | 62 (F G H J) | 75 (A B C D) |
| 11 (A B C D) | 24 (F G H J) | 37 (A B C D) | 50 (F G H J) | 63 (A B C D) |              |
| 12 (F G H J) | 25 (A B C D) | 38 (F G H J) | 51 (A B C D) | 64 (F G H J) |              |
| 13 (A B C D) | 26 (F G H J) | 39 (A B C D) | 52 (F G H J) | 65 (A B C D) |              |

**TEST 2**

- |                |                |                |                |                |                |
|----------------|----------------|----------------|----------------|----------------|----------------|
| 1 (A B C D E)  | 11 (A B C D E) | 21 (A B C D E) | 31 (A B C D E) | 41 (A B C D E) | 51 (A B C D E) |
| 2 (F G H J K)  | 12 (F G H J K) | 22 (F G H J K) | 32 (F G H J K) | 42 (F G H J K) | 52 (F G H J K) |
| 3 (A B C D E)  | 13 (A B C D E) | 23 (A B C D E) | 33 (A B C D E) | 43 (A B C D E) | 53 (A B C D E) |
| 4 (F G H J K)  | 14 (F G H J K) | 24 (F G H J K) | 34 (F G H J K) | 44 (F G H J K) | 54 (F G H J K) |
| 5 (A B C D E)  | 15 (A B C D E) | 25 (A B C D E) | 35 (A B C D E) | 45 (A B C D E) | 55 (A B C D E) |
| 6 (F G H J K)  | 16 (F G H J K) | 26 (F G H J K) | 36 (F G H J K) | 46 (F G H J K) | 56 (F G H J K) |
| 7 (A B C D E)  | 17 (A B C D E) | 27 (A B C D E) | 37 (A B C D E) | 47 (A B C D E) | 57 (A B C D E) |
| 8 (F G H J K)  | 18 (F G H J K) | 28 (F G H J K) | 38 (F G H J K) | 48 (F G H J K) | 58 (F G H J K) |
| 9 (A B C D E)  | 19 (A B C D E) | 29 (A B C D E) | 39 (A B C D E) | 49 (A B C D E) | 59 (A B C D E) |
| 10 (F G H J K) | 20 (F G H J K) | 30 (F G H J K) | 40 (F G H J K) | 50 (F G H J K) | 60 (F G H J K) |

**TEST 3**

- |             |              |              |              |              |              |
|-------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D) | 8 (F G H J)  | 15 (A B C D) | 22 (F G H J) | 29 (A B C D) | 36 (F G H J) |
| 2 (F G H J) | 9 (A B C D)  | 16 (F G H J) | 23 (A B C D) | 30 (F G H J) | 37 (A B C D) |
| 3 (A B C D) | 10 (F G H J) | 17 (A B C D) | 24 (F G H J) | 31 (A B C D) | 38 (F G H J) |
| 4 (F G H J) | 11 (A B C D) | 18 (F G H J) | 25 (A B C D) | 32 (F G H J) | 39 (A B C D) |
| 5 (A B C D) | 12 (F G H J) | 19 (A B C D) | 26 (F G H J) | 33 (A B C D) | 40 (F G H J) |
| 6 (F G H J) | 13 (A B C D) | 20 (F G H J) | 27 (A B C D) | 34 (F G H J) |              |
| 7 (A B C D) | 14 (F G H J) | 21 (A B C D) | 28 (F G H J) | 35 (A B C D) |              |

**TEST 4**

- |             |              |              |              |              |              |
|-------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D) | 8 (F G H J)  | 15 (A B C D) | 22 (F G H J) | 29 (A B C D) | 36 (F G H J) |
| 2 (F G H J) | 9 (A B C D)  | 16 (F G H J) | 23 (A B C D) | 30 (F G H J) | 37 (A B C D) |
| 3 (A B C D) | 10 (F G H J) | 17 (A B C D) | 24 (F G H J) | 31 (A B C D) | 38 (F G H J) |
| 4 (F G H J) | 11 (A B C D) | 18 (F G H J) | 25 (A B C D) | 32 (F G H J) | 39 (A B C D) |
| 5 (A B C D) | 12 (F G H J) | 19 (A B C D) | 26 (F G H J) | 33 (A B C D) | 40 (F G H J) |
| 6 (F G H J) | 13 (A B C D) | 20 (F G H J) | 27 (A B C D) | 34 (F G H J) |              |
| 7 (A B C D) | 14 (F G H J) | 21 (A B C D) | 28 (F G H J) | 35 (A B C D) |              |

**ACT STUDENT REVIEW:** The test administrator will give you instructions for completing this section.



**Student Review:** Your responses to these items will assist ACT and your test center in providing the best possible conditions for testing and planning for the future. Fill in the oval indicating your response to each item printed on the back of your test booklet.

- |                         |                       |                          |                       |                          |                       |
|-------------------------|-----------------------|--------------------------|-----------------------|--------------------------|-----------------------|
| Yes                     | No                    | Yes                      | No                    | Yes                      | No                    |
| 1 <input type="radio"/> | <input type="radio"/> | 6 <input type="radio"/>  | <input type="radio"/> | 11 <input type="radio"/> | <input type="radio"/> |
| 2 <input type="radio"/> | <input type="radio"/> | 7 <input type="radio"/>  | <input type="radio"/> | 12 <input type="radio"/> | <input type="radio"/> |
| 3 <input type="radio"/> | <input type="radio"/> | 8 <input type="radio"/>  | <input type="radio"/> | 13 <input type="radio"/> | <input type="radio"/> |
| 4 <input type="radio"/> | <input type="radio"/> | 9 <input type="radio"/>  | <input type="radio"/> | 14 <input type="radio"/> | <input type="radio"/> |
| 5 <input type="radio"/> | <input type="radio"/> | 10 <input type="radio"/> | <input type="radio"/> | 15 <input type="radio"/> | <input type="radio"/> |

**Please enter the information at the right before beginning the Writing Test.**

**Use a soft lead No. 2 pencil only. Do NOT use a mechanical pencil, ink, ballpoint, or felt-tip pen.**

**WRITING TEST BOOKLET NUMBER**

Print your 6-digit Booklet Number in the boxes at the right.

--	--	--	--	--	--

**WRITING TEST FORM**

--	--	--

Print your 3-character Test Form in the boxes above and fill in the corresponding oval at the right.

06A

**Begin WRITING TEST here.**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**If you need more space, please continue on the next page.**

IM-178694-001:654321

**Do not write in this shaded area.**

Cut Here

**WRITING TEST**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**If you need more space, please continue on the back of this page.**

2

**Do not write in this shaded area.**



WRITING TEST

Lined writing area consisting of 25 horizontal lines.

Cut Here

If you need more space, please continue on the next page.

3

PLEASE DO NOT WRITE IN THIS AREA.



SERIAL #



# Practice Test #5



## ENGLISH TEST

45 Minutes—75 Questions

**DIRECTIONS:** In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose “NO CHANGE.” In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

## PASSAGE I

## The Triangular Snowflake

[1]

Snowflakes form from tiny water droplets, following a specific process of chemical bonding as they freeze, which results in a six-sided figure. The rare “triangular” snowflake, similarly, confounded scientists for years because it apparently defied the basic laws of chemistry. [A] The seemingly triangular shape of those snowflakes suggests that forming through a different process of chemical bonding. [B] By re-creating snowflake formation, a discovery has revealed to scientists Kenneth Libbrecht and Hannah Arnold the cause of this apparent variation.

[2]

Snowflakes begin to form when water in the atmosphere freezes it causes the water molecules to bond into a hexagonal shape. During the flake’s descent from Earth’s upper atmosphere, other water vapor molecules bumps into the hexagonal structure.

- A. NO CHANGE  
 B. form, from tiny, water droplets,  
 C. form from tiny, water, droplets  
 D. form, from tiny water droplets
- F. NO CHANGE  
 G. for example,  
 H. additionally,  
 J. however,
- A. NO CHANGE  
 B. the manner in which formation  
 C. which had formed  
 D. that they form
- F. NO CHANGE  
 G. the discovery of the cause of this apparent variation has been made by scientists Kenneth Libbrecht and Hannah Arnold.  
 H. scientists Kenneth Libbrecht and Hannah Arnold have discovered the cause of this apparent variation.  
 J. the cause of this apparent variation has been discovered by scientists Kenneth Libbrecht and Hannah Arnold.
- A. NO CHANGE  
 B. freezes, causing  
 C. freezes, it causes  
 D. freezes, this causes
- F. NO CHANGE  
 G. has bumped  
 H. bumped  
 J. bump



Bypassing the liquid water phase, those molecules  
condense directly onto the established hexagonal pattern.

As a result, the flake grows outward into bigger and more complex hexagonal arrangements surrounding the original hexagonal shape at the center of the flake. [C]

[3]

In 2009, Libbrecht and Arnold's experiments revealed that triangular snowflakes begin with the same process of chemical bonding and forms a hexagonal shape. The triangular shape is an illusion resulting from

one significant addition to the process dust.

[4]

Triangular snowflakes begin to form when a tiny dust particle or other such impurity collides with the flake as it falls, thereby pushing one edge upward. [D] The downward edge of the snowflake encounters more wind resistance than the rest of the flake. The greater the pressure from the wind, causes bonds to form

quick at this edge than in the rest of the snowflake.

[5]

The resulting snowflake has three long sides and three sides that are so short they are difficult to detect. Although these snowflakes appear to have a triangular shape—they actually have a hexagonal pattern. Such snowflakes offer evidence that even when impurities

interfere, the basic laws of chemistry still apply.

7. If the writer were to delete the underlined portion (adjusting the capitalization as needed), the sentence would primarily lose:

- A. an explanation of the process water molecules undergo to change from liquid to vapor to solid.
- B. a detail that mentions a step some water molecules skip in changing from vapor to solid.
- C. a visual description of what water vapor molecules look like.
- D. an explanation of how molecules react to various air temperatures.

8. F. NO CHANGE  
G. were they to form  
H. if they formed  
J. form

9. A. NO CHANGE  
B. process is  
C. process:  
D. process;

10. F. NO CHANGE  
G. pressure from the wind, which  
H. the pressure, as the wind  
J. pressure from the wind

11. A. NO CHANGE  
B. more quickly  
C. most quickly  
D. quickest

12. F. NO CHANGE  
G. shape,  
H. shape;  
J. shape:

13. Which choice most effectively concludes the sentence and the essay?

- A. NO CHANGE
- B. scientists can be certain that a solution to even the most confusing event will be found.
- C. snowflakes will still fall if atmospheric conditions are favorable.
- D. snowflakes come in many different shapes and sizes.



Questions 14 and 15 ask about the preceding passage as a whole.

14. The writer is considering adding the following sentence to the essay:

This growth can take the form of either branching (which forms stable, symmetrical shapes) or faceting (which forms unstable, complex shapes).

If the writer were to add this sentence, it would most logically be placed at Point:

- F. A in Paragraph 1.
- G. B in Paragraph 1.
- H. C in Paragraph 2.
- J. D in Paragraph 4.

15. Suppose the writer's primary purpose had been to offer an example of a discovery that changed the way scientists viewed the basic laws of chemistry. Would this essay accomplish that purpose?

- A. Yes, because it describes how the observation of triangular snowflakes has led scientists to discover that their understanding of the basic laws of chemistry is flawed.
- B. Yes, because it describes how scientists have applied the knowledge they've gained through studying snowflakes to other areas of chemistry.
- C. No, because it focuses on how scientists are struggling to determine how triangular snowflakes are formed.
- D. No, because it explains that triangular snowflakes appeared to, but don't actually, violate the basic laws of chemistry.

## PASSAGE II

### Climbing Mt. Fuji

[1]

Bundled up in wool sweaters and thick coats, and we watched the sun setting on Mt. Fuji <sup>16</sup> in Japan. It was August and our clothes were stifling,

but we would have needed the warmth from our bodies <sup>17</sup> sealed around us as we hiked into the high altitudes.

Three friends and I stepped away from the crowd of other hikers and spoke our intention: "Sunset at the base, sunrise at the top." [A]

[2]

As we hiked, a patchwork of clouds swept across the darkening sky, hiding all traces of our surroundings outside our flashlights' beams. The trail gradually changed from compact dirt to a jumble of volcanic rocks. [B]

- 16. F. NO CHANGE
- G. coats while watching
- H. coats, we watched
- J. coats watching
- 17. A. NO CHANGE
- B. would need
- C. will need
- D. need



We tried to steady ourselves with our walking sticks but slipped and stumbled because of the jumbled rocks we were slipping on.

18  
[3]

Every thousand feet, we came to a small station constructed of tin and cement, barely able to block the wind. At each one, we noted the roof piled high on fallen rocks and felt both unsettled and reassured by this evidence of the station's protective ability. We rested uneasily for a moment as a clerk burned the station brand into our walking sticks which it was proof of our progress through the darkness.

19  
[4]

As we neared the summit, the whole group of hikers—thinly spread across the mountain for most of

the route—condensed, forming an illuminated line along

the trail. [C] Our pace slowed. Progressing along the trail, we reached the summit just five minutes before dawn. [D]

In the half-light of the rising sun: we began to make

out the dark lines of the cliffs' at the crater's edge.

18. F. NO CHANGE  
G. even though we used our walking sticks.  
H. despite any efforts to remain steady.  
J. with each step.

19. A. NO CHANGE  
B. piling high with  
C. piled high with  
D. piling high on

20. F. NO CHANGE  
G. sticks, it was proof of  
H. sticks, proof of  
J. sticks proved

21. A. NO CHANGE  
B. the most part  
C. majority  
D. more

22. F. NO CHANGE  
G. they formed  
H. there was  
J. we saw

23. Which choice emphasizes the slowness of the ascent and supports the idea that the narrator's group of friends did not set their own pace?  
A. NO CHANGE  
B. Able to advance only a few steps at a time,  
C. Moving forward with each step,  
D. Climbing higher in altitude,

24. F. NO CHANGE  
G. sun—  
H. sun,  
J. sun;

25. A. NO CHANGE  
B. cliff's at the craters'  
C. cliffs at the crater's  
D. cliffs at the craters



We crouched down on jutting pieces of rock and waited for the shifting clouds to clear. We waited for the sun. 26

[5]

Generally, a sudden gap in the clouds left us blinking

<sup>27</sup>

as the sunlight squelched out the severe landscape of gray volcanic rock. We leaned against each other, spent.

<sup>28</sup>

Perhaps there is truth in the old Japanese saying: A wise man climbs Mt. Fuji, but only a fool climbs it twice.

Questions 29 and 30 ask about the preceding passage as a whole.

29. The writer wants to add the following sentence to the essay:

We clipped small flashlights onto our coats, picked up our walking sticks, and started up the trail with the other hikers as the sun dipped below the trees.

The sentence would most logically be placed at Point:

- A. A in Paragraph 1.
- B. B in Paragraph 2.
- C. C in Paragraph 4.
- D. D in Paragraph 4.

26. If the writer were to delete the preceding sentence, the paragraph would primarily lose:

- F. a restatement of an idea that emphasizes the hikers' anticipation when they reached the summit.
- G. a statement that introduces the idea of waiting, which is the focus of the following paragraph.
- H. an unnecessary detail that contradicts information presented earlier in the paragraph.
- J. a clear image that conveys what the hikers saw when they reached the summit.

27. A. NO CHANGE

- B. Furthermore,
- C. Once again,
- D. Finally,

28. Which choice most dramatically emphasizes the ruggedness of the landscape?

- F. NO CHANGE
- G. shattered over
- H. smothered
- J. went over

30. Suppose the writer's primary purpose had been to describe the experience of doing something difficult. Would this essay accomplish that purpose?

- F. Yes, because it tells about a variety of challenges the hikers faced along their journey.
- G. Yes, because it focuses primarily on the hikers' need for walking sticks and other tools to make it up the trail.
- H. No, because it focuses on the rewarding nature of the experience but does not describe the hike as challenging.
- J. No, because it focuses mainly on the beauty of the surrounding landscape.

---

**PASSAGE III**

**The Pottery of Mata Ortiz**

In the early 1950s, a twelve-year-old boy named, Juan Quezada, gathered firewood

<sup>31</sup>

in the mountains near the village of Mata Ortiz in Chihuahua, Mexico. Though he dreamed of becoming an artist, Quezada spent all of his free time selling firewood to help support his family.

31. A. NO CHANGE

- B. boy named Juan Quezada
- C. boy, named Juan Quezada
- D. boy named Juan Quezada,





In the mountains, Quezada found shards of pots, and an occasional complete pot, painted with intricate red and black designs. These were artifacts from his ancestors, the Paquimé (or Casas Grandes) Indians, who lived in the area from about AD 1000 to AD 1400. Fascinated by the geometric designs, Quezada wondered, if he could make pots like these?

33

**34** He dug the clay, soaked it, and tried to shape it into a pot. In time, he figured out how his ancestors had mixed the clay with volcanic ash to keep it from cracking and had used minerals found nearby to create paints. When it was time to paint his pots, Quezada designed his own complex geometric patterns.

As an adult, Quezada found a job with the railroad, but he always made time for his art. By 1976 he was selling pots to travelers and had taught several members of his family how to make pots. Three of Quezada's pots were discovered in a junk shop in New Mexico by anthropologist Spencer MacCallum, who at first thought they were prehistoric. **36**

His search for their creator led him to Mata

37

Ortiz and an eventual partnership with Quezada.

38

- 32.** Which of the following alternatives to the underlined portion would NOT be acceptable?
- F. pots—along with an occasional complete pot—  
 G. pots, along with an occasional complete pot,  
 H. pots, (and an occasional complete pot)  
 J. pots (and an occasional complete pot)
- 33.** A. NO CHANGE  
 B. wondered if he could make pots like these.  
 C. wondered, if he could make pots like these.  
 D. wondered if he could make pots like these?
- 34.** Which of the following true statements would provide the best transition from the preceding paragraph to this paragraph?
- F. The village of Mata Ortiz is only three streets wide but stretches for a mile between the Casas Grandes River and the railroad tracks.  
 G. The patterns on Mata Ortiz pottery that Quezada admired are based on the techniques of the ancient Paquimé.  
 H. Quezada began working with clay from the mountains.  
 J. Quezada's painted designs became increasingly complex.
- 35.** A. NO CHANGE  
 B. a dedication to teaching  
 C. a teacher of  
 D. has taught
- 36.** In the preceding sentence, the clause “who at first thought they were prehistoric” primarily serves to indicate:
- F. how closely Quezada had created his pots within the Paquimé tradition.  
 G. that Quezada's technique as a potter wasn't very well developed yet.  
 H. how strikingly simple Quezada's pots were in shape and design.  
 J. that the style of Quezada's pots was outmoded.
- 37.** A. NO CHANGE  
 B. lead himself  
 C. led himself  
 D. lead him
- 38.** Which choice most strongly suggests that Quezada's partnership with MacCallum was not formed right away upon MacCallum's arrival in Mata Ortiz?
- F. NO CHANGE  
 G. a circumstantial  
 H. a momentary  
 J. a timely

MacCallum showed Quezada's pots to art dealers in the United States, the places in which art galleries were soon<sup>39</sup> offering Quezada thousands of dollars for them.

[1] Quezada helped his village with the money he earned selling pottery, but he wanted to do more so.<sup>40</sup> [2] So he taught people from Mata Ortiz to make pots. [3] Today

there are more than four hundred potters around,<sup>41</sup> all of

which<sup>42</sup> make their pots by hand, following the traditions of the Paquimé Indians. [4] The village is thriving, and many museums proudly display the pottery of Mata Ortiz.

[5] Each artist brought something unique to they're<sup>43</sup>

creations. 44

39. A. NO CHANGE  
 B. and it would happen there that  
 C. where  
 D. DELETE the underlined portion.
40. F. NO CHANGE  
 G. more than that.  
 H. more of them.  
 J. more.
41. A. NO CHANGE  
 B. people creating art now,  
 C. potters in Mata Ortiz,  
 D. DELETE the underlined portion and place a comma after the word *hundred*.
42. F. NO CHANGE  
 G. whom  
 H. them  
 J. who
43. A. NO CHANGE  
 B. his or herselfs  
 C. hers or his  
 D. his or her
44. For the sake of the logic and coherence of this paragraph, Sentence 5 should be placed:  
 F. where it is now.  
 G. before Sentence 1.  
 H. after Sentence 1.  
 J. after Sentence 2.

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer's primary purpose had been to write an essay summarizing the history of pottery making in Mexico. Would this essay accomplish that purpose?
- A. Yes, because it discusses ancient pottery shards and complete pots from the Paquimé Indians and compares that pottery to modern designs.  
 B. Yes, because it demonstrates the quality of the ancient pottery of the Mata Ortiz area.  
 C. No, because it focuses instead on how one artist based his creations on ancient pottery techniques and shared those techniques with other artists.  
 D. No, because it focuses instead on describing the Casas Grandes culture in ancient Mexico.



## PASSAGE IV

**Beaux Arts Architecture in the Spotlight**

On West 45th Street in New York City, wedged between buildings more than twice it's height, stands the Lyceum Theatre. Tourists and New Yorkers

alike regularly filling this theater to its 900-seat capacity. Most are there to attend a performance;

a few, for example, are likely to be architecture buffs

they come to admire the stunning building itself. Built in 1903, the theater exemplifies the Beaux Arts architectural style, which fuses elements of classical Greek and Roman design with Renaissance and Baroque details.

The Beaux Arts revival of classical Greek and Roman architecture is apparent on first view of the theater. The Lyceum's facade—the exterior front, or “face,” of the building—features half a dozen Corinthian columns. Above the columns extends a horizontal stone band called a frieze; carved into it are the classical theatrical

masks that represent comedy and tragedy. 51

46. F. NO CHANGE

G. they're

H. their

J. its

47. A. NO CHANGE

B. alike, regularly filling

C. alike, regularly fill

D. alike regularly fill

48. F. NO CHANGE

G. consequently,

H. however,

J. in fact,

49. A. NO CHANGE

B. there to

C. whom

D. they

50. F. NO CHANGE

G. frieze; into which are carved

H. frieze. Into which are carved

J. frieze, carved into it are

51. The writer is considering adding the following sentence:

Masks figured prominently in classical Greek theater performances, in part due to the fact that one actor would usually play several characters.

Should the writer make this addition here?

A. Yes, because it connects the paragraph's point about theatrical masks to the larger subject of classical Greek theater.

B. Yes, because it explains the masks' significance to classical Greek theater and architecture.

C. No, because it only addresses classical Greek theater and doesn't include information about Roman theater.

D. No, because it deviates from the paragraph's focus on the Lyceum Theatre's architecture.



Demonstrating the Beaux Arts infusion of Renaissance and Baroque details, tall, arched French windows, symmetrically placed between the columns, lighten the imposing gray limestone structure. [A] Above the windows and frieze, an exterior balcony spans the width of the gray building. [B] The balcony is fenced

52

with a balustrade, a stone railing supported by a row of waist-high, vase-shaped pillars. [C] The ornate interior of the building is consistent with its elaborate exterior. [D] Not just one but two marble-finished grand staircases lead from the foyer to the midlevel seating area, called the mezzanine. Inside the theater itself, elegant chandeliers illuminate rose-colored walls

54

that have gold accents. In keeping with sumptuous Beaux Arts style, curved rows of plush purple chairs

55

embrace the stage. [56] [57]

52. F. NO CHANGE  
G. gray limestone  
H. limestone  
J. DELETE the underlined portion.
53. A. NO CHANGE  
B. balustrade. Which is  
C. balustrade. It being  
D. balustrade, this is
54. F. NO CHANGE  
G. elegantly chandelier illuminates  
H. elegantly chandelier illuminate  
J. elegant chandeliers illuminates
55. Which choice maintains the essay's positive tone and most strongly mimics the elaborate style of decor being described at this point in the essay?  
A. NO CHANGE  
B. embellished with myriad gold accents.  
C. marred with gaudy accents of gold.  
D. accented with gold.
56. If the writer were to delete the preceding sentence, the essay would primarily lose details that:  
F. illustrate one of the Lyceum Theatre's features that deviates from Beaux Arts architecture.  
G. contribute to the description of the Lyceum Theatre's elaborate interior.  
H. support the essay's claim that Beaux Arts architecture was most popular in the twentieth century.  
J. clarify an unfamiliar architectural term used in the essay.
57. The writer wants to divide this paragraph into two in order to separate details about the building's outdoor features from details about its indoor features. The best place to begin the new paragraph would be at Point:  
A. A.  
B. B.  
C. C.  
D. D.



Patrons credit the handsome Beaux Arts aesthetic

58

with adding enhancement to their theatergoing experience.

59

Though smaller and more cramped than many newer theaters—audience members often note that legroom is limited—the Lyceum’s distinctive atmosphere continues to delight theater fans as well as architecture enthusiasts.

58. F. NO CHANGE  
 G. In the same manner, patrons  
 H. On one hand, patrons  
 J. For instance, patrons

59. A. NO CHANGE  
 B. adding enhancement to the experience of  
 C. adding to the experience of  
 D. enhancing

Question 60 asks about the preceding passage as a whole.

60. Suppose the writer’s primary purpose had been to explain how a building illustrates a particular architectural style. Would this essay accomplish that purpose?  
 F. Yes, because it describes the architectural styles of several New York theater buildings.  
 G. Yes, because it enumerates a number of the Lyceum Theatre’s Beaux Arts features.  
 H. No, because it focuses more specifically on the set design for the Lyceum Theatre’s productions.  
 J. No, because it focuses on more than one architectural style.

#### PASSAGE V

##### Mother Jones: True to the Spirit of Her Cause

The autobiography by Mary Harris Jones is riddled with factual inaccurate. Jones even fudges her date of

61

birth, she falsely lists May 1, International Workers’

62

Day, and ages herself by nearly a decade. These

untruths—whether deliberate exaggerations or

slips of the memory—ultimately matters very

63

little, for the autobiography isn’t about the life of

64

Mary Harris Jones. Jones became famous for her work.

65

61. A. NO CHANGE  
 B. factually inaccuracies.  
 C. factual inaccuracies.  
 D. factually inaccurate.

62. F. NO CHANGE  
 G. birth: she falsely lists  
 H. birth; falsely listing  
 J. birth, falsely listing:

63. A. NO CHANGE  
 B. has mattered  
 C. had mattered  
 D. matter

64. F. NO CHANGE  
 G. little. For  
 H. little; for  
 J. little,

65. Given that all the choices are true, which one provides the best transition into the rest of the essay?  
 A. NO CHANGE  
 B. Born in Cork, Ireland, in 1837, Jones immigrated to the United States in the mid-1800s.  
 C. Rather, it’s the story of her public persona, the radical labor activist “Mother Jones.”  
 D. Instead, this essay will show you why Jones’s role in history is so important.



When Mary Harris Jones got involved in labor politics in the 1860s, it was rare for a woman to attend, let alone address, union meetings. Jones, however, became one of the movement's most powerful and controversial advocate's.<sup>66</sup> She traveled the United States, from the coal mines of Appalachia to the railroad yards of the West, rallying workers to join unions and fight for better working conditions. Specifically, Jones helped organize efforts to ensure that employers complied with laws governing workday hours and child labor.

The moniker "Mother Jones" was conferred on Jones by members of the American Railway Union. She herself,<sup>67</sup> adopted the name and, subsequently, a corresponding public persona. Her audiences came to expect "Mother Jones."<sup>68</sup> By 1900, the white-haired, calico-frocked

figure was no longer known as Mary Harris Jones,<sup>69</sup> the media, union leaders and workers, and even U.S. presidents referred to her as Mother Jones.

Embracing the very role used to confine women to the domestic sphere, Jones subversively redefined the boundaries of home and family.

66. F. NO CHANGE  
 G. movement's most powerful and controversial advocates'.  
 H. movement's most powerful and controversial advocates.  
 J. movements most powerful and controversial advocates.

67. A. NO CHANGE  
 B. She, herself,  
 C. She, herself  
 D. She herself

68. At this point, the writer is considering adding the following true statement:  
 To meet their expectations, Jones crafted her speech, dress, and mannerisms based on cultural notions of motherhood.  
 Should the writer make this addition here?  
 E. Yes, because it highlights the contrast between Jones's personal style and her audiences'.  
 G. Yes, because it adds details about what types of changes Jones made to create her public persona.  
 H. No, because it detracts from the focus of the paragraph by introducing unrelated details.  
 J. No, because it doesn't indicate the effect Jones's public persona had on audiences.

69. A. NO CHANGE  
 B. Jones, in fact,  
 C. Jones in fact  
 D. Jones;



“My address is like my shoes,” she said. “It travels with  
me wherever I go.” She was the matriarch who staunchly  
 protected workers.

protected workers. 71

And protect them she did: When workers  
 went on strike, Jones secured food donations and  
 temporary living arrangements. Where companies  
 prevented the formation of unions, she fought for  
 workers’ right to organize. Instead of these tireless

efforts on there behalf, workers trusted Mother Jones  
 and, by extension, the labor unions she represented.

70. If the writer were to delete the underlined portion, the paragraph would primarily lose a quotation that:
- F. questions the distinction between Mary Harris Jones and her public persona, Mother Jones.
  - G. reinforces the essay’s characterization of Mother Jones as a happy-go-lucky vagabond.
  - H. reiterates the point that Jones enjoyed the travel opportunities her work provided.
  - J. provides support for the claim that Jones redefined the boundaries of home.
71. In the preceding sentence, the writer is considering replacing “workers” with “her family of workers.” Should the writer make this revision?
- A. Yes, because it completes the metaphor comparing Jones to the head of a family.
  - B. Yes, because it makes clear that Jones cared most about workers who were family relatives.
  - C. No, because it unnecessarily repeats information established earlier in the essay.
  - D. No, because it introduces an unrelated comparison between workers and family.
72. F. NO CHANGE  
 G. protections, to name a few, included:  
 H. she defined protection as:  
 J. she did this by:
73. A. NO CHANGE  
 B. Because of  
 C. Without  
 D. Despite
74. F. NO CHANGE  
 G. they’re behalves,  
 H. their behalf,  
 J. their behalve’s,

Question 75 asks about the preceding passage as a whole.

75. Suppose the writer’s goal had been to summarize women’s contributions to early-twentieth-century labor law reform. Would this essay accomplish that goal?
- A. Yes, because it shows that Mother Jones was a well-known and respected labor agitator.
  - B. Yes, because it introduces a prominent figure in labor history.
  - C. No, because it focuses more specifically on labor law reform in the nineteenth century.
  - D. No, because it focuses more specifically on one figure in the labor movement.

**END OF TEST 1**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**



## MATHEMATICS TEST

60 Minutes—60 Questions

**DIRECTIONS:** Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

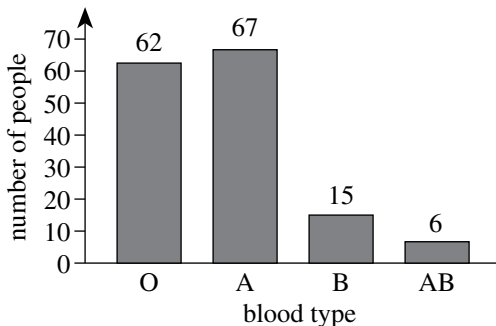
You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

1. The blood types of 150 people were determined for a study as shown in the figure below.



If 1 person from this study is randomly selected, what is the probability that this person has either Type A or Type AB blood?

- A.  $\frac{62}{150}$
  - B.  $\frac{66}{150}$
  - C.  $\frac{68}{150}$
  - D.  $\frac{73}{150}$
  - E.  $\frac{84}{150}$
2. The monthly fees for single rooms at 5 colleges are \$370, \$310, \$380, \$340, and \$310, respectively. What is the mean of these monthly fees?
- F. \$310
  - G. \$340
  - H. \$342
  - J. \$350
  - K. \$380

3. On a particular road map,  $\frac{1}{2}$  inch represents 18 miles. About how many miles apart are 2 towns that are  $2\frac{1}{2}$  inches apart on this map?

- A. 18
- B.  $22\frac{1}{2}$
- C. 36
- D. 45
- E. 90

4. Given  $f = cd^3$ ,  $f = 450$ , and  $d = 10$ , what is  $c$ ?

- F. 0.45
- G. 4.5
- H. 15
- J. 45
- K. 150

5. If  $f(x) = (3x + 7)^2$ , then  $f(1) = ?$

- A. 10
- B. 16
- C. 58
- D. 79
- E. 100

6. Jorge's current hourly wage for working at Denti Smiles is \$12.00. Jorge was told that at the beginning of next month, his new hourly wage will be an increase of 6% of his current hourly wage. What will be Jorge's new hourly wage?

- F. \$12.06
- G. \$12.60
- H. \$12.72
- J. \$18.00
- K. \$19.20





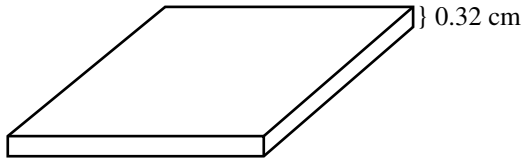
7. The first term is 1 in the geometric sequence 1, -3, 9, -27, ... What is the SEVENTH term of the geometric sequence?
- A. -243
  - B. -30
  - C. 81
  - D. 189
  - E. 729

8. The shipping rate for customers of Ship Quick consists of a fee per box and a price per pound for each box. The table below gives the fee and the price per pound for customers shipping boxes of various weights.

Weight of box (pounds)	Fee	Price per pound
Less than 10	\$ 5.00	\$1.00
10–25	\$10.00	\$0.65
More than 25	\$20.00	\$0.30

Gregg wants Ship Quick to ship 1 box that weighs 15 pounds. What is the shipping rate for this box?

- F. \$ 9.75
  - G. \$16.50
  - H. \$19.75
  - J. \$20.00
  - K. \$24.50
9. A computer chip 0.32 cm thick is made up of layers of silicon. If the top and bottom layers are each 0.03 cm thick and the inner layers are each 0.02 cm thick, how many inner layers are there?



- A. 13
- B. 15
- C. 16
- D. 52
- E. 64

10. The table below shows the number of cars Jing sold each month last year. What is the median of the data in the table?

Month	Number of cars sold
January	25
February	15
March	22
April	19
May	16
June	13
July	19
August	25
September	26
October	27
November	28
December	29

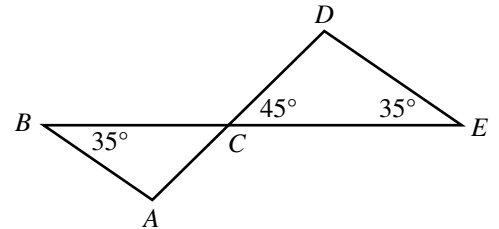
- F. 13
- G. 16
- H. 19
- J. 20.5
- K. 23.5

11. Students studying motion observed a cart rolling at a constant rate along a straight line. The table below gives the distance,  $d$  feet, the cart was from a reference point at 1-second intervals from  $t = 0$  seconds to  $t = 5$  seconds.

$t$	0	1	2	3	4	5
$d$	14	20	26	32	38	44

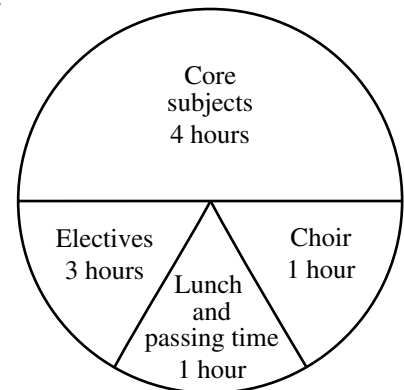
Which of the following equations represents this relationship between  $d$  and  $t$ ?

- A.  $d = t + 14$
  - B.  $d = 6t + 8$
  - C.  $d = 6t + 14$
  - D.  $d = 14t + 6$
  - E.  $d = 34t$
12. The length of a rectangle with area 54 square centimeters is 9 centimeters. What is the perimeter of the rectangle, in centimeters?
- F. 6
  - G. 12
  - H. 15
  - J. 24
  - K. 30
13. In the figure below,  $C$  is the intersection of  $\overline{AD}$  and  $\overline{BE}$ . If it can be determined, what is the measure of  $\angle BAC$ ?



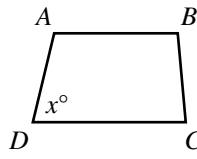
- A.  $80^\circ$
- B.  $100^\circ$
- C.  $110^\circ$
- D.  $115^\circ$
- E. Cannot be determined from the given information

14. Antwan drew the circle graph below describing his time spent at school in 1 day. His teacher said that the numbers of hours listed were correct, but that the central angle measures for the sectors were not correct. What should be the central angle measure for the Core subjects sector?



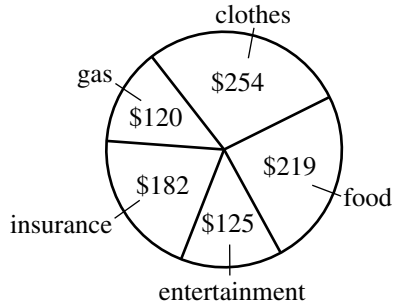
- F.  $72^\circ$
- G.  $80^\circ$
- H.  $160^\circ$
- J.  $200^\circ$
- K.  $288^\circ$



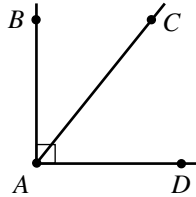
15. This month, Kami sold 70 figurines in 2 sizes. The large figurines sold for \$12 each, and the small figurines sold for \$8 each. The amount of money he received from the sales of the large figurines was equal to the amount of money he received from the sales of the small figurines. How many large figurines did Kami sell this month?
- A. 20  
B. 28  
C. 35  
D. 42  
E. 50
16. A car accelerated from 88 feet per second (fps) to 220 fps in exactly 3 seconds. Assuming the acceleration was constant, what was the car's acceleration, in feet per second per second, from 88 fps to 220 fps ?
- F.  $\frac{1}{44}$   
G.  $29\frac{1}{3}$   
H. 44  
J.  $75\frac{1}{3}$   
K.  $102\frac{2}{3}$
17. In a plane, the distinct lines  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{CD}$  intersect at  $A$ , where  $A$  is between  $C$  and  $D$ . The measure of  $\angle BAC$  is  $47^\circ$ . What is the measure of  $\angle BAD$  ?
- A.  $43^\circ$   
B.  $47^\circ$   
C.  $94^\circ$   
D.  $133^\circ$   
E.  $137^\circ$
18. In which of the following are  $\frac{1}{2}$ ,  $\frac{5}{6}$ , and  $\frac{5}{8}$  arranged in ascending order?
- F.  $\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$   
G.  $\frac{5}{6} < \frac{1}{2} < \frac{5}{8}$   
H.  $\frac{5}{6} < \frac{5}{8} < \frac{1}{2}$   
J.  $\frac{5}{8} < \frac{1}{2} < \frac{5}{6}$   
K.  $\frac{5}{8} < \frac{5}{6} < \frac{1}{2}$
19. In scientific notation,  $670,000,000 + 700,000,000 = ?$
- A.  $1.37 \times 10^{-9}$   
B.  $1.37 \times 10^7$   
C.  $1.37 \times 10^8$   
D.  $1.37 \times 10^9$   
E.  $137 \times 10^{15}$
20. For trapezoid  $ABCD$  shown below,  $\overline{AB} \parallel \overline{DC}$ , the measures of the interior angles are distinct, and the measure of  $\angle D$  is  $x^\circ$ . What is the degree measure of  $\angle A$  in terms of  $x$  ?
- F.  $(180 - x)^\circ$   
G.  $(180 - 0.5x)^\circ$   
H.  $(180 + 0.5x)^\circ$   
J.  $(180 + x)^\circ$   
K.  $x^\circ$
- 
21. To get a driver's license, an applicant must pass a written test and a driving test. Past records show that 80% of the applicants pass the written test and 60% of those who have passed the written test pass the driving test. Based on these figures, how many applicants in a random group of 1,000 applicants would you expect to get driver's licenses?
- A. 200  
B. 480  
C. 600  
D. 750  
E. 800
22. If  $a$ ,  $b$ , and  $c$  are positive integers such that  $a^b = x$  and  $c^b = y$ , then  $xy = ?$
- F.  $ac^b$   
G.  $ac^{2b}$   
H.  $(ac)^b$   
J.  $(ac)^{2b}$   
K.  $(ac)^{b^2}$
23. Which of the following expressions is equivalent to  $\frac{1}{2}y^2(6x + 2y + 12x - 2y)$  ?
- A.  $9xy^2$   
B.  $18xy$   
C.  $3xy^2 + 12x$   
D.  $9xy^2 - 2y^3$   
E.  $3xy^2 + 12x - y^3 - 2y$
24. An artist makes a profit of  $(500p - p^2)$  dollars from selling  $p$  paintings. What is the fewest number of paintings the artist can sell to make a profit of at least \$60,000 ?
- F. 100  
G. 150  
H. 200  
J. 300  
K. 600



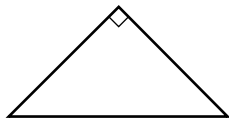
25. Last month, Lucie had total expenditures of \$900. The pie chart below breaks down these expenditures by category. The category in which Lucie's expenditures were greatest is what percent of her total expenditures, to the nearest 1%?



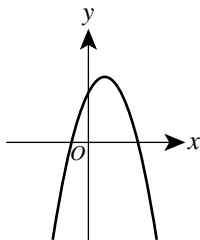
- A. 24%  
 B. 28%  
 C. 32%  
 D. 34%  
 E. 39%
26. In the figure shown below, the measure of  $\angle BAC$  is  $(x + 20)^\circ$  and the measure of  $\angle BAD$  is  $90^\circ$ . What is the measure of  $\angle CAD$ ?



- F.  $(x - 70)^\circ$   
 G.  $(70 - x)^\circ$   
 H.  $(70 + x)^\circ$   
 J.  $(160 - x)^\circ$   
 K.  $(160 + x)^\circ$
27. What is the perimeter, in inches, of the isosceles right triangle shown below, whose hypotenuse is  $8\sqrt{2}$  inches long?



- A. 8  
 B.  $8 + 8\sqrt{2}$   
 C.  $8 + 16\sqrt{2}$   
 D. 16  
 E.  $16 + 8\sqrt{2}$
28. The equation  $y = ax^2 + bx + c$  is graphed in the standard  $(x,y)$  coordinate plane below for real values of  $a$ ,  $b$ , and  $c$ . When  $y = 0$ , which of the following best describes the solutions for  $x$ ?

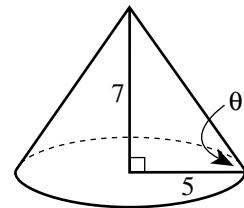


- F. 2 distinct positive real solutions  
 G. 2 distinct negative real solutions  
 H. 1 positive real solution and 1 negative real solution  
 J. 2 real solutions that are not distinct  
 K. 2 distinct solutions that are not real

29. What is the product of the complex numbers  $(-3i + 4)$  and  $(3i + 4)$ ?

- A. 1  
 B. 7  
 C. 25  
 D.  $-7 + 24i$   
 E.  $7 + 24i$

30. The radius of the base of the right circular cone shown below is 5 inches, and the height of the cone is 7 inches. Solving which of the following equations gives the measure,  $\theta$ , of the angle formed by a slant height of the cone and a radius?



- F.  $\tan \theta = \frac{5}{7}$   
 G.  $\tan \theta = \frac{7}{5}$   
 H.  $\sin \theta = \frac{5}{7}$   
 J.  $\sin \theta = \frac{7}{5}$   
 K.  $\cos \theta = \frac{7}{5}$

31. To make a 750-piece jigsaw puzzle more challenging, a puzzle company includes 5 extra pieces in the box along with the 750 pieces, and those 5 extra pieces do not fit anywhere in the puzzle. If you buy such a puzzle box, break the seal on the box, and immediately select 1 piece at random, what is the probability that it will be 1 of the extra pieces?

- A.  $\frac{1}{5}$   
 B.  $\frac{1}{755}$   
 C.  $\frac{1}{750}$   
 D.  $\frac{5}{755}$   
 E.  $\frac{5}{750}$

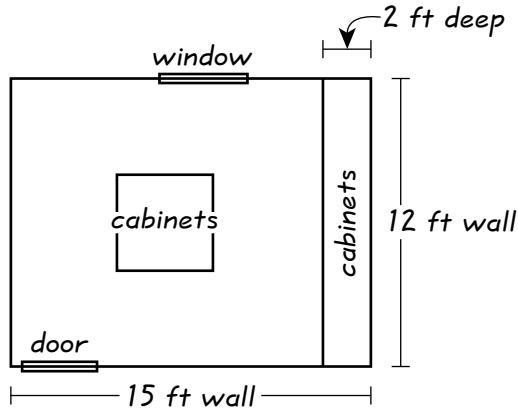
32. What fraction lies exactly halfway between  $\frac{2}{3}$  and  $\frac{3}{4}$ ?

- F.  $\frac{3}{5}$   
 G.  $\frac{5}{6}$   
 H.  $\frac{7}{12}$   
 J.  $\frac{9}{16}$   
 K.  $\frac{17}{24}$



Use the following information to answer questions 33–35.

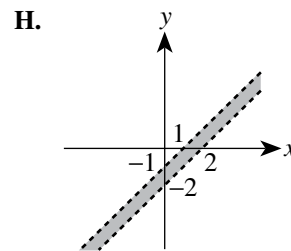
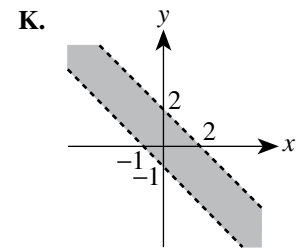
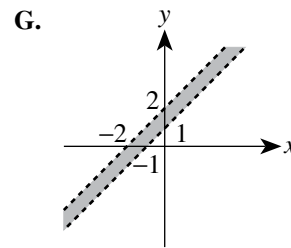
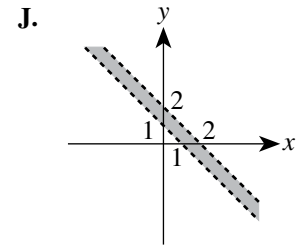
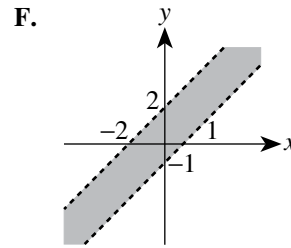
Gianna is converting a 12-foot-by-15-foot room in her house to a craft room. Gianna will install tile herself but will have CC Installations build and install the cabinets. The scale drawing shown below displays the location of the cabinets in the craft room (0.25 inch represents 2 feet).



Cabinets will be installed along one of the 12-foot walls from floor to ceiling, and 4 cabinets that are each 3 feet tall will be installed in the middle of the room. These are the only cabinets that will be installed, and each of them will be 2 feet wide and 2 feet deep. CC Installations has given Gianna an estimate of \$2,150.00 for building and installing the cabinets.

33. A 15-foot wall is how many inches long in the scale drawing?
- A. 1.5  
B. 1.875  
C. 3  
D. 3.375  
E. 3.75
34. Gianna will install tile on the portion of the floor that will NOT be covered by cabinets. What is the area, in square feet, of the portion of the floor that will NOT be covered by cabinets?
- F. 72  
G. 90  
H. 140  
J. 156  
K. 164
35. CC Installations' estimate consists of a \$650.00 charge for labor, plus a fixed charge per cabinet. The labor charge and the charge per cabinet remain the same for any number of cabinets built and installed. CC Installations would give Gianna what estimate if the craft room were to have twice as many cabinets as Gianna is planning to have?
- A. \$2,800.00  
B. \$3,000.00  
C. \$3,450.00  
D. \$3,650.00  
E. \$4,300.00

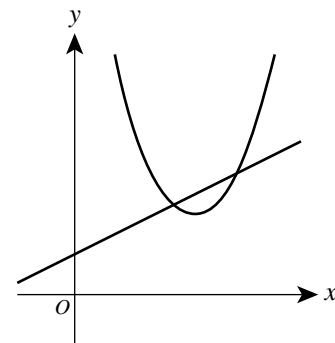
36. Which of the following is the graph of the region  $1 < x + y < 2$  in the standard  $(x,y)$  coordinate plane?



37. What is the difference between the mean and the median of the set  $\{3, 8, 10, 15\}$ ?

- A. 0  
B. 1  
C. 4  
D. 9  
E. 12

38. Which of the following describes a true relationship between the functions  $f(x) = (x - 3)^2 + 2$  and  $g(x) = \frac{1}{2}x + 1$  graphed below in the standard  $(x,y)$  coordinate plane?



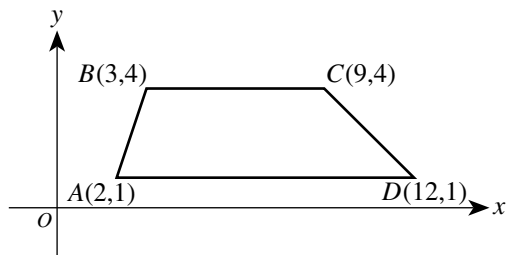
- F.  $f(x) = g(x)$  for exactly 2 values of  $x$   
G.  $f(x) = g(x)$  for exactly 1 value of  $x$   
H.  $f(x) < g(x)$  for all  $x$   
J.  $f(x) > g(x)$  for all  $x$   
K.  $f(x)$  is the inverse of  $g(x)$

GO ON TO THE NEXT PAGE.



Use the following information to answer questions 39–41.

Trapezoid  $ABCD$  is graphed in the standard  $(x,y)$  coordinate plane below.



39. What is the slope of  $\overline{CD}$ ?

- A.  $-3$
- B.  $-1$
- C.  $1$
- D.  $\frac{5}{21}$
- E.  $\frac{3}{2}$

40. When  $ABCD$  is reflected over the  $y$ -axis to  $A'B'C'D'$ , what are the coordinates of  $D'$ ?

- F.  $(-12, 1)$
- G.  $(-12, -1)$
- H.  $(12, -1)$
- J.  $(1, 12)$
- K.  $(1, -12)$

41. Which of the following vertical lines cuts  $ABCD$  into 2 trapezoids with equal areas?

- A.  $x = 2.5$
- B.  $x = 3.5$
- C.  $x = 4.5$
- D.  $x = 5.5$
- E.  $x = 6.5$

42. Given  $f(x) = x - \frac{1}{x}$  and  $g(x) = \frac{1}{x}$ , what is  $f\left(g\left(\frac{1}{2}\right)\right)$ ?

- F.  $-3$
- G.  $-\frac{3}{2}$
- H.  $-\frac{2}{3}$
- J.  $0$
- K.  $\frac{3}{2}$

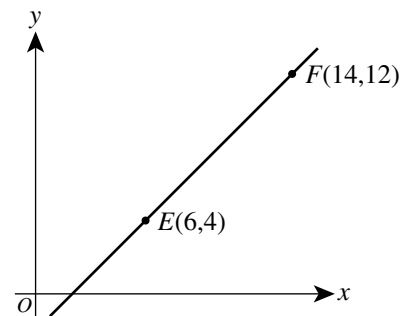
43. A formula to estimate the monthly payment,  $p$  dollars, on a short-term loan is

$$p = \frac{\frac{1}{2}ary + a}{12y}$$

where  $a$  dollars is the amount of the loan,  $r$  is the annual interest rate expressed as a decimal, and  $y$  years is the length of the loan. When  $a$  is multiplied by 2, what is the effect on  $p$ ?

- A.  $p$  is divided by 6
- B.  $p$  is divided by 2
- C.  $p$  does not change
- D.  $p$  is multiplied by 2
- E.  $p$  is multiplied by 4

44. The points  $E(6,4)$  and  $F(14,12)$  lie in the standard  $(x,y)$  coordinate plane shown below. Point  $D$  lies on  $\overline{EF}$  between  $E$  and  $F$  such that the length of  $\overline{EF}$  is 4 times the length of  $\overline{DE}$ . What are the coordinates of  $D$ ?



- F.  $(7, 5)$
- G.  $(8, 6)$
- H.  $(8, 8)$
- J.  $(10, 8)$
- K.  $(12, 10)$

45. Given that  $a \begin{bmatrix} 2 & 6 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} x & 27 \\ y & z \end{bmatrix}$  for some real number  $a$ , what is  $x + z$ ?

- A.  $\frac{4}{3}$
- B.  $\frac{27}{2}$
- C.  $26$
- D.  $27$
- E.  $48$

46. A container is  $\frac{1}{8}$  full of water. After 10 cups of water are added, the container is  $\frac{3}{4}$  full. What is the volume of the container, in cups?

- F.  $13\frac{1}{3}$
- G.  $13\frac{1}{2}$
- H.  $15$
- J.  $16$
- K.  $40$



47. Only tenth-, eleventh-, and twelfth-grade students attend Washington High School. The ratio of tenth graders to the school's total student population is 86:255, and the ratio of eleventh graders to the school's total student population is 18:51. If 1 student is chosen at random from the entire school, which grade is that student most likely to be in?
- A. Tenth  
B. Eleventh  
C. Twelfth  
D. All grades are equally likely.  
E. Cannot be determined from the given information

48.  $\frac{4}{\sqrt{2}} + \frac{2}{\sqrt{3}} = ?$

F.  $\frac{4\sqrt{3} + 2\sqrt{2}}{\sqrt{5}}$

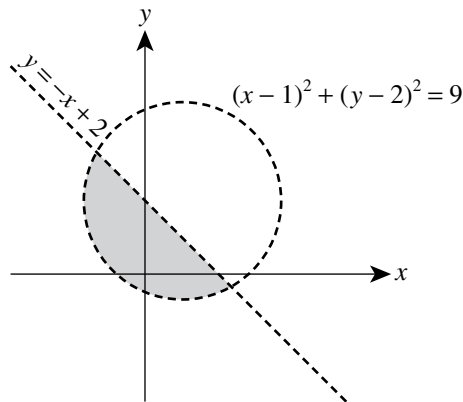
G.  $\frac{4\sqrt{3} + 2\sqrt{2}}{\sqrt{6}}$

H.  $\frac{6}{\sqrt{2} + \sqrt{3}}$

J.  $\frac{6}{\sqrt{5}}$

K.  $\frac{8}{\sqrt{6}}$

49. The shaded region in the graph below represents the solution set to which of the following systems of inequalities?



A.  $\begin{cases} y < -x + 2 \\ (x - 1)^2 + (y - 2)^2 < 9 \end{cases}$

B.  $\begin{cases} y > -x + 2 \\ (x - 1)^2 + (y - 2)^2 < 9 \end{cases}$

C.  $\begin{cases} y > -x + 2 \\ (x - 1)^2 + (y - 2)^2 > 9 \end{cases}$

D.  $\begin{cases} y < -x + 2 \\ (x - 1)^2 + (y - 2)^2 > 9 \end{cases}$

E.  $\begin{cases} (y - 2) < 3 \\ (x - 1) > 3 \end{cases}$

50. You can find the volume of an irregularly shaped solid object by completely submerging it in water and calculating the volume of water the object displaces. You completely submerge a solid object in a rectangular tank that has a base 40 centimeters by 30 centimeters and is filled with water to a depth of 20 centimeters. The object sinks to the bottom, and the water level goes up 0.25 centimeters. What is the volume, in cubic centimeters, of the object?

F. 300

G. 240

H. 200

J. 150

K. 75

51. If  $x:y = 5:2$  and  $y:z = 3:2$ , what is the ratio of  $x:z$ ?

A. 3:1

B. 3:5

C. 5:3

D. 8:4

E. 15:4

52. Which of the following is the solution statement for the inequality shown below?

$$-5 < 1 - 3x < 10$$

F.  $-5 < x < 10$

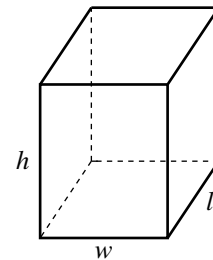
G.  $-3 < x$

H.  $-3 < x < 2$

J.  $-2 < x < 3$

K.  $x < -3$  or  $x > 2$

53. A formula for the surface area ( $A$ ) of the rectangular solid shown below is  $A = 2lw + 2lh + 2wh$  where  $l$  represents length;  $w$ , width; and  $h$ , height. By doubling each of the dimensions ( $l$ ,  $w$ , and  $h$ ), the surface area will be multiplied by what factor?



A. 2

B. 4

C. 6

D. 8

E. 12

54. A dog eats 7 cans of food in 3 days. At this rate, how many cans of food does the dog eat in  $3 + d$  days?

F.  $\frac{7}{3} + d$

G.  $\frac{7}{3} + \frac{d}{3}$

H.  $\frac{7}{3} + \frac{7d}{3d}$

J.  $7 + \frac{d}{3}$

K.  $7 + \frac{7d}{3}$



55. Kelly asked 120 students questions about skiing. The results of the poll are shown in the table below.

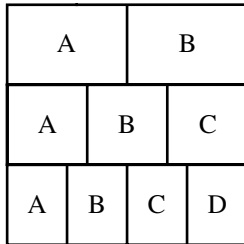
Question	Yes	No
1. Have you skied either cross-country or downhill?	65	55
2. If you answered Yes to Question 1, did you ski downhill?	28	37
3. If you answered Yes to Question 1, did you ski cross-country?	45	20

After completing the poll, Kelly wondered how many of the students polled had skied both cross-country *and* downhill. How many of the students polled indicated that they had skied both cross-country and downhill?

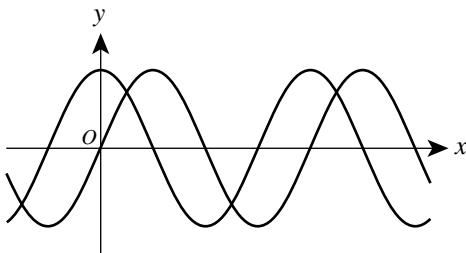
- A. 73
- B. 65
- C. 47
- D. 18
- E. 8

56. The square below is divided into 3 rows of equal area. In the top row, the region labeled A has the same area as the region labeled B. In the middle row, the 3 regions have equal areas. In the bottom row, the 4 regions have equal areas. What fraction of the square's area is in a region labeled A?

- F.  $\frac{1}{9}$
- G.  $\frac{3}{9}$
- H.  $\frac{6}{9}$
- J.  $\frac{13}{12}$
- K.  $\frac{13}{36}$



57. The functions  $y = \sin x$  and  $y = \sin(x + a) + b$ , for constants  $a$  and  $b$ , are graphed in the standard  $(x,y)$  coordinate plane below. The functions have the same maximum value. One of the following statements about the values of  $a$  and  $b$  is true. Which statement is it?



- A.  $a < 0$  and  $b = 0$
- B.  $a < 0$  and  $b > 0$
- C.  $a = 0$  and  $b > 0$
- D.  $a > 0$  and  $b < 0$
- E.  $a > 0$  and  $b > 0$

58. Which of the following number line graphs shows the solution set to the inequality  $|x - 5| < -1$ ?

- F.
- G.
- H.
- J.
- K.

59. As part of a probability experiment, Elliott is to answer 4 multiple-choice questions. For each question, there are 3 possible answers, only 1 of which is correct. If Elliott randomly and independently answers each question, what is the probability that he will answer the 4 questions correctly?

- A.  $\frac{27}{81}$
- B.  $\frac{12}{81}$
- C.  $\frac{4}{81}$
- D.  $\frac{3}{81}$
- E.  $\frac{1}{81}$

60. The sides of an acute triangle measure 14 cm, 18 cm, and 20 cm, respectively. Which of the following equations, when solved for  $\theta$ , gives the measure of the smallest angle of the triangle?

(Note: For any triangle with sides of length  $a$ ,  $b$ , and  $c$  that are opposite angles  $A$ ,  $B$ , and  $C$ , respectively,  $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$  and  $c^2 = a^2 + b^2 - 2ab \cos C$ .)

- F.  $\frac{\sin \theta}{14} = \frac{1}{18}$
- G.  $\frac{\sin \theta}{14} = \frac{1}{20}$
- H.  $\frac{\sin \theta}{20} = \frac{1}{14}$
- J.  $14^2 = 18^2 + 20^2 - 2(18)(20)\cos \theta$
- K.  $20^2 = 14^2 + 18^2 - 2(14)(18)\cos \theta$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

## READING TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is accompanied by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

## Passage I

**PROSE FICTION:** This passage is adapted from the novel *The Ground Beneath Her Feet* by Salman Rushdie (©1999 by Salman Rushdie).

Art Deco is an architectural and decorative style that was popular in the first half of the twentieth century.

When you grow up, as I did, in a great city, during what just happens to be its golden age, you think of it as eternal. Always was there, always will be. The grandeur of the metropolis creates the illusion of permanence. The peninsular Bombay into which I was born certainly seemed perennial to me. Malabar and Cumballa hills were our Capitol and Palatine, the Brabourne Stadium was our Colosseum, and as for the glittering Art Deco sweep of Marine Drive, well, that was something not even Rome could boast. I actually grew up believing Art Deco to be the “Bombay style,” a local invention, its name derived, in all probability, from the imperative of the verb “to see.” *Art dekho*. Lo and behold art. (When I began to be familiar with images of New York, I at first felt a sort of anger. The Americans had so much; did they have to possess our “style” as well? But in another, more secret part of my heart, the Art Deco of Manhattan, built on a scale so much grander than our own, only increased America’s allure, made it both familiar and awe-inspiring, our little Bombay writ large.)

In reality that Bombay was almost brand-new when I knew it; what’s more, my parents’ construction firm of Merchant & Merchant had been prominent in its making. In the ten years before my own coming into the world, the city had been a gigantic building site; as if it were in a hurry to become, as if it knew it had to provide itself in finished condition by the time I was able to start paying attention to it . . . No, no, I don’t really think along such solipsistic lines. I’m not over-attached to history, or Bombay. Me, I’m the under-attached type.

But let me confess that, even as a child, I was insanely jealous of the city in which I was raised, because it was my parents’ other love. They loved each other (good), they loved me (very good), and they loved her (not so good). Bombay was my rival. It was on account of their romance with the city that they drew up that weekly rota (list) of shared parental responsibilities. When my mother wasn’t with me—when I was riding on my father’s shoulders, or staring,

with him, at the fish in the Taraporewala Aquarium—she was out there with *her*, with Bombay; out there bringing her into being. (For of course construction work never stops completely, and supervising such work was Ameer’s particular genius. My mother the master builder. Like her father before her.) And when my father handed me over to her, he went off, wearing his local-history hat and a khaki jacket full of pockets, to dig in the foundations of building sites for the secrets of the city’s past, or else sat hatless and coatless at a designing board and dreamed his lo-and-behold dreams.

Maps of the early town afforded my father great joy, and his collection of old photographs of the edifices and *objets* of the vanished city was second to none. In these faded images were resurrected the demolished Fort, the “breakfast bazaar” market outside the Teen Darvaza or Bazaargate, and the humble mutton shops and umbrella hospitals of the poor, as well as the fallen palaces of the great. The early city’s relics filled his imagination as well as his photo albums. It was from my father that I learned of Bombay’s first great photographers, Raja Deen Dayal and A. R. Haseler, whose portraits of the city became my first artistic influences, if only by showing me what I did not want to do. Dayal climbed the Rajabai tower to create his sweeping panoramas of the birth of the city; Haseler went one better and took to the air. Their images were awe-inspiring, unforgettable, but they also inspired in me a desperate need to get back down to ground level. From the heights you see only pinnacles. I yearned for the city streets, the knife grinders, the water carriers, the pavement moneylenders, the peremptory soldiers, the railway hordes, the chess players in the Irani restaurants, the snake-buckled schoolchildren, the beggars, the fishermen, the moviemakers, the dockers, the book sewers, the loom operators, the priests. I yearned for life.

When I said this to my father he showed me photos, still lives of storefronts and piers, and told me I was too young to understand. “See where people lived and worked and shopped,” he clarified, with a rare flash of irritation, “and it becomes plain what they were like.” For all his digging, Vivvy Merchant was content with the surfaces of his world. I, his photographer son, set out to prove him wrong, to show that a camera can see beyond the surface, beyond the trappings of the actual, and penetrate to its flesh and heart.



1. The passage as a whole can primarily be characterized as the narrator's:
  - A. explanation of the relationship the narrator and his parents had with the city of Bombay.
  - B. description of important buildings and locations in Bombay.
  - C. argument for Bombay's prominence in the world of architecture.
  - D. concerns about the emotional environment in which the narrator was raised.
2. The narrator describes the photos by Bombay's first great photographers as primarily inspiring the narrator to:
  - F. turn away from a career in photography.
  - G. create grand panoramas of the new Bombay.
  - H. produce images that his father would add to his collection.
  - J. photograph subjects that depict everyday life on Bombay's streets.
3. In lines 25–31, the narrator muses over, then rejects, the notion that:
  - A. Merchant & Merchant played an important role in the building of Bombay.
  - B. he started paying attention to Bombay at a young age.
  - C. his anticipated birth was one of the causes of the rush to finish the building of Bombay.
  - D. Bombay had been a gigantic building site in the years before he was born.
4. In lines 32–43, the narrator uses which of the following literary devices to describe Bombay?
  - F. Alliteration
  - G. Allusion
  - H. Personification
  - J. Simile
5. Which of the following statements best captures how the narrator's parents balanced their parental duties with their work at the construction company?
  - A. The narrator's mother did the majority of the work at the construction company, while the narrator's father took care of the narrator.
  - B. The narrator's parents traded off responsibility for taking care of the narrator and working at the construction company.
  - C. The narrator's father worked at his designing board, while the narrator's mother took the narrator along to building sites.
  - D. The narrator's parents both worked at the construction company, while the narrator stayed home with a babysitter.
6. As it is used in line 9, the word *sweep* most nearly means:
  - F. overwhelming victory.
  - G. wide-ranging search.
  - H. complete removal.
  - J. broad area.
7. In the context of the passage, the primary function of lines 6–10 is to:
  - A. compare architectural landmarks in Bombay to those elsewhere.
  - B. help illustrate how the term “art deco” was derived.
  - C. contradict the idea that Bombay was in its golden age when the narrator was a child.
  - D. provide examples of “Bombay style” architecture in Rome.
8. The narrator as a child viewed the work his parents did for Merchant & Merchant with a strong sense of:
  - F. joy; the work provided the family with enough money to live extravagant lives.
  - G. fear; the narrator knew his parents were often so exhausted they were careless about safety.
  - H. jealousy; the work pulled the narrator's parents away from him and directed their attention to the city.
  - J. respect; his parents were known for their quality workmanship throughout the city.
9. As it is used in line 38, the phrase *drew up* most nearly means:
  - A. extended.
  - B. prepared.
  - C. approached.
  - D. straightened.
10. In the last paragraph, the narrator's father shows the narrator the photos of storefronts and piers in order to:
  - F. teach the narrator about the commercial progress the people who work in Bombay have made.
  - G. convince the narrator that Dayal and Haseler were Bombay's first great photographers.
  - H. clarify his claim that his photo collection was not about modern-day Bombay but rather about the early twentieth century.
  - J. illustrate that photos of places can reveal as much about the people who spent time there as photos of the people themselves.

## Passage II

**SOCIAL SCIENCE:** This passage is adapted from *Great Waters: An Atlantic Passage* by Deborah Cramer (©2001 by Deborah Cramer).

The Sargasso Sea is a part of the northern Atlantic Ocean.

As the *Cramer* idles through the Sargasso Sea, waiting for the wind to rise, the sea is flat and empty. Nothing demarcates or divides the smooth expanse of water dissolving into the horizon. This vast, unrough-  
5 ened surface, this breadth of uniform sea, deceives. But for a few lonely oceanic islands, the unperturbed surface offers no hint of the grand and sweeping energies hidden below.

Only one thousand miles offshore, the *Cramer* has  
10 already sailed through some of Atlantic's deepest waters. Contrary to what one might guess, Atlantic's deepest waters, like those in other oceans, are along her edges. As we continue east, toward the middle of the sea, the bottom rises. The unmarked plains of the abyss,  
15 here flattened by layers of sediment, give way to rising foothills and then to mountains. The first maps of Atlantic seafloor noted, albeit crudely, this rise. Early efforts to plumb Atlantic's depths proved outrageously inaccurate: one naval officer paid out eight miles (thir-  
20 teen kilometers) of hemp rope from a drifting ship and concluded the sea had no bottom. Eventually, sailors more or less successfully calculated depth by heaving overboard cannonballs tied to bailing twine. When they hit bottom, the sailors measured and snipped the twine  
25 and then moved on, leaving a trail of lead strung out across the seafloor. These crude soundings, forming the basis of the first map of Atlantic's basin, published in 1854, identified a prominent rise halfway between Europe and America.

For many years no one could explain why the  
30 basin of Atlantic, unlike a bowl, deepened at its edges and shoaled in its center. People assumed that this "Middle Ground," "Telegraph Plateau," or "Dolphin Rise," as it was variously called, was an ancient and  
35 drowned land bridge, or a lost continent, but sailors repairing transatlantic telegraph cable unknowingly produced evidence to prove otherwise. Wrestling with the broken cable, they accidentally twisted off a piece of the "plateau" and dredged up a twenty-one-pound  
40 (ten-kilogram) chunk of dense black volcanic rock. It was some of the youngest, freshest rock on earth, and it was torn not from a piece of continent sunk beneath the waves, but from the very foundation of the sea.

Today, highly sophisticated sound waves bring the  
45 hazy images of those early soundings into sharp focus, revealing that one of the largest and most salient geographic features on the planet lies on the floor of the ocean. Hidden beneath the waves is an immense sub-merged mountain range, the backbone of the sea. More  
50 extensive, rugged, and imposing than the Andes, Rockies, or Himalayas, it covers almost as much of earth's surface as the dry land of continents. Winding like the seam of a baseball, it circles the planet in a long, sinu-

ous path, running the entire length of Atlantic, slashing  
55 the basin neatly in two. Its mountains are stark and black, as black as the sea itself, lit only at their peaks by a thin, patchy covering of white, the skeletal remains of tiny microscopic animals that once lived at the surface. Peaks as high as Mount St. Helens sit in a watery  
60 world of blackness, more than a mile below the surface, beyond the reach of light, beyond the sight of sailors.

A great valley, eclipsing any comparable feature on dry land, runs through these mountains. Arizona's Grand Canyon, one of earth's most spectacular places,  
65 extends for about 280 miles (450 kilometers). A lesser-known canyon of similar depth but considerably greater length lies hidden in the mountains of the ridge. Although offset in many places by breaks in the moun-  
70 tains, the rift valley, as the canyon is called, extends the length of Atlantic for 11,000 miles (17,700 kilometers). Here in this bleak and forbidding place, where the water is almost freezing, subterranean fires have lifted mounds of fresh lava onto the seafloor. Scientists visit-  
75 ing the rift valley for the first time named the volcanic hills in this otherworldly setting after distant, lifeless planets.

Yet, what had seemed so foreign to scientists is an integral part of earth's very being, for at the ridge our own planet gives birth. The floor of the rift valley is  
80 torn; from the gashes has sprung the seafloor underlying all of Atlantic. Here the youngest, newest pieces are made. Earth is still cooling from her tumultuous birth four and a half billion years ago. Heat, leaking from the molten core and from radioactive decay deep inside the  
85 planet, rises toward earth's surface, powering the volcanoes that deliver the ridge to the sea.

11. The author's attitude toward the main subject of the passage can best be described as:
- A. awe and fascination.
  - B. disbelief and cynicism.
  - C. amusement and nostalgia.
  - D. boredom and indifference.
12. The passage makes clear that "Middle Ground," "Telegraph Plateau," and "Dolphin Rise" were names that people gave to what was actually:
- F. an island in Atlantic.
  - G. a transatlantic telegraph cable.
  - H. an ancient and drowned land bridge.
  - J. the immense mountain range in Atlantic's basin.

13. In the first paragraph, the author describes the stillness of the Sargasso Sea as the *Cramer* passes through it primarily to emphasize that the stillness:
- A. won't last long, for the sea will become rough when the wind rises.
  - B. makes it easy for a passenger on the *Cramer* to spot oceanic islands that break the water's surface.
  - C. is in dramatic contrast to the power of what exists on and under the seafloor far below.
  - D. makes it seem as if the *Cramer's* wake is dividing the unbroken expanse of water into two.
14. The passage states that compared to Arizona's Grand Canyon, the canyon that lies within the mountains in Atlantic's basin is considerably:
- F. deeper.
  - G. older.
  - H. wider.
  - J. longer.
15. The main purpose of the information in lines 71–76 is to:
- A. describe in detail scientists' expectations for their first trip to the rift valley.
  - B. characterize the rift valley as an alien, seemingly barren place.
  - C. provide statistics about several geographic properties of the rift valley.
  - D. list the names that scientists gave to the volcanic hills in the rift valley.
16. One of the main purposes of the last paragraph is to state that the:
- F. gashes in the rift valley continue to increase in width.
  - G. seafloor of Atlantic has cooled.
  - H. entire Atlantic seafloor has issued from the gashes in the rift valley.
  - J. volcanoes on Earth's dry land have created the newest, youngest pieces of Atlantic seafloor.
17. The author most strongly implies that people commonly assume the deepest waters of an ocean are:
- A. about one thousand miles offshore.
  - B. at the middle of the ocean.
  - C. dotted with islands.
  - D. located in trenches.
18. As it is used in line 19, the phrase *paid out* most nearly means:
- F. dispensed.
  - G. ascertained.
  - H. suggested.
  - J. compensated.
19. According to the passage, the mountain range in Atlantic's basin covers nearly the same amount of Earth's surface as does:
- A. Mount St. Helens.
  - B. the Himalayas.
  - C. the Pacific Ocean.
  - D. the dry land of continents.
20. According to the passage, the white cover on the peaks of the mountains in Atlantic's basin is:
- F. skeletal remains of microscopic animals.
  - G. thin layers of sedimentary volcanic ash.
  - H. patches of ice.
  - J. salt deposits.

### Passage III

**HUMANITIES:** Passage A is adapted from the essay “Just This Side of Byzantium” by Ray Bradbury (©1975 by Ray Bradbury), which is the introduction to a later edition of Bradbury’s 1957 novel *Dandelion Wine*. Passage B is adapted from *Dandelion Wine* (©1957 by Ray Bradbury).

#### Passage A by Ray Bradbury

I began to learn the nature of surprises, thankfully, when I was fairly young as a writer. Before that, like every beginner, I thought you could beat, pummel, and thrash an idea into existence. Under such treatment, of course, any decent idea folds up its paws, turns on its back, fixes its eyes on eternity, and dies.

It was with great relief, then, that in my early twenties I floundered into a word-association process in which I simply got out of bed each morning, walked to my desk, and put down any word or series of words that happened along in my head.

I would then take arms against the word, or for it, and bring on an assortment of characters to weigh the word and show me its meaning in my own life. An hour or two hours later, to my amazement, a new story would be finished and done. The surprise was total and lovely. I soon found that I would have to work this way for the rest of my life.

First I rummaged my mind for words that could describe my personal nightmares, fears of night and time from my childhood, and shaped stories from these.

Then I took a long look at the green apple trees and the old house I was born in and the house next door where lived my grandparents, and all the lawns of the summers I grew up in, and I began to try words for all that.

I had to send myself back, with words as catalysts, to open the memories out and see what they had to offer.

So from the age of twenty-four to thirty-six hardly a day passed when I didn’t stroll myself across a recollection of my grandparents’ northern Illinois grass, hoping to come across some old half-burnt firecracker, a rusted toy, or a fragment of letter written to myself in some young year hoping to contact the older person I became to remind him of his past, his life, his people, his joys, and his drenching sorrows.

Along the way I came upon and collided, through word-association, with old and true friendships. I borrowed my friend John Huff from my childhood in Arizona and shipped him East to Green Town so that I could say good-bye to him properly.

Along the way, I sat me down to breakfasts, lunches, and dinners with the long dead and much loved.

Thus I fell into surprise. I came on the old and best ways of writing through ignorance and experiment and

was startled when truths leaped out of bushes like quail before gunshot. I blundered into creativity as any child learning to walk and see. I learned to let my senses and my Past tell me all that was somehow true.

#### Passage B by Ray Bradbury

The facts about John Huff, aged twelve, are simple and soon stated. He could pathfind more trails than anyone since time began, could leap from the sky like a chimpanzee from a vine, could live underwater two minutes and slide fifty yards downstream from where you last saw him. The baseballs you pitched him he hit in the apple trees, knocking down harvests. He ran laughing. He sat easy. He was not a bully. He was kind. He knew the names of all the wild flowers and when the moon would rise and set. He was, in fact, the only god living in the whole of Green Town, Illinois, during the twentieth century that Douglas Spaulding knew of.

And right now he and Douglas were hiking out beyond town on another warm and marble-round day, the sky blue blown-glass reaching high, the creeks bright with mirror waters fanning over white stones. It was a day as perfect as the flame of a candle.

Douglas walked through it thinking it would go on this way forever. The sound of a good friend whistling like an oriole, pegging the softball, as you horse-danced, key-jingled the dusty paths; things were at hand and would remain.

It was such a fine day and then suddenly a cloud crossed the sky, covered the sun, and did not move again.

John Huff had been speaking quietly for several minutes. Now Douglas stopped on the path and looked over at him.

“John, say that again.”

“You heard me the first time, Doug.”

“Did you say you were—going away?”

John took a yellow and green train ticket solemnly from his pocket and they both looked at it.

“Tonight!” said Douglas. “My gosh! Tonight we were going to play Red Light, Green Light and Statues! How come, all of a sudden? You been here in Green Town all my life. You just don’t pick up and leave!”

“It’s my father,” said John. “He’s got a job in Milwaukee. We weren’t sure until today . . .”

They sat under an old oak tree on the side of the hill looking back at town. Out beyond, in sunlight, the town was painted with heat, the windows all gaping. Douglas wanted to run back in there where the town, by its very weight, its houses, their bulk, might enclose and prevent John’s ever getting up and running off.

Questions 21–25 ask about Passage A.

21. When Bradbury claims, “Thus I fell into surprise” (line 46), he’s most nearly referring to the:
- A. discovery that for him the secret to a creative outpouring was to use a word-association method to write fiction.
  - B. long-forgotten experiences he would remember when he would talk with his childhood friends in person.
  - C. realization that he wrote more effectively about his current experiences than about his past.
  - D. several methods other writers taught him to help him write honest, authentic stories.
22. Passage A indicates that Bradbury believes all beginning writers think that they can:
- F. learn the nature of surprises.
  - G. force an idea into creation.
  - H. use one word as a catalyst for a story.
  - J. become a good writer through experiment.
23. Bradbury’s claim “I would then take arms against the word, or for it” (line 12) most strongly suggests that during his writing sessions, Bradbury would:
- A. attempt to find the one word that for him was the key to understanding John Huff.
  - B. often reject a word as not being a catalyst for meaningful writing.
  - C. deliberately choose to write only about a word that inspired his fears.
  - D. feel as though he were struggling to find a word’s significance to him.
24. In the seventh paragraph of Passage A (lines 30–37), Bradbury explains his habit, over many years as a writer, of almost daily:
- F. looking at and writing about objects from his childhood that he had saved.
  - G. wishing he had kept more letters from his childhood to trigger his memories.
  - H. driving past his grandparents’ property, hoping to notice something that would remind him of his past.
  - J. thinking about his grandparents’ property, hoping to remember something that would bring his past into focus.
25. Passage A explains that when writing about the character John Huff, Bradbury had:
- A. placed John in a town in Arizona, where Bradbury himself had grown up.
  - B. included John in stories about a town in Arizona and in stories about Green Town.
  - C. “moved” John to a town other than the town in which the real-life John Huff had grown up.
  - D. “borrowed” John to use as a minor character in many of his stories.

Questions 26 and 27 ask about Passage B.

26. In the first paragraph of Passage B (lines 52–63), the narrator describes John Huff in a manner that:
- F. emphasizes John’s physical strength and intelligence, to indicate John’s view of himself.
  - G. exaggerates John’s characteristics and actions, to reflect Douglas’s idolization of John.
  - H. highlights John’s reckless behavior, to show that Douglas was most fond of John’s rebelliousness.
  - J. showcases John’s talents, to make clear why both children and adults admired John.
27. Within Passage B, the image in lines 74–76 functions figuratively to suggest that:
- A. John’s leaving on a stormy night was fitting, given Douglas’s sadness.
  - B. John’s disappointment about moving was reflected in his mood all day.
  - C. the mood of the day changed dramatically and irreversibly once John shared his news.
  - D. the sky in Green Town became cloudy at the moment John told Douglas he was moving.

Questions 28–30 ask about both passages.

28. Both Passage A and Passage B highlight Bradbury’s use of:
- F. a first person omniscient narrator to tell a story.
  - G. satire and irony to develop characters.
  - H. allegory to present a complex philosophical question.
  - J. sensory details and imaginative description to convey ideas.
29. Based on Bradbury’s description in Passage A of his writing process, which of the following methods hypothetically depicts a way Bradbury might have begun to write the story in Passage B?
- A. Taking notes while interviewing old friends after first deciding to write a story about two boys
  - B. Forming two characters, determining that he would like to tell a story about loss, and then beginning to write a scene
  - C. Writing down the words *train ticket* and then spending an hour writing whatever those words brought to his mind
  - D. Outlining the plot of a story about two boys that would end with one boy leaving on a train

30. Elsewhere in the essay from which Passage A is adapted, Bradbury writes:

Was there a real boy named John Huff?

There was. And that was truly his name. But he didn't go away from me, I went away from him.

How do these statements apply to both the information about Bradbury's approach as a storyteller provided in Passage A and the story of John Huff provided in Passage B?

- F. They reveal that Bradbury believed that to surprise readers is a fiction writer's most important task.
- G. They reinforce that Bradbury used his life experiences to create fiction but also altered those experiences as he pleased.
- H. They prove that Bradbury felt such pain over leaving John that he had to reverse events to be able to write the story.
- J. They indicate that Bradbury rarely used his life experiences to create fiction.

#### Passage IV

**NATURAL SCIENCE:** This passage is adapted from the article "The Jaws That Jump" by Adam Summers (©2006 by Natural History Magazine, Inc.).

Recently I was reminded of just how powerful ants can be when inflicting damage on intruders. A team of biomechanists has studied the incredibly speedy bite of a group of Central and South American ants. The team  
5 clocked the bite as the fastest on the planet—and discovered that it also gives the ants the unique ability to jump with their jaws, adding to an impressive array of already known defenses.

Trap-jaw ants nest in leaf litter, rather than under-  
10 ground or in mounds. There they often feed on well-armored and elusive prey, including other species of ants. As they stalk their dinner, the trap-jaws hold their mandibles wide apart, often cocked open at 180 degrees or more by a latch mechanism. When minute trigger  
15 hairs on the inner edge of the mandible come in contact with something, the jaws snap shut at speeds now known to reach 145 miles per hour. No passerby could outpace that. The astoundingly high speed gives the jaws, despite their light weight, enough force to crack  
20 open the armor of most prey and get at the tasty meat inside.

The key to the jaws' speed (and their even more amazing acceleration) is that the release comes from stored energy produced by the strong but slow muscles  
25 of the jaw. Think how an archer slowly draws an arrow in a bowstring against the flex of a bow: nearly all the energy from the archer's muscles pours into the flexing of the bow. When released, the energy stored in the bow wings the arrow toward its target much faster than the  
30 archer could by throwing the arrow like a javelin. The biomechanics of energy storage is the domain of Sheila

N. Patek and Joseph E. Baio, both biomechanists at the University of California, Berkeley. They teamed up with two ant experts, Brian L. Fisher of the California  
35 Academy of Sciences in San Francisco and Andrew V. Suarez of the University of Illinois at Urbana-Champaign, to look at the trap-jaw ant *Odontomachus bauri*.

Fisher, Suarez, and other field biologists had  
40 already noted that catching *O. bauri* was like grabbing for popping popcorn—and very hot popcorn at that, because a painful sting goes with an ant's trap-jaw bite. The insects bounced around in a dizzying frenzy and propelled themselves many times their body length  
45 when biologists or smaller intruders approached them. Patek and Baio made high-speed video images of their movements, and discovered that the secret of their self-propulsion was the well-executed "firing" of their mandibles. They also observed that mandibles started to  
50 decelerate before they meet—possibly to avoid self-inflicted damage. Most important, the ants had two distinct modes of aerial locomotion.

In the so-called escape jump, an ant orients its head and jaws perpendicular to the ground, then slams  
55 its face straight down. That triggers the cocked mandibles to release with a force 400 times the ant's body weight, launching the insect ten or more body lengths nearly straight into the air. The ant doesn't seem to go in any particular direction, but the jump is  
60 presumably fast and unpredictable enough to help the insect evade, say, the probing tongue of a lizard. Not only can the jumping ant gain height and sow confusion, but it may also get to a new vantage point from which to relaunch an attack.

The second kind of jaw-propelled locomotion is even more common than escape jumping. If an intruder enters the ants' nest, one of the ants bangs its jaws against the intruder, which triggers the trap-jaw and propels the interloper (if small enough) in one direc-  
70 tion, out of the nest, and the ant in the other. Often the force sends the ant skimming an inch off the ground for nearly a foot. The attack, for obvious reasons, is known as the "bouncer defense." In the wild, gangs of defending ants team up to attack hostile strangers, sending  
75 them head over heels out of the nest.

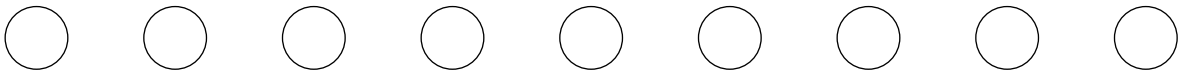
From an evolutionary point of view, the trap-jaws are an intriguing story. The ants clearly evolved an entirely new function, propulsion, for a system that was already useful—chewing up prey. Several lineages of  
80 trap-jaw ants have independently hit on the tactic of storing energy in their jaws to penetrate well-defended prey. In *Odontomachus*, the horizontal, bouncer-defense jump could have arisen out of attempts to bite intruders, but the high, escape jump—with jaws aimed  
85 directly at the ground—must have arisen from a different, perhaps accidental kind of behavior. Such a serendipitous event would have been a rare instance in which banging one's head against the ground got good results.

31. The primary purpose of the passage is to:
- provide an overview of the mechanics and key operations of the jaws of trap-jaw ants.
  - analyze Patek and Baio's techniques for filming two defensive maneuvers of trap-jaw ants.
  - compare the jaws of *Odontomachus bauri* to the jaws of other species of ants.
  - describe the evolution of the ability of trap-jaw ants to perform an escape jump.
32. The sentence in lines 73–75 and the last sentence of the passage are examples of the author's rhetorical technique of:
- weaving sarcasm into a mostly casual and playful article.
  - interjecting a lighthearted tone into a primarily technical article.
  - integrating a slightly combative tone into an article that mostly praises two scientists' work.
  - incorporating personal anecdotes into an article that mostly reports data.
33. As it is used in lines 81–82, the phrase *well-defended prey* most nearly refers to prey that:
- have a hard outer shell.
  - attack with a lethal bite.
  - travel and attack in groups.
  - move quickly.
34. The passage makes clear that the main source of the speed of the jaws of the trap-jaw ant is the:
- ease of movement of the hinge of the jaw.
  - continuous, steady firing of the jaw's mandibles.
  - light weight of the jaw in relation to the ant's body weight.
  - release of energy stored by muscles of the jaw.
35. The author uses the analogy of trying to grab popcorn as it pops in order to describe the trap-jaw ants' ability to:
- generate heat with their jaw movements.
  - move to high ground in order to attack prey.
  - attack intruders by tossing them out of the nest.
  - bounce around frantically when intruders approach.
36. One main purpose of the last paragraph is to suggest that unlike their bouncer-defense jump, the trap-jaw ants' escape jump may have arisen through:
- the ants' trying and failing to bite intruders.
  - a change in the structure of the mandibles of several lineages of ants.
  - an accidental behavior of the ants.
  - the ants' experiencing a positive outcome when they would attack in a large group.
37. As it is used in line 31, the word *domain* most nearly means:
- living space.
  - area of expertise.
  - taxonomic category.
  - local jurisdiction.
38. The passage points to which of the following as a characteristic of trap-jaw ants' mandibles that prevents the ants from harming themselves with their powerful bite?
- A hinge prevents the mandibles from snapping together forcefully.
  - Mandibles with cushioned inner edges provide a buffer when the mandibles snap shut.
  - A latch mechanism prevents the mandibles from closing completely.
  - The mandibles begin to decelerate before they meet.
39. As described in the passage, one benefit of the trap-jaw ant's escape jump is that it allows an ant to:
- land in position to launch a new attack on a predator.
  - confuse a predator with a quick, sudden sting.
  - signal to other ants using a predictable movement.
  - point itself in whichever direction it chooses to escape.
40. When a trap-jaw ant uses the bouncer-defense jump effectively on an intruder, which creature(s), if any, will be propelled either out of the nest or in another direction?
- The intruder only
  - The attacking ant only
  - The attacking ant and the intruder
  - Neither the attacking ant nor the intruder

**END OF TEST 3**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**

**DO NOT RETURN TO A PREVIOUS TEST.**



**SCIENCE TEST**

35 Minutes—40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

**Passage I**

Researchers studied how diet and the ability to smell food can affect the life span of normal fruit flies (Strain N) and fruit flies unable to detect many odors (Strain X).

*Study 1*

Three tubes (Tubes 1–3), each with 15% sugar yeast (SY) medium (a diet with 15% sugar and 15% killed yeast), were prepared. Then, 200 virgin female Strain N fruit flies less than 24 hr old were added to each tube. No additional substance was added to Tube 1. Additional odors from live yeast were added to Tube 2, and live yeast was added to Tube 3. The percent of fruit flies alive was determined every 5 days for 75 days (see Figure 1).

*Study 2*

Three tubes (Tubes 4–6), each with 5% SY medium (a diet with 5% sugar and 5% killed yeast), were prepared. Then, 200 virgin female Strain N fruit flies less than 24 hr old were added to each tube. No additional substance was added to Tube 4. Additional odors from live yeast were added to Tube 5, and live yeast was added to Tube 6. The percent of fruit flies alive was determined every 5 days for 75 days (see Figure 2).

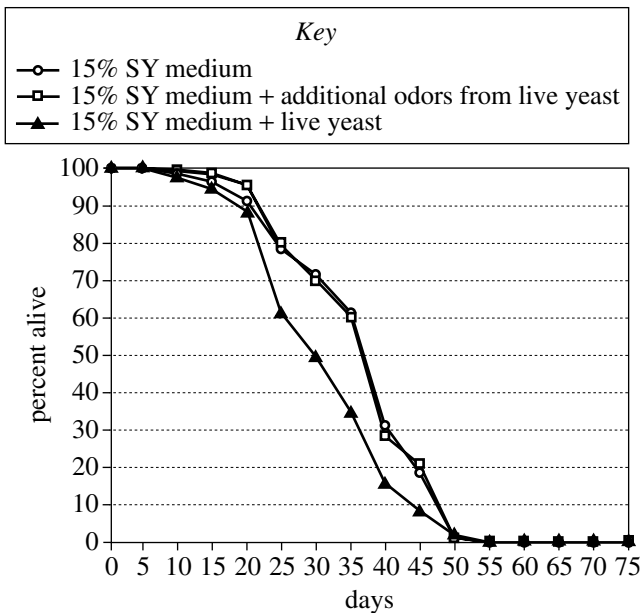


Figure 1

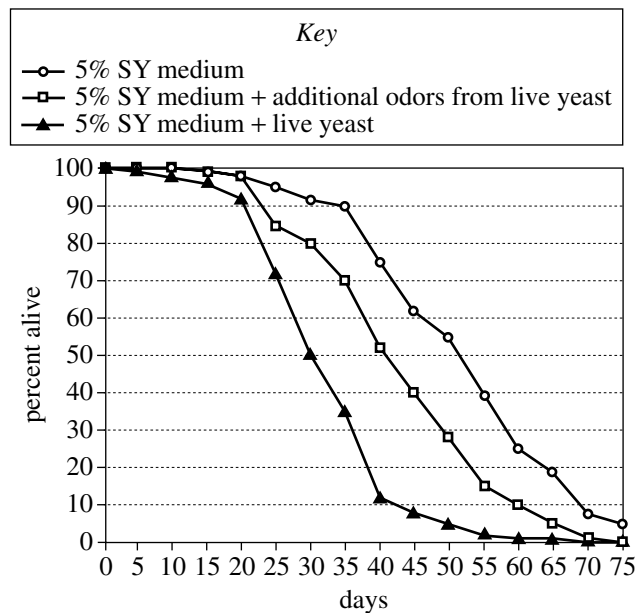


Figure 2



**Study 3**

Strain N fruit flies were modified to produce Strain X fruit flies. Strain X fruit flies lack *Or83b* (a protein required to detect a wide range of odors); therefore, they cannot detect many odors. The average life span was determined for virgin female Strain N and virgin female Strain X fruit flies fed with various SY media (see Table 1).

Strain	SY medium		Average life span (days)
	% sugar	% killed yeast	
Strain N	3	3	50.1
	5	5	50.1
	7.5	7.5	43.9
	10	10	44.8
	15	15	41.6
Strain X	3	3	61.6
	5	5	62.5
	7.5	7.5	58.9
	10	10	58.6
	15	15	55.6

Table and figures adapted from Sergiy Libert et al., "Regulation of *Drosophila* Life Span by Olfaction and Food-Derived Odors." ©2007 by the American Association for the Advancement of Science.

- In which of Studies 1 and 2 did some of the fruit flies live for more than 75 days, and what diet were those fruit flies fed?
  - Study 1; 5% SY medium
  - Study 1; 15% SY medium
  - Study 2; 5% SY medium
  - Study 2; 15% SY medium
- During Studies 1 and 2, why did the size of the fruit fly population in each tube decrease rather than increase?
  - The birthrate was 0, because the initial population contained only males.
  - The birthrate was 0, because the initial population contained only virgin females.
  - The death rate was 0, because the initial population contained only males.
  - The death rate was 0, because the initial population contained only virgin females.
- Study 1 differed from Study 2 in which of the following ways?
  - Female fruit flies were tested in Study 1, whereas male fruit flies were tested in Study 2.
  - Male fruit flies were tested in Study 1, whereas female fruit flies were tested in Study 2.
  - The SY medium tested in Study 1 contained a lower percent of sugar than did the SY medium tested in Study 2.
  - The SY medium tested in Study 1 contained a higher percent of sugar than did the SY medium tested in Study 2.
- Suppose that an additional trial in Study 3 had been performed using a 12% SY medium (a diet with 12% sugar and 12% killed yeast). The average life span of the Strain X fruit flies in this trial would most likely have been:
  - less than 55.6 days.
  - between 55.6 days and 58.6 days.
  - between 58.6 days and 61.6 days.
  - greater than 61.6 days.
- The researchers had predicted that decreasing a fruit fly's ability to detect odors would increase its life span. Are the results of Study 3 consistent with this prediction?
  - No; for each SY medium tested, the average life span of Strain X fruit flies was longer than the average life span of Strain N fruit flies.
  - No; for each SY medium tested, the average life span of Strain N fruit flies was longer than the average life span of Strain X fruit flies.
  - Yes; for each SY medium tested, the average life span of Strain X fruit flies was longer than the average life span of Strain N fruit flies.
  - Yes; for each SY medium tested, the average life span of Strain N fruit flies was longer than the average life span of Strain X fruit flies.
- Suppose the researchers wanted to determine whether a defect in the ability to detect odors would change the life span of fruit flies fed 15% SY medium when live yeast is added to the diet or when additional odors from live yeast are added to the diet. Which of the following experiments should be performed?
  - Repeat Study 1 except with Strain X fruit flies
  - Repeat Study 1 except with Strain N fruit flies
  - Repeat Study 2 except with Strain X fruit flies
  - Repeat Study 2 except with Strain N fruit flies
- The results for which 2 tubes should be compared to determine how a reduced calorie diet affects life span in the absence of live yeast and additional odors from live yeast?
  - Tube 1 and Tube 4
  - Tube 1 and Tube 2
  - Tube 2 and Tube 5
  - Tube 5 and Tube 6

**Passage II**

In the fall, monarch butterflies (*Danaus plexippus*) in eastern North America migrate to Mexico, where they overwinter in high-altitude forests of *oyamel fir* (an evergreen conifer). The butterflies store (accumulate) body lipids to use as a source of energy at a later time. Consider the following 3 hypotheses pertaining to when the butterflies store lipids and when the energy from the stored lipids is used, with respect to migration and overwintering.

*Hypothesis 1*

Monarch butterflies require energy from stored lipids for migration and during the overwintering period. The butterflies first store lipids before they begin their migration. During migration, as stored lipids are converted to energy, lipid mass continuously decreases. When the butterflies reach the overwintering sites, ending their migration, they must store lipids again before beginning the overwintering period.

*Hypothesis 2*

Monarch butterflies require energy from stored lipids for migration but not during the overwintering period. The butterflies store lipids before they begin their migration. During migration, as stored lipids are converted to energy, lipid mass continuously decreases. Because energy from stored lipids is not required during the overwintering period, the butterflies do not store lipids while at the overwintering sites.

*Hypothesis 3*

Monarch butterflies require energy from stored lipids during the overwintering period but not for migration. The butterflies do not store lipids before they begin their migration. Instead, lipids are stored during migration; therefore, lipid mass continuously increases from the beginning of migration until the end of migration. The butterflies arrive at the overwintering sites with enough lipids to provide themselves with energy during the overwintering period, so they do not store lipids while at the overwintering sites.

8. Which hypothesis, if any, asserts that monarch butterflies store lipids during 2 distinct periods?

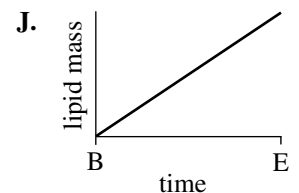
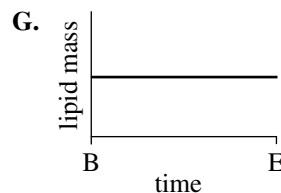
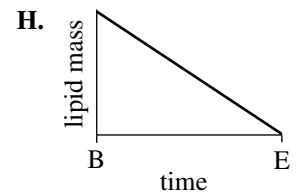
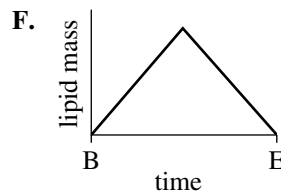
- F. Hypothesis 1
- G. Hypothesis 2
- H. Hypothesis 3
- J. None of the hypotheses

9. Which hypothesis, if any, asserts that monarch butterflies require energy from stored lipids neither for migration nor during the overwintering period?

- A. Hypothesis 1
- B. Hypothesis 2
- C. Hypothesis 3
- D. None of the hypotheses

10. Based on Hypothesis 3, which of the following figures best depicts the change in the lipid mass of a monarch butterfly from the beginning of migration to the end of migration?

(Note: In each figure, B represents the beginning of migration and E represents the end of migration.)



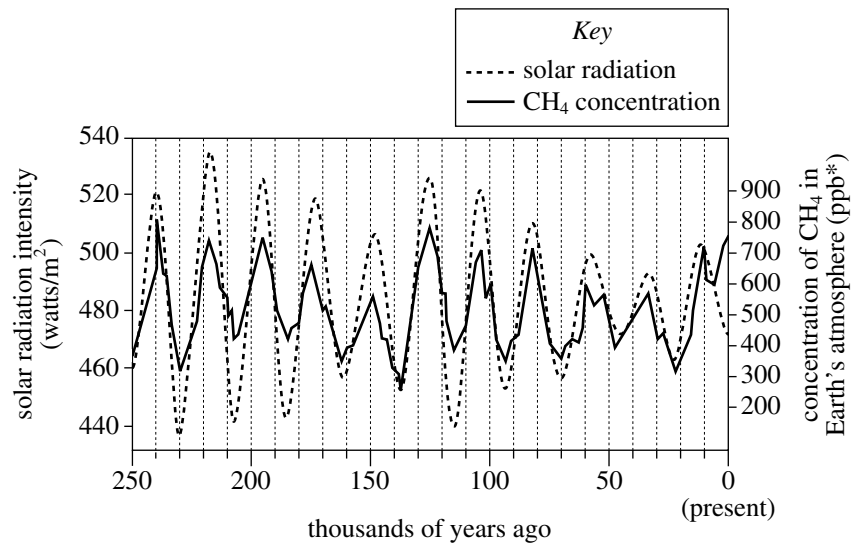


11. Assume that changes in the body mass of a monarch butterfly are caused only by changes in the mass of the butterfly's stored lipids. The statement "The percent of a monarch butterfly's body mass that is made up of lipids is greater at the beginning of migration than at the end of migration" is supported by which of the hypotheses?
- A. Hypothesis 1 only
  - B. Hypothesis 2 only
  - C. Hypotheses 1 and 2 only
  - D. Hypotheses 1, 2, and 3
12. To store lipids, monarch butterflies convert sugar from nectar they have consumed into lipids. A supporter of which hypothesis, if any, would be likely to claim that to ensure the butterflies can store lipids for the overwintering period, nectar must be present at the butterflies' overwintering sites?
- F. Hypothesis 1
  - G. Hypothesis 2
  - H. Hypothesis 3
  - J. None of the hypotheses
13. Which of the following statements about lipids in monarch butterflies is consistent with all 3 hypotheses?
- A. The butterflies' lipid masses do not change during the overwintering period.
  - B. The butterflies' lipid masses change during migration.
  - C. The butterflies use energy from stored lipids during the overwintering period.
  - D. The butterflies use energy from stored lipids for migration.
14. When the monarch butterflies use their stored lipids, the lipids must be broken down to produce energy-rich molecules that can be readily used by cells. Which of the following molecules is produced as a direct result of the breakdown of the lipids?
- F. ATP
  - G. Starch
  - H. DNA
  - J. Amino acids



### Passage III

Greenhouse gases such as methane ( $\text{CH}_4$ ) warm Earth's climate. Figure 1 shows the concentration of  $\text{CH}_4$  in Earth's atmosphere and the solar radiation intensity at Earth's surface for tropical Europe and Asia over the past 250,000 years. As the figure shows, the  $\text{CH}_4$  concentration and the solar radiation intensity have increased and decreased at the same times over most of this period. Figure 2 shows the same types of data for the same region over the past 11,000 years. This figure is consistent with the hypothesis that the greenhouse gases from human activities may have begun warming Earth's climate thousands of years earlier than once thought.



\*ppb = parts per billion

Figure 1

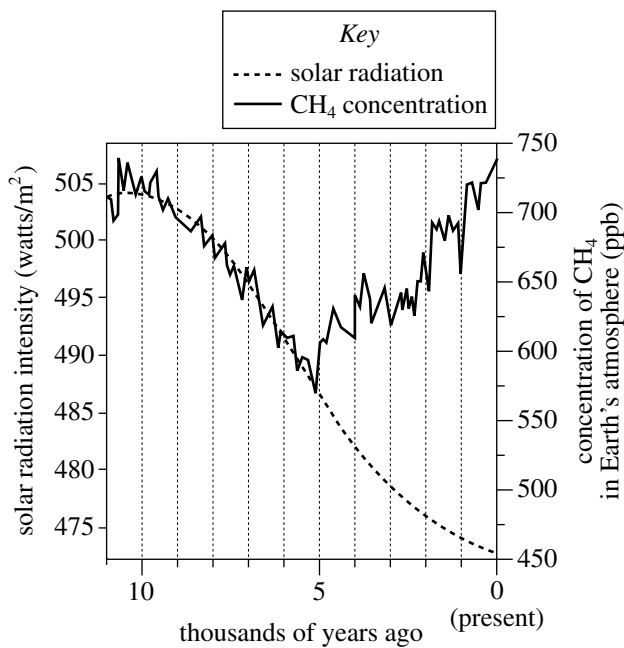


Figure 2

Figures adapted from William Ruddiman, *Plows, Plagues & Petroleum*. ©2005 by Princeton University Press.

15. According to Figure 2, the solar radiation intensity 8,000 years ago was closest to which of the following?
- 490 watts/m<sup>2</sup>
  - 495 watts/m<sup>2</sup>
  - 500 watts/m<sup>2</sup>
  - 505 watts/m<sup>2</sup>
16. According to Figure 2, if the trend in the CH<sub>4</sub> concentration had continued to match the trend in the solar radiation intensity, the CH<sub>4</sub> concentration at present would most likely be:
- less than 550 ppb.
  - between 550 ppb and 600 ppb.
  - between 600 ppb and 650 ppb.
  - greater than 650 ppb.
17. Suppose that whenever the CH<sub>4</sub> concentration increases, a corresponding, immediate increase in average global temperature occurs, and that whenever the CH<sub>4</sub> concentration decreases, a corresponding, immediate decrease in average global temperature occurs. Based on Figure 2, which of the following graphs best represents a plot of average global temperature over the past 11,000 years?
- - 
  - 
  -
18. Based on Figure 1, the average solar radiation intensity over the past 250,000 years was closest to which of the following?
- 400 watts/m<sup>2</sup>
  - 440 watts/m<sup>2</sup>
  - 480 watts/m<sup>2</sup>
  - 520 watts/m<sup>2</sup>
19. One *solar radiation cycle* is the time between a maximum in the solar radiation intensity and the next maximum in the solar radiation intensity. According to Figure 1, the average length of a solar radiation cycle during the past 250,000 years was:
- less than 15,000 years.
  - between 15,000 years and 35,000 years.
  - between 35,000 years and 55,000 years.
  - greater than 55,000 years.
20. Which of the following statements best describes the primary effect of CH<sub>4</sub> on Earth's climate?
- CH<sub>4</sub> gives off visible light to space, cooling Earth's climate.
  - CH<sub>4</sub> gives off ultraviolet radiation to space, warming Earth's climate.
  - CH<sub>4</sub> absorbs heat as it enters Earth's atmosphere from space, cooling Earth's climate.
  - CH<sub>4</sub> absorbs heat that comes up from Earth's surface, warming Earth's climate.

**Passage IV**

In 2 experiments, a student pulled each of 3 blocks in a straight line across a flat, horizontal surface.

In Experiment 1, the student measured the *pulling force* (the force required to move each block at a constant speed) and plotted the pulling force, in newtons (N), versus block mass, in kilograms (kg). The results are shown in Figure 1.

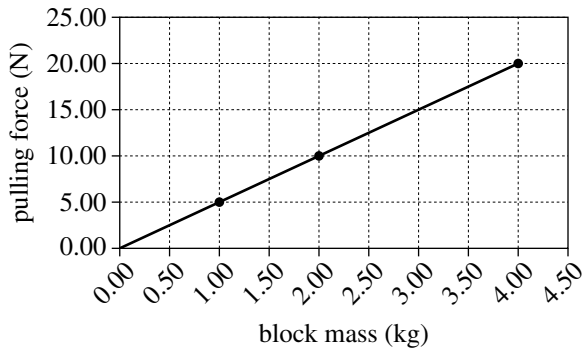


Figure 1

In Experiment 2, the student measured the speed versus time of a 2.00 kg block, a 2.50 kg block, and a 3.00 kg block as each block was pulled across the surface with a constant 30 N force. The results are shown in Figure 2.

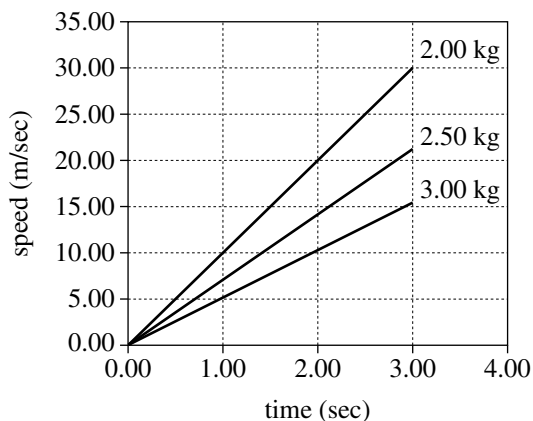


Figure 2

21. If a block was pulled toward the east, the frictional force exerted on the block by the surface was directed toward the:

- A. north.
- B. south.
- C. east.
- D. west.

22. Based on Figure 2, what is the order of the 3 blocks, from the block that required the shortest time to reach 15 m/sec to the block that required the longest time to reach 15 m/sec ?

- F. 2.00 kg block, 2.50 kg block, 3.00 kg block
- G. 2.00 kg block, 3.00 kg block, 2.50 kg block
- H. 3.00 kg block, 2.00 kg block, 2.50 kg block
- J. 3.00 kg block, 2.50 kg block, 2.00 kg block

23. Based on Figure 2, what was the approximate value of the acceleration of the 3.00 kg block?

- A. 0.0 m/sec<sup>2</sup>
- B. 5.0 m/sec<sup>2</sup>
- C. 15.0 m/sec<sup>2</sup>
- D. 20.0 m/sec<sup>2</sup>

24. Based on Figure 1, the results of Experiment 1 are best modeled by which of the following equations?

- F. Block speed (m/sec) = 0.2 × time (sec)
- G. Block speed (m/sec) = 5.0 × time (sec)
- H. Pulling force (N) = 0.2 × block mass (kg)
- J. Pulling force (N) = 5.0 × block mass (kg)

**4****4**

25. At each of the times plotted in Figure 2 (except 0.00 sec), as block mass increased, block speed:

- A. increased only.
- B. decreased only.
- C. varied, but with no general trend.
- D. remained the same.

26. Based on Figure 1, an applied force of 30.00 N would most likely have been required to maintain the constant speed of a block having a mass of:

- F. 4.00 kg.
- G. 5.00 kg.
- H. 6.00 kg.
- J. 7.00 kg.

**Passage V**

A typical *acid-base indicator* is a compound that will be one color over a certain lower pH range but will be a different color over a certain higher pH range. In the small range between these pH ranges—the *transition range*—the indicator's color will be an intermediate of its other 2 colors.

Students studied 5 acid-base indicators using colorless aqueous solutions of different pH and a *well plate* (a plate containing a matrix of round depressions—*wells*—that can hold small volumes of liquid).

*Experiment 1*

The students added a pH = 0 solution to 5 wells in the first column of the well plate, then added a pH = 1 solution to the 5 wells in the next column, and so on, up to pH = 7. Next, they added a drop of a given indicator (in solution) to each of the wells in a row, and then repeated this process, adding a different indicator to each row. The color of the resulting solution in each well was then recorded in Table 1 (B = blue, G = green, O = orange, P = purple, R = red, Y = yellow).

Indicator	Color in solution with a pH of:							
	0 1 2 3 4 5 6 7							
	Metanil yellow	R	R	O	Y	Y	Y	Y
Resorcin blue	R	R	R	R	R	P	P	B
Curcumin	Y	Y	Y	Y	Y	Y	Y	Y
Hessian bordeaux	B	B	B	B	B	B	B	B
Indigo carmine	B	B	B	B	B	B	B	B

*Experiment 2*

Experiment 1 was repeated with solutions that had a pH of 8 or greater (see Table 2).

Indicator	Color in solution with a pH of:						
	8 9 10 11 12 13 14						
	Metanil yellow	Y	Y	Y	Y	Y	Y
Resorcin blue	B	B	B	B	B	B	B
Curcumin	O	R	R	R	R	R	R
Hessian bordeaux	B	R	R	R	R	R	R
Indigo carmine	B	B	B	B	G	Y	Y

*Experiment 3*

Students were given 4 solutions (Solutions I–IV) of unknown pH. The well plate was used to test samples of each solution with 4 of the 5 indicators (see Table 3).

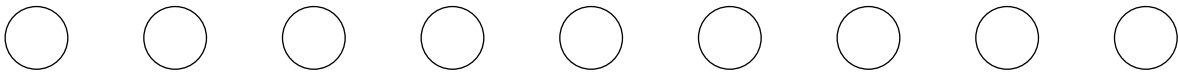
Indicator	Color in Solution:			
	I II III IV			
	Metanil yellow	Y	Y	Y
Resorcin blue	B	B	R	R
Curcumin	R	R	Y	Y
Indigo carmine	B	Y	B	B

Tables adapted from David R. Lide, ed., *CRC Handbook of Chemistry and Physics*, 78th ed. ©1997 by CRC Press LLC.





27. One way Experiment 2 differed from Experiment 3 was that in Experiment 2:
- A. the solutions to which indicators were added were of known pH.
  - B. the solutions to which indicators were added were of unknown pH.
  - C. metanil yellow was used.
  - D. metanil yellow was not used.
28. Based on the description of the well plate and how it was used, the empty well plate would most likely have been which of the following colors?
- F. Black
  - G. Blue
  - H. Red
  - J. White
29. Based on the results of Experiments 1 and 2, which of the following is a possible transition range for curcumin?
- A. pH = 3.9 to pH = 7.3
  - B. pH = 4.2 to pH = 6.6
  - C. pH = 7.4 to pH = 8.6
  - D. pH = 8.4 to pH = 9.5
30. A chemist has 2 solutions, one of pH = 1 and one of pH = 6. Based on the results of Experiments 1 and 2, could indigo carmine be used to distinguish between these solutions?
- F. No; indigo carmine is blue at both pH = 1 and pH = 6.
  - G. No; indigo carmine is blue at pH = 1 and is yellow at pH = 6.
  - H. Yes; indigo carmine is blue at both pH = 1 and pH = 6.
  - J. Yes; indigo carmine is blue at pH = 1 and is yellow at pH = 6.
31. The indicator *propyl red* has a transition range of pH = 4.6 to pH = 6.8. If propyl red had been included in Experiments 1 and 2, it would have produced results most similar to those produced by which of the 5 indicators?
- A. Metanil yellow
  - B. Resorcin blue
  - C. Curcumin
  - D. Indigo carmine
32. A student claimed that Solution III has a pH of 7.3. Are the results of Experiments 1–3 consistent with this claim?
- F. No, because in Solution III metanil yellow was yellow.
  - G. No, because in Solution III resorcin blue was red.
  - H. Yes, because in Solution III metanil yellow was yellow.
  - J. Yes, because in Solution III resorcin blue was red.
33. Based on the results of Experiments 1–3, which of Solutions I–IV has the *lowest* pH ?
- A. Solution I
  - B. Solution II
  - C. Solution III
  - D. Solution IV



**Passage VI**

*Drilling mud* (DM) is a suspension of clay particles in water. When a well is drilled, DM is injected into the hole to lubricate the drill. After this use, the DM is brought back up to the surface and then disposed of by spraying it on adjacent land areas.

A cover of DM on plants and soil can affect the *albedo* (proportion of the total incoming solar radiation that is reflected from a surface), which in turn can affect the soil temperature. The effect of a cover of DM on the albedo and the soil temperature of an unsloped, semiarid grassland area was studied from July 1 to August 9 of a particular year.

On June 30, 3 plots (Plots 1–3), each 10 m by 40 m, were established in the grassland area. For all the plots, the types of vegetation present were the same, as was the density of the vegetation cover. At the center of each plot, a soil temperature sensor was buried in the soil at a depth of 2.5 cm. An instrument that measures incoming and reflected solar radiation was suspended 60 cm above the center of each plot.

An amount of DM equivalent to 40 cubic meters per hectare (m<sup>3</sup>/ha) was then sprayed evenly on Plot 2. (One hectare equals 10,000 m<sup>2</sup>.) An amount equivalent to 80 m<sup>3</sup>/ha was sprayed evenly on Plot 3. No DM was sprayed on Plot 1.

For each plot, the albedo was calculated for each cloudless day during the study period using measurements of incoming and reflected solar radiation taken at noon on those days (see Figure 1).

For each plot, the sensor recorded the soil temperature every 5 sec over the study period. From these data, the average soil temperature of each plot was determined for each day (see Figure 2).

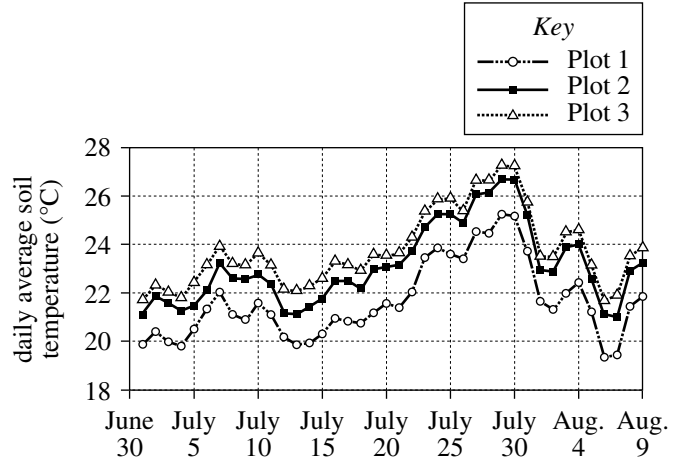


Figure 2

Figures adapted from Francis Zvomuya et al., “Surface Albedo and Soil Heat Flux Changes Following Drilling Mud Application to a Semiarid, Mixed-Grass Prairie.” ©2008 by the Soil Science Society of America.

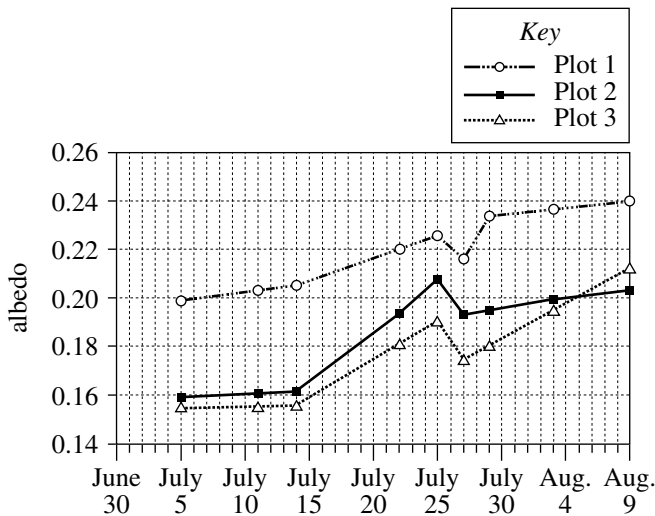


Figure 1

34. Albedo was measured at noon because that time of day is when solar radiation reaching the ground is:
- F. 100% reflected.
  - G. 100% absorbed.
  - H. least intense.
  - J. most intense.
35. Why was the study designed so that the 3 plots had the same types of vegetation present and the same density of vegetation cover? These conditions ensured that any variations in albedo and soil temperature would most likely be attributable only to variations among the plots in the:
- A. amount of DM sprayed.
  - B. type of soil present.
  - C. plot area.
  - D. plot slope.



36. On one day of the study period, a measurable rainfall occurred in the study area. The albedo calculated for the cloudless day just after the rainy day was lower than the albedo calculated for the cloudless day just before the rainy day. On which day did a measurable rainfall most likely occur in the study area?
- F. July 10  
G. July 12  
H. July 26  
J. July 28
37. For each plot, the number of temperature readings recorded by the soil temperature sensor every minute was closest to which of the following?
- A. 5  
B. 12  
C. 50  
D. 60
38. According to Figure 1 and the description of the study, was July 20 a cloudless day?
- F. No, because albedo data were not collected on that day.  
G. No, because albedo data were collected on that day.  
H. Yes, because albedo data were not collected on that day.  
J. Yes, because albedo data were collected on that day.
39. According to the results of the study, did the presence of a cover of DM increase or decrease the albedo, and did the presence of a cover of DM increase or decrease the soil temperature?
- |    | <u>albedo</u> | <u>soil temperature</u> |
|----|---------------|-------------------------|
| A. | increase      | increase                |
| B. | increase      | decrease                |
| C. | decrease      | decrease                |
| D. | decrease      | increase                |
40. Based on Figure 1, on August 3, what percent of incoming solar radiation was NOT reflected from Plot 2 ?
- F. 20%  
G. 40%  
H. 60%  
J. 80%

**END OF TEST 4**

**STOP! DO NOT RETURN TO ANY OTHER TEST.**

**[See Note on page 52.]**

**If you plan to take the ACT with writing, sharpen your pencils and continue with the writing test on page 53.**

**If you do not plan to take the ACT with writing, skip to page 56 for instructions on scoring your multiple-choice tests.**

## Practice Writing Test

Your Signature: \_\_\_\_\_  
(Do not print.)

Print Your Name Here: \_\_\_\_\_

Your Date of Birth:									
□	□	-	□	□	-	□	□	□	□
Month			Day			Year			

**Form 15AA51**

The **ACT**<sup>®</sup>

# WRITING TEST BOOKLET

**You must take the multiple-choice tests before you take the writing test.**

### Directions

This is a test of your writing skills. You will have **forty** (40) minutes to read the prompt, plan your response, and write an essay in English. Before you begin working, read all material in this test booklet carefully to understand exactly what you are being asked to do.

You will write your essay on the lined pages in the **answer document** provided. Your writing on those pages will be scored. You may use the unlined pages in this test booklet to plan your essay. Your work on these pages will not be scored.

Your essay will be evaluated based on the evidence it provides of your ability to:

- analyze and evaluate multiple perspectives on a complex issue
- state and develop your own perspective on the issue
- explain and support your ideas with logical reasoning and detailed examples
- clearly and logically organize your ideas in an essay
- effectively communicate your ideas in standard written English

Lay your pencil down immediately when time is called.

**DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.**

**ACT**<sup>®</sup>

PO Box 168  
Iowa City, IA 52243-0168

©2015 by ACT, Inc. All rights reserved.

NOTE: This test material is the confidential copyrighted property of ACT, Inc., and may not be copied, reproduced, sold, or otherwise transferred without the prior express written permission of ACT, Inc. Violators of ACT's copyrights are subject to civil and criminal penalties.

## Public Health and Individual Freedom

Most people want to be healthy, and most people want as much freedom as possible to do the things they want. Unfortunately, these two desires sometimes conflict. For example, smoking is prohibited from most public places, which restricts the freedom of some individuals for the sake of the health of others. Likewise, car emissions are regulated in many areas in order to reduce pollution and its health risks to others, which in turn restricts some people's freedom to drive the vehicles they want. In a society that values both health and freedom, how do we best balance the two? How should we think about conflicts between public health and individual freedom?

*Read and carefully consider these perspectives. Each suggests a particular way of thinking about the conflict between public health and individual freedom.*

### Perspective One

Our society should strive to achieve the greatest good for the greatest number of people. When the freedom of the individual interferes with that principle, freedom must be restricted.

### Perspective Two

Nothing in society is more valuable than freedom. Perhaps physical health is sometimes improved by restricting freedom, but the cost to the health of our free society is far too great to justify it.

### Perspective Three

The right to avoid health risks is a freedom, too. When we allow individual behavior to endanger others, we've damaged both freedom and health.

### Essay Task

Write a unified, coherent essay in which you evaluate multiple perspectives on the conflict between public health and individual freedom. In your essay, be sure to:

- analyze and evaluate the perspectives given
- state and develop your own perspective on the issue
- explain the relationship between your perspective and those given

Your perspective may be in full agreement with any of the others, in partial agreement, or wholly different. Whatever the case, support your ideas with logical reasoning and detailed, persuasive examples.

## Planning Your Essay

*Your work on these prewriting pages will not be scored.*

Use the space below and on the back cover to generate ideas and plan your essay. You may wish to consider the following as you think critically about the task:

Strengths and weaknesses of the three given perspectives

- What insights do they offer, and what do they fail to consider?
- Why might they be persuasive to others, or why might they fail to persuade?

Your own knowledge, experience, and values

- What is your perspective on this issue, and what are its strengths and weaknesses?
- How will you support your perspective in your essay?

### Note

- For your practice essay, you will need scratch paper to plan your essay and four lined sheets of paper for your response.
- On test day, you will receive a test booklet with space to plan your essay and four lined pages on which to write your response.
- Read pages 61–62 for information and instructions on scoring your practice writing test.

# 5 Scoring Your Tests

## How to Score the Multiple-Choice Tests

Follow the instructions below and on the following pages to score your practice multiple-choice tests and review your performance.

### Raw Scores

The number of questions you answered correctly on each test and in each subscore area is your raw score. Because there are many forms of the ACT, each with different questions, some forms will be slightly easier (and some slightly harder) than others. A raw score of 67 on one form of the English test, for example, may be about as difficult to earn as a raw score of 70 on another form of that test.

To compute your raw scores, check your answers with the scoring keys on pages 57–58. Count the number of correct answers for each of the four tests and seven subscore areas, and enter the number in the blanks provided on those pages. These numbers are your raw scores on the tests and subscore areas.

### Scale Scores

To adjust for the small differences that occur among different forms of the ACT, the raw scores for tests and subscore areas are converted into *scale scores*. Scale scores are printed on the reports sent to you and your college and scholarship choices.

When your raw scores are converted into scale scores, it becomes possible to compare your scores with those of examinees who took different test forms. For example, a scale score of 26 on the English test has the same meaning regardless of the form of the ACT on which it is based.

To determine the scale scores corresponding to your raw scores on the practice test, use the tables explaining procedures used to obtain scale scores from raw scores on pages 59–60. Table 1 on page 59 shows the raw-to-scale score conversions for each test, and Table 2 on page 60 shows the raw-to-scale score conversions for the subscore areas. Because each form of the ACT is unique, each form has somewhat different conversion tables. Consequently, these tables provide only approximations of the raw-to-scale score conversions that would apply if a different form of the ACT were taken. Therefore, the scale scores obtained from the practice tests don't match precisely the scale scores received from an actual administration of the ACT.

### Computing the Composite Score

The Composite score is the average of the four scale scores in English, mathematics, reading, and science. If you left any of these tests blank, do not calculate a Composite score. If you take the ACT with writing, your writing results do **not** affect your Composite score.

### Comparing Your Scores

Information about comparing your scores on the practice multiple-choice tests with the scores of recent high school graduates who took the ACT can be found at [www.actstudent.org](http://www.actstudent.org).

Your scores and percent at or below are only *estimates* of the scores that you will receive during an actual administration of the ACT. Test scores are only one indicator of your level of learning. Consider your scores in connection with your grades, your performance in outside activities, and your career interests.

### ACT College and Career Readiness Standards

The ACT College and Career Readiness Standards describe the types of skills, strategies, and understandings you will need to make a successful transition from high school to college. For English, mathematics, reading, and science, standards are provided for six score ranges that reflect the progression and complexity of the skills in each of the academic areas measured by the ACT tests. For writing, standards are provided for five score ranges. The ACT College and Career Readiness Standards and benchmark scores for each test can be found at [www.act.org](http://www.act.org).

## Reviewing Your Performance on the Practice Multiple-Choice Tests

Consider the following as you review your scores.

- Did you run out of time? Reread the information in this booklet on pacing yourself. You may need to adjust the way you use your time in responding to the questions.
- Did you spend too much time trying to understand the directions for the tests? The directions for the practice tests are the same directions that will appear in your test booklet on test day. Make sure you understand them before test day.
- Review the questions that you missed. Did you select a response that was an incomplete answer or that did not directly respond to the question being asked? Try to figure out what you overlooked in answering the questions.
- Did a particular type of question confuse you? Did the questions you missed come from a particular subscore area? In reviewing your responses, check to see whether a particular type of question or a particular subscore area was more difficult for you.



### Scoring Keys for the ACT Practice Tests

Use the scoring key for each test to score your answer document for the multiple-choice tests. Mark a “1” in the blank for each question you answered correctly. Add up the numbers in each subscore area and enter the total number correct for each subscore area in the blanks provided. Also enter the total number correct for each test in the blanks provided. The total number correct for each test is the sum of the number correct in each subscore area.

#### Test 1: English—Scoring Key

Key	Subscore Area*		Key	Subscore Area*	
	UM	RH		UM	RH
1. A	___		39. C		
2. J		___	40. J	___	
3. D	___		41. C		
4. H	___		42. G	___	
5. B	___		43. D	___	
6. J	___		44. J		___
7. B		___	45. C		___
8. J	___		46. J	___	
9. C	___		47. D	___	
10. J	___		48. H		___
11. B	___		49. B	___	
12. G	___		50. F	___	
13. A		___	51. D		___
14. H		___	52. J		___
15. D		___	53. A	___	
16. H	___		54. F	___	
17. B	___		55. B		___
18. J		___	56. G		___
19. C	___		57. C		___
20. H	___		58. F		___
21. A	___		59. D		___
22. F	___		60. G		___
23. B		___	61. C	___	
24. H	___		62. G	___	
25. C	___		63. D	___	
26. F		___	64. F	___	
27. D		___	65. C		___
28. G		___	66. H	___	
29. A		___	67. D	___	
30. F		___	68. G		___
31. B	___		69. D	___	
32. H	___		70. J		___
33. B	___		71. A		___
34. H		___	72. F		___
35. A	___		73. B		___
36. F		___	74. H	___	
37. A	___		75. D		___
38. F		___			

Number Correct (Raw Score) for:	
Usage/Mechanics (UM) Subscore Area	_____ (40)
Rhetorical Skills (RH) Subscore Area	_____ (35)
Total Number Correct for English Test (UM + RH)	_____ (75)

\*UM = Usage/Mechanics  
RH = Rhetorical Skills

1572CPRE

#### Test 2: Mathematics—Scoring Key

Key	Subscore Area*			Key	Subscore Area*		
	EA	AG	GT		EA	AG	GT
1. D	___			31. D	___		
2. H	___			32. K	___		
3. E	___			33. B	___		
4. F	___			34. H			___
5. E		___		35. D	___		
6. H	___			36. J		___	
7. E		___		37. A	___		
8. H	___			38. F		___	
9. A	___			39. B		___	
10. K	___			40. F		___	
11. C		___		41. E			___
12. K			___	42. K		___	
13. B			___	43. D		___	
14. H			___	44. G		___	
15. B		___		45. D		___	
16. H	___			46. J	___		
17. D			___	47. B	___		
18. F	___			48. G	___		
19. D	___			49. A		___	
20. F			___	50. F			___
21. B	___			51. E	___		
22. H		___		52. H		___	
23. A	___			53. B			___
24. H	___			54. K	___		
25. B	___			55. E		___	
26. G			___	56. K	___		
27. E			___	57. A			___
28. H		___		58. K		___	
29. C		___		59. E	___		
30. G			___	60. J			___

Number Correct (Raw Score) for:	
Pre-Alg./Elem. Alg. (EA) Subscore Area	_____ (27)
Inter. Alg./Coord. Geo. (AG) Subscore Area	_____ (19)
Plane Geo./Trig. (GT) Subscore Area	_____ (14)
Total Number Correct for Math Test (EA + AG + GT)	_____ (60)

\*EA = Pre-Algebra/Elementary Algebra  
AG = Intermediate Algebra/Coordinate Geometry  
GT = Plane Geometry/Trigonometry

1572CPRE

**Test 3: Reading—Scoring Key**

Key	Subscore Area*		Key	Subscore Area*	
	SS	AL		SS	AL
1. A		___	21. A		___
2. J		___	22. G		___
3. C		___	23. D		___
4. H		___	24. J		___
5. B		___	25. C		___
6. J		___	26. G		___
7. A		___	27. C		___
8. H		___	28. J		___
9. B		___	29. C		___
10. J		___	30. G		___
11. A	___		31. A	___	
12. J	___		32. G	___	
13. C	___		33. A	___	
14. J	___		34. J	___	
15. B	___		35. D	___	
16. H	___		36. H	___	
17. B	___		37. B	___	
18. F	___		38. J	___	
19. D	___		39. A	___	
20. F	___		40. H	___	

**Test 4: Science—Scoring Key**

Key		Key	
1. C	___	21. D	___
2. G	___	22. F	___
3. D	___	23. B	___
4. G	___	24. J	___
5. C	___	25. B	___
6. F	___	26. H	___
7. A	___	27. A	___
8. F	___	28. J	___
9. D	___	29. C	___
10. J	___	30. F	___
11. C	___	31. B	___
12. F	___	32. G	___
13. B	___	33. D	___
14. F	___	34. J	___
15. C	___	35. A	___
16. F	___	36. H	___
17. B	___	37. B	___
18. H	___	38. F	___
19. B	___	39. D	___
20. J	___	40. J	___

Number Correct (Raw Score) for:	
Social Studies/Sciences (SS) Subscore Area	_____ (20)
Arts/Literature (AL) Subscore Area	_____ (20)
Total Number Correct for Reading Test (SS + AL)	_____ (40)

Number Correct (Raw Score) for:	
Total Number Correct for Science Test	_____ (40)

1572CPRE

\*SS = Social Studies/Sciences  
AL = Arts/Literature  
1572CPRE

**TABLE 1****Explanation of Procedures Used to Obtain Scale Scores from Raw Scores**

On each of the four multiple-choice tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

<b>ACT Test 1572CPRE</b>	<b>Your Scale Score</b>
English	_____
Mathematics	_____
Reading	_____
Science	_____
<hr/>	
<b>Sum of scores</b>	_____
<b>Composite score (sum ÷ 4)</b>	_____
<b>Writing</b>	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

To calculate your writing score, use the rubric on pages 61–62.

<b>Scale Score</b>	<b>Raw Scores</b>					<b>Scale Score</b>
	<b>Test 1 English</b>	<b>Test 2 Mathematics</b>	<b>Test 3 Reading</b>	<b>Test 4 Science</b>	<b>Writing</b>	
<b>36</b>	75	60	40	40	47-48	<b>36</b>
<b>35</b>	72-74	58-59	39	39	46	<b>35</b>
<b>34</b>	71	57	38	38	44-45	<b>34</b>
<b>33</b>	70	55-56	37	37	42-43	<b>33</b>
<b>32</b>	68-69	54	35-36	—	41	<b>32</b>
<b>31</b>	67	52-53	34	36	40	<b>31</b>
<b>30</b>	66	50-51	33	35	38-39	<b>30</b>
<b>29</b>	65	48-49	32	34	37	<b>29</b>
<b>28</b>	63-64	45-47	31	33	35-36	<b>28</b>
<b>27</b>	62	43-44	30	32	34	<b>27</b>
<b>26</b>	60-61	40-42	29	30-31	33	<b>26</b>
<b>25</b>	58-59	38-39	28	28-29	32	<b>25</b>
<b>24</b>	56-57	36-37	27	26-27	31	<b>24</b>
<b>23</b>	53-55	34-35	25-26	24-25	29-30	<b>23</b>
<b>22</b>	51-52	32-33	24	22-23	28	<b>22</b>
<b>21</b>	48-50	30-31	22-23	21	26-27	<b>21</b>
<b>20</b>	45-47	29	21	19-20	25	<b>20</b>
<b>19</b>	43-44	27-28	19-20	17-18	24	<b>19</b>
<b>18</b>	41-42	24-26	18	16	23	<b>18</b>
<b>17</b>	39-40	21-23	17	14-15	21-22	<b>17</b>
<b>16</b>	36-38	17-20	15-16	13	20	<b>16</b>
<b>15</b>	32-35	13-16	14	12	—	<b>15</b>
<b>14</b>	29-31	11-12	12-13	11	18-19	<b>14</b>
<b>13</b>	27-28	8-10	11	10	17	<b>13</b>
<b>12</b>	25-26	7	9-10	9	16	<b>12</b>
<b>11</b>	23-24	5-6	8	8	—	<b>11</b>
<b>10</b>	20-22	4	6-7	7	14-15	<b>10</b>
<b>9</b>	18-19	—	—	5-6	13	<b>9</b>
<b>8</b>	15-17	3	5	—	12	<b>8</b>
<b>7</b>	12-14	—	4	4	—	<b>7</b>
<b>6</b>	10-11	2	3	3	10-11	<b>6</b>
<b>5</b>	8-9	—	—	2	9	<b>5</b>
<b>4</b>	6-7	1	2	—	—	<b>4</b>
<b>3</b>	4-5	—	—	1	—	<b>3</b>
<b>2</b>	2-3	—	1	—	—	<b>2</b>
<b>1</b>	0-1	0	0	0	8	<b>1</b>

# TABLE 2

## Explanation of Procedures Used to Obtain Scale Subscores from Raw Scores

ACT Test 1572CPRE Your Scale Subscore

### English

For each of the seven subscore areas, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale subscores. For each of the seven subscore areas, locate and circle either the raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale subscore that corresponds to that raw score. As you determine your scale subscores, enter them in the blanks provided on the right. The highest possible scale subscore is 18. The lowest possible scale subscore is 1.

Usage/Mechanics	_____
Rhetorical Skills	_____
<b>Mathematics</b>	
Pre-Algebra/Elementary Algebra	_____
Algebra/Coord. Geometry	_____
Plane Geometry/Trigonometry	_____
<b>Reading</b>	
Social Studies/Sciences	_____
Arts/Literature	_____

If you left a test completely blank and marked no responses, do not list any scale subscores for that test.

Scale Subscore	Raw Scores										Scale Subscore
	Test 1 English		Test 2 Mathematics				Test 3 Reading				
	Usage/Mechanics	Rhetorical Skills	Pre-Algebra/Elem. Algebra	Algebra/Coord. Geometry	Plane Geometry/Trigonometry	Social Studies/Sciences	Arts/Literature	Social Studies/Sciences	Arts/Literature		
18	38-40	35	26-27	19	14	20	19-20	20	18	18	18
17	36-37	34	24-25	18	—	19	18	19	17	17	17
16	35	32-33	22-23	17	12-13	17-18	17	17-18	16	16	16
15	33-34	31	21	15-16	11	16	16	16	15	15	15
14	32	29-30	20	14	10	15	15	15	14	14	14
13	31	27-28	18-19	12-13	9	13-14	14	13-14	13	13	13
12	29-30	25-26	17	10-11	8	12	13	12	12	12	12
11	27-28	22-24	15-16	9	7	11	11	11	11	11	11
10	25-26	20-21	14	7-8	6	9-10	11	9-10	10	10	10
9	23-24	17-19	13	6	5	8	10	8	9	9	9
8	20-22	15-16	11-12	4-5	4	7	9	7	8	8	8
7	18-19	13-14	8-10	—	3	5-6	8	4	7	7	7
6	16-17	11-12	6-7	3	2	4	6-7	3	6	6	6
5	13-15	9-10	5	2	—	3	5	2	5	5	5
4	10-12	7-8	3-4	1	1	2	3-4	1	4	4	4
3	8-9	5-6	2	—	—	—	2	—	3	3	3
2	5-7	2-4	1	—	—	—	1	—	2	2	2
1	0-4	0-1	0	0	0	0	0	0	1	0	1

## How to Score the Writing Test

It is difficult to be objective about one's own work. However, it is to your advantage to read your own writing critically, as doing so can help you grow as a writer and as a reader. It may also be helpful for you to give your practice essay to another reader, such as a classmate, parent, or teacher. To rate your essay, you and your reader(s) should review the guidelines and sample essays at [www.actstudent.org](http://www.actstudent.org) and then use the scoring rubric below to assign your practice essay a score of 1 (low) through 6 (high) in each of the four writing domains (Ideas and Analysis, Development and Support, Organization, Language Use).

## Scoring Rubric (below)

The rubric presents the standards by which your essay will be evaluated. Readers will use this rubric to assign your essay four unique scores, one per writing domain. To score your essay, determine which scorepoint, in each domain, best describes the features of your writing. Because each domain receives its own score, the four scores you assign need not be identical. For example, you may find that your essay exhibits stronger skill in organization than in the development of ideas. In this case, you may determine that your essay should receive a higher score in Organization than in Development and Support.

## The ACT Writing Test Scoring Rubric

	<i>Ideas and Analysis</i>	<i>Development and Support</i>	<i>Organization</i>	<i>Language Use</i>
<b>Score 6:</b> <b>Responses at this scorepoint demonstrate effective skill in writing an argumentative essay.</b>	The writer generates an argument that critically engages with multiple perspectives on the given issue. The argument's thesis reflects nuance and precision in thought and purpose. The argument establishes and employs an insightful context for analysis of the issue and its perspectives. The analysis examines implications, complexities and tensions, and/or underlying values and assumptions.	Development of ideas and support for claims deepen insight and broaden context. An integrated line of skillful reasoning and illustration effectively conveys the significance of the argument. Qualifications and complications enrich and bolster ideas and analysis.	The response exhibits a skillful organizational strategy. The response is unified by a controlling idea or purpose, and a logical progression of ideas increases the effectiveness of the writer's argument. Transitions between and within paragraphs strengthen the relationships among ideas.	The use of language enhances the argument. Word choice is skillful and precise. Sentence structures are consistently varied and clear. Stylistic and register choices, including voice and tone, are strategic and effective. While a few minor errors in grammar, usage, and mechanics may be present, they do not impede understanding.
<b>Score 5:</b> <b>Responses at this scorepoint demonstrate well-developed skill in writing an argumentative essay.</b>	The writer generates an argument that productively engages with multiple perspectives on the given issue. The argument's thesis reflects precision in thought and purpose. The argument establishes and employs a thoughtful context for analysis of the issue and its perspectives. The analysis addresses implications, complexities and tensions, and/or underlying values and assumptions.	Development of ideas and support for claims deepen understanding. A mostly integrated line of purposeful reasoning and illustration capably conveys the significance of the argument. Qualifications and complications enrich ideas and analysis.	The response exhibits a productive organizational strategy. The response is mostly unified by a controlling idea or purpose, and a logical sequencing of ideas contributes to the effectiveness of the argument. Transitions between and within paragraphs consistently clarify the relationships among ideas.	The use of language works in service of the argument. Word choice is precise. Sentence structures are clear and varied often. Stylistic and register choices, including voice and tone, are purposeful and productive. While minor errors in grammar, usage, and mechanics may be present, they do not impede understanding.
<b>Score 4:</b> <b>Responses at this scorepoint demonstrate adequate skill in writing an argumentative essay.</b>	The writer generates an argument that engages with multiple perspectives on the given issue. The argument's thesis reflects clarity in thought and purpose. The argument establishes and employs a relevant context for analysis of the issue and its perspectives. The analysis recognizes implications, complexities and tensions, and/or underlying values and assumptions.	Development of ideas and support for claims clarify meaning and purpose. Lines of clear reasoning and illustration adequately convey the significance of the argument. Qualifications and complications extend ideas and analysis.	The response exhibits a clear organizational strategy. The overall shape of the response reflects an emergent controlling idea or purpose. Ideas are logically grouped and sequenced. Transitions between and within paragraphs clarify the relationships among ideas.	The use of language conveys the argument with clarity. Word choice is adequate and sometimes precise. Sentence structures are clear and demonstrate some variety. Stylistic and register choices, including voice and tone, are appropriate for the rhetorical purpose. While errors in grammar, usage, and mechanics are present, they rarely impede understanding.

## The ACT Writing Test Scoring Rubric

	<i>Ideas and Analysis</i>	<i>Development and Support</i>	<i>Organization</i>	<i>Language Use</i>
<b>Score 3:</b> <b>Responses at this scorepoint demonstrate some developing skill in writing an argumentative essay.</b>	The writer generates an argument that responds to multiple perspectives on the given issue. The argument's thesis reflects some clarity in thought and purpose. The argument establishes a limited or tangential context for analysis of the issue and its perspectives. Analysis is simplistic or somewhat unclear.	Development of ideas and support for claims are mostly relevant but are overly general or simplistic. Reasoning and illustration largely clarify the argument but may be somewhat repetitive or imprecise.	The response exhibits a basic organizational structure. The response largely coheres, with most ideas logically grouped. Transitions between and within paragraphs sometimes clarify the relationships among ideas.	The use of language is basic and only somewhat clear. Word choice is general and occasionally imprecise. Sentence structures are usually clear but show little variety. Stylistic and register choices, including voice and tone, are not always appropriate for the rhetorical purpose. Distracting errors in grammar, usage, and mechanics may be present, but they generally do not impede understanding.
<b>Score 2:</b> <b>Responses at this scorepoint demonstrate weak or inconsistent skill in writing an argumentative essay.</b>	The writer generates an argument that weakly responds to multiple perspectives on the given issue. The argument's thesis, if evident, reflects little clarity in thought and purpose. Attempts at analysis are incomplete, largely irrelevant, or consist primarily of restatement of the issue and its perspectives.	Development of ideas and support for claims are weak, confused, or disjointed. Reasoning and illustration are inadequate, illogical, or circular, and fail to fully clarify the argument.	The response exhibits a rudimentary organizational structure. Grouping of ideas is inconsistent and often unclear. Transitions between and within paragraphs are misleading or poorly formed.	The use of language is inconsistent and often unclear. Word choice is rudimentary and frequently imprecise. Sentence structures are sometimes unclear. Stylistic and register choices, including voice and tone, are inconsistent and are not always appropriate for the rhetorical purpose. Distracting errors in grammar, usage, and mechanics are present, and they sometimes impede understanding.
<b>Score 1:</b> <b>Responses at this scorepoint demonstrate little or no skill in writing an argumentative essay.</b>	The writer fails to generate an argument that responds intelligibly to the task. The writer's intentions are difficult to discern. Attempts at analysis are unclear or irrelevant.	Ideas lack development, and claims lack support. Reasoning and illustration are unclear, incoherent, or largely absent.	The response does not exhibit an organizational structure. There is little grouping of ideas. When present, transitional devices fail to connect ideas.	The use of language fails to demonstrate skill in responding to the task. Word choice is imprecise and often difficult to comprehend. Sentence structures are often unclear. Stylistic and register choices are difficult to identify. Errors in grammar, usage, and mechanics are pervasive and often impede understanding.

### Calculating Your Writing Subject Score

Complete these steps to calculate your Writing Subject Score (1–36 scale).

1. Locate the four domain scores (1–6) and enter them in the first column below. Double each score and enter in the Domain Score column to the right.

			Domain Score
Ideas and Analysis	_____	x 2 =	_____
Development and Support	_____	x 2 =	_____
Organization	_____	x 2 =	_____
Language Use and Conventions	_____	x 2 =	_____

2. Enter the sum of the second-column scores here \_\_\_\_\_. This is your raw score (value between 8 and 48).
3. Use Table 1 on page 59 to find the scaled Writing Subject Score that corresponds to your raw score.

# The ACT® 2015–2016 Answer Sheet (No Writing)

**A NAME, MAILING ADDRESS, AND TELEPHONE**  
(Please print.)

\_\_\_\_\_  
Last Name                      First Name                      MI (Middle Initial)

\_\_\_\_\_  
House Number & Street (Apt. No.); or PO Box & No.; or RR & No.

\_\_\_\_\_  
City                                      State/Province                      ZIP/Postal Code

\_\_\_\_\_  
Area Code                      Number                      Country

**B MATCH NAME**  
(First 5 letters of last name)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A	A	A	A	A
B	B	B	B	B
C	C	C	C	C
D	D	D	D	D
E	E	E	E	E
F	F	F	F	F
G	G	G	G	G
H	H	H	H	H
I	I	I	I	I
J	J	J	J	J
K	K	K	K	K
L	L	L	L	L
M	M	M	M	M
N	N	N	N	N
O	O	O	O	O
P	P	P	P	P
Q	Q	Q	Q	Q
R	R	R	R	R
S	S	S	S	S
T	T	T	T	T
U	U	U	U	U
V	V	V	V	V
W	W	W	W	W
X	X	X	X	X
Y	Y	Y	Y	Y
Z	Z	Z	Z	Z

**C MATCH NUMBER**

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9
0	0	0	0	0	0	0	0	0	0

**D DATE OF BIRTH**

Month	Day	Year
<input type="radio"/> Jan.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Feb.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> March	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> April	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> May	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> June	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> July	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Aug.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Sept.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Oct.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Nov.	<input type="radio"/>	<input type="radio"/>
<input type="radio"/> Dec.	<input type="radio"/>	<input type="radio"/>

**ACT, Inc.—Confidential Restricted when data present**

**ALL** examinees must complete block A – please print.

Blocks B, C, and D are required for all examinees. Find the MATCHING INFORMATION on your ticket. Enter it EXACTLY the same way, even if any of the information is missing or incorrect. Fill in the corresponding ovals. If you do not complete these blocks to match your previous information EXACTLY, your scores will be **delayed up to 8 weeks**.

Do NOT mark in this shaded area.



**USE A SOFT LEAD NO. 2 PENCIL ONLY.**  
(Do NOT use a mechanical pencil, ink, ballpoint, correction fluid, or felt-tip pen.)

**EXAMINEE STATEMENT, CERTIFICATION, AND SIGNATURE**

1. Read the following **Statement**: By submitting this answer sheet, I agree to comply with and be bound by the *Terms and Conditions: Testing Rules and Policies for the ACT®* provided in the ACT registration materials for this assessment, including those concerning test security, score cancellation, examinee remedies, arbitration, and consent to the processing of my personally identifying information, including the collection, use, transfer and disclosure of information as described in the ACT Privacy Policy ([www.act.org/privacy.html](http://www.act.org/privacy.html)).

**International Examinees**: By my signature I am also providing my consent to ACT to transfer my personally identifying information to the United States to ACT, or a third party service provider for processing, where it will be subject to use and disclosure under the laws of the United States. I acknowledge and agree that it may also be accessible to law enforcement and national security authorities in the United States.

I understand that ACT owns the assessment questions and responses and affirm that I will not share any assessment questions or responses with anyone by any form of communication before, during, or after the assessment administration. I understand that assuming anyone else's identity to take this assessment is strictly prohibited and may violate the law and subject me to legal penalties.

2. Copy the **Certification** shown below (only the text in italics) on the lines provided. Write in your normal handwriting.

**Certification**: *I agree to the Statement above and certify that I am the person whose name and address appear on this answer sheet.*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Your Signature

Today's Date



PO BOX 168, IOWA CITY, IOWA 52243-0168

Cut Here

**Marking Directions:** Mark only **one** oval for each question. Fill in response completely. Erase errors cleanly without smudging.

**Correct mark:**

**Do NOT use these incorrect or bad marks.**

- Incorrect marks:
- Overlapping mark:
- Cross-out mark:
- Smudged erasure:
- Mark is too light:

**BOOKLET NUMBER**

1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
0	0	0	0	0	0

**FORM**

--	--	--

Print your 3-character **Test Form** in the boxes above and fill in the corresponding oval at the right.

**BE SURE TO FILL IN THE CORRECT FORM OVAL.**

PRE

**TEST 1**

- |              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D)  | 14 (F G H J) | 27 (A B C D) | 40 (F G H J) | 53 (A B C D) | 66 (F G H J) |
| 2 (F G H J)  | 15 (A B C D) | 28 (F G H J) | 41 (A B C D) | 54 (F G H J) | 67 (A B C D) |
| 3 (A B C D)  | 16 (F G H J) | 29 (A B C D) | 42 (F G H J) | 55 (A B C D) | 68 (F G H J) |
| 4 (F G H J)  | 17 (A B C D) | 30 (F G H J) | 43 (A B C D) | 56 (F G H J) | 69 (A B C D) |
| 5 (A B C D)  | 18 (F G H J) | 31 (A B C D) | 44 (F G H J) | 57 (A B C D) | 70 (F G H J) |
| 6 (F G H J)  | 19 (A B C D) | 32 (F G H J) | 45 (A B C D) | 58 (F G H J) | 71 (A B C D) |
| 7 (A B C D)  | 20 (F G H J) | 33 (A B C D) | 46 (F G H J) | 59 (A B C D) | 72 (F G H J) |
| 8 (F G H J)  | 21 (A B C D) | 34 (F G H J) | 47 (A B C D) | 60 (F G H J) | 73 (A B C D) |
| 9 (A B C D)  | 22 (F G H J) | 35 (A B C D) | 48 (F G H J) | 61 (A B C D) | 74 (F G H J) |
| 10 (F G H J) | 23 (A B C D) | 36 (F G H J) | 49 (A B C D) | 62 (F G H J) | 75 (A B C D) |
| 11 (A B C D) | 24 (F G H J) | 37 (A B C D) | 50 (F G H J) | 63 (A B C D) |              |
| 12 (F G H J) | 25 (A B C D) | 38 (F G H J) | 51 (A B C D) | 64 (F G H J) |              |
| 13 (A B C D) | 26 (F G H J) | 39 (A B C D) | 52 (F G H J) | 65 (A B C D) |              |

**TEST 2**

- |                |                |                |                |                |                |
|----------------|----------------|----------------|----------------|----------------|----------------|
| 1 (A B C D E)  | 11 (A B C D E) | 21 (A B C D E) | 31 (A B C D E) | 41 (A B C D E) | 51 (A B C D E) |
| 2 (F G H J K)  | 12 (F G H J K) | 22 (F G H J K) | 32 (F G H J K) | 42 (F G H J K) | 52 (F G H J K) |
| 3 (A B C D E)  | 13 (A B C D E) | 23 (A B C D E) | 33 (A B C D E) | 43 (A B C D E) | 53 (A B C D E) |
| 4 (F G H J K)  | 14 (F G H J K) | 24 (F G H J K) | 34 (F G H J K) | 44 (F G H J K) | 54 (F G H J K) |
| 5 (A B C D E)  | 15 (A B C D E) | 25 (A B C D E) | 35 (A B C D E) | 45 (A B C D E) | 55 (A B C D E) |
| 6 (F G H J K)  | 16 (F G H J K) | 26 (F G H J K) | 36 (F G H J K) | 46 (F G H J K) | 56 (F G H J K) |
| 7 (A B C D E)  | 17 (A B C D E) | 27 (A B C D E) | 37 (A B C D E) | 47 (A B C D E) | 57 (A B C D E) |
| 8 (F G H J K)  | 18 (F G H J K) | 28 (F G H J K) | 38 (F G H J K) | 48 (F G H J K) | 58 (F G H J K) |
| 9 (A B C D E)  | 19 (A B C D E) | 29 (A B C D E) | 39 (A B C D E) | 49 (A B C D E) | 59 (A B C D E) |
| 10 (F G H J K) | 20 (F G H J K) | 30 (F G H J K) | 40 (F G H J K) | 50 (F G H J K) | 60 (F G H J K) |

**TEST 3**

- |             |              |              |              |              |              |
|-------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D) | 8 (F G H J)  | 15 (A B C D) | 22 (F G H J) | 29 (A B C D) | 36 (F G H J) |
| 2 (F G H J) | 9 (A B C D)  | 16 (F G H J) | 23 (A B C D) | 30 (F G H J) | 37 (A B C D) |
| 3 (A B C D) | 10 (F G H J) | 17 (A B C D) | 24 (F G H J) | 31 (A B C D) | 38 (F G H J) |
| 4 (F G H J) | 11 (A B C D) | 18 (F G H J) | 25 (A B C D) | 32 (F G H J) | 39 (A B C D) |
| 5 (A B C D) | 12 (F G H J) | 19 (A B C D) | 26 (F G H J) | 33 (A B C D) | 40 (F G H J) |
| 6 (F G H J) | 13 (A B C D) | 20 (F G H J) | 27 (A B C D) | 34 (F G H J) |              |
| 7 (A B C D) | 14 (F G H J) | 21 (A B C D) | 28 (F G H J) | 35 (A B C D) |              |

**TEST 4**

- |             |              |              |              |              |              |
|-------------|--------------|--------------|--------------|--------------|--------------|
| 1 (A B C D) | 8 (F G H J)  | 15 (A B C D) | 22 (F G H J) | 29 (A B C D) | 36 (F G H J) |
| 2 (F G H J) | 9 (A B C D)  | 16 (F G H J) | 23 (A B C D) | 30 (F G H J) | 37 (A B C D) |
| 3 (A B C D) | 10 (F G H J) | 17 (A B C D) | 24 (F G H J) | 31 (A B C D) | 38 (F G H J) |
| 4 (F G H J) | 11 (A B C D) | 18 (F G H J) | 25 (A B C D) | 32 (F G H J) | 39 (A B C D) |
| 5 (A B C D) | 12 (F G H J) | 19 (A B C D) | 26 (F G H J) | 33 (A B C D) | 40 (F G H J) |
| 6 (F G H J) | 13 (A B C D) | 20 (F G H J) | 27 (A B C D) | 34 (F G H J) |              |
| 7 (A B C D) | 14 (F G H J) | 21 (A B C D) | 28 (F G H J) | 35 (A B C D) |              |

