

Effective through the **2011–2012** testing year.



PREPARING

for the ACT

What's Inside:

- Full-Length Practice Tests, including a Writing Test
- Information about the Optional Writing Test
- Strategies to Prepare for the Tests
- What to Expect on Test Day



This booklet is provided free of charge.

Esta publicación también se puede ver o descargar en español en
www.actstudent.org/testprep/index.html.



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A Message to Students

This booklet, which is provided **free of charge**, is intended to help you do your best on the ACT. It summarizes general test-taking strategies, describes the content of each test, provides specific tips for each, and lets you know what to expect on test day. Included in this booklet are **complete practice tests**—“retired” ACT questions that were administered to students on a national test date, including a writing prompt—a sample answer document, answer keys, and self-scoring instructions.

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

ACT is committed to representing the diversity of our society in all its aspects, including race, ethnicity, and gender. Thus, test passages, questions, and writing prompts are deliberately chosen to reflect the range of cultures in our population.

We also are committed to ensuring that test questions and writing prompts are fair—that they do not disadvantage any particular group of examinees. Extensive reviews of the fairness of test materials are rigorously conducted by both ACT staff and external consultants. We also employ statistical procedures to help ensure that our test materials do not unfairly affect the performance of any group.

ACT endorses the *Code of Fair Testing Practices in Education* and the *Code of Professional Responsibilities in Educational Measurement*, guides to the conduct of those involved in educational testing. ACT is committed to ensuring that each of its testing programs upholds the guidelines in each *Code*. A copy of each *Code* may be obtained free of charge from ACT Customer Services (68), P.O. Box 1008, Iowa City, IA 52243-1008, 319/337-1429.

Additional ACT Preparation Materials

- **ACT Online Prep™**: The only online test preparation program designed exclusively by ACT test development professionals. ACT Online Prep has practice test questions, a practice essay with real-time scoring, a diagnostic test, and a personalized Study Path. You can access ACT Online Prep via the Internet anywhere and at any time. Order at www.actonlineprep.com.
- The **Real ACT Prep Guide** is the official print guide to the ACT. This book includes three complete practice tests previously used in actual administrations—each with an optional Writing Test, with explanations for all right and wrong answer choices. Order at www.actstudent.org.

1 General Preparation for the ACT® Tests

Choosing a Test Option

Students may register for one of two Test Options: the ACT (No Writing), which includes the four required multiple-choice tests, or the ACT Plus Writing, which also includes a 30-minute Writing Test. The optional ACT Writing Test complements the ACT English Test. The combined results from both tests provide information about your understanding of the conventions of standard written English and your ability to produce a direct sample of your writing. Taking the ACT Plus Writing will provide you with two *additional* scores: a Writing subscore and a Combined English/Writing score. Taking the ACT Writing Test does **not** affect your subject area scores or your Composite score.

Not all colleges require or recommend taking the ACT Writing Test. Check directly with the colleges you are considering to find out their requirements, or ask your high school counselor which Test Option you should take. You can also check www.actstudent.org for a searchable list of colleges that have provided information to us about their policies—whether they require, recommend, or do not need results from the ACT Writing Test. Consult this list before you register, so you will know which Test Option to select.

The ACT Plus Writing is available within the United States, U.S. territories, and Canada on all established test dates and for Special and Arranged Testing during designated testing windows. The ACT Plus Writing is available internationally on all test dates except February.

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Choosing a Test Date

Before you choose a test date, check the application deadlines of the colleges and scholarship agencies you are considering. It will normally take three to eight weeks after a test date for ACT to mail your score report to you and to your college or scholarship choices.

Many colleges and scholarship agencies recommend that students take the ACT during the spring of their junior year. By this time, students typically have completed most of the coursework covered by the ACT. There are a number of advantages in taking the ACT then:

- You will receive test scores and other information that will help you plan your senior year of high school.
- Many colleges begin contacting prospective students during the summer before their senior year.
- If you do not score as well as you believe you can, there will be opportunities to retake the ACT in the fall of your senior year and still have your new scores available in time to meet admission and scholarship deadlines.

NOTE: You cannot plan on receiving your scores from one test date in time to register for the next.

General Test-Taking Strategies for the ACT

The ACT contains multiple-choice tests in four areas: English, Mathematics, Reading, and Science. Each of these tests contains questions that offer either four or five answer choices from which you are to choose the correct, or best, answer. The following suggestions apply to all four tests:

Pace yourself.

The time limits set for each test give nearly everyone enough time to finish all the questions. However, because the English, Reading, and Science Tests contain a considerable amount of text, it is important to pace yourself so you will not spend too much time on one passage. Similarly, try not to spend too much time puzzling over an answer to a specific problem in the Mathematics Test. Go on to the other questions and come back if there is time. Your supervisor will announce when you have five minutes remaining on each test.

Read the directions for each test carefully.

Before you begin taking one of the tests, read the directions carefully. The English, Reading, and Science Tests ask for the “best” answer. Do not respond as soon as you identify a correct answer. Read and consider all of the answer choices and choose the answer that *best* responds to the question.

The Mathematics Test asks for the “correct” answer. Read each question carefully to make sure you understand the type of answer required. Then, 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 of the answer choices.

Read each question carefully.

It is important that you understand 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.

The best strategy for taking the tests is to answer the easy questions and skip the questions you find difficult. After answering all of 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 to a question. 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 score on the tests will be based only on the number of questions that you answer correctly; **there is no penalty for guessing**. Thus, you should answer every question within the time allowed for each test, even if you have to guess. Your supervisor will announce when you have five minutes remaining on each test.

Review your work.

If there is time left after you have answered every question in a test, go back and check your work on that test. Check to be sure that you marked only one response to each question. You will not be allowed to go back to any other test or mark responses to a test after time has been called on that test.

Be precise in marking your answer document.

Be sure that you properly fill in the correct ovals on your answer document. Check to be sure that the number of the line of ovals on your answer document is the same as the number of the question you are answering and that you mark only one response for each question.

Erase completely.

If you want to change a multiple-choice answer, be sure to use a soft eraser that will not leave smudges and erase the unintended mark completely. Do not cross out answers or use correction fluid or tape; you must erase. Correction fluid/tape, smudges, or unintended marks may cause errors in scoring.

To students approved to test at national test centers with extended time:

You will be allowed up to 5 hours total to work on the multiple-choice tests at your own pace, including breaks between tests. If you are taking the ACT Plus Writing, you will be allowed up to 5 hours and 45 minutes total to work on all five tests. You will need to pace yourself through each test in order to complete all tests within the total time allowed. Your supervisor will provide time updates every hour. When you complete each test, you must notify your supervisor that you are ready to begin the next test.

General Test-Taking Strategies for the ACT Writing Test

The ACT Writing Test lets you show your skill in planning and composing a short essay. It measures writing proficiencies that are taught in high school and are important for readiness to succeed in entry-level college composition courses.

The following general strategies will help if you take the ACT Writing Test.

Pace yourself.

You will have 30 minutes to write your essay. It is important to pace yourself in the way that best suits your personal writing strategy. Many writers do best when they spend part of their time planning the essay, most of their time writing the essay, and the last part of their time reviewing the essay to make corrections and small revisions. There is no formula for the best proportion of time to spend planning, writing, and reviewing: writers, topics, and occasions differ too widely for a universal rule to apply. Keep in mind, however, that you are unlikely to have time to draft, revise, and recopy your essay. Therefore, taking a few minutes to plan your essay is a much better strategy than writing a draft with the intent to copy it over for the final essay.

In general, budget your time in the way that feels best to you based on your experience in taking essay tests in school and in other circumstances when you've done writing within a time limit. Your supervisor will announce when you have five minutes remaining on the Writing Test.

Read the directions carefully.

Before you begin the Writing Test, read the directions carefully. They tell you the aspects of writing on which your essay will be evaluated and give instructions on how to write your essay in the answer folder.

Read the writing prompt carefully.

It is important that you understand exactly what the writing prompt asks you to do. A firm grasp of the assignment is as crucial for the ACT Writing Test as it is for writing essays for class. Be sure you have a clear understanding of the issue in the writing prompt and of the question you must respond to before you start to plan and write your essay.

Write (or print) legibly in the answer folder.

If your readers cannot read what you have written, they will not be able to score your essay. You may write or print your essay, whichever you prefer—but you must do so legibly. You must write your essay using a **soft lead No. 2 pencil** (not a mechanical pencil or ink pen) and only on the lined pages in the answer folder. You may not need all the lined pages, but to ensure you have enough room to finish, do not skip lines.

Make corrections clear.

If you make corrections by using erasures or cross-outs, do so thoroughly and legibly. You may write corrections or additions neatly between the lines of your essay, but do not write in the margins of the lined pages.

Preparing for Test Day

Although what you know will determine how well you do on the ACT, your attitudes, emotions, and physical state may also influence your performance. The following tips will help you do your best:

- Be confident in your ability to do well on the ACT. You can do well!
- Be prepared to work hard.
- Know what to expect on test day. Familiarize yourself with the information in this booklet, and at **www.actstudent.org**.

NOTE: Most procedures in this booklet refer to testing on an established ACT test date at an ACT test center. Procedures may differ slightly if you test at another location. For example, for most administrations, you won't be allowed to use scratch paper because each page of the Mathematics Test has a blank column that you can use for scratch work.

- Take the practice tests in the exact order they are presented. Review your responses so you will feel comfortable about the approaching test day.
- Prepare well in advance for the tests. Do not leave preparation to the last minute.
- Get plenty of rest the night before the tests so you will be in good physical condition for taking them.
- Bring the following items with you to the test center:
 1. Your admission ticket (if you test on a National or International ACT Test Date).
 2. Acceptable identification. Your admission ticket is **not** identification. See details on your admission ticket or at **www.actstudent.org**. If you do not present acceptable identification at the time of check-in, you will **not** be admitted to test. You will have to pay a Test Date Change fee to transfer your registration to a different test date if you choose to reschedule. If you have any questions about acceptable ID, call ACT Test Administration (319/337-1510) *before* test day.
 3. Sharpened soft lead No. 2 pencils with good erasers (no mechanical pencils; no ink, ballpoint, or felt-tip pens). Do **not** bring highlight pens or any other writing instruments; you will not be allowed to use them. If you have registered to take the ACT Plus Writing, your essay **must** also be completed with a soft lead No. 2 pencil.
 4. A watch to pace yourself. Do **not** bring a watch with an alarm. You will not be allowed to set an alarm because it will disturb other students. If your alarm sounds during testing, you will be dismissed and your answer document will not be scored. Your supervisor will announce when you have five minutes remaining on each test.
 5. A permitted calculator for the Mathematics Test, if you wish to use one. (See shaded section on page 5 and details about **prohibited** models and features at **www.actstudent.org**.)

For students testing on National or International ACT Test Dates:

- If you register online, you must print your admission ticket from your ACT Web account. If you submit a registration folder, look for your admission ticket in the mail about 2 weeks after you mail your folder.
- If you misplace your admission ticket or have not received it by 10 days before the test date, log in to your ACT Web account to print a copy, or call ACT Registration at 319/337-1270 for assistance (8:00 a.m.–8:00 p.m., M–F, central time).
- Check your admission ticket for your Test Option and the location of your assigned test center. Pay attention to any special messages on your ticket such as what building to go to, what entrance to use, where to park, etc. If you are unfamiliar with the location, do a practice run to see how to get there and how much travel time you will need to arrive by the time shown on the ticket.
- If you are late, you may not be admitted to test. If you arrive earlier than 7:45 a.m., you will probably have to wait outside until testing personnel have completed their arrangements.
- Be prepared for testing to start after all examinees present at 8:00 a.m. have been checked in and seated.
- Dress comfortably. To conserve energy, your test center may be considerably warmer or cooler on weekends than during the week. Please dress so that you will be comfortable in a variety of temperatures.

2 Strategies for Taking the ACT Tests

The ACT measures the knowledge, understanding, and skills that you have acquired throughout your education. Although the sum total of what a person has learned cannot easily be changed, your performance in a specific area can be affected by adequate preparation, especially if it has been some time since you have taken a course in that area.

There are three strategies that can help you to prepare yourself for the content included in the ACT:

Familiarize yourself with the content of the ACT tests.

Review the information about the tests that is provided on the following pages. Note which content areas make up a large proportion of the tests and which do not. The specific topics included in each content area are examples of possible topics; they do not include all of the possibilities.

Refresh your knowledge and skills in the content areas.

Review those content areas you have studied but are not fresh in your mind. Spend your time refreshing your knowledge and skills in the content areas that make up large portions of the tests.

Use of Calculators on the ACT Mathematics Test

It is your responsibility to bring a permitted calculator. We regularly update information about which calculators are **prohibited** and provide the most current information only via the Web or phone.

To be certain your calculator will be permitted on test day, check www.actstudent.org or call **800/498-6481** for the most up-to-date information on permitted and prohibited devices. If you use a prohibited calculator, you will be dismissed and your answer document will not be scored.

You may use a calculator on the ACT Mathematics Test (but not on any of the other tests in the ACT). You are **not required** to use a calculator. All the problems can be solved without a calculator. If you regularly use a calculator in your mathematics work, you may wish to use one you are familiar with as you take the Mathematics Test. Using a more powerful, but unfamiliar, calculator is not likely to give you an advantage over using the kind you normally use.

You may use any four-function, scientific, or graphing calculator, unless it has features described in the current list of prohibited devices at www.actstudent.org. Other models may be permitted if you modify some of the calculator's features, such as removing paper tape, turning off sounds, removing power cords, or covering infrared data ports.

On Test Day

Be sure your calculator is working and has reliable batteries. You may bring a backup calculator and extra batteries to the test center. Testing staff will **not** supply batteries or calculators. You will **not** be allowed to share calculators during testing.

Testing staff will check your calculator to verify it is permitted, and they will monitor your use of your calculator to ensure that you:

- use it only during the Mathematics Test;
- use your backup calculator only after it has been checked by a member of the testing staff;
- do not share your calculator; and
- do not store test materials in your calculator's memory.

If your calculator has characters one inch high or larger, or a raised display, testing staff may seat you where no other examinee can see your calculator.

Identify the content areas you have not studied.

If unfamiliar content areas make up major portions of the tests, consider taking coursework to help you gain knowledge and skills in these areas before you take the ACT. Because the ACT measures knowledge and skills acquired over a period of time, it is unlikely that a “cram” course covering material that is unfamiliar to you will help you improve your scores. Longer-term survey courses will be most helpful to you, because they aim to improve your knowledge through sustained learning and practice.

ACT English Test

The ACT English Test is a 75-question, 45-minute test that measures your understanding of the conventions of standard written English (punctuation, grammar and usage, and sentence structure) and of rhetorical skills (strategy, organization, and style). Spelling, vocabulary, and rote recall of rules of grammar are not tested. The test consists of five essays, or passages, each of which is accompanied by a sequence of multiple-choice test questions. Different passage types are employed to provide a variety of rhetorical situations. Passages are chosen not only for their appropriateness in assessing writing skills but also to reflect students’ interests and experiences.

Some questions refer to underlined portions of the passage and offer several alternatives to the underlined portion. You must decide which choice is most appropriate in the context of the passage. Some questions ask about an underlined portion, a section of the passage, or the passage as a whole. You must decide which choice best answers the question posed. Many questions offer “NO CHANGE” to the passage as one of the choices. The questions are numbered consecutively. Each question number refers to a correspondingly numbered portion underlined in the passage or to a corresponding numeral in a box located at the appropriate point in the passage.

Three scores are reported for the ACT English Test: a total test score based on all 75 questions, a subscore in Usage/Mechanics based on 40 questions, and a subscore in Rhetorical Skills based on 35 questions.

Tips for Taking the ACT English Test

Pace yourself.

The ACT English Test contains 75 questions to be completed in 45 minutes. If you spend 1½ minutes skimming through each passage before responding to the questions, then you will have 30 seconds to answer each question. If possible, spend less time on each question and use the remaining time allowed for this test to review your work and return to the questions on this test that were most difficult for you.

Be aware of the writing style used in each passage.

The five 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 you respond to the questions. In responding to a question, be sure to understand the context of the question. Consider how the sentence containing an underlined portion fits in with the surrounding sentences and into the passage as a whole.

Examine the underlined portions of the passage.

Before responding to a question with an underlined portion, carefully examine what is underlined in the text. Consider the elements of writing that are included in each underlined 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. Questions asking global questions about the entire passage are placed at the end of the passage and introduced by a horizontal box enclosing the following instruction: “Questions ___ and ___ ask about the preceding passage as a whole.”

Note the differences in the answer choices.

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

Determine the best answer.

Two approaches can be taken to determine the best answer to a question in which you are to choose the best alternative to an underlined portion. In the first approach, you can reread the sentence or sentences, substituting each of the possible answer choices for the underlined portion to determine the best choice. In the second approach, you can decide how the underlined portion might best be phrased in standard written English or in terms of the particular question posed. If you think the underlined portion is the best answer, you should select “NO CHANGE.” If not, you should check to see whether your phrasing is one of the other answer choices. If you do not find your phrasing, you should choose the best of the answers presented. For questions cued by a number in a box, you must 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.

Content Covered by the ACT English Test

Six elements of effective writing are included in the English Test: punctuation, grammar and usage, sentence structure, strategy, organization, and style. The questions covering punctuation, grammar and usage, and sentence structure make up the Usage/Mechanics subscore. The questions covering strategy, organization, and style make up the Rhetorical Skills subscore. A brief description and the approximate percentage of the test devoted to each element of effective writing are given on the next page.

USAGE/MECHANICS

Punctuation (13%). Questions in this category test your knowledge of the conventions of internal and end-of-sentence punctuation, with emphasis on the relationship of punctuation to meaning (for example, avoiding ambiguity, indicating appositives).

Grammar and Usage (16%). Questions in this category test your understanding of agreement between subject and verb, between pronoun and antecedent, and between modifiers and the word modified; verb formation; pronoun case; formation of comparative and superlative adjectives and adverbs; and idiomatic usage.

Sentence Structure (24%). Questions in this category test your understanding of relationships between and among clauses, placement of modifiers, and shifts in construction.

RHETORICAL SKILLS

Strategy (16%). Questions in this category test how well you develop a given topic by choosing expressions appropriate to an essay's audience and purpose; judging the effect of adding, revising, or deleting supporting material; and judging the relevancy of statements in context.

Organization (15%). Questions in this category test how well you organize ideas and choose effective opening, transitional, and closing sentences.

Style (16%). Questions in this category test how well you choose precise and appropriate words and images, maintain the level of style and tone in an essay, manage sentence elements for rhetorical effectiveness, and avoid ambiguous pronoun references, wordiness, and redundancy.

ACT Mathematics Test

You may use a calculator on the Mathematics Test. See www.actstudent.org for details about prohibited calculators.

The ACT Mathematics Test is a 60-question, 60-minute test designed to assess the mathematical skills students have typically acquired in courses taken up to the beginning of grade 12. The test presents multiple-choice questions that require you to use reasoning skills to solve practical problems in mathematics. Most questions are discrete, but on occasion some may belong to sets of several questions (e.g., several questions based on the same graph or chart). Knowledge of basic formulas and computational skills are assumed as background for the problems, but recall of complex formulas and extensive computation is not required. The material covered on the test emphasizes the major content areas that are prerequisites to successful performance in entry-level courses in college mathematics.

Four scores are reported for the ACT Mathematics Test: a total test score based on all 60 questions, a subscore in Pre-Algebra/Elementary Algebra based on 24 questions, a subscore in Intermediate Algebra/Coordinate Geometry based on 18 questions, and a subscore in Plane Geometry/Trigonometry based on 18 questions.

Tips for Taking the ACT Mathematics Test

Pace yourself.

The ACT Mathematics Test contains 60 questions to be completed in 60 minutes. You have an average of 1 minute per question. If possible, spend less time on each question and use the remaining time allowed for this test to review your work and return to the questions on this test that were most difficult for you.

If you use a calculator, use it wisely.

Remember, all of the mathematics problems can be solved without using a calculator. In fact, some 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. For many problems, you may not want to use a calculator.

Solve the problem.

For working out the solutions to the problems, you will usually do scratch work in the space provided in the test booklet, or you will be given scratch paper to use. You may wish to glance over the answer choices after reading the questions. However, working backwards from the answer choices provided can take a lot of time and may not be effective.

Locate 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 in the test will involve several steps. Make sure your answer includes all of the necessary steps. Frequently, questions include answer choices that are based on incomplete solutions.

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 work.

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

Content Covered by the ACT Mathematics Test

Six content areas are included in the Mathematics Test: pre-algebra, elementary algebra, intermediate algebra, coordinate geometry, plane geometry, and trigonometry. The questions covering pre-algebra and elementary algebra make up the Pre-Algebra/Elementary Algebra subscore. The questions covering intermediate algebra and coordinate geometry make up the Intermediate Algebra/Coordinate Geometry subscore. The questions

covering plane geometry and trigonometry make up the Plane Geometry/Trigonometry subscore. A brief description and the approximate percentage of the test devoted to each content area are given below.

PRE-ALGEBRA/ELEMENTARY ALGEBRA

Pre-Algebra (23%). Questions in this content area are based on basic operations using whole numbers, decimals, fractions, and integers; place value; square roots and approximations; the concept of exponents; scientific notation; factors; ratio, proportion, and percent; linear equations in one variable; absolute value and ordering numbers by value; elementary counting techniques and simple probability; data collection, representation, and interpretation; and understanding simple descriptive statistics.

Elementary Algebra (17%). Questions in this content area are based on properties of exponents and square roots, evaluation of algebraic expressions through substitution, using variables to express functional relationships, understanding algebraic operations, and the solution of quadratic equations by factoring.

INTERMEDIATE ALGEBRA/COORDINATE GEOMETRY

Intermediate Algebra (15%). Questions in this content area are based on an understanding of the quadratic formula, rational and radical expressions, absolute value equations and inequalities, sequences and patterns, systems of equations, quadratic inequalities, functions, modeling, matrices, roots of polynomials, and complex numbers.

Coordinate Geometry (15%). Questions in this content area are based on graphing and the relations between equations and graphs, including points, lines, polynomials, circles, and other curves; graphing inequalities; slope; parallel and perpendicular lines; distance; midpoints; and conics.

PLANE GEOMETRY/TRIGONOMETRY

Plane Geometry (23%). Questions in this content area are based on the properties and relations of plane figures, including angles and relations among perpendicular and parallel lines; properties of circles, triangles, rectangles, parallelograms, and trapezoids; transformations; the concept of proof and proof techniques; volume; and applications of geometry to three dimensions.

Trigonometry (7%). Questions in this content area are based on understanding trigonometric relations in right triangles; values and properties of trigonometric functions; graphing trigonometric functions; modeling using trigonometric functions; use of trigonometric identities; and solving trigonometric equations.

ACT Reading Test

The ACT Reading Test is a 40-question, 35-minute test that measures your reading comprehension. The test questions ask you to derive meaning from several texts by (1) referring to what is explicitly stated and (2) reasoning to determine implicit meanings. Specifically, questions will ask you to use referring and reasoning skills 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; and analyze the author's or narrator's voice and method. The test comprises four prose passages that are representative of the level and kinds of text commonly encountered in first-year college curricula. Each passage is preceded by a heading that identifies what type of passage it is (for example, "Prose Fiction"), names the author, and may include a brief note that helps in understanding the passage. Each passage is accompanied by a set of multiple-choice test questions. These questions do not test the rote recall of facts from outside the passage, isolated vocabulary items, or rules of formal logic.

Three scores are reported for the ACT Reading Test: a total test score based on all 40 questions, a subscore in Social Studies/Sciences reading skills (based on the 20 questions on the social studies and natural sciences passages), and a subscore in Arts/Literature reading skills (based on the 20 questions on the prose fiction and humanities passages).

Tips for Taking the ACT Reading Test

Pace yourself.

The ACT Reading Test contains 40 questions to be completed in 35 minutes. If you spend 2–3 minutes reading each passage, then you will have about 35 seconds to answer each question. If possible, spend less time on the passages and the questions and use the remaining time allowed for this test to review your work and return to the questions on this test that were most difficult for you.

Read the passage carefully.

Before you begin answering a question, read the entire passage thoroughly. It is important that you read every sentence rather than skim the text. Be conscious of relationships between or among ideas. You may want to make notes about important ideas in the passage, either in the test booklet, or on scratch paper if it is provided.

Refer to the passage when answering the questions.

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

Content Covered by the ACT Reading Test

The Reading Test is based on four types of reading selections: the social studies, the natural sciences, prose fiction, and the humanities. A subscore in Social Studies/Sciences reading skills is based on the questions on the social studies and the natural sciences passages, and a subscore in Arts/Literature reading skills is based on the questions on the prose fiction and humanities passages. A brief description and the approximate percentage of the test devoted to each type of reading selection are given below.

Social Studies (25%). Questions in this category are based on passages in the content areas of anthropology, archaeology, biography, business, economics, education, geography, history, political science, psychology, and sociology.

Natural Sciences (25%). Questions in this category are based on passages in the content areas of anatomy, astronomy, biology, botany, chemistry, ecology, geology, medicine, meteorology, microbiology, natural history, physiology, physics, technology, and zoology.

Prose Fiction (25%). Questions in this category are based on intact short stories or excerpts from short stories or novels.

Humanities (25%). Questions in this category are based on passages from memoirs and personal essays and in the content areas of architecture, art, dance, ethics, film, language, literary criticism, music, philosophy, radio, television, and theater.

ACT Science Test

The ACT Science Test is a 40-question, 35-minute test that measures the interpretation, analysis, evaluation, reasoning, and problem-solving skills required in the natural sciences.

The test presents seven sets of scientific information, each followed by a number of multiple-choice test questions. The scientific information is conveyed in one of three different formats: data representation (graphs, tables, and other schematic forms), research summaries (descriptions of several related experiments), or conflicting viewpoints (expressions of several related hypotheses or views that are inconsistent with one another). 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.

You are **not permitted** to use a calculator on the ACT Science Test.

One score is reported for the ACT Science Test: a total test score based on all 40 questions.

Tips for Taking the ACT Science Test

Pace yourself.

The ACT Science Test contains 40 questions to be completed in 35 minutes. If you spend about 2 minutes reading each passage, then you will have about 30 seconds to answer each question. If possible, spend less time on the passages and the questions and use the remaining time allowed for this test to review your work and return to the questions on this test that were most difficult for you.

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 want to make notes about important ideas in the information provided, either in the test booklet, or on scratch paper if it is provided. 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 different viewpoints in passages.

Some material will present conflicting points of view, and the questions will ask you to distinguish among the various

viewpoints. It may be helpful for you to make notes summarizing each viewpoint, either next to that section in the test booklet, or on scratch paper if it is provided. For questions that ask you to compare viewpoints, these notes will help you answer more quickly.

Content Covered by the ACT Science Test

The content of the Science Test includes biology, chemistry, physics, and the Earth/space sciences (for example, geology, astronomy, and meteorology). Advanced knowledge in these subjects is not required, but knowledge acquired in general, introductory science courses is needed to answer some of the questions. The test emphasizes scientific reasoning skills over recall of scientific content, skill in mathematics, or reading ability. The scientific information is conveyed in one of three different formats.

Data Representation (38%). 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 graph reading, interpretation of scatterplots, and interpretation of information presented in tables.

Research Summaries (45%). This format provides descriptions of one or more related experiments. The questions focus upon the design of experiments and the interpretation of experimental results.

Conflicting Viewpoints (17%). This format presents expressions of several hypotheses or views that, being based on differing premises or on incomplete data, are inconsistent with one another. The questions focus upon the understanding, analysis, and comparison of alternative viewpoints or hypotheses.

ACT Writing Test (Optional)

If you register for the ACT Plus Writing, you will take the ACT Writing Test (which must be completed in English) **after** you complete the four multiple-choice tests. Taking the Writing Test will **not** affect your scores on the multiple-choice tests or your Composite score. Rather, you will receive two *additional* scores: a Combined English/Writing score on a scale of 1 through 36 and a Writing subscore on a scale of 2 through 12. You will also receive some comments on your essay.

The ACT Writing Test is a 30-minute essay test that measures your writing skills—specifically those writing skills emphasized in high school English classes and in entry-level college composition courses. The test consists of one writing prompt that will define an issue and describe two points of view on that issue. You are asked to write in response to a question about your position on the issue described in the writing prompt. In doing so, you may adopt either of the perspectives described in the prompt, or present a different point of view on the issue. Your essay score will not be affected by the point of view you take on the issue. Prompts are designed to be appropriate for response in a 30-minute timed test and to reflect students' interests and experiences.

Your essay will be evaluated on the evidence it gives of your ability to do the following:

- express judgments by taking a position on the issue in the writing prompt;
- maintain a focus on the topic throughout the essay;
- develop a position by using logical reasoning and by supporting your ideas;
- organize ideas in a logical way; and
- use language clearly and effectively according to the conventions of standard written English.

Your essay will be scored holistically—that is, on the basis of the overall impression created by all the elements of the writing. Two trained readers will score your essay, each giving it a rating from 1 (low) to 6 (high). The sum of those ratings is your Writing subscore. If the readers' ratings disagree by more than one point, a third reader will evaluate your essay and resolve the discrepancy.

Tips for Taking the ACT Writing Test

Pace yourself.

The ACT Writing Test gives you 30 minutes to read and think about the issue in the prompt, and to plan and write your essay. When asked to write a timed essay, most writers find it useful to do some planning before they write the essay, and to do a final check of the essay when it is finished. It is unlikely that you will have time to draft, revise, and recopy your essay. Therefore, taking a few minutes to plan your essay is a much better strategy than writing a first draft with the intent to copy it over for the final essay.

Prewrite.

Some writers like to plunge right in, but this is seldom a good way to do well on a timed essay. Prewriting gets you acquainted with the issue, suggests patterns for presenting your thoughts, and gives you a little breathing room to come up with interesting ideas for introducing and concluding your essay. Before writing, then, carefully consider the prompt and make sure you understand it—reread it if you aren't sure. Decide how you want to answer the question in the prompt. Then jot down your ideas on the topic: this might simply be a list of ideas, reasons, and examples that you will use to explain your point of view on the issue. Write down what you think others might say in opposition to your point of view and think about how you would refute their argument. Think of how best to organize the ideas in your essay. Do your prewriting in your Writing Test booklet. You can refer back to these notes as you write your essay on the lined pages of your answer folder.

Write.

Once you're ready to write your essay in the answer folder, proceed with the confidence that you have prepared well and that you will have attentive and receptive readers who are interested in your ideas. At the beginning of your essay, make sure readers will see that you understand the issue. Explain your point of view in a clear and logical way. If possible, discuss the issue in a broader context or evaluate the implications or complications of the issue. Address what others might say to refute your point of view and present a counterargument. Use specific examples.

Vary the structure of your sentences, and use varied and precise word choices. Make logical relationships clear by using transitional words and phrases. Do not wander off the topic. End with a strong conclusion that summarizes or reinforces your position.

Is it advisable to organize the essay by using a formula, like "the five-paragraph essay"? Points are neither awarded nor deducted for following formulas, so feel free to use one or not as best suits your preference. Some writers find formulas stifling, while other writers find them vital. The exact numbers of words and paragraphs in your essay are less important than the clarity and development of your ideas. Writers who have something to say can usually express their ideas at reasonable length and in the right number of paragraphs.

Review your essay.

Take a few minutes before time is called to read over your essay. Correct any mistakes in grammar, usage, punctuation, and spelling. If you find any words that are hard to read, recopy them so your readers can read them easily. Make any corrections and revisions neatly, between the lines. Do not write in the margins. Your readers take into account that you had only 30 minutes to compose and write your essay. Within that time limit, try to make your essay as polished as you can.

Practice.

There are many ways to prepare for the ACT Writing Test. You may be surprised that these include reading newspapers and magazines, listening to news analyses on television or radio, and participating in discussions and debates about issues and problems. These activities help you become more familiar with current issues, with different perspectives on those issues, and with strategies that skilled writers and speakers use to present their points of view.

Of course, one of the best ways to prepare for the ACT Writing Test is to practice writing different kinds of texts, for different purposes, with different audiences in mind. The writing you do in your English classes will help you. So will practice in writing essays, stories, poems, plays, editorials, reports, letters to the editor, a personal journal, or other kinds of writing that you do on your own. Because the ACT Writing Test asks you to explain your perspective on an issue in a convincing way, writing opportunities like editorials or letters to the editor of a newspaper are especially helpful. Practicing a variety of different kinds of writing will help make you a versatile writer able to adjust to different writing occasions and assignments.

It is also a good idea to practice writing within a time limit. This will help build skills that are important in college-level learning and in the world of work. Taking the practice ACT Writing Test in this booklet will give you a good idea of what timed writing is like and how much additional practice you may need. You might want to take the practice ACT Writing Test even if you do not plan to take the ACT Plus Writing, because all the writing you do contributes to your skill in expressing yourself.

Content Covered by the ACT Writing Test

Writing is where form and content come together. To state that more precisely, writing is where *you* put form and content together. On the ACT Writing Test, we provide the “prompt”—a writing question about an issue that has been chosen for its appropriateness in a 30-minute test and for its relevance to students’ interests and experiences. The prompt defines the topic and asks you to focus on that topic in your essay. But the “content” of your essay—the arguments and explanations, the analysis and examples, in all their details—is provided by you. By applying your writing skills to shaping that content, you also provide the “form” of your essay. So, with regard to the content covered by the Writing Test, you are the author.

3 What to Expect on Test Day

Reporting Time

For National and International Test Dates, you must report to the test center by the time stated on your admission ticket, normally 8:00 a.m. If you are late, you may not be admitted to test. If your admission ticket does not list a specific room, test center staff or posted signs will direct you to your test room.

Identification Required

At check-in, you will be required to show acceptable ID. See ID requirements on your admission ticket or at www.actstudent.org. You will also need to bring your admission ticket to complete your answer document correctly.

Dos and Don'ts

In the test room, the supervisor or proctor will direct you to a seat. If you need a left-handed desk, tell your supervisor as you enter. Do not leave the test room after you have been admitted. Only pencils, erasers, a permitted calculator (for the Mathematics Test only), and your admission ticket will be allowed on your desk. You will be required to put all other personal belongings away. You will not be allowed to have scratch paper, books, dictionaries, notes or other aids, highlighters, colored pens or pencils, mechanical pencils, ink pens, correction fluid, reading material, or any electronic devices other than a permitted calculator. Examples of prohibited devices include: timer, cell phone, media player, PDA, headphones, camera. You may not use tobacco in any form or have food or drink (including water) in the test room. You must abide by the rules of the test center.

Try to relax just before beginning the tests. Take a few deep breaths, tense and relax your muscles, and think about pleasant things.

Test Preliminaries

Testing will begin as soon as all examinees present at 8:00 a.m. are checked in and seated. Listen carefully to all directions read by your supervisor. Ask questions if you do not understand what you are to do. It is very important that you *follow all directions* carefully. For instance, if you do not

copy the Matching Information from your admission ticket onto your answer document accurately, or fill in the correct ovals, your scores will be delayed up to 8 weeks.

You will receive a different answer document depending on which Test Option you registered to take. Make sure the answer document you receive matches the Test Option you intend to take.

When you receive your test booklet, you will be told to read the directions printed on the cover, then asked to write the booklet number and test form on your answer document. It is extremely important that you fill in the correct ovals for your test booklet number and for the test form you are taking because these determine which answer key will be used to score your answer document. The supervisor will then tell you when to break the seal, open your test booklet, and begin work. If you are taking the ACT Plus Writing, you will receive a Writing Test booklet only after you have completed the four multiple-choice tests.

Taking the Tests

As you are working, keep your eyes on your own test booklet and answer document. If you have a question, raise your hand. Do not look around. Please remember that as you take the tests you may not use information or materials that cause you to obtain a test score that misrepresents what you have learned.

It is important that you understand what is considered prohibited behavior on the ACT. If you are involved in **any** of the actions listed below, you will be dismissed and your answer document will not be scored.

Prohibited behaviors include:

- filling in or altering ovals on a test or continuing to write the essay after time is called on that test (You must put your pencil down immediately when time is called.)
- looking at another examinee's test booklet or answer document
- giving or receiving assistance
- looking back at a test on which time has been called
- looking ahead in the test booklet
- using highlight pens, colored pens or pencils, notes, dictionaries, or other aids
- using a prohibited calculator
- using a calculator on any test other than the Mathematics Test
- sharing a calculator with another examinee
- using any device to share or exchange information at any time during testing or during break (**all** electronic devices, including cell phones, must be turned off from the time you are admitted to test until you are dismissed after testing concludes)
- attempting to remove test materials, including questions or answers, from the test room by any means
- not following instructions or abiding by the rules of the test center
- exhibiting confrontational, threatening, or unruly behavior
- creating a disturbance or allowing an alarm or phone to sound in the test room

If you engage in **any** of these prohibited behaviors, you will be dismissed from the test center and your answer document will **not** be scored.

If you finish a test before time is called, review your work on that test. Do **not** return to a previous test and do not work ahead. If you are satisfied with your responses, place your answer document inside your test booklet and close the cover. Sit quietly until your supervisor gives you additional instructions.

You will have a 10- to 15-minute break after the first two tests. Do not leave the building during the break because some buildings have automatic locking doors, and you may be locked out. You must ask permission to leave the room during testing to go to the restroom; you will not be allowed to make up lost time. If you are taking the ACT Plus Writing, you will have time after Test 4 in which to sharpen your pencils.

On certain test dates, ACT administers test questions for developmental purposes. Your responses to these questions do not affect your scores.

At the conclusion of testing, you will be asked to sign a statement and copy a certification in your normal handwriting to verify truthful identification of yourself. You will be required to sit quietly until you are dismissed. After all answer documents and test booklets have been collected and counted, your supervisor will dismiss you.

Special Situations

If, for any reason, you have to leave the test center before completing all your tests, you must decide whether or not you want your answer document scored and inform your supervisor of your decision. If you fail to do so, your answer document will be scored. If you decide *after* you have completed all your tests that you do not want your answer document scored, tell your supervisor *before* you leave the test center. You need not give a reason.

Once you break the seal on your multiple-choice test booklet, you cannot request a Test Date Change. If you do not complete all your tests and want to test again, you will have to reregister and pay the basic fee for your test option again. If you want to take the ACT again, you will have to reregister. See www.actstudent.org or *Registering for the ACT*. Once you begin filling out your answer document, you cannot request a Test Option Change (i.e., you may not change from ACT Plus Writing to the ACT [No Writing] or the reverse, on test day).

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 or on an authorized non-Saturday date (e.g., because your religious beliefs prohibit testing on Saturday) **or** on a rescheduled test date arranged by ACT—but not on more than one of those days. If you are admitted and allowed to test a second time, we will report only the scores from the first test. The second set of scores will be cancelled without refund.

Test Information Release

On certain national test dates, if you test at a national test center, you may order (for an additional fee) a copy of the test questions, a copy of your answers, a list of correct

answers, and scoring instructions. This service is not available for all test dates or for other testing programs (e.g., International, State). If you want it, check www.actstudent.org or *Registering for the ACT* to see which test dates offer this service and register for one of those dates.

4 Taking the Practice Tests

Taking the practice tests can help you become familiar with the ACT. It will be most helpful if you take the tests under conditions that are as similar as possible to those you will experience on test day. The following tips will help you make the most of the practice tests:

- The four multiple-choice tests require a total of 2 hours and 55 minutes. Take them in order in one sitting, with a 10- to 15-minute break between Tests 2 and 3.
- Sit at a desk with good lighting. You will need sharpened No. 2 pencils with good erasers. You may not use highlight pens or correction fluid. Remove all books and other aids from your desk. On test day, you will not be allowed to use references or notes. For most administrations, you won't need scratch paper because each page of the Mathematics Test has a blank column that you can use for scratch work.
- If you plan to use a calculator on the Mathematics Test, review the information about prohibited calculators at www.actstudent.org.
- 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. (Students approved for extended time should set a timer for 60-minute announcements up to the total time allowed—5 hours for the ACT [No Writing], or 5 hours and 45 minutes for the ACT Plus Writing, and an announcement of five minutes remaining at the end.)
- Give yourself only the time allowed for each test.
- Detach and use the sample multiple-choice answer document on pages 73–74.
- Read the general test directions on the first page of the practice multiple-choice tests. These are the same directions that will appear on your test booklet on test day. After you have read the directions, start your timer and begin with Test 1. Continue through Test 4, taking a 10- to 15-minute break between Tests 2 and 3. If you do not plan to take the ACT Plus Writing, score your multiple-choice tests using the information beginning on page 59.
- If you plan to take the ACT Plus Writing, read the directions on the first page of the practice ACT Writing Test (page 57). These are the same directions that will appear on your test booklet on test day. After you have read the directions, start your timer, then carefully read the prompt on page 58. After you have considered what the prompt is asking you to do, use scratch paper to plan your essay and then write your essay in the lined pages (75–78) on the answer document. When you have finished, score your essay using the information on pages 66–72.

Practice Multiple-Choice Tests

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 0964E



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 each test 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 your test supervisor 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.

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

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



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 a⁶ 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 the⁸ 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 kindling⁹ she 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.¹⁰

Occasionally,¹¹ the fire chugs like a train engine, hungry for more oxygen. Each time the fire is stoked, sparks

shoot from the chimney into the night sky.¹²

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. ²⁰ [3] She was over a foot long and about seven inches high. [4] As soon as my aunt assured me that Rosie ²¹ 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 ²³ grandmother had started raising over twenty years ²⁴ ago. My aunt said that she would have checked with ²⁵ 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.

²⁶
Tortoises are land-dwelling, vegetarian turtles. They can

experience the satisfaction of contentment through a diet
²⁷
of grass clippings, lettuce, broccoli, melons, and other

vegetables and fruit. They like to warm themselves in the
²⁸
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
²⁹
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
³⁰
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
³¹

31. A. NO CHANGE
B. family's
C. families'
D. families



he had limited access to formal education, Banneker
³²
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
³³
of her contract, bought some land and then married a freed
slave. 34 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
³⁵
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,
³⁶
displayed his mechanical skills, and displaying his interest
³⁶
in learning. He had dismantled a pocket watch borrowed
³⁶

from a traveling merchant, made detailed drawings of its
³⁷
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 fol-
lowing true statement:
Indentured servants needed a master's permis-
sion 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 mechani-
cal skills when he constructed a clock out of hand-
carved wooden parts.
J. displayed his interest in mechanical skills by con-
structing 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.

43

[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,⁵² 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, so⁵³

a nature watcher⁵⁴ can quietly paddle through shallows

frequented by shorebirds and other wildlife. 55

Equipment for both types of kayaks are⁵⁶ similar, and

fairly simple. Kayakers use a short, double-bladed paddle,⁵⁷ 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

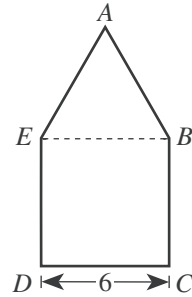
3. Vehicle A averages 14 miles per gallon of gasoline, and Vehicle B averages 36 miles per gallon of gasoline. At these rates, how many more gallons of gasoline does Vehicle A need than Vehicle B to make a 1,008-mile trip?

- 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

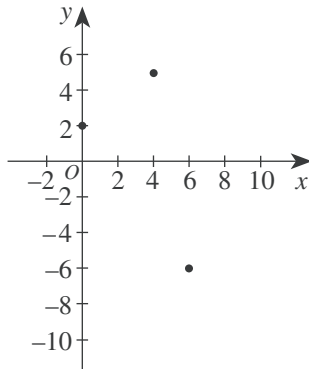
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9. In the standard (x,y) coordinate plane, point M with coordinates $(5,4)$ is the midpoint of \overline{AB} , and B has coordinates $(7,3)$. What are the coordinates of A ?

- 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 ?

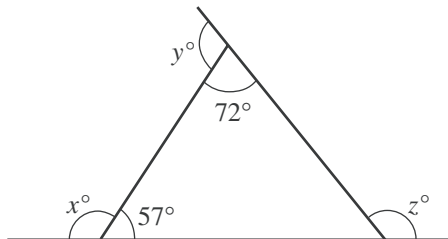


- F. $(10,-3)$
- G. $(9,-2)$
- H. $(8, 2)$
- J. $(7, 1)$
- K. $(2,-9)$

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?

$$\begin{matrix} & \begin{matrix} A & B & C \end{matrix} & & \begin{matrix} \text{Cost} \\ A \\ B \\ C \end{matrix} \\ \begin{matrix} X \\ Y \end{matrix} & \begin{bmatrix} 100 & 200 & 150 \\ 120 & 50 & 100 \end{bmatrix} & & \begin{bmatrix} \$ 5 \\ \$10 \\ \$15 \end{bmatrix} \end{matrix}$$

- 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° , y° , and z° 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

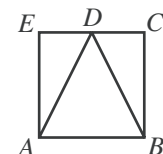
Use the following information to answer questions 13–15.

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.

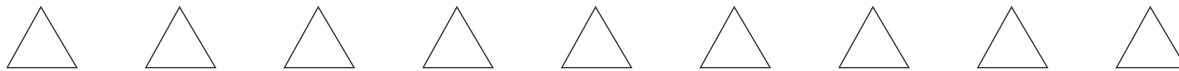
Candidate	Number of voters
Blackcloud	50
Lue	80
Gomez	40
Whitney	30

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°
 - B. 72°
 - C. 90°
 - D. 108°
 - E. 144°

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

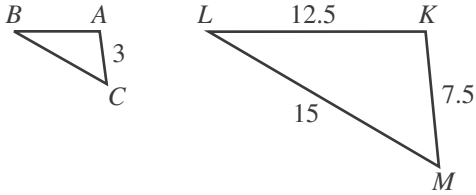


17. Which of the following is the slope of a line parallel to the line $y = \frac{2}{3}x - 4$ in the standard (x,y) coordinate plane?
- A. -4
 B. $-\frac{3}{2}$
 C. 2
 D. $\frac{3}{2}$
 E. $\frac{2}{3}$
18. Janelle cut a board 30 feet long into 2 pieces. The ratio of the lengths of the 2 pieces is 2:3. 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 ?

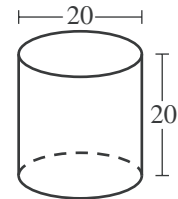
A. 4
 B. 8
 C. 16
 D. 32
 E. 64

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?

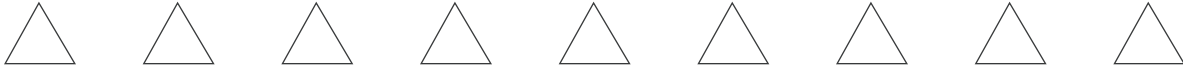
F. \$10,400
 G. \$12,167
 H. \$42,000
 J. \$52,000
 K. \$53,782

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. 300π
 B. 400π
 C. 500π
 D. 600π
 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. $16x^2 + 8x - 1$

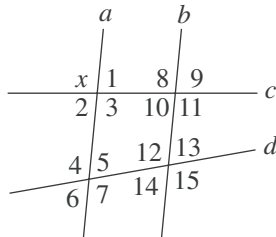


33. The table below shows the total number of goals scored in each of 43 soccer matches in a regional tournament. What is the average number of goals scored per match, to the nearest 0.1 goal?

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}

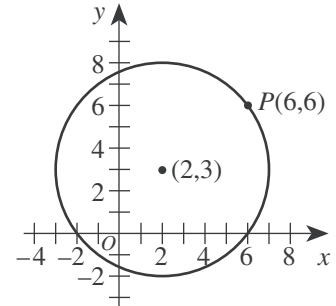
35. $(3x^3)^3$ is equivalent to:

- 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. $x < 6$

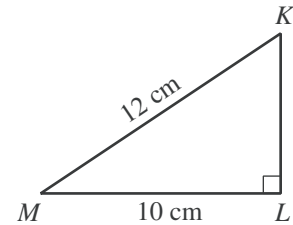
37. As shown in the standard (x,y) coordinate plane below, $P(6,6)$ lies on the circle with center $(2,3)$ and radius 5 coordinate units. What are the coordinates of the image of P after the circle is rotated 90° clockwise (C) about the center of the circle?



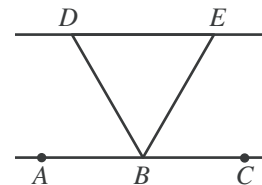
- A. (2, 3)
- B. (3, 2)
- C. (5, -1)
- D. (6, 0)
- E. (7, 3)

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°
- B. 60°
- C. 45°
- D. 30°
- E. Cannot be determined from the given information

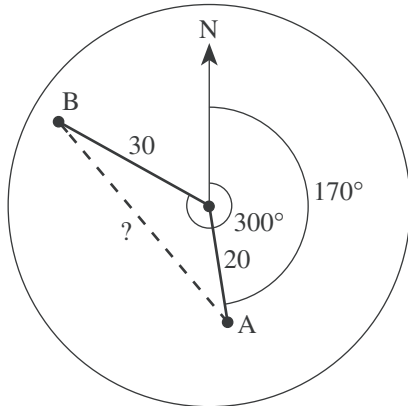
40. If there are 8×10^{12} hydrogen molecules in a volume of 4×10^4 cubic centimeters, what is the average number of hydrogen molecules per cubic centimeter?

- F. 5×10^{-9}
- G. 2×10^3
- H. 2×10^8
- J. 32×10^{16}
- K. 32×10^{48}

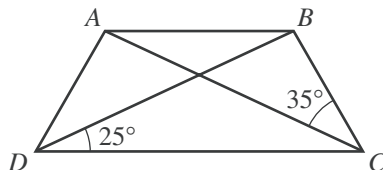


41. In the figure below, a radar screen shows 2 ships. Ship A is located at a distance of 20 nautical miles and bearing 170° , and Ship B is located at a distance of 30 nautical miles and bearing 300° . Which of the following is an expression for the straight-line distance, in nautical miles, between 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 $c^2 = a^2 + b^2 - 2ab \cos \angle C$.)

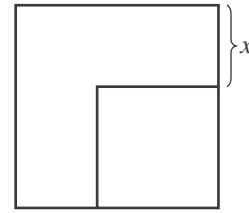


- A. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 60^\circ}$
 B. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 130^\circ}$
 C. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 170^\circ}$
 D. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 300^\circ}$
 E. $\sqrt{20^2 + 30^2 - 2(20)(30)\cos 470^\circ}$
42. What rational number is halfway between $\frac{1}{5}$ 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° , and $\angle BCA$ measures 35° . What is the measure of $\angle DBC$?



- A. 85°
 B. 95°
 C. 105°
 D. 115°
 E. 125°

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?

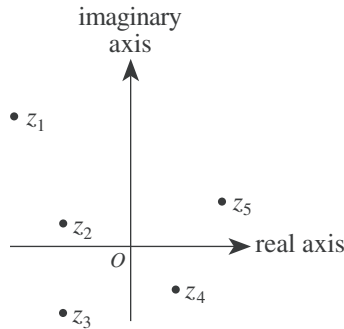
- F. $a + b$
 G. $-(a + b)$
 H. $\sqrt{a - b}$
 J. $a - b$
 K. $-(a - b)$

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?

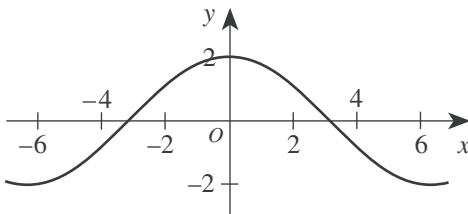


- F. z_1
G. z_2
H. z_3
J. z_4
K. z_5

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.



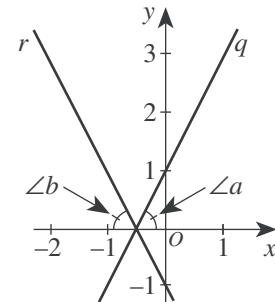
The function is:

- 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. $\frac{271}{1,000}$

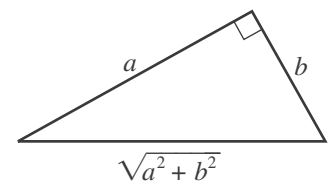
52. In the figure below, line q in the standard (x,y) coordinate plane has equation $-2x + y = 1$ and intersects line r , which is distinct from line q , at a point on the x -axis. The angles, $\angle a$ and $\angle b$, formed by these lines and the x -axis are congruent. What is the slope of line r ?



- 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 $\cos\left[\tan^{-1}\left(\frac{a}{b}\right)\right]$?

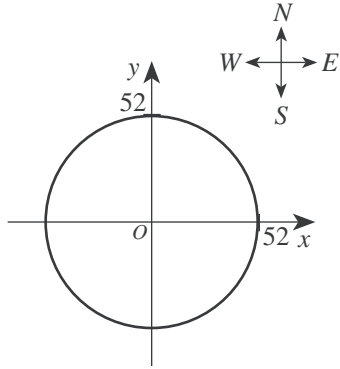
- A. $\frac{a}{b}$
B. $\frac{b}{a}$
C. $\frac{a}{\sqrt{a^2 + b^2}}$
D. $\frac{b}{\sqrt{a^2 + b^2}}$
E. $\frac{\sqrt{a^2 + b^2}}{a}$





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?

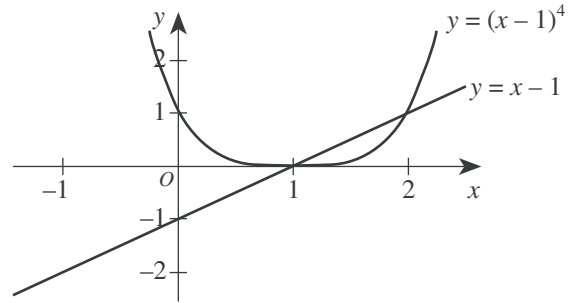
A. $x + y = 52$
B. $(x + y)^2 = 52$
C. $(x + y)^2 = 52^2$
D. $x^2 + y^2 = 52$
E. $x^2 + y^2 = 52^2$

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 $(x - 1)^4 < (x - 1)$?

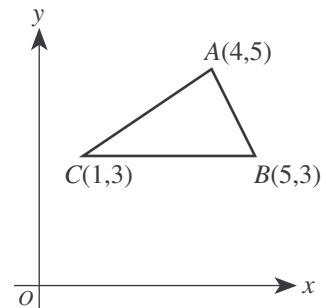


A. No real values
B. $x < 0$ and $x > 1$
C. $x < 1$ and $x > 2$
D. $0 < x < 1$
E. $1 < x < 2$

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
10 latch or pound the knocker. But in truth, the door to that 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.

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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

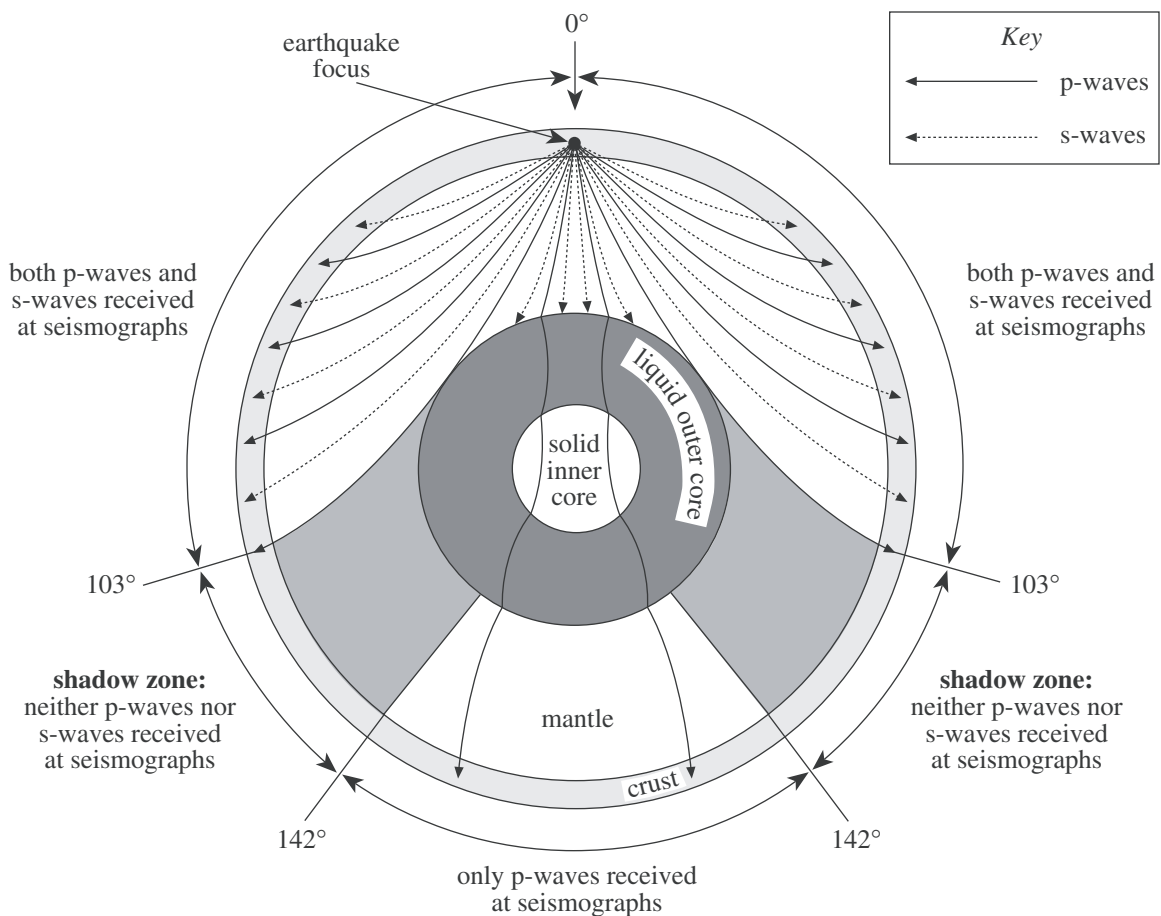
DIRECTIONS: There are seven passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

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

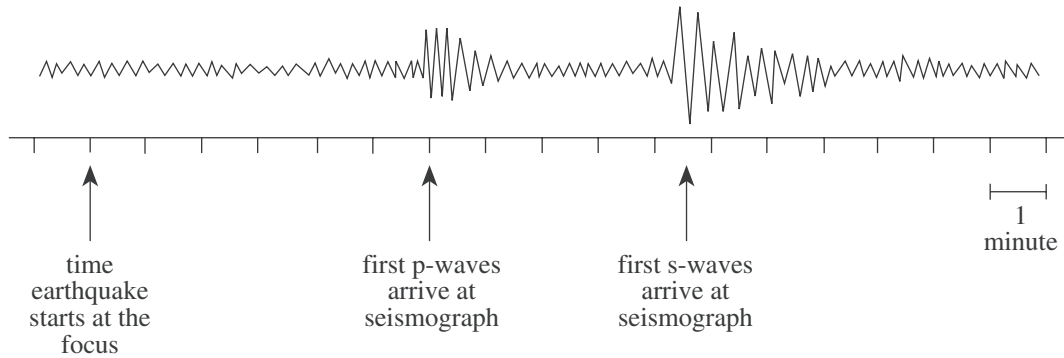
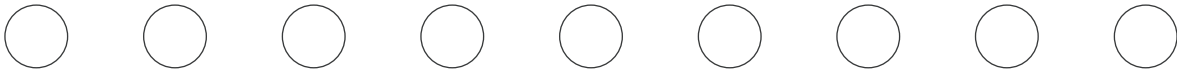


Figure 2

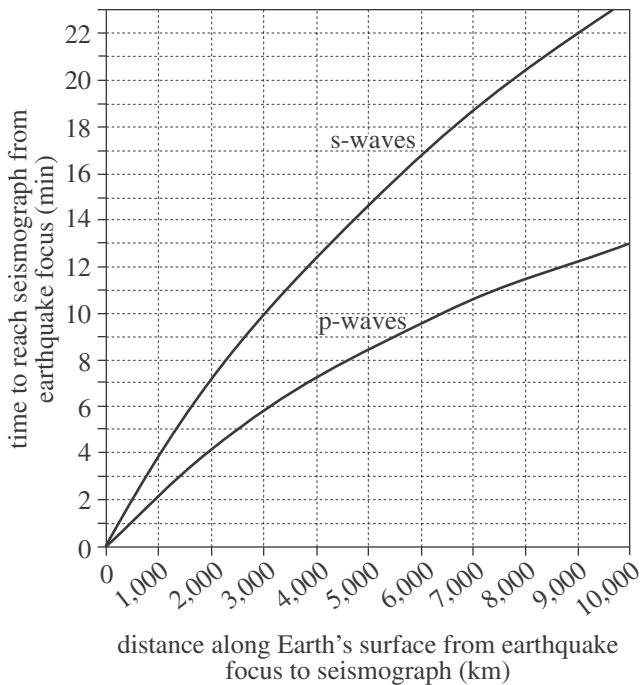


Figure 3

1. Figure 1 shows that a seismograph located at a point 125° 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}O and ^{16}O) in the groundwater. Smaller $\delta^{18}\text{O}$ values indicate cooler average temperatures.



Figure 1

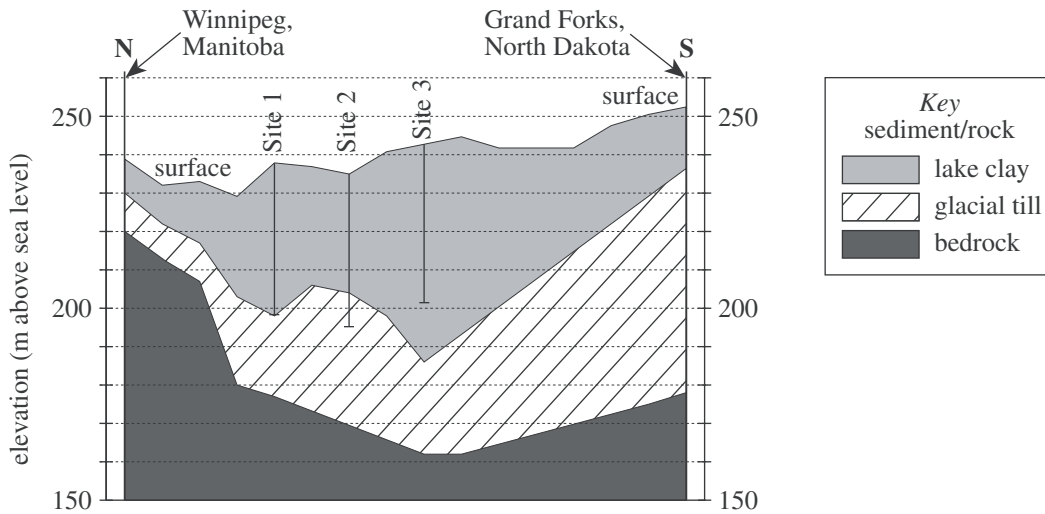
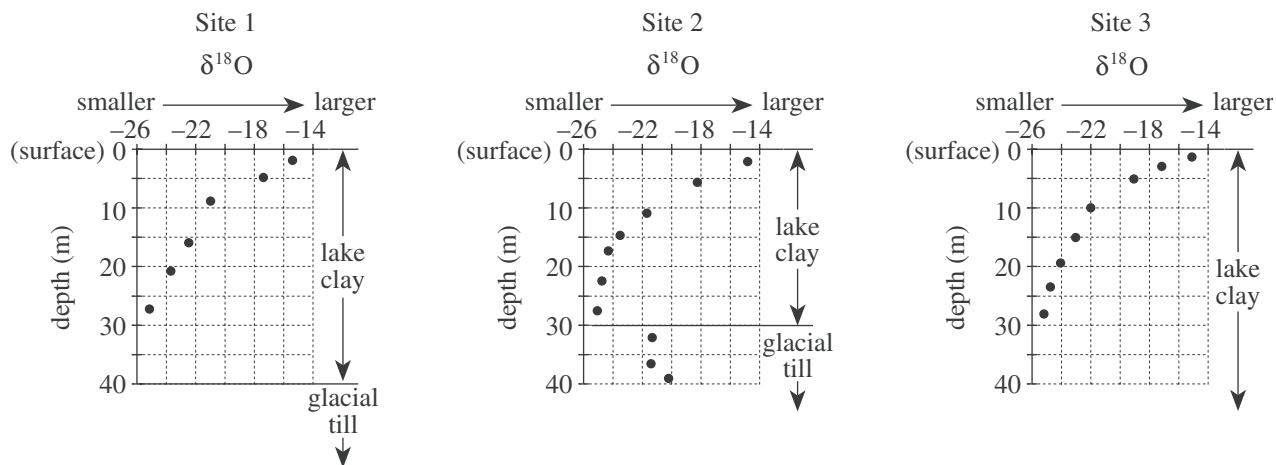


Figure 2



$$\text{Note: } \delta^{18}\text{O} = \left[\left(\frac{{}^{18}\text{O}/{}^{16}\text{O} \text{ of groundwater sample}}{{}^{18}\text{O}/{}^{16}\text{O} \text{ of standard water sample}} \right) - 1 \right] \times 1,000$$

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

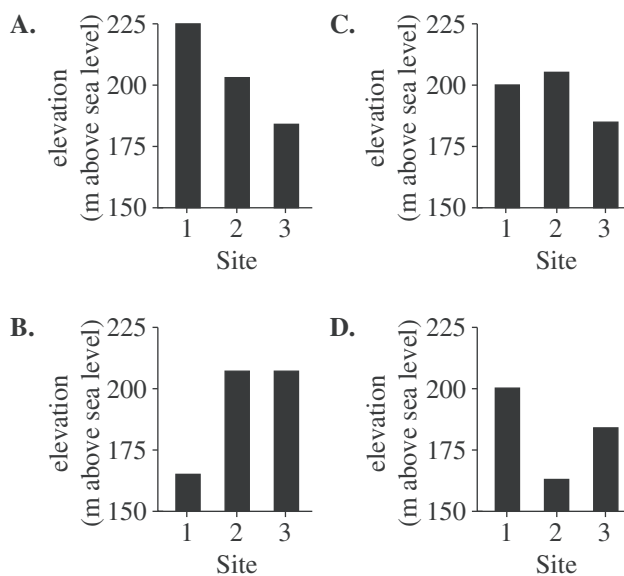
7. According to Figure 3, at Sites 1, 2, and 3, the smallest $\delta^{18}\text{O}$ value of the groundwater in the lake clay was recorded at a depth between:

- 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).

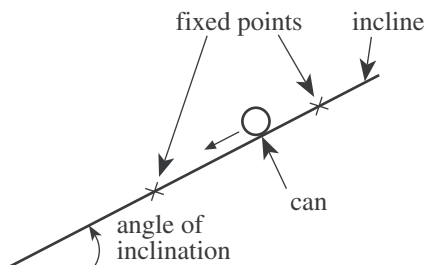


Figure 1

Identical 1.2 L aluminum cans were used in the first two experiments. The angle of inclination of the incline was 2.3° 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.

- 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:
 - rolled more rapidly down the incline.
 - made bubbles in the liquid easier to see.
 - contained a greater quantity of liquid.
 - had thicker walls and was less likely to break.
- 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?
 - Trials 1 and 2
 - Trials 2 and 3
 - Trials 2 and 4
 - 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:

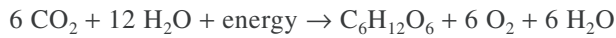


Table 1 lists wavelength ranges for visible light and the color frequently associated with each range.

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.

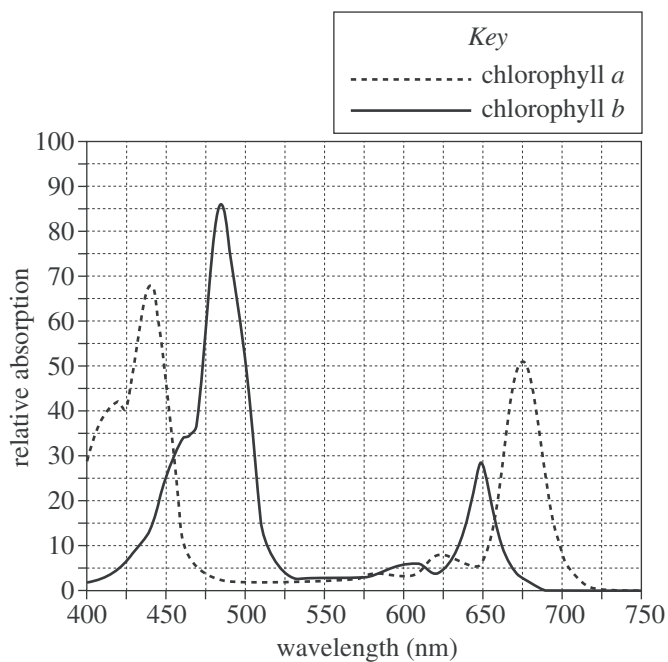


Figure 1

Figure 2 shows the average rate of photosynthesis at various wavelengths as a percent of the average rate of photosynthesis at 670 nm.

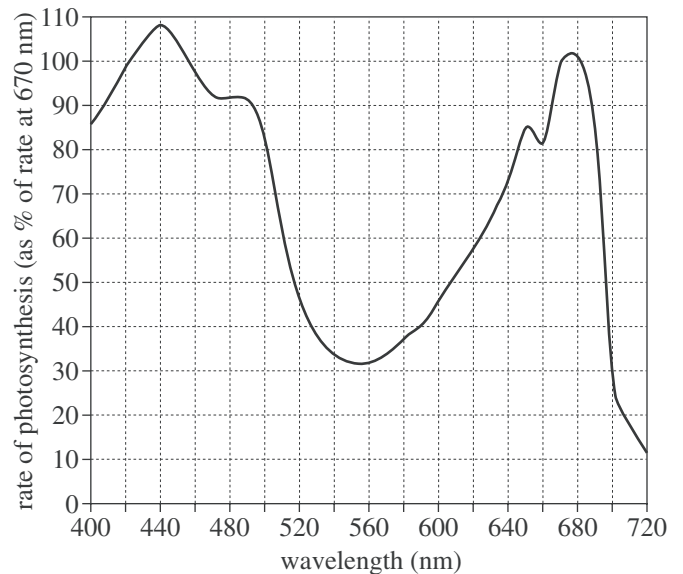


Figure 2

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

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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 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). H₂O 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 H₂O (see Table 1).

Liquid	Mass of H ₂ 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 H₂O. 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 H₂O (see Table 2).

Liquid	Mass of H ₂ 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/H₂O 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 H₂O.

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 CO_2 gas and increases the acidity (lowers the pH) of the solution. The other pathway produces acid but not 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 CO_2 (see Figure 1).

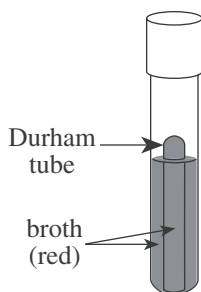


Figure 1

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°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 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	CO_2	acid	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	CO_2	acid	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	CO_2	acid	CO_2

A. – – + +
 B. + + – –
 C. + + + +
 D. – – – –



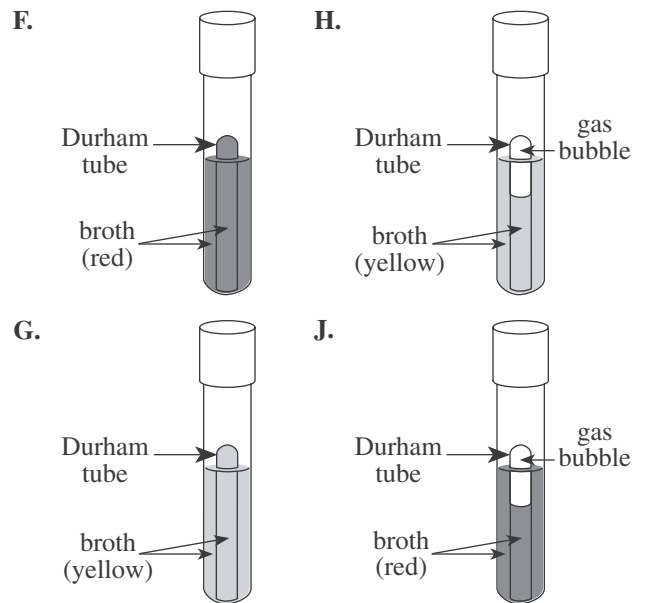
30. Suppose a scientist isolates a bacterial species that is 1 of the 4 species used in Experiment 1. She adds the species to sucrose broth and observes that neither acid nor CO_2 is produced. She then adds the species to lactose broth and observes that both acid and CO_2 are produced. Based on the results 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 CO_2 was produced when each species was alone in the sucrose broth, but CO_2 was produced when the 2 species were together in the sucrose broth.
- D. No CO_2 was produced when each species was alone in the lactose broth, but 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?

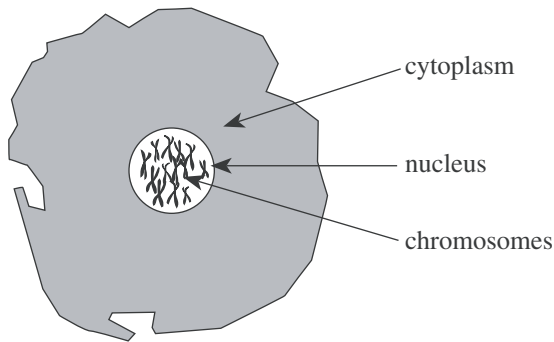


33. Is the hypothesis that Species A and Species C acted synergistically supported by the results of Experiment 2?

- A. Yes, because both acid and CO_2 were produced from sucrose.
- B. Yes, because both acid and CO_2 were produced from lactose.
- C. No, because only acid, not CO_2 , was produced from both sucrose and lactose.
- D. No, because neither acid nor 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[®] 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.

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

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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

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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.

ACT Test 64E	Your Scale Score
English	_____
Mathematics	_____
Reading	_____
Science	_____
Sum of scores	_____
Composite score (sum ÷ 4)	_____

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	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.

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	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	10	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	7	9	9	11	11	10
9	23-24	18-19	11-12	5-6	6	6	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	2	—	—	4-5	4-5	5
4	11-12	7-8	3	—	—	—	3	3	3	3	4
3	9-10	5-6	2	1	1	1	2	2	2	2	3
2	5-8	3-4	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

English

Usage/Mechanics _____
Rhetorical Skills _____

Mathematics

Pre-Algebra/Elem. Alg. _____
Alg./Coord. Geometry _____
Plane Geometry/Trig. _____

Reading

Soc. Studies/Sciences _____
Arts/Literature _____

Science

Composite

Combined English/Writing Writing

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	99	36	
35	99		99			99		99	99	99	99	35	
34	99		99			99		99	99	99	99	34	
33	97		98			97		99	99	99	99	33	
32	96		97			95		98	99	99	99	32	
31	95		96			93		97	97	97	97	31	
30	93		95			91		97	96	96	96	30	
29	91		93			88		95	94	94	94	29	
28	89		91			85		94	91	91	91	28	
27	86		88			81		92	88	88	88	27	
26	83		84			78		89	84	84	84	26	
25	79		79			74		85	80	80	80	25	
24	74		74			70		78	75	75	75	24	
23	69		68			65		72	69	69	69	23	
22	64		62			59		65	62	62	62	22	
21	57		57			54		56	55	55	55	21	
20	50		52			47		48	48	48	48	20	
19	42		47			41		38	40	40	40	19	
18	36	99	99	40	99	99	99	34	99	99	30	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
Mean	20.6	10.3	10.7	21.0	11.0	10.5	10.5	21.4	10.8	11.0	20.9	21.1	
S.D.	6.1	3.8	3.2	5.2	3.5	2.9	3.1	6.1	3.5	3.8	4.9	5.0	

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	
Mean	21.1	7.3
S.D.	5.5	1.6

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.

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
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7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
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FORM

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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

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|--------------|--------------|--------------|--------------|--------------|--------------|
| 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

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|-------------|--------------|--------------|--------------|--------------|--------------|
| 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"/> |
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