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ACT

Preparing for the

Assessment®

What's Inside...

- *Strategies to Prepare for the Test*
- *What to Expect on Test Day*
- *New Full-Length Practice Test*

2003–2004

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An ACT Program for Educational Planning

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Preparing for the ACT Assessment®

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A Message to Students

The best indication of how well you will do in college is a measure of how well you can perform the skills necessary for college coursework. The ACT Assessment measures these skills in English, mathematics, reading, and science. These areas are tested because they include the major areas of instruction in most high school and college programs.

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

We also are committed to ensuring that test questions 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.

How to Use This Free Booklet

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 of the tests, provides specific tips for each, and lets you know what you can expect on the test day. Included in this booklet are a **complete practice test**—“retired” ACT Assessment questions that were administered to students on a national test date—and a sample answer document and scoring instructions.

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

ACT endorses the *Code of Fair Testing Practices in Education*, a statement of guidelines for those who develop, administer, and use educational tests and data. The *Code* sets forth criteria for fairness in four areas: developing and selecting appropriate tests, interpreting test scores, striving for fairness, and informing test takers. ACT is committed to ensuring that each of its testing programs upholds the *Code*'s standards for appropriate test development practice and use.

Additional ACT Preparation Materials

- Check out the sample questions and explanations of correct answers on the ACT website (www.act.org).
- **ACTive Prep®: The Official Electronic Guide to the ACT Assessment** is an interactive, multimedia CD-ROM set that includes real ACT tests with answer explanations to help you prepare for the ACT Assessment. The program can also help you develop a personalized study plan based on your individual needs. ACTive Prep is the only test preparation software developed by ACT.
Order ACTive Prep through the ACT website at www.act.org/activeprep or use the order form on page 63, which also shows system requirements. (**Note:** If you already have a copy of ACTive Prep, you may not want to order it again.)
- Two different retired sample test booklets are available (see page 63).
- Check your local library or bookstore for the official guide to the ACT Assessment, *Getting Into the ACT*, published by Harcourt Brace. This book is the **only** commercial book that includes actual retired ACT tests.

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General Preparation for the ACT

Choosing a Test Date

Before you choose a test date, consider the application deadlines of the colleges and scholarship agencies that are of interest to you. It will take four to seven weeks after a test date for ACT to mail your score report to you and to your college or agency choices.

Many college 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 in high school.
- Many colleges begin contacting prospective students during the summer before the 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 the new information available in time to meet admission and scholarship deadlines.

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

A copy of the full *Code* may be obtained free of charge from ACT Customer Services, P.O. Box 1008, Iowa City, IA 52243-1008, 319/337-1429.

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General Test-Taking Strategies

The ACT consists of tests in four areas: English, Mathematics, Reading, and Science. Each of these tests contains multiple-choice 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 tests in all four areas:

Pace yourself.

The time limits set for each ACT 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 there are five minutes remaining on each test.

Read the directions for each test carefully.

Before you begin taking one of the ACT 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 ACT 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.

Use logic in 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 ACT tests will be based 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. The supervisor will announce when there are 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 in that test. Check to be sure that you marked only one answer to each question. You will not be allowed to go back to any other test or mark answers to a test after time has been called on that test.

Be precise in marking your answer document.

Be sure that you fill in the correct ovals and rectangles 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. Position your answer document next to your test booklet so you can mark your answers quickly and completely.

Erase completely.

If you want to change an answer on your answer document, be sure to erase the unintended mark completely.

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

You will have a total of five hours, including breaks, to take the ACT. Supervisors will announce when each hour has passed. You will need to pace yourself through each test in order to complete all four tests within the time allowed. For each test, check your work before notifying the supervisor that you are ready to go on to the next test.

Preparing for the 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 the test day. Familiarize yourself with the information in this booklet and in the registration booklet. NOTE: Most procedures in this booklet refer to testing on a national test date. Procedures may differ slightly if you test outside the United States or through another type of testing. For example, if you test at a national test center, you won't need scratch paper because each page of the Mathematics Test will provide a blank column that you can use for scratch work. Otherwise, you will be provided with scratch paper.
- Take the practice test and review your responses so you will feel comfortable about the approaching test day.
- Prepare well in advance for the test. Do not leave preparation to the last minute.
- Get plenty of rest the night before the test so you will be in good physical condition for taking it.
- Bring the following items with you to the test center:
 1. Your test center admission ticket (if you are testing on a national test date).
 2. Acceptable identification. Your admission ticket is **not** identification. See details on page 5. If you do not present acceptable identification at the time of check-in, you will not be admitted to test.

3. Sharpened soft-lead (No. 2) pencils with good erasers. Do **not** bring highlight pens or any other writing instruments; you will not be allowed to use them.
4. A wristwatch so that you can pace yourself during the test. Do **not** bring a watch that has an alarm function. You will not be allowed to set an alarm because it will disturb other students. An announcement will be made by the supervisor when five minutes remain on each test.
5. A permitted calculator for use on the Mathematics Test, if you wish to use one. (See shaded section below.)

For students testing on national test dates:

- If you misplace your admission ticket, call ACT Registration at 319/337-1270 for assistance.
- Check your admission ticket for the location of the test center to which you have been assigned. If you are unfamiliar with the location, do a practice run to see how to get there and how much time you will need to arrive on time.
- Plan to arrive by the time stated on your admission ticket. If you arrive earlier than 7:45 A.M., you will probably have to wait outside until the 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 assigned seats.
- Dress comfortably. To conserve energy, your test center may be considerably warmer or cooler on weekends than during the week. Please dress in such a way that you will be comfortable in a variety of temperatures.

Standby Testing on National Test Dates

ACT strongly recommends that you register by the regular or late deadline for the test date you desire. Only properly registered students are guaranteed a seat and test booklet at the assigned test center.

If you miss the late registration deadline but have a pressing need to test on the upcoming test date, you can try to test as a “standby” examinee. Testing as a standby is more costly, and you are **not** guaranteed a seat or test booklet.

If you decide to take your chance as a standby, follow the instructions for standby testing in the registration booklet or on ACT’s website. You must bring a completed national registration folder and fee payment with you to the test center in a sealed registration envelope. Your name and address must be clearly printed on the outside of the envelope. You must also bring acceptable identification. Standby examinees who have these required items with them will be admitted *only* after all registered students have been seated. Even if you are inadvertently admitted and allowed to test, **no** scores will be reported if you **did not turn in** your registration packet before testing.

Test center supervisors will not know until after all properly registered examinees have been seated on the test day if space and materials are available, so it is not useful to contact supervisors prior to the test date; they cannot guarantee you will be admitted.

Use of Calculators on the ACT Assessment Mathematics Test

You may use a calculator on the ACT Assessment Mathematics Test (but not on any of the other tests in the ACT Assessment). 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 math 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 **Prohibited** list. For models on the **Permitted with Modification** list, you will be required to modify some of the calculator’s features.

Prohibited Calculators

The following types of calculators are **prohibited**:

- pocket organizers
- handheld or laptop computers
- electronic writing pads or pen-input devices—*The Sharp EL 9600 is permitted.*
- calculators built into cellular phones or other wireless communication devices
- calculators with a typewriter keypad (keys in QWERTY format)—*Calculators with letter keys not in QWERTY format are permitted.*
- calculators with built-in computer algebra systems—*Prohibited calculators in this category include all calculators in all of the following series:*
 - Casio: CFX-9970G (including, for example, CFX-9970GE) and Algebra fx 2.0
 - Texas Instruments: TI-89 and TI-92 (including, for example, TI-92 Plus)
 - Hewlett-Packard: HP-40G and HP-49G

We regularly update information about which calculators are **prohibited**. To be certain your calculator will be permitted on test day, visit www.act.org or call 800/498-6481 for a recorded message.

Calculators Permitted with Modification

The following types of calculators are **permitted, but only after they are modified as noted**:

- calculators with paper tape—*Remove the tape.*
- calculators that make noise—*Turn off the sound feature.*
- calculators that can communicate wirelessly with other calculators—*Completely cover the infrared data port with heavy opaque material, such as duct tape or electrician’s tape.*
- calculators that have power cords—*Remove all power/electrical cords.*

On the Test Day

If you decide to bring a calculator to the test center, it must not be a prohibited type. Be sure your calculator is working and has reliable batteries. You may bring a spare 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 a permitted type, 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 if your primary calculator fails;
- 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 test taker can see your calculator.

Identification Required at Time of Check-In

Acceptable identification must be presented at the time of check-in or you will not be admitted to test. This requirement is designed to protect you. You must present ONE of the following:

1. **Current Official Photo ID:** Current official photo ID recently issued by your school, employer, or city/state/federal government (for example, driver's license or current passport) on which BOTH your name and current photograph appear. Only photo ID issued by one of these listed institutions is acceptable.

2. **Recent Published Photo:** Recognizable *individual* photograph of you in a current (within last two years) publication (such as a newspaper or school yearbook) with your first and last names in the caption. If you bring a newspaper clipping, the testing staff may keep it to send to ACT.

3. **School Letter of Identification:** If you do not have acceptable photo ID, ask your counselor or other school official (who may **not** be a relative) for a letter of identification. Your counselor's letter must be **on school letterhead** and include your name and *full physical description* or a recognizable recent photograph with school seal or school official's signature across a portion of the photo. (If school letterhead is computer-generated or photocopied, a school seal is **required**.) A photocopy of a transcript may be used **only** if it includes a recent photo and is signed as described below.

You must sign the letter **in ink in the presence** of the counselor or school official (who may **not** be a relative), and that official must also **personally** sign the letter in **ink**. Printed, stamped, or photocopied signatures are not acceptable. You will be required to sign the letter again on the test day in the presence of testing staff, and they will keep the letter to send to ACT.

4. **Notarized Statement with Photo:** If you do not have acceptable photo ID *and* you do not attend a high school, contact a notary public (who may **not** be a relative) for a statement of identification. Attach a current photograph of yourself to a sworn statement that includes your name. You must sign this statement in the presence of the notary public, and the notary public must notarize the statement with the notary seal or stamp affixed to a portion of the photo. You will be asked to sign the statement again at the test center, and the testing staff will keep it to send to ACT.

If you do not present one of the forms of ID in the above list, you will **not** be admitted to the test center. The following forms of ID are **unacceptable**: photo ID issued by a business for promotional purposes (for example, amusement parks); membership card (for example, health clubs); birth certificate; Social Security card; credit card, with or without photo. Your parents or classmates may **not** present identification on your behalf or "vouch for" you.

Plan ahead and be certain you will have acceptable ID with you at check-in on the test day. (Traffic tickets or police reports documenting a stolen wallet, even though they may include a physical description and signature, are **not** acceptable.) If you have any questions about acceptable ID, call ACT Test Administration (319/337-1510) *before* the test day.

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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 this knowledge cannot easily be changed, your performance in a specific subject matter 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 do not have freshly in your mind. Spend your time refreshing your knowledge in the content areas that make up large portions of the tests.

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 in these areas before you take the ACT. Because the ACT measures knowledge 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 in the subject matter will be most helpful to you, because they aim to improve your knowledge in the area.

ACT English Test

The 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 prose 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 portion underlined. 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 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 below.

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 choosing effective opening, transitional, and closing sentences.

Organization (15%). Questions in this category test how well you organize ideas and judge the relevance of statements in context (making decisions about order, coherence, and unity).

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

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 complex formulas and extensive computation are 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.

Use of calculators is permitted on the Mathematics Test. See page 4 for details.

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. The maximum estimated time that should be spent on each question is 1 minute. 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, writing space for scratch work usually is available 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. And the Plane Geometry/Trigonometry subscore is based on the questions covering plane geometry and trigonometry. 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 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 college freshman 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 in the social studies and natural sciences sections of the test), and a subscore in Arts/Literature reading skills (based on the 20 questions in the prose fiction and humanities sections of the test).

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 35–41 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 the scratch paper 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 in the social studies and the natural sciences sections of the test, and a subscore in Arts/Literature reading skills is based on the questions in the prose fiction and humanities sections of the test. 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 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. The use of calculators is **not** permitted on the 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 the scratch paper 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 your test booklet (or if you are testing outside the U.S., on the scratch paper 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 background 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.

3

What to Expect on the Test Day

Identification Required

You are to report to the test center by the time stated on your admission ticket, normally 8:00 A.M. If your admission ticket does not list a specific room, test center staff or posted signs will direct you to the testing room. **At check-in, you will be required to show BOTH your admission ticket and acceptable ID.** See ID requirements on page 5 of this booklet.

Dos and Don'ts

In the testing room, the supervisor or proctor will direct you to a seat. If you need a left-handed desk, tell your supervisor as you enter. Only pencils, a calculator (for the Mathematics Test only), and your admission ticket will be allowed on your desk. Scratch paper (unless provided by the test supervisor for certain types of testing), notes, slide rules, and foreign language or other dictionaries are not allowed in the testing room. You will be required to put all other personal belongings away. You may not eat, use tobacco in any form, or drink in the testing room. You must abide by the rules of the institution where you are testing. Do not leave the testing room after you have been admitted.

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

Test Preliminaries

The testing session will begin as soon as all examinees present at 8:00 A.M. are checked in. Listen carefully to all directions read by the 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 answer document will not match your registration record—and the reporting of your scores will take three to five weeks longer than usual to process.

After you have completed side 1 of the answer document, you will receive a test booklet. You will be told to read the directions printed on the cover, then asked to write the booklet number and test form at the top of side 2 of the 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 open your test booklet and begin work.

The top portion of your admission ticket will be collected by your supervisor.

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, but do not look around. Please remember that as you take the test you should 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 Assessment. If you are involved in **any** of the actions listed below, you will have to return your test materials and leave the test center. Prohibited behaviors include:

- attempting to fill in or alter any ovals after time is called on any test (You must put down your pencil 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, notes, dictionaries, or other aids
- using an unauthorized calculator
- using any device (e.g., a calculator) to share or exchange information
- using a calculator on any test other than the Math Test
- attempting to remove test materials, including questions or answers, from the testing room by any means
- creating a disturbance or allowing an alarm, pager, or phone to sound that disrupts testing for other examinees

All of the above activities are prohibited. If you are observed engaging in any prohibited behavior, your answer document will **not** be scored and you will be dismissed from the test center.

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

You will have a short break after the first two tests. Do not leave the building during the break period 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 rest room; you will not be given time to make up for the time you miss.

On certain test dates, ACT administers test questions for developmental purposes. Responses to such questions are not counted toward your scores.

At the conclusion of the session, you will be asked to read and sign a statement certifying 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, the supervisor will dismiss you.

Special Situations

If you become ill and have to leave the center before finishing the ACT, you must decide whether or not you want your answer document scored and inform the supervisor of your decision. If you fail to do so, your answer document will

be scored. Or, if you decide *after* you have finished the ACT that you do not want it scored, tell the supervisor *before* you leave the test center. You need not give a reason.

Once you break the seal on your test booklet, you cannot later request a refund or request a test date change. If you want to take the ACT Assessment again, follow the instructions for REregistration.

Test Information Release

On certain national test dates, you may obtain (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 dates or for other types of testing, so if you want it, be sure to check the registration booklet, *Registering for the ACT Assessment*, and register for a test date on which it is available. (Your request must be postmarked no later than three months after the test date.) The information will be mailed 6 to 8 weeks **after** the test date.

4

Taking the Practice Test

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

- The four ACT tests require a total of 2 hours and 55 minutes. Try to take them in one sitting, with only a short 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. Remove all books and other aids from your desk. On the test day, you will not be allowed to use references or notes. If you test at a national test center, you won't need scratch paper because each page of the Mathematics Test will provide a blank column that you can use for scratch work. Otherwise, you will be provided with scratch paper.
- **If you plan to use a calculator on the Mathematics Test, review the details about permissible calculators on page 4. Use a calculator with which you are familiar for both the practice test and on the test day. You may use any four-function, scientific, or graphing calculator on the Mathematics Test, except as specified on page 4.**
- Use a digital timer or clock to time yourself on each test. Set your timer for five minutes less than the allotted time for each test so you can get used to the five-minute warning. (Students approved for extended-time should set a timer for 60-minute warnings.)
- Allow yourself only the time permitted for each test.
- Detach and use the sample answer sheet on pages 61–62.
- Read the general test directions on the first page of the practice test. These are the same directions that will appear on your test booklet on the test day. After you have read the directions, start your timer and begin with Test 1.
- After you finish the practice test, use the scoring keys and conversion tables on pages 55–59 of this booklet to score your practice test.

Practice Test

Form 0359F

ACT Assessment[®]

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 A BALLPOINT PEN.*

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

Notes from Underground

A lot of people hate to ride the New York City subways, but I love them because I like to get places fast.

A musician balancing a cello case, two Buddhist monks ¹ in saffron robes, and a group of stockbrokers in crisp,

charcoal gray suits get on at Wall Street. A passenger ² placidly sews while the subway train flings and jolts. A

teenager whose ³ holding a shoebox containing a kitten as

tiny as a gingersnap smiles even if ⁴ a line of girls in frilly white communion dresses file by. About three and a half

million people a day ride the subways ⁵ I think maybe

I might possibly have met them all. ⁶

1. At this point, the writer wants to provide one reason why she likes to ride the subways. Which choice is most relevant to the information provided in this first paragraph?

- A. NO CHANGE
- B. I never know what I'll see there.
- C. they are so much cheaper than taxis.
- D. they are places of enormous quiet and calm.

2. F. NO CHANGE
G. charcoal gray suits,
H. charcoal, gray suits
J. charcoal gray, suits

3. A. NO CHANGE
B. thats
C. as
D. who's

4. F. NO CHANGE
G. as
H. whereas
J. such that

5. A. NO CHANGE
B. subways, and
C. subways, which
D. subways actually

6. F. NO CHANGE
G. perhaps I've
H. I've possibly
J. I've



Sometimes a Salvation Army volunteer boards the subway train with sandwiches and juice to give to the needy. “Put your pride to the side!” the volunteer shouts, and I’ve seen many people put out their hands. The
7

speaker also raises money. Its impossible to predict which
8

people will dig into their pockets or if they were to open
9 their purses, and I’ve stopped trying to guess.

Last week some fellow passengers and I watched an elderly man with a portable chessboard playing
10 chess against himself. Just yesterday I sat across the

aisle with a woman who was composing music
11

in pink-tinted glasses in a notebook. She tapped her foot
12 as she reviewed what she’d written and then stopped

tapping and jotted more notes as the train hurtled along.
13

Today is my mother’s birthday. I decided to surprise her with lilac blooms from my backyard, so this morning, carrying a shopping bag full of the flowers, I boarded a crowded “E” train and rode it to the very last stop in the

7. A. NO CHANGE
B. Therefore, the
C. In conclusion, the
D. In other words, the

8. F. NO CHANGE
G. It’s
H. Its’
J. That’s

9. A. NO CHANGE
B. would have opened
C. open
D. might be opening

10. Which of the following alternatives to the underlined portion would NOT be acceptable?
F. who played
G. as he played
H. played
J. who was playing

11. A. NO CHANGE
B. to
C. at
D. from

12. The best placement for the underlined portion would be:
F. where it is now.
G. after the word *woman*.
H. after the word *was*.
J. after the word *composing*.

13. Which choice most effectively emphasizes the rapid speed of the train?
A. NO CHANGE
B. continued on its way.
C. moved on down the tracks.
D. proceeded toward the next stop.

Bronx. Strangers smiled and took pains not to crush the flowers, even when the train jerked to a halt. 14 I got off at an elevated station and, lifting the splendid bouquet, rushed down to my mother, feeling delighted that I'd brought the blooms all the way from Brooklyn on the subway train.

14. If the writer were to delete the preceding sentence, this paragraph would primarily lose a statement that:
- F. provides physical descriptions of people on the subway train.
 - G. supports the opening sentence of the essay.
 - H. provides evidence that people can be friendly on the subway train.
 - J. gives an explanation for the narrator's actions.

Question 15 asks about the preceding passage as a whole.

15. Suppose the writer had intended to write a brief essay persuading readers that the subway system is New York City's most economical means of public transportation. Would this essay fulfill the writer's goal?
- A. Yes, because the essay supplies evidence of the large number of people using the subways.
 - B. Yes, because the essay describes people who are able to give to the needy because they have extra money in their pockets.
 - C. No, because the essay focuses on the kinds of people riding the subways, not on how inexpensive the subways are to ride.
 - D. No, because the essay focuses on the writer's love of all public transportation, not just the subways.

PASSAGE II

Navajo Code Talkers

During World War II, a group of Navajo soldiers developed a code that became one of the most successful in U.S. military history. This group,¹⁶ known as the Navajo code talkers, took part in every assault the U.S. Marines conducted in the Pacific from 1942 to 1945, transmitting information,¹⁷ on tactics, troop movements, orders, and other vital communications over telephones and radios.

American military officials have¹⁸ been using cumbersome¹⁹ machines to encode and relay information during battles. In preliminary tests under simulated combat

16. F. NO CHANGE
G. group which was
H. group was
J. group
17. A. NO CHANGE
B. transmitting information on:
C. transmitting information on
D. transmitting: information on
18. F. NO CHANGE
G. had
H. would have
J. will have
19. A. NO CHANGE
B. thorny
C. strenuous
D. gawky



conditions, the Navajo encoded, transmitted, and decoded a three-line message in twenty seconds as the machines required thirty minutes to perform the same job.

Nevertheless, these tests convinced the

officials of the value, of using the Navajo language in a code.

The Navajo language is complex, with a structure and sounds that makes them unintelligible to anyone without

extensive exposure to it. Outside Navajo communities,

such exposure is rare, which greatly contributed to

it's success.

The Navajo developed and memorized the code. Since their language did not have words for common U.S. military equipment, they turned to nature. They named planes after birds and ships after fish. Dive bombers became *gini* (chicken hawk) and destroyers were called *ca-lo* (shark). The skilled Japanese code breakers remained baffled by the Navajo language. The code was never broken.

Unfortunately, the code talkers sometimes faced dangerous peril from their own side. Many code talkers needed bodyguards to protect them from other American soldiers, some of whom mistook the Navajo for Japanese

20. F. NO CHANGE
G. seconds so
H. seconds,
J. seconds, whereas
21. A. NO CHANGE
B. Similarly, these
C. Still, these
D. These
22. F. NO CHANGE
G. officials, of the value
H. officials of the value
J. officials, of the value,
23. A. NO CHANGE
B. makes it
C. make it
D. make them
24. F. NO CHANGE
G. from
H. with
J. of
25. Which of the following alternatives to the underlined portion would NOT be acceptable?
A. rare; this
B. rare this
C. rare. This
D. rare, a factor that
26. F. NO CHANGE
G. that
H. this
J. the Navajo code's
27. A. NO CHANGE
B. The Navajo, who were various heights and weights,
C. Being of various heights and weights, the Navajo
D. The Navajo of different sizes
28. F. NO CHANGE
G. hazardous
H. risky
J. OMIT the underlined portion.

soldiers. Regardless, the Navajo were resolute and served their country courageously.

The Navajo code remained classified after the war that was later used, along with codes made from other ²⁹American Indian languages, in the Korean Conflict and the Vietnam War. Now that the Navajo code is no longer used, the code talkers, whose secret work ³⁰saved American lives, can finally receive public recognition for their actions.

29. A. NO CHANGE
 B. and which
 C. and
 D. OMIT the underlined portion.
30. F. NO CHANGE
 G. hush-hush actions
 H. concealed, hidden efforts
 J. doings, kept under wraps,

PASSAGE III

An American Griot

[1] When storyteller Mary Carter Smith practices her art and everybody listens. ³¹
 [2] Wearing a brightly colored African dress, a large turban, and bracelets, the seventy-eight-year-old Smith seems to inhabit each of the different characters she describes. [3] Her voice changes with each emotion she wants to evoke. [4] Her gestures fit the pace of the narrative. [5] And though many of the stories are intended to make the audience laugh, Smith is fully aware of the other values of storytelling. [6] Indeed, ³²she identifies strongly with the griots of West Africa—those village storytellers where they ³³use songs, poems, and narration to help preserve and transmit culture and history. [7] Clearly others recognize her as a valuable resource. [8] Smith is the official griot of both the city of Baltimore and the state of Maryland; she has served as griot-in-residence at ³⁴

31. A. NO CHANGE
 B. Smith, practices her art
 C. Smith, practices her art,
 D. Smith practices her art,
32. F. NO CHANGE
 G. Well,
 H. However,
 J. At once,
33. A. NO CHANGE
 B. who
 C. whom
 D. that they
34. Which of the following alternatives to the underlined portion would NOT be acceptable?
 F. Maryland. She
 G. Maryland, and she
 H. Maryland and
 J. Maryland, she



several universities. 35

Though Smith has been interested in theater since her youth, her recognition of her own talent grew gradually. She worked for thirty years as a teacher and librarian in the field of education in Baltimore public schools. 36 She organized theater groups in her community and took several trips to Africa to study traditional cultures. All along, she was telling stories—everything from social satire to her retelling of “Cinderella” as Cindy Ellie, a ³⁷ poor African American girl whose rags are transformed into magnificent African-style gowns. Over time, she was invited to perform in churches, libraries, and museums. 38

Smith realized the extent of her gift when her friend Alex Haley ³⁹ who had gathered essential material critical to writing ⁴⁰ his best-selling novel *Roots* from a griot in Gambia, began to refer to her as “my American griot,” ⁴¹ this was a revelation to Smith.

35. The writer is considering deleting the phrase “at several universities” from Sentence 8. If the phrase were deleted, the essay would primarily lose:
- A. an essential link to the paragraph that follows.
 - B. a contrast for the purpose of making a comparison.
 - C. information that qualifies the term *griot-in-residence*.
 - D. an unnecessary detail.
36. Which of the following words or phrases from the preceding sentence is LEAST necessary and could therefore be deleted?
- F. thirty
 - G. and librarian
 - H. in the field of education
 - J. Baltimore public
37. A. NO CHANGE
B. Ellie. A
C. Ellie; a
D. Ellie, she was a
38. At this point, the writer is considering adding the following true statement:
- In high school, Smith was a member of both the drama and speech clubs.
- Should the writer make this addition here?
- F. Yes, because it supports the idea that Smith was telling stories throughout her life.
 - G. Yes, because it supports the idea expressed earlier that Smith organized theater groups in her community.
 - H. No, because it contradicts the point made earlier that Smith worked for thirty years as a teacher and librarian.
 - J. No, because it distracts the reader from the main focus of the paragraph and does not logically fit at this point in the essay.
39. A. NO CHANGE
B. friend, Alex Haley
C. friend Alex Haley;
D. friend Alex Haley,
40. F. NO CHANGE
G. for
H. important to
J. that was essential to
41. A. NO CHANGE
B. griot” that
C. griot.” This
D. griot,”



“Hearing that was like a man who has shoed horses all his life being told, ‘You’re a blacksmith!’” she recalls.

42

Today, Smith’s repertoire is so vast that she could speak consecutively for twelve hours straight without

43

running out of material. It’s unlikely she would ever attempt such a feat, but if she did, there would be no dull moments.

44

42. Given that all the choices are quotations from Mary Carter Smith, which one would best support the argument the writer is making concerning Smith’s belated discovery of her own talent?

- F. NO CHANGE
- G. “You’ve got to reveal truths to your listeners,” she says.
- H. “Through his novel *Roots*, Alex Haley was in some ways performing the function of a griot for America,” she says.
- J. “I’d say that one of the most crucial moments in my development as a storyteller is the few hours I once spent listening to a griot in West Africa,” she recalls.

43. A. NO CHANGE
B. continuously nonstop
C. perpetually
D. OMIT the underlined portion.

44. F. NO CHANGE
G. It’s unlikely,
H. Its unlikely,
J. Its unlikely

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer had intended to write a brief essay focusing on the various ways that storytelling influences community values. Would this essay successfully fulfill the writer’s goal?

- A. Yes, because the essay indicates that Smith believes storytelling pulls a community together.
- B. Yes, because the essay shows that Smith’s Baltimore community valued her gift as a storyteller.
- C. No, because the essay focuses on the griots of West Africa, not on community values.
- D. No, because the essay’s main focus is on one storyteller and the way in which she practices her art.

PASSAGE IV

Baseballs and Butterflies

[1] Our son has started playing organized T-ball, a beginner’s version of baseball. [2] “Organized” is what parents call it, anyway. [3] Joe is seven, living in those two or three years when they can manage to throw a baseball a few feet but when what they’re really interested in are

46

46. F. NO CHANGE
G. children
H. he
J. some of them

things closer at hand, bugs, butterflies, dirt (if they're in the infield), grass (if they're in the outfield). [4] Children of that age still think nothing of doing little dances in the outfield, often with their backs to home plate and, consequently, the batter. [5] It's not as if the outfielders' positions matter much, though—the ball never gets hit hard enough to reach there. [49]

Since there's not much chance that a seven-year-old just learning the game can hit a pitched baseball, the umpire puts the ball on top of a stationary tee, a piece of flexible tubing adjusted to each batter's height. If batters repeatedly fail to hit the ball—and lots of them do—the umpire is patient, giving them four or five chances instead

of the usual three. [52] When a batter finally makes contact, the ball dribbles into the infield, where the

nearest player usually ends up throwing the ball at the first baseman's feet or, if the fielder is precocious, over the first baseman's head.

47. A. NO CHANGE
B. hand, bugs, butterflies, dirt,
C. hand: bugs, butterflies, dirt
D. hand: bugs, butterflies, dirt,
48. F. NO CHANGE
G. if
H. whether
J. as to whether
49. The writer wishes to add the following sentence in order to emphasize the uncertainty already expressed about an idea in the paragraph:
I still have doubts.
The new sentence would best amplify and be placed after Sentence:
A. 1.
B. 2.
C. 3.
D. 4.
50. F. NO CHANGE
G. While
H. Although
J. Unless
51. Which of the following alternatives to the underlined portion would NOT be acceptable?
A. umpire patiently gives
B. umpire, who is patient, gives
C. umpire, who patiently gives
D. patient umpire gives
52. If the writer were to delete the word *repeatedly* and the phrase “and lots of them do” (and the dashes) from the preceding sentence, the sentence would primarily lose:
F. a tone of admiration for the work of the umpires.
G. details about the rules of T-ball.
H. an explanation of why children often fail to hit the ball.
J. a sense of how difficult the task is for the children.
53. A. NO CHANGE
B. accomplishes a result of
C. attains the consequence of
D. results in



In a T-ball league, one needs to do something to keep the score from reaching triple digits in the early going.

There's a rule, therefore⁵⁴, that says the runner must stop when any fielder from the other team picks up the ball and holds it aloft. The rule might seem a good one, but the

children can't remember to hold up the ball⁵⁵. Once they've picked it up, they look at it quizzically for a

while and then, look up to see⁵⁶ what all the ruckus is about.

What it's⁵⁷ about a bleacher section full of parents, each adult frantically holding up a stiff arm. The child with the

ball wonders at the grown-up's⁵⁸ odd, noisy behavior.

Meanwhile, the runners continue to score. They score, that

is, if they were not to be⁵⁹ distracted by the grown-ups—or the butterflies.

54. F. NO CHANGE

G. instead,

H. likewise,

J. meanwhile,

55. A. NO CHANGE

B. regulation-sized ball.

C. ball, which is regulation sized.

D. ball, which is the same size as a regular baseball.

56. F. NO CHANGE

G. then, look up, to see

H. then look up to see,

J. then look up to see

57. A. NO CHANGE

B. That's

C. It's

D. Thats

58. F. NO CHANGE

G. grown-ups'

H. grown-ups

J. grown-ups,

59. A. NO CHANGE

B. they would not have been

C. they're not

D. they're not to be

Question 60 asks about the preceding passage as a whole.

60. Suppose the writer had intended to write an essay describing one child's experiences playing T-ball. Would this essay accomplish the writer's goal?

F. Yes, because it reveals that the narrator's son Joe is now playing T-ball, and then it goes on to describe Joe's experiences at one of his games.

G. Yes, because it discusses the narrator's son Joe's T-ball skills, such as the fact that he can throw a baseball a few feet.

H. No, because while it mentions that the narrator's son Joe plays T-ball, it also notes he is more interested in things such as dirt and bugs.

J. No, because although the T-ball experiences of the narrator's son Joe are alluded to, it is primarily about the general features of T-ball games.



PASSAGE V

Fixing Raptor Feathers

Raptors, or birds of prey, cannot afford to be grounded for weeks waiting for a large number of flight feathers to regrow. They must be able to fly if they are to hunt and eat. Raptors, including eagles and hawks, therefore normally shed their feathers slowly, one or two at a time.

61

The premature loss of a flight feather to injury, then, is not an incidental matter to raptors, most of which are diurnal. If a feather breaks off with the stub of its hollow quill shaft still in place, the bird's body mistakenly believes the feather is whole. Only when the quill socket containing the stub is

63

empty will a new feather grow. Quills are hollow, so the

64

removal of a quill stub before it is ready to be naturally shed would be very painful to the animal. Bird

65

rehabilitators, therefore, treat broken raptor feathers through imping—the implanting of a new feather into the quill stub.

66

61. The writer wants to describe the way raptors shed feathers. Which choice would be most consistent with the way the feather-shedding process has been described up to this point?
- A. NO CHANGE
 B. in an all-at-once blizzard.
 C. often losing them in clumps.
 D. leaving them flightless for long periods of time.
62. F. NO CHANGE
 G. raptors.
 H. raptors, most of which are mainly active during the day—that is, diurnal.
 J. raptors, daytime-hunting creatures for the most part.
63. Which of the following alternatives to the underlined portion would NOT be acceptable?
- A. sound.
 B. complete.
 C. total.
 D. intact.
64. Given that all of the choices are true, which one most clearly provides a reason for the statement that follows in this sentence?
- F. NO CHANGE
 G. fasten deeply,
 H. break occasionally,
 J. are very light,
65. A. NO CHANGE
 B. they are
 C. those are
 D. that is
66. Which of the following alternatives to the underlined portion would NOT be acceptable?
- F. *imping*, which is the
 G. *imping*: the
 H. *imping*. The
 J. *imping*, the



The bird rehabilitator begins by determining which feather has been damaged. On each wing, all flighted

birds, having ten primary flight feathers, each one shaped

67

slight different. If the left number seven feather is broken

68

off, the rehabilitator selects a number seven feather from a collection kept exclusively for imping. If necessary, a number six or eight feather can be carefully trimmed with small scissors to the shape of a number seven feather. 69

The quill of this replacement feather is trimmed so that when the replacement feather is eventually attached to the quill stub still in the bird's body, the repaired feather will

be equal in length to the original, whole feather.

70

Next, the rehabilitator whittles a bamboo chopstick

71

to duplicate the curve and slant of the complete feather shaft. He or she then inserts the carved chopstick into the quill stub. After sliding the shaft of the replacement feather over the sturdy, light bamboo

stick, glue—just a touch—is applied. The raptor now

72

has a rebuilt, functional feather. Eventually, it will be

73

67. A. NO CHANGE
 B. birds, by having
 C. birds, which have
 D. birds have
68. F. NO CHANGE
 G. slight differently.
 H. slightly differently.
 J. slightly more different.

69. The writer is considering revising the preceding sentence to read as follows:

If necessary, a number six or eight feather can be cut to the shape of a number seven feather.

If the writer did this, the sentence would primarily lose a sense of how:

- A. limited rehabilitators' feather collections are.
 B. delicate the work being described is.
 C. different each of a bird's flight feathers is.
 D. easy it is to replace a number seven feather.

70. F. NO CHANGE
 G. be equally long
 H. equal the length
 J. equal in length

71. A. NO CHANGE
 B. However,
 C. Indeed,
 D. Finally,

72. F. NO CHANGE
 G. a touch of glue is applied by the rehabilitator.
 H. the application of a touch of glue follows.
 J. the rehabilitator applies a touch of glue.

73. Which of the following alternatives to the underlined portion would NOT be acceptable?

- A. feather; eventually, it
 B. feather, eventually, it
 C. feather, which eventually
 D. feather that eventually

1



1

shed, allowing a new, complete feather to grow in it's
74

place. 75

74. F. NO CHANGE
G. grow in its
H. have grow in its
J. have grow in it's

75. At this point, the writer is considering adding the following true statement:

This imping procedure is just one of the many responsibilities bird rehabilitators have.

Should the writer make this addition here?

- A. Yes, because it reveals the relative importance of imping compared to the other work of bird rehabilitators.
B. Yes, because it reinforces the idea that imping is of great benefit to raptors.
C. No, because it goes beyond the scope of the essay, which focuses on how the feathers of certain types of birds are repaired.
D. No, because it undermines the essay's earlier claim that imping is the most important work that bird rehabilitators do.

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.

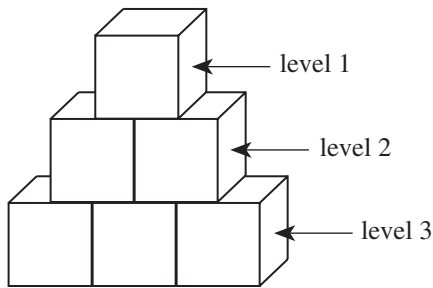
You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

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. Carmen is playing with blocks. She arranges stacks of blocks so that each successive level of blocks has 1 fewer block than the level below it and the top level has 1 block. Such a stack with 3 levels is shown below. Carmen wants to make such a stack with 12 levels. How many blocks would she use to build this stack?



- A. 66
 B. 78
 C. 132
 D. 144
 E. 156
2. To keep up with rising expenses, a motel manager needs to raise the \$40.00 room rate by 22%. What will be the new rate?
 F. \$40.22
 G. \$42.20
 H. \$48.00
 J. \$48.80
 K. \$62.00
3. As a salesperson, your commission is directly proportional to the dollar amount of sales you make. If your sales are \$800, your commission is \$112. How much commission would you earn if you had \$1,400 in sales?
 A. \$210
 B. \$196
 C. \$175
 D. \$128
 E. \$ 64

4. If $7 + 3x = 22$, then $2x = ?$

- F. 5
 G. 10
 H. 12
 J. 14
 K. $\frac{58}{3}$

5. The total cost of renting a car is \$30.00 for each day the car is rented plus $28\frac{1}{2}\text{¢}$ for each mile the car is driven. What is the total cost of renting the car for 5 days and driving 350 miles?

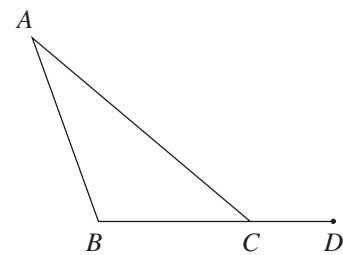
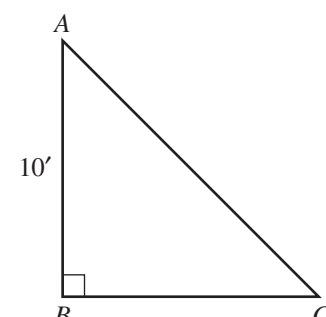
(Note: No sales tax is involved.)

- A. \$ 104.75
 B. \$ 159.98
 C. \$ 249.75
 D. \$ 300.00
 E. \$1,147.50

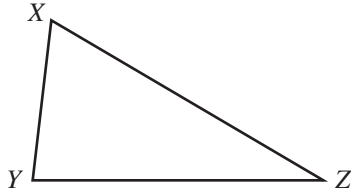
6. In any parallelogram $ABCD$, it is always true that the measures of $\angle ABC$ and $\angle BCD$:

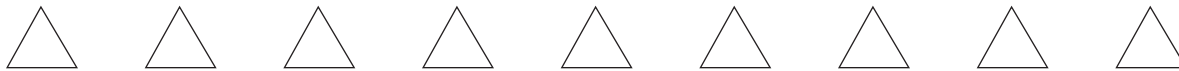
- F. add up to 180° .
 G. add up to 90° .
 H. are each greater than 90° .
 J. are each 90° .
 K. are each less than 90° .



7. What is the least common denominator for adding the fractions $\frac{4}{15}$, $\frac{1}{12}$, and $\frac{3}{8}$?
- A. 40
B. 120
C. 180
D. 480
E. 1,440
8. The product $(2x^4y)(3x^5y^8)$ is equivalent to:
- F. $5x^9y^9$
G. $6x^9y^8$
H. $6x^9y^9$
J. $5x^{20}y^8$
K. $6x^{20}y^8$
9. It costs a dollars for an adult ticket to a reggae concert and s dollars for a student ticket. The difference between the cost of 12 adult tickets and 18 student tickets is \$36. Which of the following equations represents this relationship between a and s ?
- A. $\frac{12a}{18s} = 36$
B. $216as = 36$
C. $|12a - 18s| = 36$
D. $|12a + 18s| = 36$
E. $|18a + 12s| = 36$
10. If $x > 1$, then which of the following has the LEAST value?
- F. \sqrt{x}
G. $\sqrt{2x}$
H. $\sqrt{x \cdot x}$
J. $x\sqrt{x}$
K. $x \cdot x$
11. Charles defined a new operation, \blacklozenge , on pairs of ordered pairs of integers as follows: $(a,b) \blacklozenge (c,d) = \frac{ac + bd}{ab - cd}$. What is the value of $(2,1) \blacklozenge (3,4)$?
- A. -2
B. -1
C. 2
D. 5
E. 10
12. In the figure below, $\angle BAC$ measures 30° , $\angle ABC$ measures 110° , and points B , C , and D are collinear. What is the measure of $\angle ACD$?
- 
- F. 150°
G. 140°
H. 130°
J. 120°
K. 110°
13. In the isosceles right triangle below, $AB = 10$ feet. What is the length, in feet, of \overline{AC} ?
- 
- A. 5
B. 10
C. 20
D. $\sqrt{20}$
E. $10\sqrt{2}$
14. In a bag of 400 jelly beans, 25% of the jelly beans are red in color. If you randomly pick a jelly bean from the bag, what is the probability that the jelly bean picked is NOT one of the red jelly beans?
- F. $\frac{1}{2}$
G. $\frac{1}{4}$
H. $\frac{3}{4}$
J. $\frac{1}{16}$
K. $\frac{15}{16}$



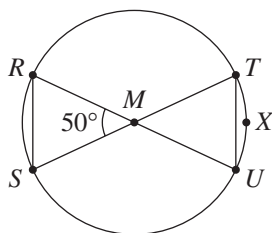
15. What polynomial must be added to $x^2 - 2x + 6$ so that the sum is $3x^2 + 7x$?
- A. $4x^2 + 5x + 6$
 B. $3x^2 + 9x + 6$
 C. $3x^2 + 9x - 6$
 D. $2x^2 + 9x - 6$
 E. $2x^2 - 5x + 6$
16. What is the slope of any line parallel to the line $8x + 9y = 3$ in the standard (x,y) coordinate plane?
- F. -8
 G. $-\frac{8}{9}$
 H. $\frac{8}{3}$
 J. 3
 K. 8
17. In the standard (x,y) coordinate plane, a line segment has its endpoints at $(3,6)$ and $(9,4)$. What are the coordinates of the midpoint of the line segment?
- A. $(3,-1)$
 B. $(3, 1)$
 C. $(6, 2)$
 D. $(6, 5)$
 E. $(12,10)$
18. When $y = x^2$, which of the following expressions is equivalent to $-y$?
- F. $(-x)^2$
 G. $-x^2$
 H. $-x$
 J. x^{-2}
 K. x
19. For the function $h(x) = 4x^2 - 5x$, what is the value of $h(-3)$?
- A. -93
 B. -9
 C. 21
 D. 51
 E. 159
20. For all triangles $\triangle XYZ$ where side \overline{XZ} is longer than side \overline{YZ} , such as the triangle shown below, which of the following statements is true?
- 
- F. The measure of $\angle X$ is always less than the measure of $\angle Y$.
 G. The measure of $\angle X$ is always equal to the measure of $\angle Y$.
 H. The measure of $\angle X$ is always greater than the measure of $\angle Y$.
 J. The measure of $\angle X$ is sometimes less than the measure of $\angle Y$ and sometimes equal to the measure of $\angle Y$.
 K. The measure of $\angle X$ is sometimes greater than the measure of $\angle Y$ and sometimes equal to the measure of $\angle Y$.
21. $|7(-3) + 2(4)| = ?$
- A. -28
 B. -13
 C. 13
 D. 28
 E. 29
22. If $x > |y|$, which of the following is the solution statement for x when $y = -4$?
- F. x is any real number.
 G. $x > 4$
 H. $x < 4$
 J. $-4 < x < 4$
 K. $x > 4$ or $x < -4$
23. The perimeter of a parallelogram is 72 inches, and 1 side measures 12 inches. What are the lengths, in inches, of the other 3 sides?
- A. 12, 12, 36
 B. 12, 18, 18
 C. 12, 24, 24
 D. 12, 30, 30
 E. Cannot be determined from the given information
24. The lengths of the corresponding sides of 2 similar right triangles are in the ratio of 2:5. If the hypotenuse of the smaller triangle is 5 inches long, how many inches long is the hypotenuse of the larger triangle?
- F. 2
 G. 2.5
 H. 7
 J. 10
 K. 12.5



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

- A. $(6, 0)$
- B. $(4\frac{1}{2}, 1\frac{1}{2})$
- C. $(1, 2)$
- D. $(0, -2)$
- E. $(-3, 0)$

26. In the circle shown below, M is the center and lies on \overline{RU} and \overline{ST} . Which of the following statements is NOT true?



- F. $\angle TUM$ measures 65°
- G. \overline{TU} is parallel to \overline{RS}
- H. \widehat{TXU} measures 50°
- J. $\overline{RM} \cong \overline{TM}$
- K. $\overline{RS} \cong \overline{SM}$

27. John Jones has decided to go into the business of producing and selling boats. In order to begin this venture, he must invest \$10 million in a boat production plant. The cost to produce each boat will be \$7,000, and the selling price will be \$20,000. Accounting for the cost of the production plant, which of the following expressions represents the profit, in dollars, that John will realize when x boats are produced and sold?

- A. $13,000x - 10,000,000$
- B. $27,000x - 10,000,000$
- C. $9,973,000x$
- D. $20,000x$
- E. $13,000x$

28. If $2x^2 + 6x = 36$, what are the possible values of x ?

- F. -12 and 3
- G. -6 and 3
- H. -3 and 6
- J. -3 and 12
- K. 12 and 15

29. As a class experiment, a cart was rolled at a constant rate along a straight line. Shawn recorded in the chart below the cart's distance (x), in feet, from a reference point at the start of the experiment and for each of 5 times (t), in seconds.

t	0	1	2	3	4	5
x	10	14	18	22	26	30

Which of the following equations represents this data?

- A. $x = t + 10$
- B. $x = 4t + 6$
- C. $x = 4t + 10$
- D. $x = 10t + 4$
- E. $x = 14t$

30. To increase the mean of 4 numbers by 2, by how much would the sum of the 4 numbers have to increase?

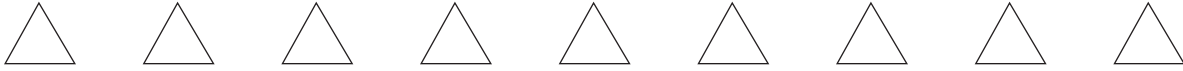
- F. 2
- G. 4
- H. 6
- J. 8
- K. 16

31. Meg pounded a stake into the ground. When she attached a leash to both the stake and her dog's collar, the dog could reach 9 feet from the stake in any direction. Using 3.14 for π , what is the approximate area of the lawn, in square feet, the dog could reach from the stake?

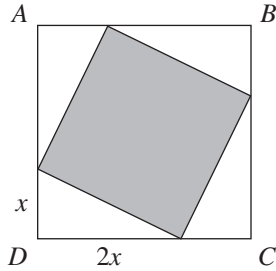
- A. 28
- B. 57
- C. 113
- D. 254
- E. 283

32. Television screen sizes are the diagonal length of the rectangular screen. Hector recently changed from watching a television with a 13-inch screen to a television with a similar 19-inch screen. If a boxcar appeared 8 inches long on the 13-inch screen, how long, to the nearest inch, will it appear on the 19-inch screen?

- F. 10
- G. 12
- H. 14
- J. 16
- K. 18

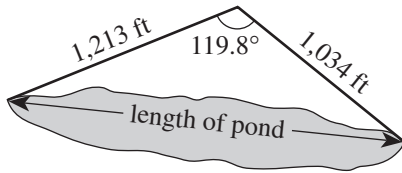


33. In the figure below, $ABCD$ is a square. Points are chosen on each pair of adjacent sides of $ABCD$ to form 4 congruent right triangles, as shown below. Each of these has one leg that is twice as long as the other leg. What fraction of the area of square $ABCD$ is shaded?



- A. $\frac{1}{9}$
- B. $\frac{2}{9}$
- C. $\frac{4}{9}$
- D. $\frac{5}{9}$
- E. $\frac{8}{9}$

34. A surveyor took and recorded the measurements shown in the figure below. If the surveyor wants to use these 3 measurements to calculate the length of the pond, which of the following would be the most directly applicable?



- F. The Pythagorean theorem
- G. A formula for the area of a triangle
- H. The ratios for the side lengths of 30° - 60° - 90° triangles
- J. The ratios for the side lengths of 45° - 45° - 90° triangles
- K. The law of cosines: For any $\triangle ABC$, where a is the length of the side opposite $\angle A$, b is the length of the side opposite $\angle B$, and c is the length of the side opposite $\angle C$, $a^2 = b^2 + c^2 - 2bc \cos(\angle A)$

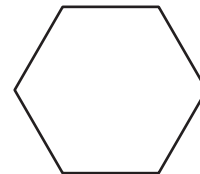
35. Which of the following is the graph of the equation $2x + y = 4$ in the standard (x,y) coordinate plane?

- A.
- B.
- C.
- D.
- E.

36. Which of the following figures in a plane separates it into half-planes?

- F. A line
- G. A ray
- H. An angle
- J. A point
- K. A line segment

37. What is the maximum number of distinct diagonals that can be drawn in the hexagon shown below?

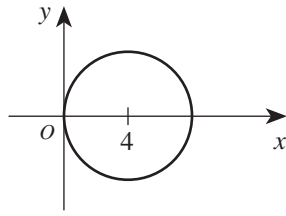


- A. 4
- B. 5
- C. 6
- D. 9
- E. 12



38. In the standard (x,y) coordinate plane, the center of the circle shown below lies on the x -axis at $x = 4$. If the circle is tangent to the y -axis, which of the following is an equation of the circle?

- F. $(x + 4)^2 + y^2 = 4$
 G. $(x - 4)^2 + y^2 = 16$
 H. $(x - 4)^2 - y^2 = 16$
 J. $(x - 4)^2 + y^2 = 4$
 K. $x^2 + (y - 4)^2 = 16$

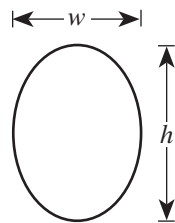


39. In what order should $\frac{5}{3}$, $\frac{7}{4}$, $\frac{6}{5}$, and $\frac{9}{8}$ be listed to be arranged by increasing size?

- A. $\frac{9}{8} < \frac{6}{5} < \frac{5}{3} < \frac{7}{4}$
 B. $\frac{9}{8} < \frac{6}{5} < \frac{7}{4} < \frac{5}{3}$
 C. $\frac{7}{4} < \frac{5}{3} < \frac{9}{8} < \frac{6}{5}$
 D. $\frac{6}{5} < \frac{9}{8} < \frac{5}{3} < \frac{7}{4}$
 E. $\frac{5}{3} < \frac{6}{5} < \frac{7}{4} < \frac{9}{8}$

40. Mai is putting gold foil around the outside of an elliptical picture frame. The perimeter of an ellipse is given by the formula $p = \frac{\pi}{2} \sqrt{2(h^2 + w^2)}$, where h is the height and w is the width, as shown in the diagram below. If an elliptical frame has an outside height equal to 4 inches and an outside width equal to 3 inches, what is its outside perimeter, in inches?

- F. $\frac{5}{2} \pi \sqrt{2}$
 G. $\frac{7}{2} \pi \sqrt{2}$
 H. $5\pi \sqrt{2}$
 J. $\frac{\pi}{2} (4\sqrt{2} + 3)$
 K. $(4\pi + 3)\sqrt{2}$



41. If $\frac{A}{30} + \frac{B}{105} = \frac{7A+2B}{x}$ and A , B , and x are integers greater than 1, then what must x equal?

- A. 9
 B. 135
 C. 210
 D. 630
 E. 3,150

Use the following information to answer questions 42–44.

Kaylee is planning to purchase a car. She will need to borrow some of the money and has a chart, shown below, to use to approximate her monthly payment. The chart gives the approximate monthly payment per \$1,000 borrowed.

Monthly payment per \$1,000 borrowed for various annual rates and various numbers of payments			
Annual interest rate	Number of monthly payments		
	36	48	60
5%	\$29.97	\$23.03	\$18.87
8%	\$31.34	\$24.41	\$20.28
10%	\$32.27	\$25.36	\$21.24
12%	\$33.22	\$26.34	\$22.24

42. Kaylee found a used car she is thinking about purchasing. The list price is \$8,795. She calculates that she will need to borrow \$6,500. Approximately what would her monthly payment be if she borrowed the money for 36 months at an annual interest rate of 10%?

- F. \$164.84
 G. \$171.21
 H. \$209.76
 J. \$234.72
 K. \$283.81

43. A local dealership is having an end-of-the-model-year clearance sale and is offering 5% annual interest on new-car loans for 36, 48, or 60 months. The maximum amount Kaylee can budget for her monthly car payment is \$300. Of the following loan amounts, which one is the maximum Kaylee can borrow at 5% annual interest and stay within her budget?

- A. \$10,000
 B. \$13,000
 C. \$14,000
 D. \$15,000
 E. \$20,000

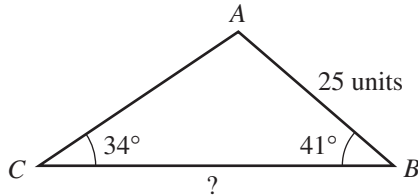
44. Another dealership is offering 5-year loans with a 9% annual interest rate. Kaylee uses her chart to estimate the payment per \$1,000 borrowed. Of the following, which is most likely the monthly payment per \$1,000 borrowed?

- F. \$20.52
 G. \$20.76
 H. \$20.85
 J. \$21.00
 K. \$21.74



45. In $\triangle ABC$, shown below, the measure of $\angle B$ is 41° , the measure of $\angle C$ is 34° , and \overline{AB} is 25 units long. Which of the following is an expression for the length, in units, of \overline{BC} ?

(Note: The law of sines states that, for any triangle, the ratios of the sines of the interior angles to the lengths of the sides opposite those angles are equal.)

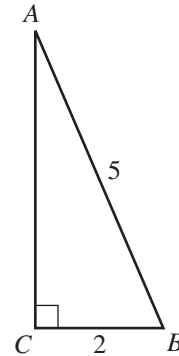


- A. $\frac{25 \sin 105^\circ}{\sin 41^\circ}$
 B. $\frac{25 \sin 105^\circ}{\sin 34^\circ}$
 C. $\frac{25 \sin 75^\circ}{\sin 41^\circ}$
 D. $\frac{25 \sin 41^\circ}{\sin 105^\circ}$
 E. $\frac{25 \sin 34^\circ}{\sin 75^\circ}$
46. For $i^2 = -1$, $(4 + i)^2 = ?$
 F. 15
 G. 17
 H. $15 + 4i$
 J. $15 + 8i$
 K. $16 + 4i$
47. If r and s can be any integers such that $s > 10$ and $2r + s = 15$, which of the following is the solution set for r ?
 A. $r \geq 3$
 B. $r \geq 0$
 C. $r \geq 2$
 D. $r \leq 0$
 E. $r \leq 2$
48. Which of the following expressions has a positive value for all x and y such that $x > 0$ and $y < 0$?
 F. $y - x$
 G. $x + y$
 H. x^3y
 J. $\frac{x^2}{y}$
 K. $\frac{x}{y^2}$

49. What is the value of $\log_2 8$?

- A. 3
 B. 4
 C. 6
 D. 10
 E. 16

50. In the right triangle below, the measure of $\angle C$ is 90° , $AB = 5$ units, and $CB = 2$ units. What is $\tan B$?

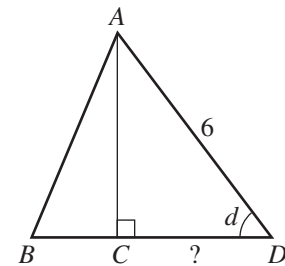


- F. $\frac{\sqrt{21}}{2}$
 G. $\frac{3}{2}$
 H. $\frac{\sqrt{21}}{5}$
 J. $\frac{3}{5}$
 K. $\frac{2}{5}$

51. A flight instructor charges \$50 per lesson, plus an additional fee for the use of his plane. The charge for the use of the plane varies directly with the square root of the time the plane is used. If a lesson plus 16 minutes of plane usage costs \$90, what is the total amount charged for a lesson having 36 minutes of plane usage?

- A. \$185
 B. \$150
 C. \$135
 D. \$110
 E. \$ 60

52. In $\triangle ABD$, shown below, C is on \overline{BD} , the length of \overline{AD} is 6 inches, and $\sin d = 0.8$. How many inches long is \overline{CD} ?



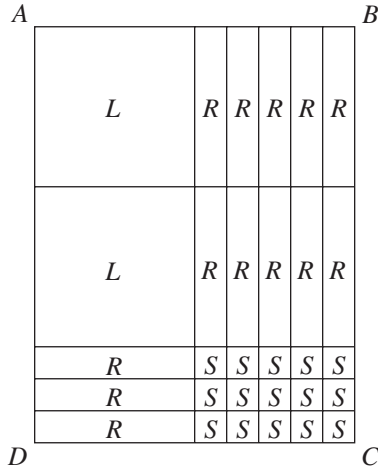
- F. 1.2
 G. 1.8
 H. 3.6
 J. 4.8
 K. Cannot be determined from the given information

53. For real numbers a and b , when is the equation $|a + b| = |a - b|$ true?

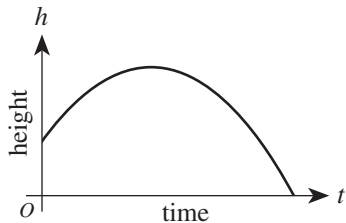
- A. Always
 B. Only when $a = b$
 C. Only when $a = 0$ and $b = 0$
 D. Only when $a = 0$ or $b = 0$
 E. Never



54. As shown below, rectangle $ABCD$ is divided into 2 large squares (labeled L) each x inches on a side, 15 small squares (labeled S) each y inches on a side, and 13 rectangles (labeled R) each x inches by y inches. What is the total area, in square inches, of $ABCD$?



- F. $2x^2 + 13xy + 15y^2$
 G. $6x^2 + 16y^2$
 H. $2x^2 + 15y^2$
 J. $2x^2 + 8xy + 15y^2$
 K. $2x^2 + 13xy + 15y^2$
55. For some real number A , the graph of the line $y = (A + 1)x + 8$ in the standard (x,y) coordinate plane passes through $(2,6)$. What is the slope of this line?
- A. -4
 B. -3
 C. -1
 D. 3
 E. 7
56. The graph of the equation $h = -at^2 + bt + c$, which describes how the height, h , of a hit baseball changes over time, t , is shown below.



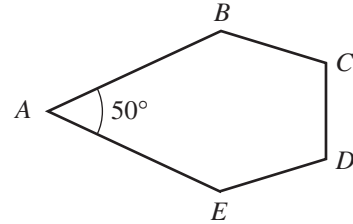
If you alter only this equation's c term, which gives the height at time $t = 0$, the alteration has an effect on which of the following?

- I. The h -intercept
 II. The maximum value of h
 III. The t -intercept
- F. I only
 G. II only
 H. III only
 J. I and III only
 K. I, II, and III

57. When graphed in the standard (x,y) coordinate plane, the lines $x = -3$ and $y = x - 3$ intersect at what point?

- A. $(0, 0)$
 B. $(0, -3)$
 C. $(-3, 0)$
 D. $(-3, -3)$
 E. $(-3, -6)$

58. In pentagon $ABCDE$, shown below, $\angle A$ measures 50° . What is the total measure of the other 4 interior angles?



- F. 130°
 G. 200°
 H. 310°
 J. 432°
 K. 490°

59. For all real numbers b and c such that the product of c and 3 is b , which of the following expressions represents the sum of c and 3 in terms of b ?

- A. $b + 3$
 B. $3b + 3$
 C. $3(b + 3)$
 D. $\frac{b+3}{3}$
 E. $\frac{b}{3} + 3$

60. Which of the following expresses the number of meters a contestant must travel in a 3-lap race where the course is a circle of radius R meters?

- F. $3R$
 G. $3\pi R$
 H. $3\pi R^2$
 J. $6R$
 K. $6\pi R$

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 title story of *Only the Little Bone*, a collection of short stories by David Huddle (©1986 by David Huddle).

My grandfather has made crutches for me. These are sturdy crutches, just the right size. I am delighted with them and launch myself around the house on them.

And take a fall immediately. And continue falling several times a day, great splatting, knocking-into-furniture-and-breaking-things falls that cause everyone in the family to come running. My grandfather has forgotten to put rubber tips on the ends of my crutches. When we figure this out and buy the rubber tips and put them on the crutches, I stop falling. But by then the bone-set that was coming along nicely has slipped, and the doctor has ordered me back to the wheelchair.

The missing crutch-tips are the first clue I have to this peculiar family trait, one that for lack of any better term I must call “flawed competence.” We Bryants are a family of able and clever people, industrious, intelligent, determined, and of good will. We are careful in our work. After all, my grandfather measured me on two occasions before he made the crutches. But we usually do something wrong.

Four years later I become increasingly aware of “flawed competence” when I develop a plan for converting our old grown-over tennis court into a basketball court. My grandfather is always interested in plans, and in this planning session, we decide that he will make the hoops, and he will help me make the backboards. Clearing the ground and smoothing the surface will be my tasks. So I rip out honeysuckle and hatchet down a few little scrub cedars. We Bryants are known for setting our minds to things.

Then my grandfather delivers the hoops. They are beautifully designed and constructed, metalwork of a high order for such amateurs as my grandfather and his men. But the hoops are twice as big around as ordinary basketball hoops.

I say, simply, that they are too big. I am not ungrateful, not trying to be hateful, not in my opinion being overly fastidious. I am simply describing a char-

acteristic of the hoops. But my grandfather’s feelings are damaged. No, they can’t be made smaller, and no, he’s not interested in helping me with the backboards now or with any other part of my plan. He’s sorry he got involved in the first place. This, too, is a corollary of “flawed competence.” We are sensitive, especially about our work, especially about the flawed part of our work.

At the place where I work twenty-eight years after the basketball hoops, I am given a new office, one with a view of the lake. There’s a string attached, though, and that is that I have to build my own bookcases. I commence planning with enthusiasm. That’s another, less harmful family trait, that attraction to making plans. I measure, I look at other people’s shelves, I get someone to help me attach brackets to my office walls.

It is while I am cutting a notch in one of the uprights to allow access to the light-switch that I suddenly think of my grandfather and those basketball hoops. I feel a light sweat break out on my forehead. A pattern of genetic fate reveals itself to me: I’m going to mess up these bookshelves just as my grandfather before me would have messed them up. No doubt I’m sawing the notch in the wrong place.

The whole time I work I wait to see where the screw-up is going to come. I imagine what my colleagues will be saying about me in the hallways. Did you know that Bryant built his shelves so they tilt? Did you know that Bryant’s books rejected the color he painted his shelves? But the screw-up doesn’t appear. I paint the shelves red, and they look O.K. (Granddaddy Bryant once painted yellow a whole row of company houses he built.) I paint a chair blue and red, and it’s a little silly-looking, but it picks up the blue of the carpet and the red of the shelves. The vision isn’t nearly as impressive as I thought it would be, but then what vision ever is? We plan-makers are accustomed to things turning out not-quite-as-good-as-we-had-in-mind. Our world view includes the “diminished excellence” component. Diminished excellence is a condition of the world and therefore never an occasion for sorrow, whereas flawed competence comes out of character and therefore is frequently the reason for the bowed head, the furrowed brow. Three months later, when I try to turn the heat off in my office, I discover that I have placed one of the shelf uprights too close to

85 the radiator to be able to work the valve. The screw-up was there all along, but in this case I am relieved to find it. I am my grandfather's grandson after all.

1. The passage is written from the point of view of:
 - A. an unidentified narrator observing the relationship over time between a boy and his grandfather.
 - B. two members of the same family discovering their shared trait through joint activities.
 - C. a grown man agonizing over the mixed messages he received as a child from older relatives.
 - D. a boy and the man he becomes considering incidents that illustrate a family trait.
2. Which of the following best describes the author's approach to presenting the story of the narrator's discovery about himself?
 - F. Revealing the narrator's self-awareness about a trait through a blend of personal reflection and scenes from the narrator's youth and adulthood
 - G. Starting immediately with a statement of the discovery in the narrator's voice and continuing with scenes that reveal how the discovery came about
 - H. Describing the physical details of scenes and summarizing their significance in a concluding statement in the narrator's voice
 - J. Using dialogue in the midst of scenes fraught with tension to indicate what the narrator is experiencing internally
3. Each of the three projects described in the passage reveals:
 - A. the increasing antagonism between the grandfather and grandson.
 - B. the errors the narrator makes and the disapproval they bring from others.
 - C. that such incidents set the stage for the Bryant family traits to emerge.
 - D. that the narrator is determined to avoid being ungrateful, hateful, or overly fastidious.
4. The boy's approach to the task of converting the tennis court to a basketball court can best be described as:
 - F. reluctant until his grandfather's plans inspire him.
 - G. enthusiastic until his grandfather's error puts them both in an awkward position.
 - H. apprehensive until he discovers his error is not a devastating one.
 - J. thrilled until he remembers that his grandfather is a poor planner.
5. As he is revealed in the incident of undertaking the construction of the basketball court, the grandfather can best be characterized as:
 - A. confidently optimistic, then childishly defensive.
 - B. charmingly patient, then increasingly accusatory.
 - C. consistently encouraging in spite of setbacks.
 - D. vocally defensive, then quietly apologetic.
6. The question "Did you know that Bryant built his shelves so they tilt?" (lines 65–66) helps establish that the narrator is anxious because:
 - F. his coworkers have discovered his incompetence and have made it the subject of office humor.
 - G. his coworkers resent his having a corner office and punish him with their biting humor.
 - H. he fears his incompetence is so glaring it will make him the object of ridicule among coworkers.
 - J. the tilting bookshelves remind him that, like his grandfather, he cannot hide his mistakes.
7. Information in the second paragraph (lines 4–12) reveals that the family's response to the grandfather's error with the crutches is to:
 - A. find a workable remedy for it.
 - B. lay the blame on the narrator.
 - C. praise him for more successful projects.
 - D. fix what wasn't wrong in the first place.
8. It can most reasonably be inferred from the sixth paragraph (lines 36–46) that the statement that the basketball hoops "can't be made smaller" (line 40) is:
 - F. a fact stated by the grandfather apologetically.
 - G. an opinion stated by the grandfather indignantly.
 - H. a claim the narrator makes to humiliate a relative.
 - J. a conclusion the narrator reaches after hard labor.
9. It can most reasonably be inferred that the narrator's discovery that an error has been made in constructing the bookshelves is for him a source of:
 - A. embarrassment in the face of coworkers who anticipated it.
 - B. comfort because it reveals a trait that he shares with his family.
 - C. frustration because it will require a remedy that will be tedious to carry out.
 - D. relief because it gives him an excuse to seek the assistance of coworkers in finishing the project.
10. In the last paragraph, a comparison is made between "diminished excellence" and "flawed competence." From the narrator's point of view, the conditions are different because the one is:
 - F. a source of sorrow while the other is a source of pride.
 - G. based in the family while the other is based in the self.
 - H. inherent in the environment while the other is inherent in the individual.
 - J. a sign that the individual can improve the world while the other is a sign that the individual can't.

Passage II

SOCIAL SCIENCE: This passage is adapted from Dava Sobel's book *Longitude* (©1995 by Dava Sobel).

To learn one's longitude at sea, one needs to know what time it is aboard ship and also the time at the home port or another place of known longitude—at that very same moment. The two clock times enable the navigator to convert the hour difference into a geographical separation. Since the Earth takes twenty-four hours to complete one full revolution of three hundred sixty degrees, one hour marks one twenty-fourth of a spin, or fifteen degrees. And so each hour's time difference between the ship and the starting point marks a progress of fifteen degrees of longitude to the east or west. Every day at sea, when the navigator resets the ship's clock to local noon when the sun reaches its highest point in the sky, and then consults the home-port clock, every hour's discrepancy between them translates into another fifteen degrees of longitude.

Those same fifteen degrees of longitude also correspond to a distance traveled. At the Equator, where the girth of the Earth is greatest, fifteen degrees stretch fully one thousand miles. North or south of that line, however, the mileage value of each degree decreases. One degree of longitude equals four minutes of time the world over, but in terms of distance, one degree shrinks from sixty-eight miles at the Equator to virtually nothing at the poles.

Precise knowledge of the hour in two different places at once—a longitude prerequisite so easily accessible today from any pair of cheap wristwatches—was utterly unattainable up to and including the era of pendulum clocks. On the deck of a rolling ship, such clocks would slow down, or speed up, or stop running altogether. Normal changes in temperature encountered en route from a cold country of origin to a tropical trade zone thinned or thickened a clock's lubricating oil and made its metal parts expand or contract with equally disastrous results. A rise or fall in barometric pressure, or the subtle variations in the Earth's gravity from one latitude to another, could also cause a clock to gain or lose time.

For lack of a practical method of determining longitude, every great captain in the Age of Exploration became lost at sea despite the best available charts and compasses. Untold numbers of sailors died when their destinations suddenly loomed out of the sea and took them by surprise. In a single such accident on October 22, 1707, at the Scilly Isles near the southwestern tip of England, nearly two thousand men lost their lives.

The quest for a solution to the problem of longitude persisted over four centuries and across the whole continent of Europe. The British Parliament, in its famed Longitude Act of 1714, set the highest bounty of all, naming a prize equal to several million dollars in today's currency for a "Practicable and Useful" means of determining longitude.

English clockmaker John Harrison, a mechanical genius who pioneered the science of portable precision timekeeping, devoted his life to this quest. He accomplished what Newton had feared impossible: He invented a clock that would carry the true time from the home port, like an eternal flame, to any remote corner of the world.

With no formal education or apprenticeship to any watchmaker, Harrison nevertheless constructed a series of virtually friction-free clocks that required no lubrication and no cleaning, that were made from materials impervious to rust, and that kept their moving parts perfectly balanced in relation to one another, regardless of how the world pitched or tossed about them. He did away with the pendulum, and he combined different metals inside his works in such a way that when one component expanded or contracted with changes in temperature, the other counteracted the change and kept the clock's rate constant.

His every success, however, was parried by members of the scientific elite, who distrusted Harrison's magic box. The commissioners charged with awarding the longitude prize changed the contest rules whenever they saw fit, so as to favor the chances of astronomers over the likes of Harrison and his fellow "mechanics." But the utility and accuracy of Harrison's approach triumphed in the end. In 1773 he claimed his rightful reward. His followers shepherded Harrison's intricate, exquisite invention through the design modifications that enabled it to be mass produced and enjoy wide use.

To retrace this story in an age when a network of satellites can nail down a ship's position within a few feet in just a moment or two—is to see the globe anew.

11. The function of the first paragraph in relation to the passage as a whole is to:
- orient the reader to the subject of longitude by explaining how longitude is determined at sea.
 - explain the political significance of developing an accurate way of determining longitude.
 - establish that longitude calculations are necessary to determine time in two different places at once.
 - introduce a discussion of how knowledge of Earth's position relative to the Sun was gained in the process of advances in timekeeping.

12. Which of the following best describes the way the fifth paragraph (lines 48–54) functions in the passage as a whole?
- F. It puts into historical perspective the difficulty of solving the longitude problem and introduces the subject of Britain’s longitude prize.
 - G. It translates the technical terminology used elsewhere in the passage into language that is more widely understood.
 - H. It sheds light on why it took longer for a solution to the longitude problem to emerge in Europe than in other parts of the world.
 - J. It diminishes the importance of the lives that were lost in the efforts to solve the longitude problem.
13. It can reasonably be inferred from the passage that before Harrison’s efforts, other individuals trying to solve the longitude problem had failed to:
- A. consider clocks as the potential instrument of calculation.
 - B. agree on why longitude decreases in value at increasing distances from Earth’s equator.
 - C. improve upon the features of clocks that made them unreliable at sea.
 - D. understand the ways that charts and compasses could be used in connection with timepieces to calculate longitude.
14. The reference to the catastrophe at Scilly (lines 45–47) is used to illustrate the point made in the passage that:
- F. charts and compasses were poorly made in the 1700s.
 - G. England more than other countries stood to gain from a solution to the problem of determining longitude.
 - H. captains were contributing to the problem of lost lives by resisting a solution to the problem of determining longitude.
 - J. Harrison’s accomplishments addressed shortcomings of navigation whose consequences were vast in scale.
15. Information in the second paragraph (lines 17–25) establishes that one degree of longitude translates into a distance of:
- A. sixty-eight miles at Earth’s equator but less on either side of Earth’s equator.
 - B. sixty-eight miles at Earth’s equator but more on either side of Earth’s equator.
 - C. one thousand miles the world over.
 - D. virtually nothing at Earth’s equator, increasing to a maximum of sixty-eight miles at the poles.
16. Which of the following statements best describes the metals used in Harrison’s clock?
- F. The metals were identical so that they would respond consistently to changes in conditions at sea.
 - G. The metals were different so that their changes in response to conditions at sea would counteract each other.
 - H. The metals that remained stable in response to temperature changes were encased in metals that were impervious to rust.
 - J. The metals expanded and contracted in ways that were counteracted by changes in the parts made of wood.
17. The passage suggests that Harrison’s principal competitors in the race to develop a means of determining longitude were:
- A. the great captains in the Age of Exploration.
 - B. members of the British Parliament.
 - C. trained clockmakers with formal educations.
 - D. individuals in the scientific community.
18. According to the passage, there was a delay between the time when Harrison arrived at a solution to the problem of longitude and when he received his reward because his:
- F. invention predated the Longitude Act of 1714.
 - G. clock was only one of many successful solutions to emerge simultaneously.
 - H. opponents obstructed his efforts to claim the prize money.
 - J. supporters abandoned him in order to exploit his invention for their own financial gain.
19. Lines 82–84 indicate that others took over Harrison’s work in order to:
- A. secure a wider range of applications for an instrument that had been used only at sea.
 - B. take credit for his remarkable accomplishments.
 - C. diminish the significance of his clock by having it mass-produced.
 - D. turn his design into one that could be practically produced for more users.
20. The passage indicates that instruments for determining longitude now include:
- F. modified pendulum clocks.
 - G. satellites.
 - H. a network of ships.
 - J. barometers.

Passage III

HUMANITIES: This passage is adapted from the essay “Albany, 1958” by Lydia Minatoya. It appeared in her book *Talking to High Monks in the Snow* (©1992 by Lydia Minatoya). This story takes place in Albany, New York.

The meter of my childhood was the rising and plunging of a sewing machine needle: rapid and smooth, like an endless distant drum roll. My mother hummed as she sewed. She guided the fabric this way and that. In 1938, she had graduated from a school of costume design, and before World War II, she had her own boutique in Los Angeles. It was a time when the dream of America never seemed finer.

The Albany of my childhood was a festive place, closer in spirit to the nineteenth century than to the twenty-first. Italian pushcart grocers crowded southern city blocks, crafting tiered architectural wonders from fresh produce and pungent sausage. Heavy-legged workhorses clopped along cobblestones, delivering bread from German bakeries and milk from Dutch dairies. A cable car ran along streets named for trees.

Each year in early April, an annual dinner-dance was sponsored by the pharmaceutical institute where my father worked as a researcher. A ballroom was rented in a downtown hotel. Musicians were hired to play big-band music. The dinner-dance was the only time when my mother would sew for herself. It was the one time when my parents went out, alone, together. I was a romantic child, dreamy and diffuse. For me, the dinner-dance was an annual event: looked forward to in long anticipation and back upon with nostalgia.

Each year, on a snowy weekday evening, Father would take us window shopping. The deserted downtown streets would be a magical glaze of snow-softened lights and shadowy shop displays. My mother would linger in front of the mannequins clad in evening apparel. I would follow along, drunk with wonder.

Each year before the tape had desiccated on the backs of the New Year’s cards and they had fallen to the floor, my mother would have decided on the design for her dinner-dance dress. Then there would be a trip to the fabric store. I would run my hands along graduated rainbows of thread spools. I would watch their changing hues as they shimmered in the light.

As the dress took form, my parents would practice dancing.

“Slow, slow, quick, quick, slow,” Father would mutter with determination as he trod unmincingly on Okaa-chan’s feet and guided her into the walls.

“Next lady?” he gallantly would inquire. My sister Misa and I would take turns, balancing on the tops of his shoes, as Father swept us around the room.

I always thought that Dinner-Dance Eve had some of the magic of Christmas. Every year, I would perch

on the bathtub’s edge. I would watch my father fix his tie. “See the nice dimple below the knot?” Father would turn from the mirror and bend to show me. “The dimple is very important.” I solemnly would nod—the honored recipient of this arcane cultural wisdom.

Back in the bedroom, Okaa-chan would slide into her new dress. She would glance at her reflection with modest pleasure. When she moved, I could catch the sweet scent of face powder.

When I was seven or eight, the window shopping and the dinner-dances stopped. The granite façades of the downtown stores were grimy with graffiti. Display windows were boarded with plywood. The elegant hotels had fallen into disrepair. No one danced to big-band music anymore.

As I grew older, my mother began to sew for wealthy women. The women lived in country homes where sunlight, reflected from swimming pools just beyond French doors, played across fine wood floors.

Once after a luncheon in the city, a woman came to our house for a fitting. Standing erect in the doorway, then bowing slightly, my mother met her formally.

“Won’t you please come in? May I please take your coat?”

“Here you go. Try to put it somewhere clean.”

Like an eagle, her words slipped regally down a great distance and struck with awful ease.

After the fitting, my father was ashamed and angry.

“Actually, I do not like this work,” he stormed. “You do not have to do this; we do not need this kind of money.” He waved his arms dismissively at Okaa-chan’s sewing machine. “They come and look at our home with contempt. You kneel at their hems like a servant! *Mo dame desu yo!* It is no good, I tell you!”

Okaa-chan was intractable. Eloquent in anger, she blazed over the pronunciation of words that ordinarily would have left pondering pauses in her speech. “I do not care what they think of me, of our home. They cannot affect our value.” My mother stepped in front of her sewing machine, as if to shield it from scorn. “My work gives me happiness.” She squarely faced my father. “I do not care if you speak as Husband,” she said. “I am a Designer!”

21. As it is described in the passage, sewing seems most closely associated in the narrator’s mind with her mother’s:

- A. low wages.
- B. compassion.
- C. self-worth.
- D. thriftiness.

22. It is reasonable to infer from the passage that the narrator looks back on the dinner-dances as a time when:
- F. her parents were in conflict over her mother's work.
 - G. the entire family was filled with excitement and anticipation.
 - H. she and her father had a much easier relationship with each other.
 - J. her mother and father had renewed hope for the future of the family.
23. It is reasonable to infer that the primary reason the author included the information in the eleventh paragraph (lines 59–64) is to:
- A. contrast it with the earlier description of the family looking at shop displays on a snowy evening.
 - B. support the information about the trip to the fabric store, which is presented earlier.
 - C. compare it with the scene where the father dances with his wife and daughters.
 - D. contrast it with the scene presented in the last two paragraphs (lines 78–92).
24. The primary focus of lines 65–92 is:
- F. the relationship between the narrator and her mother.
 - G. Okaa-chan's strength and integrity.
 - H. Albany's move toward the twenty-first century.
 - J. the narrator's father's stubbornness.
25. When the narrator says, "I solemnly would nod—the honored recipient of this arcane cultural wisdom" (lines 53–54), she most likely means that:
- A. she felt intimidated when her father was giving her information that she did not understand.
 - B. her father was honored to be able to share personal information with his daughter.
 - C. when her father put on his tie, she pretended to be honored, even though she thought his comment was silly.
 - D. the information her father was giving her seemed important and made her feel valued.
26. The sentence "Like an eagle, her words slipped regally down a great distance and struck with awful ease" (lines 75–76) indicates that the narrator:
- F. was not sure what her mother expected of her.
 - G. recognized that her mother was being demeaned.
 - H. wanted to distance herself from her mother.
 - J. was ill at ease with her position in the family.
27. Information in the passage suggests that the narrator's father disapproves of Okaa-chan's sewing business primarily because it:
- A. diminishes his role as a provider.
 - B. means more to her than he does.
 - C. does not generate enough income.
 - D. threatens his sense of dignity.
28. Based on the last two paragraphs (lines 78–92), which of the following statements indicates what the narrator's father and mother have in common?
- F. They both want control of the family finances.
 - G. They are both fighting for their self-respect.
 - H. They both want to teach a lesson to their children.
 - J. They are both angry at the woman who came for the fitting.
29. The author uses the term "architectural wonders" (line 12) to describe:
- A. nineteenth-century buildings.
 - B. German baked goods.
 - C. crowded city blocks with cobblestone streets.
 - D. arranged layers of fruits, vegetables, and sausages.
30. Which of the following words best describes the narrator's father's dancing as he practices for the dinner-dance with Okaa-chan?
- F. Skillful
 - G. Graceful
 - H. Clumsy
 - J. Indifferent

Passage IV

NATURAL SCIENCE: This passage is adapted from the Preface to neurologist Oliver Sacks's collection of essays *An Anthropologist on Mars* (©1995 by Oliver Sacks).

Nature's imagination, as Freeman Dyson likes to say, is richer than ours, and he speaks, marvellingly, of this richness in the physical and biological worlds, the endless diversity of physical forms and forms of life.
5 For me, as a physician, nature's richness is to be studied in the phenomena of health and disease, in the endless forms of individual adaptation by which human organisms, people, adapt and reconstruct themselves.

Defects, disorders, diseases, in this sense, can play
10 a paradoxical role, by bringing out latent powers, developments, evolutions, forms of life, that might never be seen, or even be imaginable, in their absence. It is the paradox of disease, in this sense, its "creative" potential, that forms the central theme of this book.

15 Thus while one may be horrified by the ravages of developmental disorder or disease, one may sometimes see them as creative too—for if they destroy particular paths, particular ways of doing things, they may force the nervous system into making other paths and ways,
20 force on it an unexpected growth and evolution. This other side of development or disease is something I see, potentially, in almost every patient; and it is this which I am especially concerned to describe.

Similar considerations were brought up by A. R. Luria, who studied the long-term survival of patients who had cerebral tumors or had suffered brain injuries or strokes—and the ways, the adaptations, they used to survive. He also studied deaf and blind children as a very young man (with his mentor L. S. Vygotsky).
30 Vygotsky stressed the intactness rather than the deficits of such children:

A handicapped child represents a qualitatively different, unique type of development. . . . If a blind child or a deaf child achieves the same level of development as a normal child, then the child with a defect achieves this *in another way, by another course, by other means*; and, for the pedagogue, it is particularly important to know the uniqueness of the course along which he must lead the child.
40 This uniqueness transforms the minus of a handicap into the plus of compensation.

That such radical adaptations could occur demanded, Luria thought, a new view of the brain, a sense of it not as programmed and static, but rather as dynamic and
45 active, a supremely efficient adaptive system geared for evolution and change, ceaselessly adapting to the needs of the organism—its need, above all, to construct a coherent self and world, whatever defects or disorders of brain function befell it. That the brain is minutely
50 differentiated is clear: there are hundreds of tiny areas crucial for every aspect of perception and behavior. The miracle is how they all cooperate, are integrated together, in the creation of a self.

This sense of the brain's remarkable capacity for
55 the most striking adaptations, not least in the special (and often desperate) circumstances of neural or sensory mishap, has come to dominate my perception of my patients and their lives. So much so, indeed, that I am sometimes moved to wonder whether it may not be
60 necessary to redefine the very concepts of "health" and "disease," to see these in terms of the ability of the organism to create a new organization and order, one that fits its special, altered disposition and needs, rather than in the terms of a rigidly defined "norm."

65 Sickness implies a contraction of life, but such contractions do not have to occur. Nearly all of my patients, so it seems to me, whatever their problems, reach out to life—and not only despite their conditions, but often because of them, and even with their aid.

70 The study of disease, for the physician, demands the study of identity, the inner worlds that patients, under the spur of illness, create. But the realities of patients, the ways in which they and their brains construct their own worlds, cannot be comprehended
75 wholly from the observation of behavior, from the outside.

With this in mind, I have taken off my white coat, deserted, by and large, the hospitals where I have spent the last twenty-five years, to explore my subjects' lives
80 as they live in the real world, feeling in part like a naturalist, examining rare forms of life; in part like an anthropologist, a neuroanthropologist, in the field—but most of all like a physician, called here and there to make house calls, house calls at the far borders of
85 human experience.

31. The quotation by L. S. Vygotsky in lines 32–41 is used in this passage to support the idea that:

- A. children with handicaps should be studied in the same way as children defined by physicians as "normal."
- B. deficits need to demonstrate intactness in order to be judged acceptable.
- C. neural or sensory mishap occurs in children as well as in adults.
- D. development of children with handicaps may proceed in positive yet quite distinctive ways.

32. The author of the passage refers to the work of A. R. Luria and L. S. Vygotsky primarily to underscore the idea that people who have:

- F. disabilities or developmental disorders learn to create new selves.
- G. disabilities or developmental disorders need special treatment.
- H. unusual handicaps are qualitatively different.
- J. neural mishaps have minutely differentiated brains.

33. Lines 42–53 suggest that, prior to A. R. Luria’s research, medical researchers had thought of the brain as:
- A. dynamic.
 - B. unchanging.
 - C. paradoxical.
 - D. creative.
34. As it is used in line 41, the word *compensation* most nearly means:
- F. payment.
 - G. differentiation.
 - H. disposition.
 - J. adaptation.
35. The author’s main purpose in lines 54–69 is to show:
- A. how he has come to think differently about the brain.
 - B. why sickness often causes a contraction of life.
 - C. when he had made new discoveries about the brain.
 - D. which of his subjects helped him redefine the term “norm.”
36. The author of the passage makes it clear that, when it comes to understanding the effects of a disease on an individual patient, it is necessary for medical doctors to:
- F. adhere to established norms of human behavior in diagnosing and treating disease.
 - G. quickly establish a method of treatment that will save the patient from further suffering.
 - H. examine the ways that people learn to live with a disease in their daily lives.
 - J. know each person’s brain is minutely differentiated and responsible for the disease being studied.
37. The last paragraph suggests that the author’s main reason for leaving the hospital to visit his patients is to allow him to:
- A. feel more like a patient than a physician.
 - B. become a more important part of the real world.
 - C. understand his patients’ illnesses better.
 - D. see if being a naturalist is like being a physician.
38. The paradox mentioned in the second paragraph (lines 9–14) is best described by which of the following statements?
- F. The course of human evolution is guided by the creative potential of the static brain.
 - G. Serious illness can lead directly to previously unthought of yet productive developmental change.
 - H. Sickness may contract life, but in so doing it can maintain the physical “norm” at a similar level.
 - J. The long-term study of disorders and diseases brings out the creative skills of researchers.
39. As it is used in line 15, the word *ravages* most nearly means:
- A. paradoxical features.
 - B. creative adaptations.
 - C. fatal nature.
 - D. destructive actions.
40. The word *miracle* in line 52 refers most specifically to the ways in which:
- F. brain function disorders are cured.
 - G. unique handicaps are compensated for.
 - H. different areas of the brain work together.
 - J. the creative potential of disease is revealed.

END OF TEST 3

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.
DO NOT RETURN TO A PREVIOUS TEST.**



SCIENCE TEST

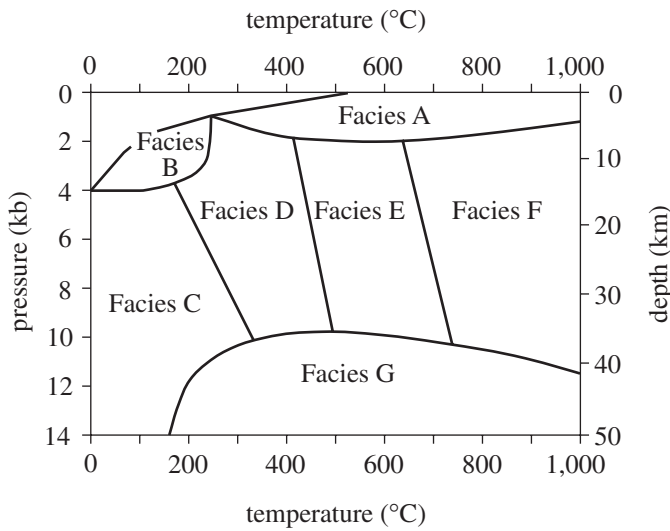
35 Minutes—40 Questions

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

Metamorphic rocks form when temperature and/or pressure cause changes in preexisting rock. Figure 1 shows the temperature and pressure conditions in which certain *facies* (categories of metamorphic rocks) are formed.



(Note: Boundaries are not actually sharp, distinct lines.)

Figure 1

Figure adapted from Sheldon Judson, Marvin Kauffman, and L. Don Leet, *Physical Geology*. ©1982 by Prentice-Hall, Inc.

A rock's *metamorphic grade* (a measure of the intensity of metamorphism) is classified on a scale of low (very similar to the original rock) to high (very different from the original rock). Table 1 lists the grades of Facies A–G from Figure 1. Figure 2 shows characteristic minerals that may be present in rocks of a given grade.

Table 1	
Facies	Metamorphic grade*
A	low
B	low
C	low to medium
D	low to medium
E	medium
F	medium to high
G	high

*Metamorphic grade is a measure of the intensity of metamorphism.

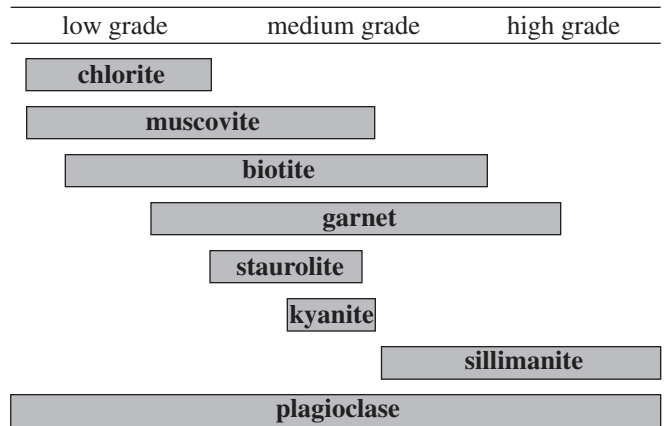


Figure 2

Figure 2 adapted from Frank Press and Raymond Siever, *Earth*. ©1986 by W. H. Freeman and Co.



1. According to Figure 2, which of the following minerals would most typically be found only in rocks of a medium grade?

- A. Muscovite
- B. Biotite
- C. Kyanite
- D. Plagioclase

2. According to Figure 1, a Facies G rock will most likely form under which of the following pressure and temperature conditions?

	<u>Pressure</u>	<u>Temperature</u>
F.	3 kb	800°C
G.	5 kb	400°C
H.	8 kb	1,000°C
J.	11 kb	600°C

3. Figure 1 indicates that as depth increases, pressure:

- A. decreases only.
- B. remains the same.
- C. increases only.
- D. increases, then decreases.

4. According to Figure 2, the presence of which of the following minerals in a metamorphic rock would be *least* helpful in determining that rock's grade?

- F. Chlorite
- G. Muscovite
- H. Staurolite
- J. Plagioclase

5. *Hornfels* is a metamorphic rock formed when *magma* (molten rock) heats sedimentary rocks on Earth's surface. According to Figure 1, hornfels is most likely a member of which of the following facies?

- A. Facies A
- B. Facies C
- C. Facies E
- D. Facies G

**Passage II**

In 1908, an object from outer space devastated 2,000 km² of forest in Siberia. The object was between 10 m and 100 m in diameter and traveled at a maximum speed of 15 km/sec. It exploded at an altitude of 8 km and released energy equivalent to 20 million tons of TNT. Two scientists discuss whether this object was a comet or an asteroid.

Scientist 1

The object was a comet, a body made of ices (such as frozen water or methane) and dust. Most of this cometary material is *volatile* (easily vaporized) and low in density. Friction in Earth's atmosphere heated the comet to a temperature at which it exploded, high above the ground. The majority of the ices and dust were vaporized in the explosion, which explains why no crater was formed at the site and why no large, identifiable fragments of the object were found. An asteroid would not have been completely destroyed. Intact asteroid fragments that reached the ground would have created one or more craters upon impact and left behind recoverable pieces. Evidence shows that the object decelerated rapidly before it exploded. Because of their low density, comets are capable of such rapid deceleration, whereas high-density objects, such as asteroids, are not.

Scientist 2

The object was a stony asteroid. As it entered Earth's atmosphere, its high speed created a large air pressure difference between the area just in front of the asteroid and the area just behind the asteroid. The large pressure difference eventually exceeded the structural strength of the asteroid. The asteroid flattened, decelerated rapidly due to the dramatic increase in its surface area, and fragmented before reaching the ground. This fragmentation would have appeared like an explosion. Calculations show that a comet between 10 m and 100 m in diameter would explode at an altitude much higher than 8 km, but a stony asteroid of that size would fragment at or near an altitude of 8 km. Recovery of large asteroid fragments is difficult due to the area's boggy soil; however, small, glassy fragments were recovered and are believed to be melted and resolidified pieces of the asteroid.

6. Which of the following phrases best describes the major point of difference between the 2 scientists' hypotheses?
- F. The location of the event
 - G. The speed the object was traveling
 - H. The density of Earth's atmosphere
 - J. The type of object that entered Earth's atmosphere
7. According to Scientist 2's viewpoint, compared to the altitude at which a stony asteroid would have exploded in Earth's atmosphere, a comet of similar size would most likely have exploded at:
- A. the same altitude.
 - B. a higher altitude.
 - C. a slightly lower altitude.
 - D. a much lower altitude.
8. Scientist 1's viewpoint indicates that when the materials that compose most of a comet are sufficiently heated, they change to:
- F. solids.
 - G. gases.
 - H. liquids.
 - J. a vacuum.
9. Which of the following statements best describes how Scientist 2 would explain why no large, identifiable fragments of the object have been recovered?
- A. Any large, identifiable fragments that reached the ground have been removed from the area by erosion.
 - B. Any large, identifiable fragments were thrown hundreds of kilometers from the site.
 - C. No large, identifiable fragments of the object reached the ground.
 - D. No large, identifiable fragments of the object have been recovered due to the soil conditions in the area.



10. How would the behavior of the asteroid differ from that described in Scientist 2's viewpoint if the asteroid had not been flattened by the air pressure difference? The asteroid would:
- F. not have entered Earth's atmosphere.
 - G. have struck another planet in the solar system.
 - H. have decelerated more gradually.
 - J. have frozen.
11. Which of the following statements would both scientists most likely use to explain the damage to the forest caused by the object's explosion? Energy from the explosion:
- A. traveled rapidly down to Earth's surface.
 - B. dissipated in the upper atmosphere.
 - C. was released less than 1 km above Earth's surface.
 - D. was released as the object struck Earth's surface.
12. Scientist 1's viewpoint would be *weakened* by which of the following observations about comets, if true?
- F. Comets are composed mainly of frozen materials.
 - G. Comets are much larger than 100 m in diameter.
 - H. Comets often pass close enough to Earth to intersect Earth's atmosphere.
 - J. Comets orbit the Sun.

**Passage III**

The seeds of some plants attract ants with a nutritious structure called an *elaiosome*. The ants carry the seeds to their nests, eat the elaiosomes, and then leave the seeds in a waste pile, where some seeds *germinate* (begin to grow). Three studies were conducted to examine this process.

Study 1

For 2 plant species (A and B), seed mass per seed in milligrams (mg), elaiosome mass per seed (mg), and percentage of seed mass composed of elaiosome were recorded (see Table 1).

Species	Seed mass (mg)	Elaiosome mass per seed (mg)	Percentage of seed mass composed of elaiosome
A	6.8	0.420	6.2
B	14.9	0.924	6.2

Study 2

Three study sites were established in order to determine the rate of seed collection by a single species of ant for the plants used in Study 1. In Site 1, Species A plants were absent; in Site 2, Species B plants were absent. Both plants were absent in Site 3.

Two seed dishes were placed in each site: 1 containing 20 Species A seeds and 1 containing 20 Species B seeds. The dishes were left out for 48 hours and the number of seeds taken from each dish was recorded. The results appear in Table 2.

Site	Plant species absent	Number of seeds removed from seed dishes containing:	
		Species A	Species B
1	A	13	3
2	B	2	12
3	A and B	8	9

Tables 1 and 2 adapted from Brent H. Smith et al., "Frequency-Dependent Seed Dispersal by Ants of Two Deciduous Forest Herbs." ©1989 by the Ecological Society of America.

Study 3

The researchers planted 2,550 seeds from a third species, Species C. They also observed 2,550 Species C seeds that were planted by ants in similar environments. All seeds were observed for 2 years. Table 3 presents the results.

Maturation of Species C seeds	Results from:	
	hand-planted seeds	ant-planted seeds
Seeds that germinated	26	39
Plants alive after 1 year	9	20
Plants alive after 2 years	4	13
Seeds produced per plant after 2 years	2,187	2,163

Table 3 adapted from Frances M. Hanzawa, Andrew J. Beattie, and David C. Culver, "Directed Dispersal: Demographic Analysis of an Ant-Seed Mutualism." ©1988 by The University of Chicago.

13. Based on the results of Study 3, one could generalize that compared to hand-planting of seeds, ant-planting of seeds results in:
- increased seed germination.
 - increased seed production per plant.
 - decreased plant survival after 1 year.
 - decreased plant survival after 2 years.
14. Which of the following variables was controlled in the design of Study 2 ?
- The number of ants in each site
 - The number of seed dishes placed in each site
 - The mass of the elaiosome of each seed
 - The type of seeds taken by the ants in each site
15. According to the results of the studies, Species A and Species B are most similar in that their:
- seed masses are the same.
 - germination rates on ant waste piles are the same.
 - percentages of elaiosome mass per seed are the same.
 - rates of production of seeds after 1 year are the same.



16. In Study 2, Site 3 was used to study the:

- F. preference of a different ant species for the seeds of both plant species.
- G. seed preference of ants in an area in which both plant species were absent.
- H. growth and survival of both plant species in an area where ants were not present.
- J. effects of elaiosome mass on the seed preference of ants.

17. Which of the following is a weakness of the design of Study 2 ?

- A. Some plants were not present at each site.
- B. Some seeds were not present at each site.
- C. The seeds may have been removed from the dishes by animals other than ants.
- D. The plants may have been eaten by animals other than ants.

18. The results of Study 2 suggest that which of the following factors most affects the seed preference of ants?

- F. Seed mass
- G. Elaiosome mass
- H. Percentage of seed mass composed of elaiosome
- J. Abundance of a plant in a given area

**Passage IV**

Some students conducted experiments using different brands of adhesive tape, one kind each of paper and plastic, a board, and a spring scale.

Experiment 1

A student stuck one end of a piece of tape onto the edge of a board that was wrapped with paper. The other end of the tape was clamped to a spring scale, as shown in Figure 1.

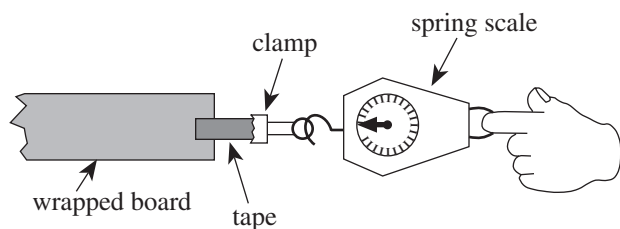


Figure 1

While one student held the board, a second student pulled the spring scale until the tape came off the paper wrapping; a third student recorded the force in newtons, N, indicated on the spring scale at the moment the tape came off the paper wrapping.

The procedure was repeated for 3 different brands of tape; each brand of tape came in many different widths, of which 2 or 3 were tested. The results are shown in Table 1.

Tape brand	Tape width (cm)	Force (N) to remove tape:			
		Trial 1	Trial 2	Trial 3	Average
X	1.0	1.6	1.9	2.2	1.9
	2.0	3.9	3.7	4.1	3.9
	3.0	6.0	5.6	5.8	5.8
Y	2.0	4.0	4.5	4.3	4.3
	2.5	5.4	5.1	5.7	5.4
Z	1.0	2.2	1.6	1.8	1.9
	2.0	4.1	3.9	3.6	3.9

Experiment 2

The students performed an experiment similar to Experiment 1, except that the paper wrapping was replaced by a plastic wrapping. The results are shown in Table 2.

Tape brand	Tape width (cm)	Force (N) to remove tape:			
		Trial 1	Trial 2	Trial 3	Average
X	1.0	1.7	1.5	1.6	1.6
	2.0	3.2	3.2	3.3	3.2
	3.0	5.0	5.0	5.1	5.0
Y	2.0	4.3	4.3	4.3	4.3
	2.5	5.5	5.4	5.4	5.4
Z	1.5	2.8	2.8	2.9	2.8

19. The results of the 2 experiments support the conclusion that, for a given brand of tape, as the tape's width increases, the force required to remove the tape from a given wrapping:
- A. increases only.
 - B. decreases only.
 - C. remains constant.
 - D. varies, but with no particular trend.

20. In Experiment 2, had Brand X tape in a 4.0 cm width been tested, the force required to remove the tape from the plastic wrapping would have been closest to:
- F. 5.0 N.
 - G. 7.0 N.
 - H. 9.0 N.
 - J. 11.0 N.

21. Based on the average results of Experiments 1 and 2, which of the following brands of tape adhered better to the paper than to the plastic?
- A. Brand X
 - B. Brand Y
 - C. Brands X and Y
 - D. Brands Y and Z



22. Which brand(s) of tape was/were used at only 2 different widths in both experiments?
- F. Brand X only
 - G. Brand Y only
 - H. Brand Z only
 - J. Brands Y and Z only
23. For the students to determine the force required to remove tape from a wrapping, which of the following attractive forces had to exceed the adhesive force between the tape and the wrapping?
- A. The force between the clamp and the tape
 - B. The force between the clamp and the paper or plastic wrapping
 - C. The force between the Earth and the wrapping
 - D. The force between the Earth and the tape
24. The students' instructor gave them a strip of tape that was 2.5 cm wide and asked them to identify the brand. The students repeated the procedures from Experiments 1 and 2 using the tape and obtained average forces of 4.9 N for paper and 4.1 N for plastic. Which of the following brands would most likely have produced these results?
- F. Brand X only
 - G. Brand Y only
 - H. Brands X and Y only
 - J. Brands Y and Z only



Passage V

Researchers conducted an experiment to determine the factors affecting heat flow. In each trial, one or more blocks of a particular material were placed between two walls at constant temperatures T_1 and T_2 in one of the configurations shown in Figure 1. Heat was transferred through the block(s) from the hotter wall to the cooler wall. This heat flow, measured in joules per second (J/sec), is shown in Table 1.

(Note: All blocks used in the experiment were identical in size and shape. In each configuration, the *contact area* was the surface area of the end of the block(s) against one wall.)

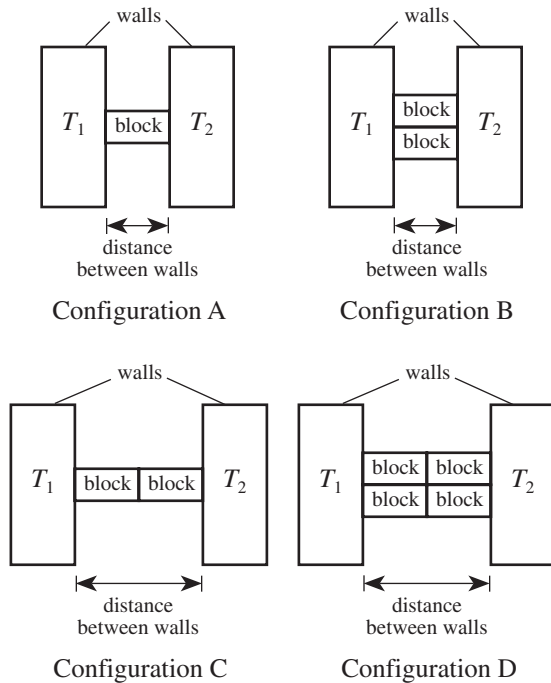


Figure 1

Trial	Block material	Configuration	T_1 ($^{\circ}\text{C}$)	T_2 ($^{\circ}\text{C}$)	Heat flow (J/sec)
1	glass wool	A	50	20	0.025
2	glass wool	B	50	20	0.050
3	glass wool	C	50	20	0.013
4	glass wool	D	50	20	0.025
5	glass wool	A	100	70	0.025
6	glass wool	A	20	50	0.025
7	wood	A	50	20	0.072
8	brick	A	50	20	0.500
9	concrete	A	50	20	0.540
10	steel	A	50	20	31
11	aluminum	A	50	20	140
12	aluminum	A	60	20	190
13	aluminum	A	70	20	240

25. According to the information provided, heat flowed from the wall at temperature T_2 to the wall at temperature T_1 in which trial?

- A. Trial 4
- B. Trial 6
- C. Trial 10
- D. Trial 12

26. *Insulators* are materials that are poor heat conductors. According to Trials 7 through 10, a wall of a given thickness built of which of the following materials would provide the best insulation between a room and the outdoors?

- F. Wood
- G. Brick
- H. Concrete
- J. Steel

27. The results of Trials 1 and 5 are consistent with the hypothesis that heat flow from a hotter wall to a cooler wall is dependent on the:

- A. temperature of the hotter wall only.
- B. temperature of the cooler wall only.
- C. sum of the wall temperatures.
- D. difference between the wall temperatures.

28. Materials differ in their *thermal conductivities*: the higher the thermal conductivity, the greater the heat flow through the material. According to Trials 6 through 11, which of the following statements about relative thermal conductivities is NOT true?

- F. Brick has a higher thermal conductivity than glass wool.
- G. Brick has a higher thermal conductivity than wood.
- H. Steel has a higher thermal conductivity than aluminum.
- J. Steel has a higher thermal conductivity than concrete.

4

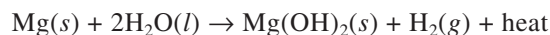


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29. Trials 1 and 3 provide evidence that heat flow depends on which of the following factors?
- A. Distance between walls
 - B. Contact area
 - C. Temperature of the hotter wall
 - D. Temperature of the cooler wall

**Passage VI**

Flameless ration heaters (FRHs) are used by combat soldiers to heat their meals in the field. The heat is produced when magnesium reacts with water:



The rate of the reaction increases in the presence of iron (Fe) and sodium chloride (NaCl). The following experiments were done to determine how to design FRHs.

Experiment 1

A 1.0-mole (mol) piece of Mg ribbon, 0.10 mol of Fe powder, and 0.10 mol of NaCl were added to 25 mL of H₂O at 20°C in an insulated container. The mixture was stirred constantly and its temperature was measured every 50 sec. The experiment was repeated with Mg ribbon cut into 100 pieces and with Mg powder (see Figure 1).

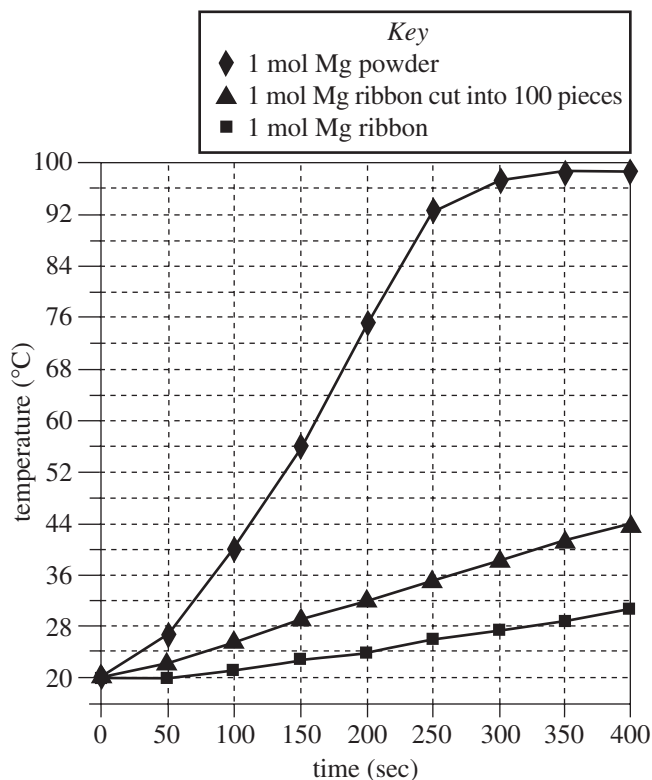


Figure 1

Experiment 2

Powdered Mg (0.10 mol) was mixed with 0.10 mol of NaCl. The mixture was added to 100 mL of H₂O at 20°C in an insulated container. The mixture was stirred constantly and the maximum temperature increase that occurred within 15 min was recorded. The procedure was repeated with different amounts of Fe powder added to each mixture (see Table 1).

Fe added (mol)	Maximum temperature increase (°C)
0	4
0.10	23
0.20	34
0.30	44
0.40	55
0.50	66
0.60	66
0.70	66

Experiment 3

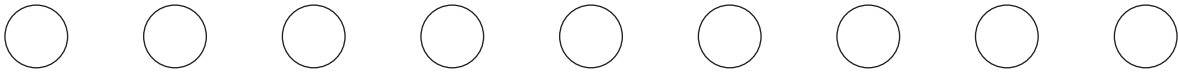
Powdered Mg (0.10 mol) was mixed with 0.50 mol of Fe powder and added to 100 mL of H₂O at 20°C in an insulated container. The mixture was stirred constantly and the maximum temperature increase that occurred within 15 min was recorded. The procedure was repeated with different amounts of NaCl (see Table 2).

NaCl added (mol)	Maximum temperature increase (°C)
0	0
0.025	19
0.050	34
0.075	50
0.100	66
0.125	82*

*Solution was boiling.



30. Which of the following is the most likely reason that amounts greater than 0.125 mol of NaCl were not tested in Experiment 3 ? The results showed that:
- F. adding more NaCl no longer increased the reaction rate.
 - G. adding more NaCl would decrease the reaction rate.
 - H. the boiling point was reached, so no further data could be gathered with this procedure.
 - J. more Fe would need to be added for any greater increase in temperature to occur.
31. Based on the results of Experiment 3, one can reasonably conclude that as the amount of NaCl added increased from 0 mol to 0.100 mol, the maximum rise in temperature within 15 min of the start of the reaction:
- A. increased only.
 - B. increased, then stayed the same.
 - C. decreased only.
 - D. decreased, then stayed the same.
32. If a trial had been done in Experiment 3 with 0.060 mol of NaCl added, the maximum temperature increase of the mixture that would have occurred within 15 min would have been closest to:
- F. 34°C.
 - G. 42°C.
 - H. 50°C.
 - J. 62°C.
33. Which of the following factors affecting the reaction of Mg and H₂O was studied in Experiment 1, but not in Experiments 2 or 3 ?
- A. Reaction temperature
 - B. Addition of NaCl
 - C. Addition of Fe
 - D. Surface area of Mg
34. An engineer is designing an FRH, to be used with 100 mL of H₂O, that will most rapidly generate the greatest amount of heat with the *least* amount of materials. Based on the results of Experiments 1, 2, and 3, which of the following specifications should she choose?
- F. 0.50 mol Fe powder, 0.125 mol NaCl, and 0.10 mol of Mg powder
 - G. 0.50 mol Fe powder, 0.125 mol NaCl, and 0.10 mol of Mg ribbon
 - H. 0.70 mol Fe powder, 0.125 mol NaCl, and 0.10 mol of Mg powder
 - J. 0.70 mol Fe powder, 0.125 mol NaCl, and 0.10 mol of Mg ribbon
35. It has been observed that as Mg and H₂O react, the Mg(OH)₂ (magnesium hydroxide) that is produced forms an unreactive coating on the Mg surface. Which of the following models for why NaCl speeds up the reaction is most consistent with this observation and the results of the experiments?
- A. NaCl absorbs heat produced in the reaction, causing the Mg(OH)₂ to melt off of the Mg surface.
 - B. NaCl binds with Fe to inhibit the reaction of Mg with H₂O.
 - C. NaCl reacts with Mg(OH)₂ to form a stronger barrier against H₂O.
 - D. NaCl reacts with Mg(OH)₂, removing the coating from the Mg, allowing more contact with H₂O.



Passage VII

Enzymes are large protein molecules that increase the rate of chemical reactions in living systems. The *substrate* is the substance that interacts with the enzyme in a reaction. The *acceleration factor* is the factor by which the enzyme increases the rate of a reaction. Figures 1–3 show the effects that changes in temperature, pH, and substrate concentration have on the rate of reaction of a substrate when Enzymes A and B are present. Figure 4 shows the effects that changes in the concentrations of Enzymes A and B have on the rates of reaction in substrate solutions of the same concentration.

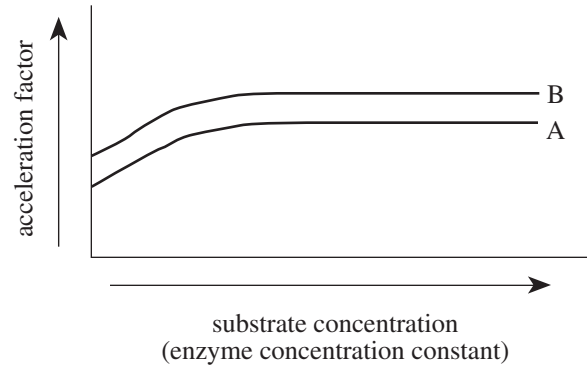


Figure 3

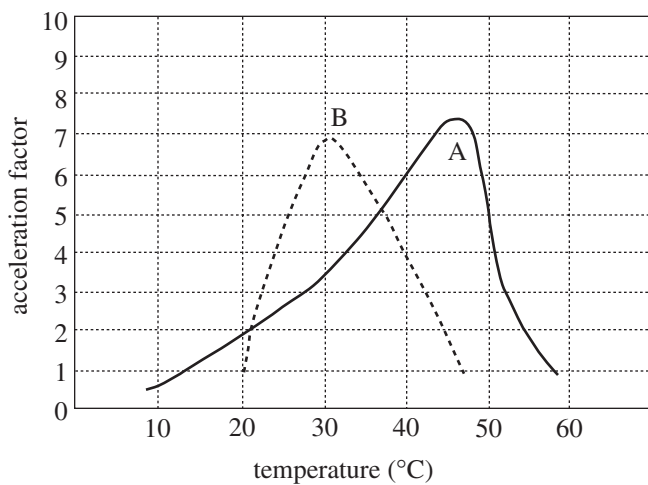


Figure 1

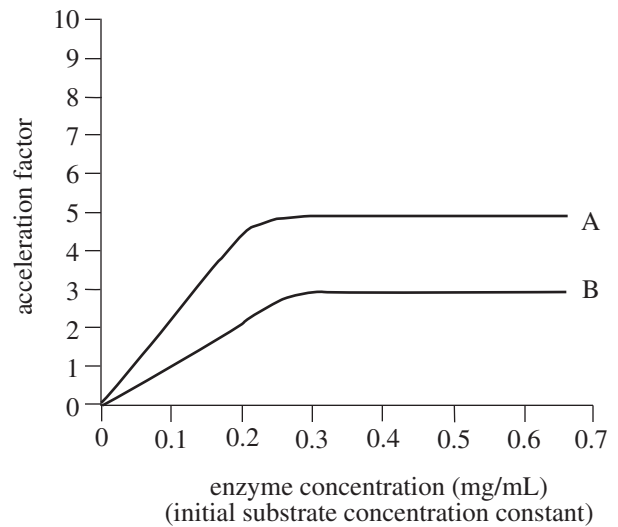


Figure 4

Figures adapted from Carl M. Raab, *Reviewing Biology*. ©1987 by Amsco School Publications, Inc.

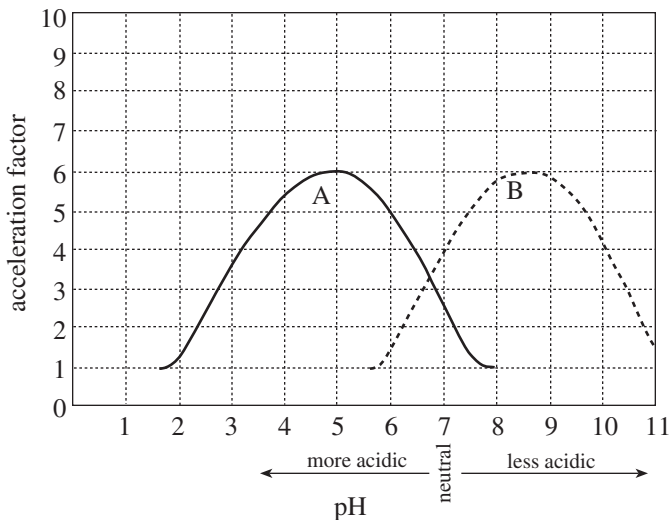


Figure 2

36. According to Figure 2, Enzyme A has the fastest rate of reaction at a pH closest to:

- F. 5.
- G. 6.
- H. 8.
- J. 9.

37. Based on the data in Figure 2, at which of the following pHs, if any, do Enzymes A and B have the same acceleration factor?

- A. At pH 5 only
- B. At pH 6.7 only
- C. At all pHs between 2 and 11
- D. At none of the pHs shown in the figure



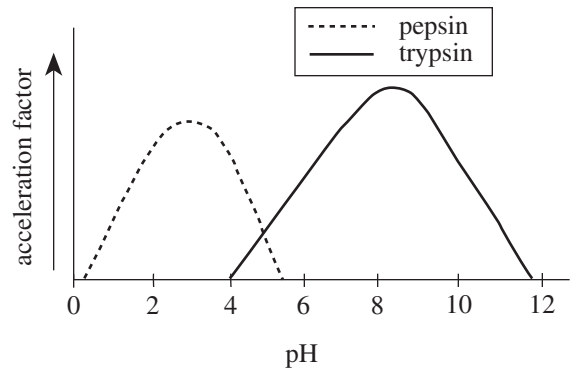
38. A scientist claims that the acceleration factor of Enzyme B is dependent on both enzyme and substrate concentration. Do the data in Figures 3 and 4 support her claim?

- F. No; the acceleration factor is dependent on enzyme concentration, but not on substrate concentration.
- G. No; the acceleration factor is not dependent on either enzyme or substrate concentration.
- H. Yes; the acceleration factor is dependent on enzyme concentration, but not on substrate concentration.
- J. Yes; the acceleration factor is dependent on both enzyme and substrate concentration.

39. A scientist claims that for the conditions used to obtain the data for Figure 4, the acceleration factor of Enzyme B at a given concentration will always be greater than that of Enzyme A at the same concentration. Do the data support his conclusion?

- A. No; Enzyme B shows a lower acceleration factor at all the enzyme concentrations tested.
- B. No; Enzyme B shows a lower acceleration factor at all the substrate concentrations tested.
- C. Yes; Enzyme B shows a higher acceleration factor at all the enzyme concentrations tested.
- D. Yes; Enzyme B shows a higher acceleration factor at all the substrate concentrations tested.

40. The figure below shows the relative acceleration factors for *pepsin*, an enzyme found in the stomach, and *trypsin*, an enzyme found in the small intestine.



Based on this figure and Figure 2, one would best conclude that compared to the acidity of solutions in the stomach, the solutions in the small intestine are:

- F. more acidic.
- G. less acidic.
- H. equally acidic.
- J. less acidic for pepsin, but more acidic for trypsin.

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

5

Scoring Your Practice Test

How to Score the Practice Test

The remainder of this booklet provides scoring keys and score conversion tables. Follow the instructions below and on the following pages to score the practice test and review your performance.

Raw Scores

The number of questions you answered correctly on each test and in each subscore area is your raw score. Because there are many forms of the ACT, each 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 55–57. Count the number of correct answers for each of the four tests and seven subscore areas, and enter the number in the blanks provided on those pages. These numbers are your raw scores on the tests and subscore areas.

Scale Scores

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

When your raw scores are converted into scale scores, it becomes possible to compare your scores with those of examinees who completed 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 58–59. Table 1 on page 58 shows the raw-to-scale score conversions for the total tests, and Table 2 on page 59 shows the raw-to-scale score conversions for the subscore areas. Because each form of the ACT Assessment 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 Assessment were taken. Therefore, the scale scores obtained from the practice test would not be expected to match precisely the scale scores received from a national administration of the ACT Assessment.

Percent At or Below

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 take the ACT.

The norms table (Table 3 on page 60) enables you to compare your scores on the sample test with the scores of recent high school graduates who tested as sophomores,

juniors, or seniors. The numbers reported in Table 3 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 49. This means that 49% 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 sample test are only *estimates* of the scores that you will obtain on an actual form 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.

Standards for Transition®

To add to the information you receive about your performance on the ACT Assessment, ACT has developed Standards for Transition®. The Standards for Transition help you to more fully understand what your total test score means for each academic area assessed in the ACT Assessment: English, Mathematics, Reading, and Science. The Standards for Transition describe the types of skills, strategies, and understandings you will need to make a successful transition from high school to college. Standards are provided for six score ranges that reflect the progression and complexity of skills in the four academic areas measured in the ACT Assessment. The Standards for Transition can be found at ACT's website (www.act.org) and in the student guide, *Using Your ACT Assessment Results*, that you will receive with your score report.

Reviewing Your Performance on the Practice Test

After you have determined your scale scores, consider the following as you evaluate how you did on the practice test.

- Did you run out of time before you completed a test? 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 and pace yourself so that you can do so. Remember there is no penalty for guessing.
- Did you spend too much time trying to understand the directions to the tests? If so, read the directions for each test again thoroughly. The directions in the practice test are exactly like the directions that will appear in your test booklet on the test day. Make sure you understand them now, so you won't have to spend too much time studying them when you take the actual test.
- 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 to the practice test, check to see whether a particular type of question or a particular subscore area was more difficult for you or took more of your time.

Scoring Keys for the ACT Practice Test

Use the scoring key for each test to score your answer document for the practice test. Mark a "1" in the blank for each question you answered correctly. Add up the numbers in each subscore area and enter the total number correct for each subscore area in the blanks provided. Also enter the total number correct for each test in the blanks provided. The total number correct for each test is the sum of the number correct in each subscore area.

Test 1: English—Scoring Key

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

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

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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Test 3: Reading—Scoring Key

	<u>Key</u>	<u>Subscore Area*</u>		<u>Key</u>	<u>Subscore Area*</u>		<u>Key</u>	<u>Subscore Area*</u>	
		<u>SS</u>	<u>AL</u>		<u>SS</u>	<u>AL</u>		<u>SS</u>	<u>AL</u>
1.	D		_____	15.	A	_____	29.	D	_____
2.	F		_____	16.	G	_____	30.	H	_____
3.	C		_____	17.	D	_____	31.	D	_____
4.	G		_____	18.	H	_____	32.	F	_____
5.	A		_____	19.	D	_____	33.	B	_____
6.	H		_____	20.	G	_____	34.	J	_____
7.	A		_____	21.	C	_____	35.	A	_____
8.	G		_____	22.	G	_____	36.	H	_____
9.	B		_____	23.	A	_____	37.	C	_____
10.	H		_____	24.	G	_____	38.	G	_____
11.	A	_____		25.	D	_____	39.	D	_____
12.	F	_____		26.	G	_____	40.	H	_____
13.	C	_____		27.	D	_____			
14.	J	_____		28.	G	_____			

Number Correct (Raw Score) for:	
Social Studies/Sciences (SS) Subscore Area	_____ (20)
Arts/Literature (AL) Subscore Area	_____ (20)
Total Number Correct for Reading Test (SS + AL)	_____ (40)

* SS = Social Studies/Sciences
AL = Arts/Literature

Test 4: Science—Scoring Key

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

Number Correct (Raw Score) for:	
Total Number Correct for Science Test	_____ (40)

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TABLE 1

Procedures Used to Obtain Scale Scores From Raw Scores for the ACT Practice Test

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

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

ACT Test	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	74	59	39	—	35
34	73	58	38	39	34
33	72	57	—	—	33
32	71	55-56	37	38	32
31	70	54	36	—	31
30	68-69	52-53	35	37	30
29	67	50-51	34	36	29
28	65-66	48-49	32-33	35	28
27	63-64	45-47	31	34	27
26	61-62	43-44	30	33	26
25	58-60	41-42	28-29	31-32	25
24	56-57	38-40	27	30	24
23	54-55	36-37	25-26	28-29	23
22	52-53	34-35	24	27	22
21	49-51	32-33	23	25-26	21
20	46-48	30-31	21-22	23-24	20
19	43-45	28-29	20	21-22	19
18	40-42	25-27	19	19-20	18
17	38-39	21-24	18	17-18	17
16	36-37	18-20	17	15-16	16
15	33-35	15-17	15-16	14	15
14	30-32	12-14	14	13	14
13	28-29	09-11	12-13	11-12	13
12	26-27	07-08	10-11	10	12
11	24-25	06	08-09	09	11
10	21-23	05	07	07-08	10
9	18-20	04	06	06	9
8	15-17	03	05	05	8
7	12-14	—	04	04	7
6	10-11	02	—	03	6
5	08-09	—	03	02	5
4	06-07	01	02	—	4
3	04-05	—	—	01	3
2	02-03	—	01	—	2
1	00-01	00	00	00	1

TABLE 2

ACT Test _____ **Your Scale Subscore** _____

Procedures Used to Obtain Scale Subscores From Raw Scores for the ACT Practice Test

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 score 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 items, do not list any scale subscores for that test.

English		
Usage/Mechanics (UM)		
Rhetorical Skills (RH)		
Mathematics		
Pre-Algebra/Elem. Algebra (EA)		
Inter. Algebra/Coord. Geometry (AG)		
Plane Geometry/Trigonometry (GT)		
Reading		
Social Studies/Sciences (SS)		
Arts/Literature (AL)		

Scale Subscore	Raw Scores										Scale Subscore
	Test 1 English			Test 2 Mathematics				Test 3 Reading			
	Usage/ Mechanics	Rhetorical Skills	Pre-Algebra/ Elem. Algebra	Inter. Algebra/ Coord. Geometry	Plane Geometry/ Trigonometry	Social Studies/ Sciences	Arts/ Literature	Social Studies/ Sciences	Arts/ Literature	Social Studies/ Sciences	
18	39-40	35	24	18	18	18	20	20	20	20	18
17	38	34	23	17	17	17	18-19	18-19	19	19	17
16	36-37	33	22	16	16-17	16	17	17	18	18	16
15	34-35	31-32	20-21	15	15	15	16	16	17	17	15
14	33	29-30	19	13-14	13-14	13-14	14-15	14-15	16	16	14
13	31-32	27-28	18	12	12	12	13	13	15	15	13
12	30	25-26	17	10-11	10-11	10-11	12	12	14	14	12
11	28-29	22-24	15-16	09	09	09	10-11	10-11	13	13	11
10	25-27	20-21	13-14	07-08	07-08	07-08	09	09	12	12	10
9	23-24	17-19	12	06	05-06	05-06	08	08	11	11	9
8	21-22	15-16	10-11	05	04	04	06-07	06-07	10	10	8
7	19-20	12-14	07-09	04	03	03	05	05	09	09	7
6	16-18	11	06	03	—	—	04	04	07-08	07-08	6
5	14-15	09-10	04-05	02	02	02	—	—	05-06	05-06	5
4	11-13	06-08	03	—	—	—	03	03	04	04	4
3	08-10	04-05	02	01	01	01	02	02	03	03	3
2	05-07	02-03	01	—	—	—	01	01	01-02	01-02	2
1	00-04	00-01	00	00	00	00	00	00	00	00	1

TABLE 3
Norms Table for the ACT Practice Test

Use the norms table below to determine your estimated percent at or below for each of your scale scores.

In the far left column, circle your scale score for the English Test (from page 58). 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 (from page 58) and subscore area (from page 59). You may find it easier to use the right column of scale scores for your Science Test and Composite scores.

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 four tests, subscore areas, and the Composite as shown at the bottom of the norms table.

ACT Test	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	_____

National Distributions of "Percent At or Below" for ACT Test Scores ACT-Tested High School Graduates of 2000, 2001, and 2002.																	
Score	ENGLISH		Usage/Mechanics		Rhetorical Skills		MATHEMATICS				READING			SCIENCE		COMPOSITE	Score
	Pre-Algebra/Elem. Alg.	Alg./Coord. Geometry	Plane Geometry/Trig.	Soc. Studies/Sciences	Arts/Literature												
36	99						99					99			99	99	36
35	99						99					99			99	99	35
34	99						99					98			99	99	34
33	99						99					97			99	99	33
32	98						99					96			99	99	32
31	97						98					94			98	98	31
30	96						96					92			97	97	30
29	94						94					90			96	95	29
28	92						92					87			95	93	28
27	88						89					83			92	90	27
26	85						85					79			89	86	26
25	81						81					74			85	82	25
24	76						76					70			79	77	24
23	71						71					65			73	71	23
22	65						66					59			65	64	22
21	59						61					53			56	57	21
20	52						55					47			49	49	20
19	45						49					40			39	41	19
18	37	99	99				41	99	99	99		35	99	99	30	33	18
17	32	99	99				32	97	99	99		30	98	97	22	26	17
16	26	96	98				23	93	98	99		25	94	91	15	19	16
15	20	92	95				15	89	97	95		20	89	85	11	13	15
14	15	86	89				08	84	93	91		15	84	78	08	08	14
13	11	80	83				03	76	87	83		11	75	71	05	05	13
12	08	72	75				01	67	79	74		06	68	63	03	02	12
11	06	65	64				01	59	69	65		03	61	54	01	01	11
10	04	56	51				01	49	57	52		01	51	46	01	01	10
09	02	45	38				01	39	42	37		01	38	37	01	01	09
08	01	35	25				01	28	27	23		01	28	29	01	01	08
07	01	24	15				01	18	16	13		01	18	22	01	01	07
06	01	16	09				01	09	10	07		01	11	15	01	01	06
05	01	10	05				01	04	06	04		01	06	09	01	01	05
04	01	05	02				01	01	02	02		01	03	04	01	01	04
03	01	02	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	20.4	10.2	10.5				20.7	10.9	10.2	10.5		21.3	10.7	11.0	21.0	20.9	
S.D.	5.6	3.6	3.0				5.0	3.4	2.9	2.9		6.1	3.5	3.9	4.6	4.8	

Note: These norms are the source of national and state norms printed on ACT Assessment score reports during the 2002–2003 testing year. Sample size: 3,230,299.

ACT ASSESSMENT® 2003-2004 National Answer Sheet

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

Last Name _____ First Name _____ MI (Middle Initial) _____

House Number and Street _____ State _____ ZIP Code _____

City _____

Area Code _____ Number _____

ALL examinees MUST complete blocks A, B, C, and D.

Registered Examinees: Enter the MATCHING INFORMATION in blocks B, C, and D EXACTLY as it appears on your admission ticket, even if any part of the information is missing or incorrect. Fill in the corresponding ovals. If you do not complete these blocks to match your admission ticket EXACTLY, your scores will be delayed. Leave block E blank.

Standby Examinees: Enter your identifying information in blocks B, C, and D. Fill in the corresponding ovals. Also fill in the Standby Testing oval in block E.

B MATCH NAME (FIRST 6 LETTERS OF LAST NAME)		C SOCIAL SECURITY NUMBER (or ACT ID Number, including the leading dash)		D DATE OF BIRTH	
Month	Day	Year	Month	Day	Year
<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1
<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2	<input type="radio"/> 2
<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3
<input type="radio"/> 4	<input type="radio"/> 4	<input type="radio"/> 4	<input type="radio"/> 4	<input type="radio"/> 4	<input type="radio"/> 4
<input type="radio"/> 5	<input type="radio"/> 5	<input type="radio"/> 5	<input type="radio"/> 5	<input type="radio"/> 5	<input type="radio"/> 5
<input type="radio"/> 6	<input type="radio"/> 6	<input type="radio"/> 6	<input type="radio"/> 6	<input type="radio"/> 6	<input type="radio"/> 6
<input type="radio"/> 7	<input type="radio"/> 7	<input type="radio"/> 7	<input type="radio"/> 7	<input type="radio"/> 7	<input type="radio"/> 7
<input type="radio"/> 8	<input type="radio"/> 8	<input type="radio"/> 8	<input type="radio"/> 8	<input type="radio"/> 8	<input type="radio"/> 8
<input type="radio"/> 9	<input type="radio"/> 9	<input type="radio"/> 9	<input type="radio"/> 9	<input type="radio"/> 9	<input type="radio"/> 9
<input type="radio"/> 0	<input type="radio"/> 0	<input type="radio"/> 0	<input type="radio"/> 0	<input type="radio"/> 0	<input type="radio"/> 0

E STANDBY TESTING

Fill in this oval ONLY if you turned in a standby registration folder at the test center. This will help ACT™ to match your answer sheet to your registration record.

Yes, I am testing as a standby examinee.

ONLY REGISTERED Examinees who need to make corrections are to complete any of blocks F, G, H, or I. If you need to make corrections, complete ONLY the block(s) below for which the information on your admission ticket is incomplete or incorrect. Leave the other blocks blank. **If the information on your admission ticket is complete and correct, or if you are a standby examinee, DO NOT MARK in blocks F, G, H, or I.**

F NAME CORRECTION

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

G SOCIAL SECURITY NUMBER CORRECTION

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

H DATE OF BIRTH CORRECTION

Month	Day	Year
<input type="radio"/> Jan.	<input type="radio"/> 1	<input type="radio"/> 1
<input type="radio"/> Feb.	<input type="radio"/> 2	<input type="radio"/> 2
<input type="radio"/> Mar.	<input type="radio"/> 3	<input type="radio"/> 3
<input type="radio"/> Apr.	<input type="radio"/> 4	<input type="radio"/> 4
<input type="radio"/> May	<input type="radio"/> 5	<input type="radio"/> 5
<input type="radio"/> June	<input type="radio"/> 6	<input type="radio"/> 6
<input type="radio"/> July	<input type="radio"/> 7	<input type="radio"/> 7
<input type="radio"/> Aug.	<input type="radio"/> 8	<input type="radio"/> 8
<input type="radio"/> Sep.	<input type="radio"/> 9	<input type="radio"/> 9
<input type="radio"/> Oct.	<input type="radio"/> 0	<input type="radio"/> 0
<input type="radio"/> Nov.	<input type="radio"/> 0	<input type="radio"/> 0
<input type="radio"/> Dec.	<input type="radio"/> 0	<input type="radio"/> 0

I HIGH SCHOOL CODE CORRECTION

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

IM-(A) 168149-001:654321



SIDE 2

BOOKLET NUMBER

FORM

Test Directions

Mark only one oval for each question. Fill in your response completely and neatly. Erase any errors thoroughly.

Incorrect Marks:



Correct Mark:



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

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0359F

TEST 1

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

TEST 2

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

TEST 3

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

TEST 4

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

DO NOT SIGN THIS UNTIL YOU HAVE COMPLETED THIS ENTIRE SECTION.

I hereby certify that I have truthfully identified myself on this form. I understand that the consequences of falsifying my identity include cancellation of my scores.

Your Signature

Today's Date

2003–2004 Order Form for Additional ACT Preparation Materials

ITEM NUMBER	ITEM DESCRIPTION	QUANTITY	UNIT PRICE	QTY. x UNIT PRICE
040 20H 000 (Personal Version— maximum of two users)	ACTive Prep® CD-ROM (See below for System Requirements)		\$24.95	
080 117 990	ACT Assessment Sample Test Booklet 9954D		\$5.00	
080 117 020	ACT Assessment Sample Test Booklet 0255C		\$5.00	
All prices include shipping. ACTive Prep will be shipped via First Class Mail. Printed materials will be shipped via UPS or a comparable method to arrive within two weeks of receipt of your order at ACT.		TOTAL MATERIALS COST		
		CA and NC residents add sales tax		
		TOTAL AMOUNT DUE		

SHIP MATERIALS TO: (Please print or type.)

NAME _____

STREET ADDRESS _____

MAILING ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

TELEPHONE NUMBER _____ FAX NUMBER _____

RECIPIENT'S E-MAIL ADDRESS (Please print in all capital letters.) _____

PAYMENT METHOD: (due with order)

Payment enclosed.
(check* or money order payable to ACT)

Please charge to my credit card.
(required for phone and fax orders)

MasterCard VISA

Account # _____

Exp. Date ____ - ____

Signature _____

Cardholder's Name _____
(Please print.)

*If your check is returned due to insufficient or uncollected funds, we may add an additional \$10 service fee. We may have the total amount debited electronically from your checking account; this means your bank will not provide a cancelled check for the debit transaction with your monthly statement.

You may order preparation materials by mail, phone, or fax as listed below.

<p>Mail this form to:</p> <p>ACT Customer Services P.O. Box 1008 Iowa City, IA 52243-1008</p>	<p>Phone Orders to: 319/337-1429 (Monday–Friday, 8:30 A.M.–4:30 P.M., central time)</p> <p>Fax Orders to: 319/337-1578</p>
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Please use address and phone numbers ONLY to order preparation materials.

ACTIVE Prep – System Requirements

PC Compatibles

- Windows® 95/98, 2000, ME
- Pentium II 233 MHz processor or better (minimum Pentium 166 processor with MMX)
- 64 MB RAM (minimum 32 MB RAM)
- 65 MB hard disk space available for ACTive Prep files
- 16x CD-ROM drive (minimum 8x CD-ROM drive)
- Color monitor capable of 800 by 600 resolution or better
- SVGA videocard capable of displaying thousands of colors at 800 by 600 resolution or better
- 100% Soundblaster-16 compatible sound card with speakers or headphones
- Modem and communication software (optional)

Apple Macintosh and Compatibles

- MAC OS 8.1 or greater
- PowerPC G3 233 MHz processor or better (including iMac) (minimum PowerPC 603e 200 MHz processor or PowerPC 604 132 MHz processor)
- 64 MB RAM (minimum 32 MB RAM)
- 65 MB hard disk space available for ACTive Prep files
- 24x CD-ROM drive (minimum 8x CD-ROM drive)
- Color monitor capable of 800 by 600 resolution or better
- Onboard video or videocard capable of displaying thousands of colors at 800 by 600 resolution or better
- Modem and communication software (optional)

If you have questions concerning the system requirements, please call 319/337-1161.

Cut Here

Prepare for the ACT Assessment with
ACTive Prep®: The Official Electronic Guide to the ACT Assessment
(See description on page 2.)

There are several ways to order this CD-ROM software:

- Use the order form on page 63 of this booklet
- Visit www.act.org/activeprep and order directly from the ACTIVE Prep website
- Select ACTIVE Prep when using “ACT ONLINE REGISTRATION” at www.act.org
- Select ACTIVE Prep when registering for the ACT Assessment using the paper folder

How to Register/REregister for the ACT Assessment®

ONLINE—www.act.org—click on “ACT ONLINE REGISTRATION”

You can register or REregister for any national test date within the United States via the Web and pay by VISA or MasterCard. After you create your record and select your test date, you can take up to 72 hours to complete and submit it to ACT. If you register via the Web, you will receive your admission ticket about one week earlier than if you register by paper folder.

If you are requesting test accommodations or extended time testing, or you plan to use a fee waiver or state voucher, you must submit a paper folder.

PAPER FOLDER—available from your high school guidance office or ACT

You can get a **free** ACT Assessment student registration packet from your high school guidance office. If your high school cannot help you, you may order a packet (allow 2–3 weeks for delivery) from ACT at www.act.org/aap/forms/stud_req.html or write or call:

ACT Registration Department
P.O. Box 414
Iowa City, IA 52243-0414
319/337-1270
(Normal hours M–F, 8:00 A.M. to 8:00 P.M., central time)

For an additional \$10.00 fee, you can also REregister by telephone. You must pay by VISA or MasterCard. (See page 5 of *Registering for the ACT Assessment* for information on this expedited service.)

Keep this booklet for future reference.

Visit ACT’s website at www.act.org
for education and career planning information.