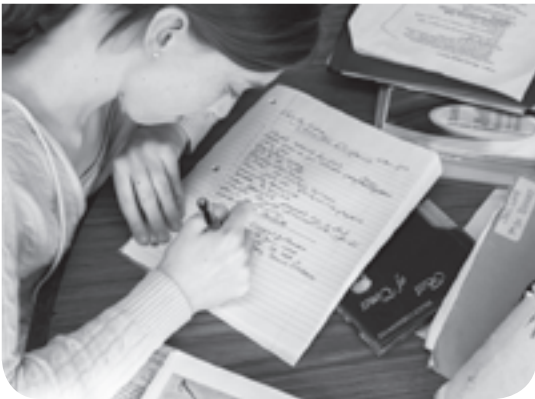




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Introduction to the SAT® and the College Board

If you plan to register for the SAT, you can use this book to get familiar with the test. Remember, if you have access to the Internet you can find everything in this booklet and more at sat.org/practice.

Contents

Introduction to the SAT and the College Board.....	1
The Critical Reading Section.....	5
The Mathematics Section.....	11
The Writing Section.....	25
Official SAT Practice Test.....	33
Scoring the Essay.....	81
Scoring the Official SAT Practice Test.....	82

Student Search Service®

Student Search Service® is a free program that connects you with colleges and universities across the country that are looking for students just like you. If you take the PSAT/NMSQT®, the SAT, SAT Subject Tests™ or any AP® Exam, you can be included in this free service.

Here's how it works: During SAT or SAT Subject Test registration, indicate that you want to be a part of Student Search Service. Your name is made available for access, along with other information such as your address, high school grade point average, date of birth, grade level, high school, email address, intended college major and extracurricular activities.

Colleges and scholarship programs then use Search to help them locate and recruit students with characteristics that they find to be a good match with their programs. This is a great way for you to get information about colleges with which you may not be familiar.

Here are some points to keep in mind about Student Search Service:

- Being part of Student Search Service is voluntary. While most students who take the PSAT/NMSQT, AP Exams, SAT or SAT Subject Tests participate in this service, you may take the test even if you don't take part in Student Search Service.
- Colleges participating in Student Search Service never receive student scores or phone numbers. Colleges can ask for names of students within certain score ranges, but your exact score is not reported.

- Being contacted by a college doesn't mean you have been admitted. The colleges and organizations that participate want to find students who fit in with their environment, classes, programs, scholarships and special activities. However, you can be considered for admission only after you apply. Student Search Service is simply a way for colleges to reach prospective students like you and inform them of their opportunities.
- Student Search Service will share your contact information only with colleges and qualified nonprofit educational or scholarship programs. Your name will never be sold to a commercial marketing firm or retailer of merchandise or services (such as test prep).

Why Should You Take the SAT?

The SAT is an essential passport for your college admission journey. The SAT gives colleges what they want: a showcase of your skills and potential. The College Board is here to help guide you throughout the college-going process so that you can find the right college fit and best path forward to future opportunities.

It's more than just a test.

The SAT can also help connect you to our college planning resources. Go to bigfuture.org to start your journey. Learn how other students like you made their college choices. Find out more about the application process, access financial aid tools, explore majors and more — all to help you narrow down your choices and find the right college.

It's one path to financial support and scholarships.

The SAT can help connect you to scholarship organizations, and many colleges use it for merit awards in addition to admission. Take a look at the "Student Search Service" information on this page to learn more.

It's fair to everyone.

The SAT was first created to help level the playing field in college admission. It still does so today. The SAT is the most rigorously researched and designed test in the world, which ensures that students from all backgrounds have an equal chance to succeed.

What Does the SAT Measure?

The SAT measures the skills you have learned in and outside of the classroom and how well you can apply that knowledge. It tests how you think, solve problems and communicate. The test is composed of three sections:

- **Critical Reading**, which includes sentence completion and passage-based reading questions.
- **Mathematics**, which includes multiple-choice and student-produced response questions based on the math that college-bound students typically learn during their first three years of high school.
- **Writing**, which has multiple-choice questions and a written essay.

You have three hours and 45 minutes of testing time, plus three five-minute breaks, for a total of four hours to complete the entire test.

All multiple-choice questions are scored the same way: one point for each correct answer, and one-quarter point subtracted for a wrong answer. No points are subtracted for answers left blank or for incorrect student-produced response questions (see page 22). The total score for each section is on a 200- to 800-point scale, with 10-point intervals.

How Can You Get Ready for the Test?

Get Started Now

- Take challenging classes, study hard, and read and write outside of the classroom.
- Take the PSAT/NMSQT in your sophomore and/or junior year. Once you get your results, sign in to My College QuickStart™ to get a personalized planning kit to help you start getting ready for the SAT.
- Review the sample questions, test-taking approaches and directions in this booklet.
- Take advantage of our low-cost practice materials, with the lessons, practice questions, and practice exams in The Official SAT Online Course™, and *The Official SAT Study Guide*™ Third Edition (also available with DVD).

Use Our Online Resources

At sat.org/practice you'll find a wealth of practice tools to help you put your best foot forward on test day.

- Create your own study plan and practice with The Official SAT Question of the Day™, also available via Twitter or our mobile app.
- Take an official SAT practice test online so you can get it scored automatically and review the answer explanations. You can also take the practice test included in this booklet.
- With SAT Skills Insight™ you can see what you need to get to the next level on the SAT.

Approaches to Taking the SAT

Know What to Expect

Use the information in this booklet and at sat.org/practice to help you be ready on test day.

- **Become familiar with the test.** Study the descriptions of the SAT sections, so you're not surprised or confused on test day.
- **Learn the test directions.** The directions for answering the questions in this booklet are the same as those on the actual test. If you become familiar with the directions now, you'll leave yourself more time to answer the questions when you take the test.
- **Review the sample questions.** The more familiar you are with the question formats, the more comfortable you'll feel when you see similar questions on the actual test. In particular, be sure to practice writing answers to the student-produced response mathematics questions (see page 22).
- **Understand how the tests are scored.** You get one point for each right answer and lose a fraction of a point for each wrong answer. You neither gain nor lose points for omitting an answer. Hard questions count the same amount as easier questions.

Use These Test-Taking Strategies

- **Listen carefully to instructions and follow the directions given to you.** Be sure to fill in the Form Code, Test Form and Test Book Serial Number fields as directed on page 1 of the answer sheet. If they are not correct, we won't be able to score your test.
- **Read carefully.** Consider all the choices in each question. Avoid careless mistakes that will cause you to lose points.
- **Answer the easy questions first.** Work on less time-consuming questions before moving on to the more difficult ones. Questions in each section are generally ordered from easiest to hardest. The exception is in the passage-based reading questions, which are ordered according to the logic and organization of each passage.
- **Eliminate answer choices that you know are wrong.** Cross them out in your test booklet so that you can clearly see which choices are left.
- **Make educated guesses or skip the question.** If you have eliminated the choices that you know are wrong, guessing is your best strategy. However, if you cannot eliminate any of the answer choices, it is best to skip the question. You will lose points for incorrect answers. No points are deducted if an answer is left blank.
- **Use your test booklet as scratch paper.** Use it to make notes or write down ideas. What you write in the booklet will not affect your score.
- **Circle the questions you've skipped.** This will help you keep track of which questions you've skipped.
- **Check your answer sheet regularly.** Make sure you are in the right place. Check the number of the question and the number on the answer sheet every few questions. This is especially important when you skip a question. Losing your place on the answer sheet can cost you time and even points.

- **Keep your answer sheet neat.** The answer sheet is scored by a machine, which can't tell the difference between an answer and a doodle. If the machine reads what appear to be two answers for one question, it will consider the question unanswered.
- **Work at an even, steady pace and limit your time on any one question.** All questions are worth the same number of points. If you need a lot of time to answer a question, go on to the next one. Later, you may have time to return to the question you skipped. Your goal is to spend time on the questions that you are most likely to answer correctly.
- **Keep track of time.** Occasionally check your progress so that you know where you are and how much time is left.
- **Always use a No. 2 pencil.** All answer sheet circles must be filled in darkly and completely with a No. 2 pencil. If you need to erase an answer, erase it as completely as possible. The SAT essay must be written with a No. 2 pencil. Essays written in pen will receive a score of zero.

On Test Day

Make sure that you read and understand our policies and requirements for taking the SAT. These are available in two places:

- Online at sat.org/test-day
- In the *Registration Guide to the SAT and SAT Subject Tests*

You will need to bring the following to the test center:

- Your Admission Ticket, which is required for entry to the test center.
- An acceptable photo ID. Be sure to check online or in the registration guide about what ID you can use.
- Two No. 2 pencils and a soft eraser.
- An approved calculator with fresh batteries. For more information on calculators, see pages 11-12.
 - Make sure your calculator is in good working order.
 - You may bring additional batteries and a backup calculator to the test center. Test center staff will not have batteries or calculators for your use.
 - **You may not share a calculator with another test-taker.**

Test Scores

Scores are available for free at sat.org/scores several weeks after each test is given. You can also get your scores, for a fee, by telephone. Call Customer Service at 866-756-7346 in the United States. From outside the United States, dial +1-212-713-7789.

How the Test Is Scored

The first step in scoring is to calculate the raw score for each section. The second step is to convert that raw score to a scale of 200 to 800. The raw scores are calculated as follows:

- For each correct answer, add (+) 1 point.
- For each incorrect multiple-choice answer, subtract (-) 1/4 point.
- For each incorrect student-produced response, no points are subtracted.
- For each question not answered, no points are subtracted.

SAT Writing Subscores

In addition to an overall writing score, you receive two writing subscores — one for your essay, and one for the multiple-choice questions.

- The **essay subscore** is a raw score ranging from 2 to 12. The essay raw score contributes about 30 percent toward your total writing score. (Note: Essays that are not written on the essay assignment, not written in No. 2 pencil, or not considered legible after several attempts at reading will receive a zero.)
- The **multiple-choice writing subscore** on your score report has been converted from a raw score to a scale of 20 to 80. The multiple-choice raw score contributes about 70 percent to your overall writing score.

My SAT Online Score Report

My SAT Online Score Report gives you personalized, practical information about your SAT results, including how your score compares to those of the total group of test-takers and how you performed on each section of the test. It also allows you to access and print your essay to share with your teachers or counselor. Link to your report at collegeboard.org/satscores.

Score Choice™

Score Choice™ gives you the option to choose which scores to send colleges based on what each college wants to receive. You can select which scores to send each college by test date for the SAT and by individual test taken for SAT Subject Tests™. You can choose scores from one, several or all SAT test dates in your record. Score Choice is optional, so if you don't actively choose to use it, all of your scores will be sent automatically with your score report. Since most colleges only consider your best scores, you should still feel comfortable reporting scores from all of your tests.

About the College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators and schools. For further information, visit www.collegeboard.org.

Protecting Your Privacy

Telemarketing and Internet Scams

From time to time, we receive reports of phone scams in which callers posing as employees of the College Board contact students and families attempting to sell test preparation products or otherwise requesting sensitive personally identifying information, such as credit card and social security numbers. Some of these callers engage in illegal spoofing to make it seem as if the call is coming from the actual company. **These calls do not come from the College Board. The College Board does not make unsolicited phone calls to students or families requesting this type of information.** This type of activity, known as telemarketing fraud, is a crime. Should you receive an unsolicited phone call from someone claiming to work for the College Board, including where your Caller ID indicates that the telephone number originates from a College Board location, do not provide the caller with any personal information.

Representatives of the College Board only make calls or send text messages to students and their families in response to student-generated inquiries and/or to provide or gather information about a test or program for which the student registered or regarding preparation for college and the application process. Should you have a question about the origin of a phone call you have received in which the caller claims to be from the College Board, contact Customer Service.

Safety and Security Tips

1. Be wary of unsolicited contacts, whether via telephone or email.
2. Remember that the College Board will never contact you to ask you to send your credit card, bank account, or password information over the telephone or through email.
3. Never supply credit card information to someone who calls or emails you.
4. If you suspect you have received a fraudulent call or email, contact the Federal Trade Commission (FTC) and your local authorities and provide them with all the details.
5. Keep in mind that if an offer appears too good to be true, it probably is.
6. To make a complaint and to obtain more information about protecting yourself from telephone and Internet scams, visit the FTC's Consumer Information site at www.ftc.gov/bcp/menus/consumer/phone.shtm.

The Critical Reading Section

The critical reading section gives you a chance to show how well you understand what you read. This section has two types of questions:

- Sentence completions (19 questions)
- Passage-based reading (48 questions)

Note: Calculators may not be on your desk or used on the critical reading section of the SAT.

Approaches to the Critical Reading Section

- Work on sentence completion questions first. They take less time to answer than the passage-based reading questions.
- The difficulty of sentence completion questions increases as you move through the section.
- Passage-based reading questions do not increase in difficulty from easy to hard. Instead, they follow the logic of the passage.
- The information you need to answer each reading question is always in the passage(s). Reading carefully is the key to finding the correct answer. Don't be misled by an answer that looks correct but is not supported by the actual text of the passage(s).
- Passage-based reading questions often include line numbers to help direct you to the relevant part(s) of the passage. If one word or more is quoted exactly from the passage, the line number(s) where that quotation can be found will appear in the test question. You may have to look elsewhere in the passage, however, in order to find support for the best answer to the question.
- Do not jump from passage to passage. Stay with a passage until you have answered as many questions as you can before you proceed to the next passage.
- In your test booklet, mark each question you skip so that you can easily go back to it later if you have time.
- Remember that all questions are worth one point regardless of the type or difficulty.

Sentence Completions

Sentence completion questions measure your

- knowledge of the meanings of words; and
- ability to understand how the different parts of a sentence fit together logically.

Directions

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, **best** fits the meaning of the sentence as a whole.

Example:

Hoping to ----- the dispute, negotiators proposed a compromise that they felt would be ----- to both labor and management.

- (A) enforce . . . useful
- (B) end . . . divisive
- (C) overcome . . . unattractive
- (D) extend . . . satisfactory
- (E) resolve . . . acceptable

(A) (B) (C) (D) (E)

Answering Sentence Completion Questions

One way to answer a sentence completion question with two missing words is to focus first on just one of the two blanks. If one of the words in an answer choice is logically wrong, then you can eliminate the entire choice from consideration.

- Look at the first blank in the above example. Would it make sense to say that “negotiators” who have “proposed a compromise” were hoping to **enforce** or **extend** the “dispute”? No, so neither (A) nor (D) can be the correct answer.
- Now you can focus on the second blank. Would the “negotiators” have proposed a compromise that they believed would be **divisive** or **unattractive** to “both labor and management”? No, so (B) and (C) can be eliminated, and only choice (E) remains.
- Always check your answer by reading the entire sentence with your choice filled in. Does it make sense to say, “Hoping to **resolve** the dispute, negotiators proposed a compromise that they felt would be **acceptable** to both labor and management”? Yes.

Correct answer: (E) / Difficulty level: Easy

Sample Questions

1. Because King Philip's desire to make Spain the dominant power in sixteenth-century Europe ran counter to Queen Elizabeth's insistence on autonomy for England, ----- was -----.

(A) reconciliation . . . assured
(B) warfare . . . avoidable
(C) ruination . . . impossible
(D) conflict . . . inevitable
(E) diplomacy . . . simple

Be sure to look for key words and phrases as you read each sentence. Words such as *although*, *however*, *if*, *but* and *since* are important to notice because they signal how the different parts of a sentence are logically related to each other. Words such as *not* and *never* are important because they indicate negation. In the example above, the entire sentence hinges on a few key words: “Because something *ran counter* to something else, *blank* was *blank*.”

- The word “because” indicates that the information in the first part of the sentence (the part before the comma) explains the reason for the situation described in the second part. The first part states that what King Philip wanted (domination for Spain) “ran counter to” what Queen Elizabeth wanted (independence for England).
- Given that there was such a fundamental disagreement between the two monarchs, would **reconciliation** be **assured**? Unlikely.
- Would **warfare** be **avoidable**? Hardly; warfare might be unavoidable.
- Would **ruination** be **impossible**? No.
- Would **diplomacy** be **simple**? Not necessarily.
- Only choice (D) fits logically with the key words in the sentence: *Because* what one person wanted *ran counter* to what another person wanted, **conflict** was **inevitable**.

Correct answer: (D) / Difficulty level: Medium

2. There is no doubt that Larry is a genuine -----: he excels at telling stories that fascinate his listeners.
- (A) braggart (B) dilettante (C) pilferer
(D) prevaricator (E) raconteur

Some sentence completion questions contain a colon. This is a signal that the words after the colon define or directly clarify what came before. In this case, “he excels at telling stories that fascinate his listeners” serves to define the word **raconteur**, choice (E). None of the other words is directly defined by this clause.

- A **braggart** may or may not excel at telling stories and may actually annoy listeners.
- A **dilettante** is someone who dabbles at a career or hobby and so may not excel at anything.
- A **pilferer** steals repeatedly, in small quantities; this has nothing to do with storytelling.
- A **prevaricator** tells lies, but not necessarily in an accomplished or fascinating way; and the sentence refers to stories, not lies.

You should choose the word that best fits the meaning of the sentence as a whole, and only choice (E) does so.

Correct answer: (E) / Difficulty level: Hard

Passage-Based Reading

The passage-based reading questions on the SAT measure your ability to read and think carefully about several different passages ranging in length from about 100 to about 850 words. Passages are taken from a variety of fields, including the humanities, social studies, natural sciences and fiction or literary nonfiction. They vary in style and can include narrative, argumentative and expository elements. Some selections consist of a pair of related passages on a shared issue or theme; in some of the questions, you are asked to compare and contrast these passages.

The following kinds of questions may be asked about a passage:

- **Vocabulary in Context:** These questions ask you to determine the meanings of words from their context in the reading passage.
- **Literal Comprehension:** These questions assess your understanding of significant information directly stated in the passage.
- **Extended Reasoning:** These questions measure your ability to synthesize and analyze information as well as to evaluate the assumptions made and the techniques used by the author. Most of the reading questions fall into this category. You may be asked to identify cause and effect, make inferences, recognize a main idea or an author’s tone, or follow the logic of an analogy or an argument.

Answering Passage-Based Reading Questions

Following are samples of the kinds of reading passages and questions that may appear on your test. For each set of sample materials:

- Read the passage carefully.
- Decide on the best answer to each question.
- Read the explanation for the correct answer.

Some of the reading passages on the SAT are as short as a paragraph or two, about 100 words in length. You will also find one or more pairs of related short passages in each edition of the test. Such material will be followed by one to five questions that measure the same kinds of reading skills that are measured by the questions following longer passages.

Directions

The passages below are followed by questions based on their content; questions following a pair of related passages may also be based on the relationship between the paired passages. Answer the questions on the basis of what is stated or implied in the passages and in any introductory material that may be provided.

Sample Questions

Questions 3-4 are based on the following passage.

“The rock was still wet. The animal was glistening, like it was still swimming,” recalls Hou Xiangang. Hou discovered the unusual fossil while surveying rocks as a paleontology graduate student in 1984, near the Chinese town of Chengjiang. “My teachers always talked about the Burgess Shale animals. It looked like one of them. My hands began to shake.”

Hou had indeed found a *Naraoia* like those from Canada. However, Hou’s animal was 15 million years older than its Canadian relatives.

Some questions ask you to recognize the meaning of a word as it is used in the passage.

3. In line 4, “surveying” most nearly means

- (A) calculating the value of
- (B) examining comprehensively
- (C) determining the boundaries of
- (D) polling randomly
- (E) conducting a statistical study of

The word “surveying” has a number of meanings, several of which are included in the choices above. In the context of this passage, however, only (B) makes sense. A student in the field of “paleontology” is one who studies prehistoric life as recorded in fossil remains. One of the activities of a paleontology student would be to examine rocks carefully and “comprehensively” while looking for fossils.

- (A), (C) and (E) are incorrect because someone who studies fossils would not calculate the “value” of rocks, or determine the “boundaries” of rocks, or conduct a “statistical study” of rocks.
- (D) is wrong because “polling” rocks makes no sense at all.

Correct answer: (B) / Difficulty level: Easy

You may be asked to make an inference or draw a conclusion about a statement made in the passage.

4. It can be inferred that Hou Xiangang’s “hands began to shake” (line 9) because Hou was
- (A) afraid that he might lose the fossil
 - (B) worried about the implications of his finding
 - (C) concerned that he might not get credit for his work
 - (D) uncertain about the authenticity of the fossil
 - (E) excited about the magnitude of his discovery

In the passage, Hou states that the fossil that he found “looked like” certain other fossils that his “teachers always talked about.” He understands almost immediately, therefore, the significance of what he has found, and so (E) is the correct answer: Hou’s hands were shaking because he was “excited about the magnitude of his discovery.”

- (A) is wrong because there is no suggestion that Hou was “afraid that he might lose the fossil.”
- (B) and (C) are wrong because the passage does not indicate that Hou was “worried about” his discovery or “concerned that he might not get credit.” The passage indicates only that Hou recognized that he had found something valuable.
- (D) is wrong because Hou’s immediate reaction is that he thinks he has found an important fossil. The first two sentences of the passage dramatize the discovery; it is Hou’s excitement, not his uncertainty, that causes him to tremble.

Correct answer: (E) / Difficulty level: Easy

Questions 5-8 are based on the following passages.

These two passages were adapted from autobiographical works. In the first, a playwright describes his first visit to a theater in the 1930s; in the second, an eighteenth-century writer describes two visits to theaters in London.

Passage 1

I experienced a shock when I saw a curtain go up for the first time. My mother had taken me to see a play at the Schubert Theater on Lenox Avenue in Harlem in New York City. Here were living people talking to one another inside a large ship whose deck actually heaved up and down with the swells of the sea. By this time I had been going to the movies every Saturday afternoon — Charlie Chaplin’s little comedies, adventure serials, Westerns. Yet once you knew how they worked, movies, unlike the stage, left the mind’s grasp of reality intact since the happenings were not in the theater where you sat. But to see the deck of the ship in the theater moving up and down, and people appearing at the top of a ladder or disappearing through a door—where did

they come from and where did they go?
20 Obviously into and out of the real world of
Lenox Avenue. This was alarming.
And so I learned that there were two
kinds of reality, but that the stage was far
more real. As the play's melodramatic story
25 developed, I began to feel anxious, for there
was a villain on board who had a bomb and
intended to blow everybody up. All over the
stage people were looking for him but he
appeared, furtive and silent, only when the
30 searchers were facing the other way. They
looked for him behind posts and boxes and
on top of beams, even after the audience
had seen him jump into a barrel and pull
the lid over him. People were yelling, "He's
35 in the barrel," but the passengers were deaf.
What anguish! The bomb would go off any
minute, and I kept clawing at my mother's
arm, at the same time glancing at the the-
ater's walls to make sure that the whole
40 thing was not really real. The villain was
finally caught, and we happily walked out
onto sunny Lenox Avenue, saved again.

Passage 2

I was six years old when I saw my first
play at the Old Drury. Upon entering the
45 theater, the first thing I beheld was the green
curtain that veiled a heaven to my imagina-
tion. What breathless anticipations I
endured! I had seen something like it in an
edition of Shakespeare, an illustration of the
50 tent scene with Diomedes in *Troilus and
Cressida*. (A sight of that image can always
bring back in a measure the feeling of that
evening.) The balconies at that time, full of
well-dressed men and women, projected
55 over the orchestra pit; and the pilasters*
reaching down were adorned with a glister-
ing substance resembling sugar candy. The
orchestra lights at length rose. Once the bell
sounded. It was to ring out yet once again—

60 and, incapable of the anticipation, I reposed
my shut eyes in a sort of resignation upon
my mother's lap. It rang the second time.
The curtain drew up—and the play was
Artaxerxes! Here was the court of ancient
65 Persia. I took no proper interest in the
action going on, for I understood not its
import. Instead, all my feeling was absorbed
in vision. Gorgeous costumes, gardens,
palaces, princesses, passed before me. It was
70 all enchantment and a dream.

After the intervention of six or seven
years I again entered the doors of a theater.
That old *Artaxerxes* evening had never done
ringing in my fancy. I expected the same
75 feelings to come again with the same occa-
sion. But we differ from ourselves less at
sixty and sixteen, than the latter does from
six. In that interval what had I not lost! At
six I knew nothing, understood nothing,
80 discriminated nothing. I felt all, loved all,
wondered all. I could not tell how, but I had
left the temple a devotee, and was returned a
rationalist. The same things were there
materially; but the emblem, the reference,
85 was gone. The green curtain was no longer a
veil, drawn between two worlds, the unfold-
ing of which was to bring back past ages, but
a certain quantity of green material, which
was to separate the audience for a given time
90 from certain of their fellows who were to
come forward and pretend those parts. The
lights—the orchestra lights—came up a
clumsy machinery. The first ring, and the
second ring, was now but a trick of the
95 prompter's bell. The actors were men and
women painted. I thought the fault was in
them; but it was in myself, and the alteration
which those many centuries—those six
short years—had wrought in me.

* Pilasters are ornamental columns set into walls.

Following are four sample questions about this pair of related passages. In the test, as many as 13 questions may appear with a passage of this length. Some questions will focus on Passage 1, others will focus on Passage 2, and about half of the questions following each pair of passages will focus on the relationships between the passages.

Some questions require you to identify shared ideas or similarities between the two related passages.

5. The authors of both passages describe
- (A) a young person's sense of wonder at first seeing a play
 - (B) a young person's desire to become a playwright
 - (C) the similarities between plays and other art forms
 - (D) how one's perception of the theater may develop over time
 - (E) the experience of reading a play and then seeing it performed

To answer this question, you have to figure out what these two passages have in common. The subject of Passage 1 is a child's first visit to see a play performed in a theater, and how captivated he was by the entire experience. Passage 2 describes two different visits to the theater; at age six the child is entranced by the spectacle of the performance, but "after the intervention of six or seven years" the older and now more knowledgeable child is not so impressed. (A) is the correct answer because all of Passage 1 and the first half of Passage 2 describe "a young person's sense of wonder at first seeing a play."

- (B) is wrong; even though the introduction to these passages reveals that one of the authors is a "playwright," there is no mention in either passage of a "desire to become a playwright."
- (C) is wrong because Passage 1 mentions differences rather than "similarities" between plays and movies, and Passage 2 does not mention any "other art forms" at all.
- (D) is wrong because only Passage 2 discusses "how one's perception of the theater may develop over time"—this subject is unmentioned in Passage 1.
- (E) is wrong because there is no reference in either passage to "the experience of reading a play."

Correct answer: (A) / Difficulty level: Easy

Some questions assess your comprehension of information that is directly stated in a passage.

6. The "happenings" mentioned in line 14 refer to the
- (A) work undertaken to produce a movie
 - (B) events occurring in the street outside the theater
 - (C) fantasies imagined by a child
 - (D) activity captured on the movie screen
 - (E) story unfolding on the stage

To answer this question correctly, you have to understand lines 11–15, a rather complex sentence that makes an important distinction in Passage 1. The author indicates that, unlike plays, movies leave "the mind's grasp of reality intact," because the "happenings" in a movie are not occurring in the actual theater. Instead, images are projected on a screen in the theater. Thus (D) is the correct answer; the word "happenings" refers to the "activity captured on the movie screen."

- (A) and (B) are wrong because, when you insert them in place of the word "happenings," the sentence in lines 11–15 makes no sense.
- (C) is wrong; even if the movies being referred to include "fantasies" in them, they are not "imagined by a child" but are actually projected on the movie screen.
- (E) is wrong because, in line 14, "happenings" refers to the "story unfolding" in a movie, not "on the stage."

Correct answer: (D) / Difficulty level: Medium

You may be asked to recognize the author's tone or attitude in a particular part of a passage, or in the passage as a whole.

7. In the final sentence of Passage 2 ("I thought . . . in me"), the author expresses
- (A) exultation (B) vindication (C) pleasure
(D) regret (E) guilt

Even though this question focuses on a single sentence, you must understand the context in which the statement occurs in order to determine the feeling expressed by the author. In the second paragraph of Passage 2, the author states that the experience of attending a play at age 12 or 13 was much different than at age 6. "The same things were there materially" in the theater, but the older child knew much more than the younger one about what was going on. Ironically, this increased knowledge actually decreased the author's pleasure in attending the play. "In that interval what had I not lost!" the author exclaims in line 78. Where the younger child saw nobles in "the court of ancient Persia," the older child saw "men and women painted." Thus the final sentence of Passage 2 expresses "regret" concerning the changes that "those many centuries — those six short years — had wrought" in the author. (D) is the correct answer.

- (A) and (C) are incorrect because the author does not feel "exultation" about or take "pleasure" in the "alteration" that has occurred; on the contrary, the author laments it.
- (B) is incorrect because there is no expression of "vindication" in the final sentence; the author is not trying to justify, support, or defend the experiences described in the passage, but rather to explain the changes that have occurred due to the passing of time.
- (E) is incorrect because, even though the final sentence states that the "fault" was not in the actors but in the now more knowledgeable child, the author feels no "guilt" about the change. There is no way to avoid the passage of time (and the learning that goes along with it). Aging is not the child's "fault," but the loss of a youthful sense of wonder and innocence can still cause regret.

Correct answer: (D) / Difficulty level: Hard

Some questions require you to determine and compare the primary purpose or main idea expressed in each passage.

8. Which of the following best describes the difference between Passages 1 and 2 ?
- (A) Passage 1 remembers an event with fondness, while Passage 2 recalls a similar event with bitter detachment.
(B) Passage 1 considers why the author responded to the visit as he did, while Passage 2 supplies the author's reactions without further analysis.
(C) Passage 1 relates a story from a number of different perspectives, while Passage 2 maintains a single point of view.
(D) Passage 1 treats the visit to the theater as a disturbing episode in the author's life, while Passage 2 describes the author's visit as joyful.
(E) Passage 1 recounts a childhood experience, while Passage 2 examines how a similar experience changed over time.

This question asks you to do two things: first, understand the overall subject or purpose of each passage; second, recognize an important "difference between" the two. The correct answer is (E) because the entire first passage does indeed tell the story of a particular "childhood experience" — a trip to the theater — whereas the second passage describes two different trips to the theater and how the "experience changed over time."

- (A) is wrong because there is neither bitterness nor "detachment" in Passage 2. In fact, the first paragraph of Passage 2 expresses excitement and "enchantment," and the second paragraph expresses disappointment and regret.
- (B) is wrong because Passage 2 includes a great deal more than just "the author's reactions" to visiting the theater; most of the second paragraph provides "further analysis" of what had changed and why the reactions to the two visits were so different.
- (C) is wrong because it reverses the two narrative approaches in this pair of passages. Passage 1 "maintains a single point of view," that of the youthful first-time theatergoer, whereas the author of Passage 2 presents at least two "different perspectives," that of the enchanted six-year-old and of the older child returning to the theater.
- (D) is wrong because the author of Passage 1 does not find his first visit to the theater "disturbing" in a negative way. Although he feels "shock" when the curtain goes up and anxiety during the play, these responses merely indicate how effective and "real" the performance was for him. In the end, the child and his mother walked "happily" out of the theater.

Correct answer: (E) / Difficulty level: Easy

The Mathematics Section

The mathematics section of the SAT contains two types of questions:

- Standard multiple-choice (44 questions)
- Student-produced response questions that provide no answer choices (10 questions)

Some questions are like those you may have seen in your mathematics courses. The ability to reason logically in a variety of situations, some of which may be new to you, is tested throughout.

Approaches to the Mathematics Section

- **Familiarize yourself with the directions ahead of time.**
- **The test does not require you to memorize formulas.** Commonly used formulas are provided in the test booklet at the beginning of each mathematics section. It is up to you to decide which formula is appropriate to a question.
- **Read the problem carefully.** Look for key words that tell you what the problem is asking. Ask yourself the following questions before you solve each problem: What is the question asking? What do I know?
- **With some problems, it may be useful to draw a sketch or diagram of the given information.**
- **Use the test booklet for scratch work.** You are not expected to do all the reasoning and figuring in your head. You will not receive credit for anything written in the booklet, but you will be able to check your work easily later.
- **Decide when to use a calculator.** (See Calculator Tips.)
- **Eliminate choices.** If you don't know the correct answer to a question, try some of the choices. It's sometimes easier to find the wrong answers than the correct one. On some questions, you can eliminate all the incorrect choices.
- **Make sure your answer is a reasonable answer to the question asked.** This is especially true for student-produced response questions, where no answer choices are given.
- **All figures are drawn to scale unless otherwise indicated.**

Calculator Policy

You will not be allowed to share calculators. You will be dismissed and your scores will be canceled if you use your calculator to share information during the test or to remove test questions or answers from the test room.

Calculator Tips

- **Remember to bring your calculator on test day.** Calculators will not be available at the test center. You should be familiar with how to use the calculator you bring to the test.
- **Make sure your calculator is in good working order and that its batteries are fresh.** If your calculator fails during testing and you have no backup, you will have to complete the test without it (or cancel your scores for the entire test).

- **Don't buy an expensive, sophisticated calculator just to take the test.** Although you can use them for the test, more sophisticated calculators are not required for any problem.
- **Don't try to use a calculator on every question.** First, decide how you will solve the problem, and then decide whether to use the calculator. The calculator is meant to aid you in problem solving, not to get in the way.
- **Get your thoughts down before using your calculator.** It may help to do scratch work in the test booklet.
- **Take the practice test with a calculator at hand.** This will help you determine which types of questions you should use your calculator to answer.

Acceptable Calculators

We recommend that you bring a calculator to use on the mathematics section of the SAT. Every question on the test can be solved without a calculator, but you may have an advantage if you use a scientific or graphing calculator on some questions.

Calculators permitted during testing are:

- Graphing calculators
- Scientific calculators
- Four-function calculators (not recommended). See page 12 for the calculators that are permitted for use on the SAT.

Test-takers using a calculator with large characters (one inch high or more) or raised display that might be visible to other test-takers will be seated at the discretion of the test supervisor in a location where other test-takers cannot view the large or raised display.

Unacceptable Calculators

The following calculators are not permitted:

- Portable/handheld computers, laptops, electronic writing pads, pocket organizers
- Models that have a QWERTY (i.e., typewriter) keypad, either as part of hardware or software (e.g., TI-92 Plus, Voyage 200)
- Models that have pen-input, stylus or touch-screen capability (e.g., Palm, PDAs, Casio ClassPad) or have wireless or Bluetooth capability
- Models that use paper tape, "talk" or make unusual noises, or require an electrical outlet
- Models that can access the Internet
- Models that have cell phone capability or have audio/video recording capability
- Models that have a digital audio/video player or have a camera or scanning capability

The following calculators are permitted on the SAT:

Four-function calculators: Although not recommended, **any** four-function calculator is permitted.

Scientific calculators: **Any** scientific calculator (programmable or nonprogrammable) is permitted.

Graphing calculators: The following **graphing calculators** are permitted. This list will be updated as needed.

Casio

FX-6000 series
FX-6200 series
FX-6300 series
FX-6500 series
FX-7000 series
FX-7300 series
FX-7400 series
FX-7500 series
FX-7700 series
FX-7800 series
FX-8000 series
FX-8500 series
FX-8700 series
FX-8800 series

FX-9700 series
FX-9750 series
FX-9860 series
CFX-9800 series
CFX-9850 series
CFX-9950 series
CFX-9970 series
FX 1.0 series
Algebra FX 2.0 series
FX-CG-10 (PRIZM)
FX-CG-20

Hewlett-Packard

HP-9G
HP-28 series
HP-38G
HP-39 series
HP-40 series
HP-48 series
HP-49 series
HP-50 series

Radio Shack

EC-4033
EC-4034
EC-4037

Sharp

EL-5200
EL-9200 series
EL-9300 series
EL-9600 series*
EL-9900 series

*The use of the stylus is not permitted.

Other

Datexx DS-883
Micronta
Smart²

Texas Instruments

TI-73
TI-80
TI-81
TI-82
TI-83/TI-83 Plus
TI-83 Plus Silver
TI-84 Plus
TI-84 Plus Silver
TI-84 Plus C Silver
TI-85
TI-86
TI-89
TI-89 Titanium
TI-Nspire
TI-Nspire CX
TI-Nspire CM-C
TI-Nspire CAS
TI-Nspire CX CAS
TI-Nspire CAS CX-C

Mathematics Review

Number and Operations (20–25%)

- Arithmetic word problems (including percent, ratio and proportion)
- Properties of integers (even, odd, prime numbers, divisibility, etc.)
- Rational numbers
- Sets (union, intersection, elements)
- Counting techniques
- Sequences and series (including exponential growth)
- Elementary number theory

Algebra and Functions (35–40%)

- Substitution and simplifying algebraic expressions
- Properties of exponents
- Algebraic word problems
- Solutions of linear equations and inequalities
- Systems of equations and inequalities
- Quadratic equations
- Rational and radical equations
- Equations of lines
- Absolute value
- Direct and inverse variation
- Concepts of algebraic functions
- Newly defined symbols based on commonly used operations

Geometry and Measurement (25–30%)

- Area and perimeter of a polygon
- Area and circumference of a circle
- Volume of a box, cube and cylinder
- Pythagorean Theorem and special properties of isosceles, equilateral and right triangles
- Properties of parallel and perpendicular lines
- Coordinate geometry
- Geometric visualization
- Slope
- Similarity
- Transformations

Data Analysis, Statistics and Probability (10–15%)

- Data interpretation (tables and graphs)
- Descriptive statistics (mean, median, mode and range)
- Probability

Number and Operations

- **Integers:** $\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots$
(Note: zero is neither positive nor negative.)
- **Consecutive Integers:** Integers that follow in sequence; for example, 22, 23, 24, 25. Consecutive integers can be more generally represented by $n, n + 1, n + 2, n + 3, \dots$
- **Odd Integers:** $\dots, -7, -5, -3, -1, 1, 3, 5, 7, \dots, 2k + 1, \dots$ where k is an integer
- **Even Integers:** $\dots, -6, -4, -2, 0, 2, 4, 6, \dots, 2k, \dots$, where k is an integer (Note: zero is an even integer.)
- **Prime Numbers:** 2, 3, 5, 7, 11, 13, 17, 19, \dots
(Note: 1 is not a prime and 2 is the only even prime.)
- **Digits:** 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
(Note: the units digit and the ones digit refer to the same digit in a number. For example, in the number 125, the 5 is called the units digit or the ones digit.)

Percent

Percent means hundredths, or number out of 100. For example, 40 percent means $\frac{40}{100}$ or 0.40 or $\frac{2}{5}$.

Problem 1: If the sales tax on a \$30.00 item is \$1.80, what is the sales tax rate?

Solution: $\$1.80 = \frac{n}{100} \times \30.00

$n = 6$, so 6% is the sales tax rate.

Percent Increase / Decrease

Problem 2: If the price of a computer was decreased from \$1,000 to \$750, by what percent was the price decreased?

Solution: The price decrease is \$250. The percent decrease is the value of n in the equation $\frac{250}{1,000} = \frac{n}{100}$. The value of n is 25, so the price was decreased by 25%.

Note: $n\%$ increase means $\frac{\text{increase}}{\text{original}} = \frac{n}{100}$;

$n\%$ decrease means $\frac{\text{decrease}}{\text{original}} = \frac{n}{100}$.

Average Speed

Problem: José traveled for 2 hours at a rate of 70 kilometers per hour and for 5 hours at a rate of 60 kilometers per hour. What was his average speed for the 7-hour period?

Solution: In this situation, the average speed was

$$\frac{\text{total distance}}{\text{total time}}$$

The total distance was

$$2 \text{ hr} \left(70 \frac{\text{km}}{\text{hr}} \right) + 5 \text{ hr} \left(60 \frac{\text{km}}{\text{hr}} \right) = 440 \text{ km.}$$

The total time was 7 hours. Thus, the average speed was

$$\frac{440 \text{ km}}{7 \text{ hr}} = 62\frac{6}{7} \text{ kilometers per hour.}$$

Note: In this example, the average speed over the 7-hour period is not the average of the two given speeds, which would be 65 kilometers per hour.

Sequences

Two common types of sequences that appear on the SAT are arithmetic and geometric sequences.

An **arithmetic sequence** is a sequence in which successive terms differ by the same constant amount.

For example: 3, 5, 7, 9, . . . is an arithmetic sequence.

A **geometric sequence** is a sequence in which the ratio of successive terms is a constant.

For example: 2, 4, 8, 16, . . . is a geometric sequence.

A sequence may also be defined using previously defined terms. For example, the first term of a sequence is 2, and each successive term is 1 less than twice the preceding term. This sequence would be 2, 3, 5, 9, 17, . . .

On the SAT, explicit rules are given for each sequence. For example, in the sequence above, you would not be expected to know that the 6th term is 33 without being given the fact that each term is one less than twice the preceding term. For sequences on the SAT, the first term is *never* referred to as the “zeroth” term.

Algebra and Functions

Factoring

You may need to apply these types of factoring:

$$x^2 + 2x = x(x + 2)$$

$$x^2 - 1 = (x + 1)(x - 1)$$

$$x^2 + 2x + 1 = (x + 1)(x + 1) = (x + 1)^2$$

$$2x^2 + 5x - 3 = (2x - 1)(x + 3)$$

Functions

A function is a relation in which each element of the domain is paired with *exactly* one element of the range. On the SAT, unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number. For example, if

$f(x) = \sqrt{x + 2}$, the domain of f is all real numbers greater than or equal to -2 . For this function, 14 is paired with 4, since $f(14) = \sqrt{14 + 2} = \sqrt{16} = 4$.

Note: The $\sqrt{\quad}$ symbol represents the positive, or principal, square root. For example, $\sqrt{16} = 4$, not ± 4 .

Exponents

You should be familiar with the following rules for exponents on the SAT.

For all values of a , b , x , y :

$$x^a \cdot x^b = x^{a+b} \quad (x^a)^b = x^{ab} \quad (xy)^a = x^a \cdot y^a$$

For all values of a , b , $x > 0$, $y > 0$:

$$\frac{x^a}{x^b} = x^{a-b} \quad \left(\frac{x}{y} \right)^a = \frac{x^a}{y^a} \quad x^{-a} = \frac{1}{x^a}$$

Also, $x^{\frac{a}{b}} = \sqrt[b]{x^a}$. For example, $x^{\frac{2}{3}} = \sqrt[3]{x^2}$.

Note: For any nonzero number x , it is true that $x^0 = 1$.

Variation

Direct Variation: The variable y is directly proportional to the variable x if there exists a nonzero constant k such that $y = kx$.

Inverse Variation: The variable y is inversely proportional to the variable x if there exists a nonzero constant k such that $y = \frac{k}{x}$ or $xy = k$.

Absolute Value

The absolute value of x is defined as the distance from x to zero on the number line. The absolute value of x is written as $|x|$. For all real numbers x :

$$|x| = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$$

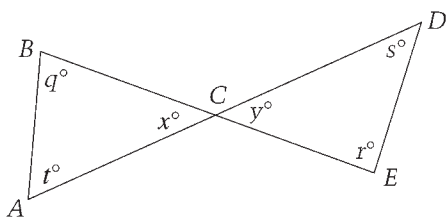
For example: $\begin{cases} |2| = 2, & \text{since } 2 > 0 \\ |-2| = -(-2) = 2, & \text{since } -2 < 0 \\ |0| = 0 \end{cases}$

Geometry and Measurement

Figures that accompany problems are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a particular problem that the figure is not drawn to scale. In general, even when figures are not drawn to scale, the relative positions of points and angles may be assumed to be in the order shown. Also, line segments that extend through points and appear to lie on the same line may be assumed to be on the same line. A point that appears to lie on a line or curve may be assumed to lie on the line or curve.

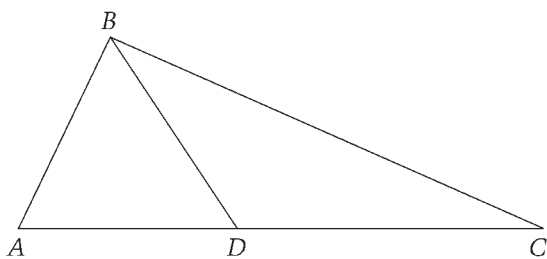
The text “Note: Figure not drawn to scale” is included with the figure when degree measures may not be accurately shown and specific lengths may not be drawn proportionally. The following examples illustrate what information can and cannot be assumed from figures.

Example 1:



Since \overline{AD} and \overline{BE} are line segments, angles ACB and DCE are vertical angles. Therefore, you can conclude that $x = y$. Even though the figure is drawn to scale, you should NOT make any other assumptions without additional information. For example, you should NOT assume that $AC = CD$ or that the angle at vertex E is a right angle even though they might look that way in the figure.

Example 2:



Note: Figure not drawn to scale.

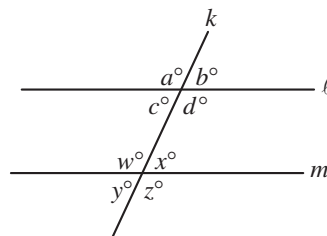
A question may refer to a triangle such as ABC above. Although the note indicates that the figure is not drawn to scale, you may assume the following from the figure:

- ABD and DBC are triangles.
- D is between A and C .
- A, D and C are points on a line.
- The length of \overline{AD} is less than the length of \overline{AC} .
- The measure of angle ABD is less than the measure of angle ABC .

You may *not* assume the following from the figure:

- The length of \overline{AD} is less than the length of \overline{DC} .
- The measures of angles BAD and BDA are equal.
- The measure of angle ABD is greater than the measure of angle DBC .
- Angle ABC is a right angle.

Properties of Parallel Lines



1. If two parallel lines are cut by a third line, the alternate interior angles are congruent. In the figure above,

$$c = x \text{ and } w = d.$$

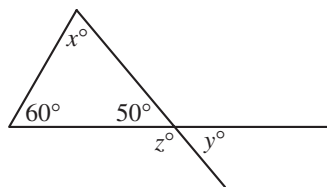
2. If two parallel lines are cut by a third line, the corresponding angles are congruent. In the figure,

$$a = w, b = x, c = y, \text{ and } d = z.$$

3. If two parallel lines are cut by a third line, the sum of the measures of the interior angles on the same side of the transversal is 180° . In the figure,

$$c + w = 180 \text{ and } d + x = 180.$$

Angle Relationships



1. The sum of the measures of the interior angles of a triangle is 180° . In the figure above,

$$x = 70 \text{ because } 60 + 50 + x = 180.$$

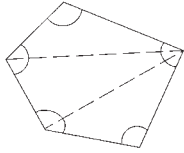
2. When two lines intersect, vertical angles are congruent. In the figure,

$$y = 50.$$

3. A straight angle measures 180° . In the figure,

$$z = 130 \text{ because } z + 50 = 180.$$

4. The sum of the measures of the interior angles of a polygon can be found by drawing all diagonals of the polygon from one vertex and multiplying the number of triangles formed by 180° .



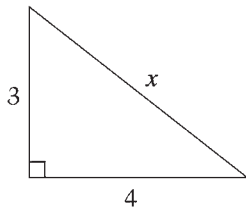
Since this polygon is divided into 3 triangles, the sum of the measures of its angles is $3 \times 180^\circ$, or 540° .

Unless otherwise noted in the SAT, the term “polygon” will be used to mean a convex polygon; that is, a polygon in which each interior angle has a measure of less than 180° .

A polygon is “regular” if all its sides are congruent and all its angles are congruent.

Side Relationships

1. Pythagorean Theorem: In any right triangle, $a^2 + b^2 = c^2$, where c is the length of the longest side and a and b are the lengths of the two shorter sides.



To find the value of x , use the Pythagorean Theorem.

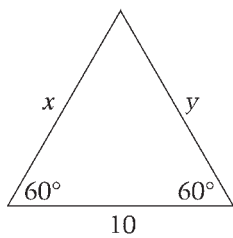
$$x^2 = 3^2 + 4^2$$

$$x^2 = 9 + 16$$

$$x^2 = 25$$

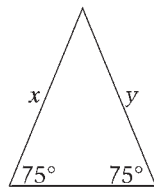
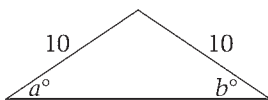
$$x = \sqrt{25} = 5$$

2. In any equilateral triangle, all sides are congruent and all angles are congruent.

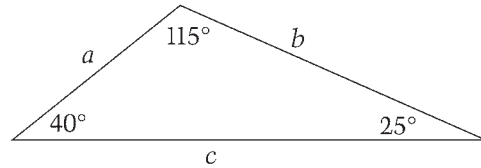


Because the measure of the unmarked angle is 60° , the measures of all angles of the triangle are equal; therefore, the lengths of all sides of the triangle are equal:
 $x = y = 10$.

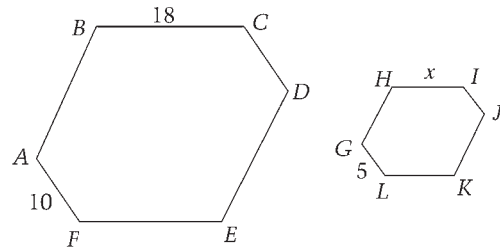
3. In an isosceles triangle, the angles opposite congruent sides are congruent. Also, the sides opposite congruent angles are congruent. In the figures below, $a = b$ and $x = y$.



4. In any triangle, the longest side is opposite the largest angle, and the shortest side is opposite the smallest angle. In the figure below, $a < b < c$.



5. Two polygons are *similar* if and only if the lengths of their corresponding sides are in the same ratio and the measures of their corresponding angles are equal.



If polygons $ABCDEF$ and $GHIJKL$ are similar, then \overline{AF} and \overline{GL} are corresponding sides, so that

$$\frac{AF}{GL} = \frac{10}{5} = \frac{2}{1} = \frac{BC}{HI} = \frac{18}{x}. \text{ Therefore, } x = 9 = HI.$$

Note: \overline{AF} means the line segment with endpoints A and F , and AF means the length of \overline{AF} .

Area and Perimeter

Rectangles

Area of a rectangle = length \times width = $\ell \times w$

Perimeter of a rectangle = $2(\ell + w) = 2\ell + 2w$

Circles

Area of a circle = πr^2 (where r is the radius)

Circumference of a circle = $2\pi r = \pi d$ (where d is the diameter)

Triangles

Area of a triangle = $\frac{1}{2}$ (base \times altitude)

Perimeter of a triangle = the sum of the lengths of the three sides

Triangle inequality: The sum of the lengths of any two sides of a triangle must be greater than the length of the third side.

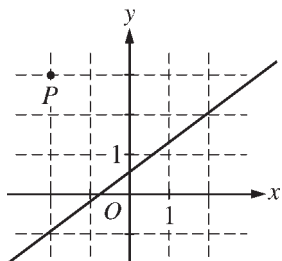
Volume

Volume of a rectangular solid (or cube) = $\ell \times w \times h$
(ℓ is the length, w is the width and h is the height)

Volume of a right circular cylinder = $\pi r^2 h$
(r is the radius of the base, and h is the height)

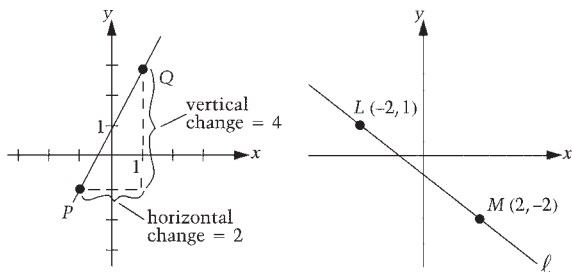
Be familiar with the formulas that are provided in the Reference Information included with the test directions. Refer to the test directions in the sample test in this publication.

Coordinate Geometry



- In questions that involve the x - and y -axes, x -values to the right of the y -axis are positive and x -values to the left of the y -axis are negative. Similarly, y -values above the x -axis are positive and y -values below the x -axis are negative. In an ordered pair (x, y) , the x -coordinate is written first. Point P in the figure above appears to lie at the intersection of gridlines. From the figure, you can conclude that the x -coordinate of P is -2 and the y -coordinate of P is 3 . Therefore, the coordinates of point P are $(-2, 3)$. Similarly, you can conclude that the line shown in the figure passes through the point with coordinates $(-2, -1)$ and the point $(2, 2)$.

- Slope of a line = $\frac{\text{change in } y\text{-coordinates}}{\text{change in } x\text{-coordinates}}$



$$\text{Slope of } \overline{PQ} = \frac{4}{2} = 2$$

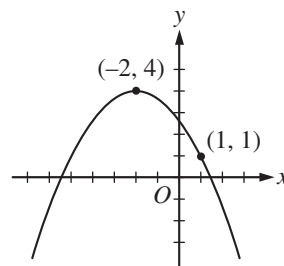
$$\text{Slope of } \ell = \frac{1 - (-2)}{-2 - 2} = -\frac{3}{4}$$

A line that slopes upward as you go from left to right has a *positive* slope. A line that slopes downward as you go from left to right has a *negative* slope. A horizontal line has a slope of zero. The slope of a vertical line is undefined.

Parallel lines have the same slope. The product of the slopes of two perpendicular lines is -1 , provided the slope of each of the lines is defined. For example, any line perpendicular to line ℓ above has a slope of $\frac{4}{3}$.

The equation of a line can be expressed as $y = mx + b$, where m is the slope and b is the y -intercept. Since the slope of line ℓ is $-\frac{3}{4}$, the equation of line ℓ can be expressed as $y = -\frac{3}{4}x + b$. Since the point $(-2, 1)$ is on the line, $x = -2$ and $y = 1$ must satisfy the equation. Hence, $1 = \frac{3}{2} + b$, so $b = -\frac{1}{2}$ and the equation of line ℓ is $y = -\frac{3}{4}x - \frac{1}{2}$.

- A quadratic function can be expressed as $y = a(x - h)^2 + k$ where the vertex of the parabola is at the point (h, k) and $a \neq 0$. If $a > 0$, the parabola opens upward; and if $a < 0$, the parabola opens downward.



The parabola above has its vertex at $(-2, 4)$. Therefore, $h = -2$ and $k = 4$. The equation can be represented by $y = a(x + 2)^2 + 4$. Since the parabola opens downward, we know that $a < 0$. To find the value of a , we also need to know another point on the parabola. Since we know the parabola passes through the point $(1, 1)$, $x = 1$ and $y = 1$ must satisfy the equation. Hence, $1 = a(1 + 2)^2 + 4$, so $a = -\frac{1}{3}$. Therefore, an equation for the parabola is $y = -\frac{1}{3}(x + 2)^2 + 4$.

Data Analysis, Statistics and Probability

Measures of Center

An **average** is a statistic that is used to summarize data. The most common type of average is the **arithmetic mean**. The average (arithmetic mean) of a list of n numbers is equal to the sum of the numbers divided by n .

For example, the mean of 2, 3, 5, 7 and 13 is equal to

$$\frac{2 + 3 + 5 + 7 + 13}{5} = 6.$$

When the average of a list of n numbers is given, the sum of the numbers can be found. For example, if the average of six numbers is 12, the sum of these six numbers is 12×6 , or 72.

The **median** of a list of numbers is the number in the middle when the numbers are ordered from greatest to least or from least to greatest. For example, the median of 3, 8, 2, 6 and 9 is 6 because when the numbers are ordered, 2, 3, 6, 8, 9, the number in the middle is 6. When there is an even number of values, the median is the same as the mean of the two middle numbers. For example, the median of 6, 8, 9, 13, 14 and 16 is the mean of 9 and 13, which is 11.

The **mode** of a list of numbers is the number that occurs most often in the list. For example, 7 is the mode of 2, 7, 5, 8, 7 and 12. The list 2, 4, 2, 8, 2, 4, 7, 4, 9 and 11 has two modes, 2 and 4.

Note: On the SAT, the use of the word *average* refers to the arithmetic mean and is indicated by “average (arithmetic mean).” An exception is when a question involves average speed (see page 14). Questions involving median and mode will have those terms stated as part of the question’s text.

Range

The **range** of a list of numbers is the value obtained by subtracting the smallest number in the list from the greatest number in the list. For example, in the list 8, 15, 11, -4, 0, 6, -7 and 12, the range is equal to the difference between 15 and -7, which is 22.

Probability

Probability refers to the chance that a specific outcome can occur. When outcomes are equally likely, probability can be found by using the following definition:

$$\frac{\text{number of ways that a specific outcome can occur}}{\text{total number of possible outcomes}}$$

For example, if a jar contains 13 red marbles and 7 green marbles, the probability that a marble selected from the jar at random will be green is

$$\frac{7}{7 + 13} = \frac{7}{20} \text{ or } 0.35$$

Note: The phrase *at random* in the preceding example means that each individual marble in the jar is equally likely to be selected. It does not mean the two colors are equally likely to be selected.

If a particular outcome can never occur, its probability is 0. If an outcome is certain to occur, its probability is 1. In general, if p is the probability that a specific outcome will occur, values of p fall in the range $0 \leq p \leq 1$. Probability may be expressed as either a decimal, a fraction or a ratio.

Multiple-Choice Questions

The questions that follow will give you an idea of the type of mathematical thinking required to solve problems on the SAT. First, try to answer each question yourself, and then read the solutions that follow. These solutions may give you new insights into solving the problems or point out techniques you'll be able

to use again. Most problems can be solved in a variety of ways, so don't be concerned if your method is different from the one given. Note that the directions indicate that you are to select the *best* of the choices given.

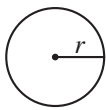
Directions

For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratch work.

Notes

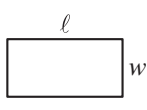
- The use of a calculator is permitted.
- All numbers used are real numbers.
- Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
- Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information

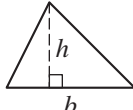


$$A = \pi r^2$$

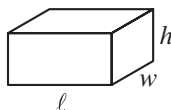
$$C = 2\pi r$$



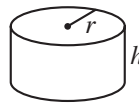
$$A = \ell w$$



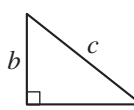
$$A = \frac{1}{2}bh$$



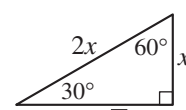
$$V = \ell wh$$



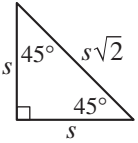
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

Sample Questions

Below are seven examples of standard multiple-choice questions. Following each question, you will find one or two solutions.

- A special lottery is to be held to select the student who will live in the only deluxe room in a dormitory. There are 100 seniors, 150 juniors, and 200 sophomores who applied. Each senior's name is placed in the lottery 3 times; each junior's name, 2 times; and each sophomore's name, 1 time. If a student's name is chosen at random from the names in the lottery, what is the probability that a senior's name will be chosen?

- (A) $\frac{1}{8}$ (B) $\frac{2}{9}$ (C) $\frac{2}{7}$
- (D) $\frac{3}{8}$ (E) $\frac{1}{2}$

To determine the probability that a senior's name will be chosen, you must determine the total number of seniors' names that are in the lottery and divide this number by the total number of names in the lottery. Since each senior's name is placed in the lottery 3 times, there are $3 \times 100 = 300$ seniors' names. Likewise, there are $2 \times 150 = 300$ juniors' names and $1 \times 200 = 200$ sophomores' names in the lottery. The probability that a senior's name will be chosen is

$$\frac{300}{300 + 300 + 200} = \frac{300}{800} = \frac{3}{8}$$

Correct answer: (D) / Difficulty level: Medium

NOONTIME TEMPERATURES IN HILO, HAWAII

Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.
66	78	75	69	78	77	70

2. The table above shows the temperatures at noon, in degrees Fahrenheit, in a city in Hawaii over a one-week period. If m represents the median of these temperatures, f represents the temperature that occurred most often, and a represents the average (arithmetic mean) of these seven temperatures, which of the following is the correct order of m , f , and a ?

- (A) $a < m < f$
 (B) $a < f < m$
 (C) $m < a < f$
 (D) $m < f < a$
 (E) $a = m < f$

Correct answer: (A) / Difficulty level: Medium

To determine the correct order of m , f , and a , it is helpful to first place the seven temperatures in ascending order, as shown below:

66 69 70 75 77 78 78

The median temperature is the middle temperature in the ordered list, which is 75, so $m = 75$. The temperature that occurred most often, or the mode, is 78, so $f = 78$. To determine the average, you can add the seven numbers together and divide by 7. However, you can determine the relationship between the average and the median by inspection. The three numbers greater than 75 are closer to 75 than are the three numbers smaller than 75. Therefore, the average of the seven numbers will be less than 75. The correct order of m , f , and a is $a < m < f$.

3. The projected sales volume of a video game cartridge is given

by the function $s(p) = \frac{3000}{2p + a}$, where s is the number of

cartridges sold, in thousands; p is the price per cartridge, in dollars; and a is a constant. If according to the projections, 100,000 cartridges are sold at \$10 per cartridge, how many cartridges will be sold at \$20 per cartridge?

- (A) 20,000 (B) 50,000 (C) 60,000
 (D) 150,000 (E) 200,000

Correct answer: (C) / Difficulty level: Medium

For 100,000 cartridges sold at \$10 per cartridge, $s = 100$ (since s is the number of cartridges sold, in thousands) and $p = 10$. Substituting into the equation yields

$$100 = \frac{3000}{2(10) + a}$$

$$100(20 + a) = 3000$$

$$20 + a = 30$$

$$a = 10$$

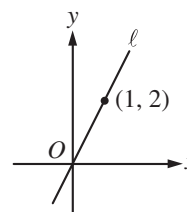
Since a is a constant, the function can be written as

$$s(p) = \frac{3000}{2p + 10}$$

To determine how many cartridges will be sold at \$20 per cartridge, you need to evaluate

$$s(20) = \frac{3000}{2(20) + 10} = 60$$

Since s is given in thousands, there will be 60,000 cartridges sold at \$20 per cartridge.



4. In the xy -coordinate plane above, line ℓ contains the points $(0, 0)$ and $(1, 2)$. If line m (not shown) contains the point $(0, 0)$ and is perpendicular to ℓ , what is an equation of m ?

- (A) $y = -\frac{1}{2}x$
 (B) $y = -\frac{1}{2}x + 1$
 (C) $y = -x$
 (D) $y = -x + 2$
 (E) $y = -2x$

Correct Answer: (A) / Difficulty level: Medium

Using the coordinates of the two points given on line ℓ , the slope

of ℓ is $\frac{2 - 0}{1 - 0} = 2$. Line m , which is perpendicular

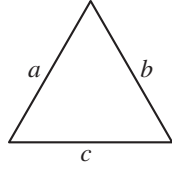
to ℓ , will have a slope of $-\frac{1}{2}$, since slopes of perpendicular lines

are negative reciprocals of each other. An equation

of m can be written as $y = -\frac{1}{2}x + b$. Since line m also

contains point $(0, 0)$, it follows that $b = 0$. Therefore, an equation

of line m is $y = -\frac{1}{2}x$.



Note: Figure not drawn to scale.

5. If two sides of the triangle above have lengths 5 and 6, the perimeter of the triangle could be which of the following?
- I. 15
 II. 20
 III. 22
- (A) I only (B) I and II only (C) I and III only
 (D) II and III only (E) I, II, and III

Correct answer: (B) / Difficulty level: Hard

In questions of this type, statements I, II, and III should each be considered independently of the others. In this question, you must determine which of those statements *could* be true.

- Statement I states that 15 could be the perimeter of the triangle. This is true. If the perimeter of the triangle is 15, and two sides have lengths 5 and 6, then the third side of the triangle would have length $15 - (6 + 5)$, or 4. A triangle can have side lengths of 4, 5, and 6. So the perimeter of the triangle could be 15.
- Similarly, statement II is true. If 20 is the perimeter of the triangle, then the third side of the triangle would have length $20 - (6 + 5)$, or 9. A triangle can have side lengths of 5, 6, and 9. So the perimeter of the triangle *could* be 20.
- Finally, consider whether the triangle could have a perimeter of 22. In this case, the length of the third side would be $22 - (6 + 5) = 11$. The triangle inequality states that the sum of the lengths of any two sides of a triangle must be greater than the length of the third side. Since the sum of 5 and 6 is not greater than 11, it follows that 5, 6, and 11 cannot be the lengths of the sides of a triangle, and so the given triangle cannot have a perimeter of 22.

Therefore, the correct answer to the question is I and II only, which is choice (B).

6. If $x > 1$ and $\frac{\sqrt{x}}{x^3} = x^m$, what is the value of m ?
- (A) $-\frac{7}{2}$ (B) -3 (C) $-\frac{5}{2}$
 (D) -2 (E) $-\frac{3}{2}$

Correct answer: (C) / Difficulty level: Medium

Since \sqrt{x} can be written as $x^{\frac{1}{2}}$ and $\frac{1}{x^3}$ can be written as x^{-3} , the left side of the equation is $x^{\frac{1}{2}} \cdot x^{-3} = x^{\left(\frac{1}{2} - 3\right)} = x^{-\frac{5}{2}}$. Since $x^{-\frac{5}{2}} = x^m$, the value of m is $-\frac{5}{2}$.

7. If k is divisible by 2, 3, and 15, which of the following is also divisible by these numbers?
- (A) $k + 5$ (B) $k + 15$ (C) $k + 20$
 (D) $k + 30$ (E) $k + 45$

Correct answer: (D) / Difficulty level: Medium

Since k is divisible by 2, 3, and 15, k must be a multiple of 30, as 30 is the least common multiple of 2, 3, and 15. Some multiples of 30 are 0, 30, 60, 90, and 120.

- If you add two multiples of 30, the sum will also be a multiple of 30. For example, 60 and 90 are multiples of 30, and their sum, 150, is also a multiple of 30.
- If you add a multiple of 30 to a number that is not a multiple of 30, the sum will not be a multiple of 30. For example, 60 is a multiple of 30 and 45 is not. Their sum, 105, is not a multiple of 30.
- The question asks which answer choice is divisible by 2, 3, and 15 — that is, which answer choice is a multiple of 30. All the answer choices are in the form of “ k plus a number.” Only choice (D), $k + 30$, is the sum of k and a multiple of 30. The sum of k and 30 is also a multiple of 30, so the correct answer is choice (D).

Student-Produced Response Questions

Questions of this type have no answer choices provided. Instead, you must solve the problem and fill in your answer on a special grid. Ten questions on the test will be of this type.

It is very important for you to understand the directions for entering answers on the grid. You will lose valuable testing time if you have to stop to figure out how to grid the answers when you take the test. Take the time now to understand how to enter your answers in this special format.

A primary advantage of this format is that it allows you to enter the form of the answer that you obtain, whether a whole number, decimal or fraction. For example, if you obtain $\frac{2}{5}$, you can grid $\frac{2}{5}$. If you obtain .4, you can grid .4. Generally, you should grid the form of the answer that you obtain naturally in solving the problem. The grid will only hold numbers that range from 0 to 9999. Decimals and fractions can also be gridded.

Below are the actual directions that you will find on the test — read them carefully.

Each of the remaining questions requires you to solve the problem and enter your answer by marking the circles in the special grid, as shown in the examples below. You may use any available space for scratch work.

Answer: $\frac{7}{12}$

Write answer in boxes. →

7	/	1	2
○	○	○	○
1	0	0	0
2	1	1	1
3	2	2	●
4	3	3	3
5	4	4	4
6	5	5	5
7	6	6	6
8	7	7	7
9	8	8	8
9	9	9	9

← Fraction line

Grid in result. →

Answer: 2.5

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

← Decimal point

Answer: 201

Either position is correct.

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

Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

- Mark no more than one circle in any column.
- Because the answer sheet will be machine-scored, **you will receive credit only if the circles are filled in correctly.**
- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If

3	1	/	2
○	○	○	○

 is gridded, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
- **Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid. For example, if you obtain an answer such as 0.6666..., you should record your result as .666 or .667. **A less accurate value such as .66 or .67 will be scored as incorrect.** Acceptable ways to grid $\frac{2}{3}$ are:

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

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

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

Approaches to Student-Produced Response Questions

- **Decide in which column you want to begin gridding your answers before the test starts.** You can start gridding your answers in any column (space permitting), but it helps to decide on a method ahead of time.
- **If the answer is zero, grid it in column 2, 3 or 4.** Note that there is no circle to grid for zero in column 1.
- **Do not use leading zeros.** For example, if your answer is .125, you must grid .125 or convert it to the fraction $\frac{1}{8}$.
- **A fraction does not have to be reduced unless it will not fit the grid.** For example, $\frac{15}{25}$ will not fit. The reduced form of $\frac{3}{5}$ can be entered. Note that $\frac{6}{10}$ and $\frac{9}{15}$ would also be considered correct and do not have to be reduced. The decimal form, .6, can also be gridded.

- **Do your best to be certain of your answer before you grid it.** If you erase your answer, do so completely. Incomplete erasures may be picked up by the scoring machines as intended answers.
- **Check your work if your answer does not fit on the grid.** If you obtain a negative value, a value greater than 9999 or an irrational number, you have made an error.
- **Make an educated guess if you don't know the answer.** On student-produced response (grid-in) questions, you don't lose points for wrong answers.
- **Always enter your answer by filling in the circles on the grid.** Only answers entered on the grid are scored. Your handwritten answer at the top of the grid isn't scored. However, writing your answer at the top of the grid may help you avoid gridding errors.

Sample Questions

Below are five examples of student-produced response questions. Following each question, you will find a solution and several ways to enter the correct answer.

$$\begin{aligned} |4x - 7| &= 5 \\ |3 - 8x| &= 1 \end{aligned}$$

8. What value of x satisfies both of the equations above?

	1	/	2
.	✓	●	.
0	0	0	0
1	●	1	1
2	2	2	●
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

.	5		
●	✓	✓	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	●	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Since $|4x - 7| = 5$, the value of $4x - 7$ is either 5 or -5 :

$$\begin{aligned} 4x - 7 &= 5 & 4x - 7 &= -5 \\ 4x &= 12 & 4x &= 2 \\ x &= 3 & \text{or} & x = \frac{1}{2} \end{aligned}$$

The two values of x that satisfy the first equation are 3 and $\frac{1}{2}$.

Since $|3 - 8x| = 1$, the value of $3 - 8x$ is either 1 or -1 :

$$\begin{aligned} 3 - 8x &= 1 & 3 - 8x &= -1 \\ 8x &= 2 & 8x &= 4 \\ x &= \frac{1}{4} & \text{or} & x = \frac{1}{2} \end{aligned}$$

The two values of x that satisfy the second equation are $\frac{1}{4}$ and $\frac{1}{2}$. You are asked to find the value of x that

satisfies both equations. That value is $\frac{1}{2}$. The answer can

be entered in the grid as 1/2 or .5.

Difficulty level: Hard

9. For all positive integers a and b , let $a \diamond b$ be defined by $a \diamond b = \frac{a^b + 1}{a - 1}$. What is the value of $4 \diamond 2$?

1	7	/	3
.	✓	●	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	●
4	4	4	4
5	5	5	5
6	6	6	6
7	●	7	7
8	8	8	8
9	9	9	9

5	.	6	6
.	✓	✓	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	●	●
7	7	7	7
8	8	8	8
9	9	9	9

5	.	6	7
.	✓	✓	.
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	●	6
7	7	7	●
8	8	8	8
9	9	9	9

The words "let $a \diamond b$ be defined by" tell you that the symbol \diamond is not supposed to represent a common mathematical operation, but one that is made up for this question. To evaluate $4 \diamond 2$, you substitute 4 for a and 2 for b in the expression $\frac{a^b + 1}{a - 1}$.

This gives $\frac{4^2 + 1}{4 - 1}$, which equals $\frac{17}{3}$.

The answer may be entered in the grid as 17/3 or as 5.66 or 5.67.

Difficulty level: Medium

10. Of the 6 courses offered by the music department at her college, Kay must choose exactly 2 of them. How many different combinations of 2 courses are possible for Kay if there are no restrictions on which 2 courses she can choose?

		1	5
.	✓	✓	.
0	0	0	0
1	1	●	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	●
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

There are 6 courses offered; let us refer to them as 1, 2, 3, 4, 5 and 6. One way to find the number of combinations is to list all possible pairings. They are 1-2, 1-3, 1-4, 1-5, 1-6, 2-3, 2-4, 2-5, 2-6, 3-4, 3-5, 3-6, 4-5, 4-6 and 5-6. There are 15 combinations. Note that 1-2 and 2-1 represent the same combination, so only one is in the list.

You could also notice that there are 5 pairings that start with course 1 and 4 additional pairings that start with course 2, and so forth. The total number of combinations is $5 + 4 + 3 + 2 + 1 = 15$.

You could also solve the problem by noting that the total number of permutations (that is, the number of different ways 2 of 6 courses could be selected) is 6 for the first course selected times 5 for the second course selected, or $6 \times 5 = 30$. To find the number of combinations, you must divide the number of permutations by the number of arrangements. For each pair of courses $A-B$ selected, the arrangement $B-A$ is also possible. Therefore, there are 2 arrangements. So the number of combinations is $30 \div 2 = 15$.

Difficulty level: Medium

11. Let the function f be defined by $f(x) = x^2 - 7x + 10$.

If $f(t + 1) = 0$, what is one possible value of t ?

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

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

Since $f(x) = x^2 - 7x + 10$, substituting $(t + 1)$ for x into the function yields $f(t + 1) = (t + 1)^2 - 7(t + 1) + 10$, or $f(t + 1) = (t^2 + 2t + 1) - (7t + 7) + 10$, or $f(t + 1) = t^2 - 5t + 4$.

Since $f(t + 1) = 0$, it follows that $t^2 - 5t + 4 = 0$, or $(t - 1)(t - 4) = 0$. Therefore, $t = 1$ or $t = 4$.

Another way to solve the question would be to use a dummy variable k . For example, let $k = t + 1$. Then $f(k) = k^2 - 7k + 10 = (k - 5)(k - 2)$. Since $k = t + 1$ and $f(t + 1) = 0$, it follows that $f(k) = 0$. So $(k - 5)(k - 2) = 0$, and therefore, $k = 5$ or $k = 2$. Since $t = k - 1$, it follows that $t = 4$ or $t = 1$.

This question asks for one possible value of t . Either 1 or 4 satisfies the question being asked. Choose only one correct answer (not both) to enter in the grid.

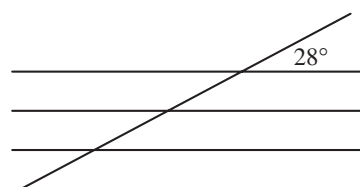
When there is a range of possible correct answers, your *gridded response* must lie within the range. For example, consider a problem for which all numbers between 4 and 5, exclusive, are correct answers. For this problem, although 4.0002 is within the range ($4 < t < 5$), its rounded value 4.00 is not within the range and therefore would not be considered a correct answer to the problem.

Difficulty level: Hard

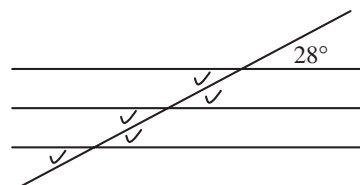
12. Three parallel lines in a plane are intersected by a fourth line, forming twelve angles. If one of the angles has measure 28° , how many of the other eleven angles have measure 28° ?

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

Drawing the figure described in the problem will help you visualize the correct solution to the problem. The figure below shows three parallel lines intersected by a fourth line. The acute angle is labeled 28° .



Using the fact that vertical angles and alternate interior angles are equal, you can put a check showing the other angles in the figure that also measure 28° , as shown below.



There are 5 other angles that measure 28° . Therefore, the correct answer to this problem is 5. The number 5 can be gridded in any of the four columns on the answer grid.

Difficulty level: Easy

The Writing Section

The writing section includes both multiple-choice questions and a direct writing measure in the form of an essay.

The multiple-choice sections include:

- Improving sentences (25 questions)
- Identifying sentence errors (18 questions)
- Improving paragraphs (6 questions)

The multiple-choice sections measure your ability to

- communicate ideas clearly and effectively;
- improve a piece of writing through revision and editing;
- recognize and identify sentence-level errors;
- understand grammatical elements and structures and how they relate to one another in a sentence;
- recognize correctly formed grammatical structures;
- clearly express ideas through sentence combining and use of transitional words and phrases; and
- improve coherence of ideas within and among paragraphs.

Note: Calculators may not be on your desk or used on the writing section of the SAT.

Characteristics of Effective Writing		
Multiple-choice writing questions focus on common problems associated with four characteristics of effective writing. Illustrations of problems are given below. Multiple-choice writing questions also require recognition of correct sentences and effective writing strategies.		
Writing problem	Sentence illustrating the problem	Should be...
1. Being consistent		
Sequence of tenses	After he broke his arm, he is home for two weeks.	After he broke his arm, he was home for two weeks.
Shift of pronoun	If you are tense, one should try to relax.	If you are tense, you should try to relax.
Parallelism	She skis, plays tennis, and flying hang gliders.	She skis, plays tennis, and flies hang gliders.
Noun agreement	Carmen and Sarah are both a pilot.	Carmen and Sarah are both pilots.
Pronoun reference	Several people wanted the job, so he or she filled out the required applications.	Several people wanted the job, so they filled out the required applications.
Subject-verb agreement	There is eight people on the shore.	There are eight people on the shore.
2. Expressing ideas logically		
Coordination and subordination	Tawanda has a rash, and she is probably allergic to something.	Tawanda has a rash; she is probably allergic to something.
Logical comparison	Nathan grew more vegetables than his neighbor's garden.	Nathan grew more vegetables than his neighbor grew.
Modification and word order	Barking loudly, the tree had the dog's leash wrapped around it.	Barking loudly, the dog wrapped its leash around the tree.
3. Being clear and precise		
Ambiguous and vague pronouns	In the newspaper they say that few people voted.	The newspaper reported that few people voted.
Diction	He circumvented the globe on his trip.	He circumnavigated the globe on his trip.
Wordiness	There are many problems in the contemporary world in which we live.	There are many problems in the contemporary world.
Improper modification	If your car is parked here while not eating in the restaurant, it will be towed away.	If you park here and do not eat in the restaurant, your car will be towed away.
4. Following conventions		
Pronoun case	He sat between you and I at the stadium.	He sat between you and me at the stadium.
Idiom	Natalie had a different opinion for her.	Natalie had a different opinion of her.
Comparison of modifiers	Of the sixteen executives, Naomi makes more money.	Of the sixteen executives, Naomi makes the most money.
Sentence fragment	Fred having to go home early.	Fred has to go home early.
Comma splice	Mary took time out of her busy schedule to visit her aunt, John decided to continue working through the summer.	Mary took time out of her busy schedule to visit her aunt, but John decided to continue working through the summer.
5. Recognizing effective writing Some sentences require students to recognize that there is no error.		

Improving Sentences

This question type measures your ability to

- Recognize and correct faults in grammar and sentence structure.
- Recognize effective sentences that follow the conventions of standard written English.

Directions

The following sentence tests correctness and effectiveness of expression. Part of the sentence or the entire sentence is underlined; beneath the sentence are five ways of phrasing the underlined material. Choice A repeats the original phrasing; the other four choices are different. If you think the original phrasing produces a better sentence than any of the alternatives, select choice A; if not, select one of the other choices.

In making your selection, follow the requirements of standard written English; that is, pay attention to grammar, choice of words, sentence construction, and punctuation. Your selection should result in the most effective sentence — clear and precise, without awkwardness or ambiguity.

EXAMPLE:

Laura Ingalls Wilder published her first book and she was sixty-five years old then.

- (A) and she was sixty-five years old then
- (B) when she was sixty-five
- (C) at age sixty-five years old
- (D) upon the reaching of sixty-five years
- (E) at the time when she was sixty-five

A B C D E

Answering Improving Sentences Questions

Read the entire sentence carefully but quickly and ask yourself whether the underlined portion is correct or whether it needs to be revised.

Remember that choice (A) is the same as the underlined portion. Even if you think that the sentence does not require correction and that choice (A) is the correct answer, it is a good idea to read each choice quickly to make sure.

When reading choices (A) through (E), replace the underlined part of the sentence with each answer choice to determine which revision results in a sentence that is clear and precise and meets the requirements of standard written English.

Look for common problem areas in sentences. These include subject-verb agreement, parallelism, placement of modifiers, and the use of relative clauses.

Remember that the right answer will be the one correct version among the five choices.

Keep in mind that while the answer choices change, the rest of the sentence stays the same.

In the example, connecting the two ideas (“Laura Ingalls Wilder published her first book”) and (“she was sixty-five years old then”) with the word “and” indicates that the two ideas are independent and equally important. The word “and” should be replaced to establish the relationship between the two ideas.

- The word “and” indicates that the two ideas it connects are independent and equally important. No.
- Replacing the word “and” with “when” clearly expresses the information that the sentence is intended to convey by relating Laura Ingalls Wilder’s age to her achievement. Yes, but continue to look at the other revisions.
- Using the word “at” results in a phrase that is not idiomatic. No.
- The phrase “upon the reaching of” also results in a phrase that is not idiomatic. No.
- The phrase “at the time when she was sixty-five” is awkward and wordy. No.

Correct answer: (B) / Difficulty level: Easy

Sample Question

1. Looking up from the base of the mountain, the trail seemed more treacherous than it really was.
 - (A) Looking up
 - (B) While looking up
 - (C) By looking up
 - (D) Viewing
 - (E) Viewed

When a modifying phrase begins a sentence, it must logically modify the sentence’s subject; otherwise, it is a *dangling modifier*. In this example, every option except (E) is a dangling modifier.

- In (A), the phrase “Looking up from the base of the mountain” does not logically modify the subject “the trail.” A person might stand at the base of a mountain and look up at a trail, but it is illogical to suggest that a trail looks up from the base of a mountain.
- (B), (C), and (D) are simply variations of the error found in (A). Each results in a sentence that illogically suggests that a trail was looking up from the base of a mountain.
- (E) is correct. Although a trail cannot itself look up from the base of a mountain, a trail can be viewed by someone looking up from the base of a mountain, so the phrase “Viewed from the base of the mountain” logically modifies the subject “the trail.”

Correct answer: (E) / Difficulty level: Hard

Identifying Sentence Errors

This question type measures your ability to

- Recognize faults in grammar and usage.
- Recognize effective sentences that follow the conventions of standard written English.

Directions

The following sentence tests your ability to recognize grammar and usage errors. The sentence contains either a single error or no error at all. No sentence contains more than one error. The error, if there is one, is underlined and lettered. If the sentence contains an error, select the one underlined part that must be changed to make the sentence correct. If the sentence is correct, select choice E.

In choosing answers, follow the requirements of standard written English.

EXAMPLE:

The other delegates and him immediately

A B C

accepted the resolution drafted by the

D

neutral states. No error

E

(A) ● (C) (D) (E)

Answering Identifying Sentence Errors Questions

Read the entire sentence carefully but quickly, paying attention to the underlined choices (A) through (D). Ask yourself whether any of the underlined words or phrases in the sentence contains a grammar or usage error. Keep in mind that some sentences do not contain an error.

Select the underlined word or phrase that must be changed to make the sentence correct. Mark (E) No error if you believe that the sentence is correct as written.

Develop the habit of looking for the most common mistakes that people make in grammar: subject-verb agreement, pronoun reference and agreement, and adjective/adverb confusion.

In the example above, “The other delegates and him” are the people who “immediately accepted the resolution,” and the phrase “drafted by the neutral states” describes “the resolution.” Check each underlined word or phrase for correctness.

- The phrase “The other” correctly modifies the word “delegates.”
- The pronoun “him” is in the wrong case. (One would not say “him immediately accepted.”) “Him” is an error, but go on to check the other choices, especially if you are not sure.
- The word “immediately” correctly modifies the verb “accepted.”
- The phrase “drafted by” correctly expresses the action of the “neutral states.”

Correct answer: (B) / Difficulty level: Easy

Sample Question

2. After hours of futile debate, the committee has
A
decided to postpone further discussion
B
of the resolution until their next meeting.
C D
No error
E

- The error in this sentence occurs at (D). A pronoun must agree in number (singular or plural) with the noun to which it refers. Collective nouns such as “committee” can be treated as plural when members of the group act as individuals, or as singular when the group functions as a unit. In this sentence, the committee acts as a singular unit, as shown by the use of the singular verb “has,” which is not underlined and so cannot be changed. Therefore, the plural pronoun “their” at (D) is used incorrectly.
- The other options contain no errors. In (A), the preposition “After” appropriately introduces a phrase that indicates when the committee made its decision. In (B), “to postpone” is the verb form needed to complete the description of the committee’s decision. In (C), the prepositional phrase “of the resolution” appropriately specifies the subject of the postponed discussion.
- The sentence may be corrected as follows: After hours of futile debate, the committee has decided to postpone further discussion of the resolution until *its* next meeting.

Correct answer: (D) / Difficulty level: Hard

Improving Paragraphs

This type of question measures your ability to

- Edit and revise sentences in the context of a paragraph or entire essay.
- Organize and develop paragraphs in a coherent and logical manner.
- Apply the conventions of standard written English.

Directions

The following passage is an early draft of an essay. Some parts of the passage need to be rewritten.

Read the passage and select the best answers for the questions that follow. Some questions are about particular sentences or parts of sentences and ask you to improve sentence structure or word choice. Other questions ask you to consider organization and development. In choosing answers, follow the requirements of standard written English.

Answering Improving Paragraphs Questions

To answer the improving paragraphs questions that accompany the draft essay, you will need to note what sentences need to be corrected and to know how each sentence relates to the other sentences and to the essay as a whole.

Read the entire essay quickly to determine its overall meaning. The essay is intended as a draft, so you will notice errors.

In answering each question, make sure that your answer about a particular sentence or group of sentences makes sense in the context of the passage as a whole. Choose the best answer from among the choices given, even if you can imagine another correct response.

Sample Questions

Questions 3 and 4 are based on the following passage:

- (1) Many times art history courses focus on the great “masters,” ignoring those women who should have achieved fame. (2) Often women artists like Mary Cassatt have worked in the shadows of their male contemporaries. (3) They have rarely received much attention during their lifetimes.
- (4) My art teacher has tried to make up for it by teaching us about women artists and their work. (5) Recently she came to class very excited; she had just read about a little-known artist named Annie Johnson, a high school teacher who had lived all of her life in New Haven, Connecticut. (6) Johnson never sold a painting, and her obituary in 1937 did not even mention her many paintings. (7) Thanks to Bruce Blanchard, a Connecticut businessman who bought some of her watercolors at an estate sale. (8) Johnson is finally starting to get the attention that she deserved more than one hundred years ago. (9) Blanchard now owns a private collection of hundreds of Johnson’s works — watercolors, charcoal sketches, and pen-and-ink drawings.
- (10) There are portraits and there are landscapes. (11) The thing that makes her work stand out are the portraits. (12) My teacher described them as “unsentimental.” (13) They do not idealize characters. (14) Characters are presented almost photographically. (15) Many of the people in the pictures had an isolated, haunted look. (16) My teacher said that isolation symbolizes Johnson’s life as an artist.

3. In context, which is the best revision to the underlined portion of sentence 3 (reproduced below)?

They have rarely received much attention during their lifetimes.

- (A) In fact, they had
- (B) Too bad these artists have
- (C) As a result, these women have
- (D) In spite of this, women artists
- (E) Often it is the case that the former have

Although sentence 3 is not grammatically incorrect, its relationship to the preceding sentence needs to be made clearer. A transitional phrase should be added to emphasize the cause-and-effect relationship between the stated facts — women artists received little attention *as a consequence* of having worked in the shadows of their male contemporaries — and the ambiguous pronoun “They” should be replaced with a word or phrase that clearly refers to the “women artists” and not the “male contemporaries” mentioned in sentence 2.

- (A), (B), and (D) are unsatisfactory because in each case the transitional phrase (“In fact,” “Too bad,” or “In spite of this”) fails to indicate the cause-and-effect relationship. Moreover, both (A) and (B) leave the ambiguity of the pronoun unresolved.
- (E) is unsatisfactory not only because it fails to signal the cause-and-effect relationship, but also because it is wordy and illogically combines the adverbs “Often” and “rarely.”
- (C) is correct. The transitional phrase “As a result” clearly indicates a cause-and-effect relationship, and “these women” properly resolves the ambiguity of the pronoun “They.”

Correct answer: (C) / Difficulty level: Hard

4. In context, which of the following is the best version of sentence 10 (reproduced below)?

There are portraits and there are landscapes.

- (A) (As it is now)
- (B) You can see both portraits and landscapes.
- (C) Therefore, both portraits and landscapes are among her works.
- (D) Johnson painted both portraits and landscapes.
- (E) Among them Johnson has portraits and landscapes.

In addition to being vague, sentence 10 contains no noun to which the pronoun “her” in sentence 11 may refer. It should be revised so that Johnson is clearly identified as the painter of the portraits and landscapes.

- (A), (B), and (C) are unsatisfactory because they do not mention Johnson.
- Though (E) does mention Johnson, it is misleading in that the words “Johnson has” suggest that Johnson is the owner rather than the painter of the portraits and landscapes.
- (D) is correct because it properly identifies Johnson as the painter of the artworks and thus provides an antecedent for the pronoun “her” in sentence 11.

Correct answer: (D) / Difficulty level: Easy

The Essay

The essay measures your ability to:

- Develop a point of view on an issue presented in an excerpt;
- Support your point of view using reasoning and examples from your reading, studies, experience, or observations; and
- Follow the conventions of standard written English.

Approaches to the Essay

There are no shortcuts to success on the SAT essay. You will not receive high scores on your essay just because it is long, or has five paragraphs, or uses literary examples. The high school and college teachers who score the SAT reward essays that insightfully develop a point of view with appropriate reasons and examples and that use language skillfully. So what can you do to write a successful SAT essay?

- **Read the entire assignment. It’s all there to help you.** Every essay assignment contains a short paragraph about the issue. Imagine that you are talking to the author of the paragraph about the issue. Would you argue with him or her, or agree? What other ideas or examples would you bring up? Answering these questions will help you develop your own point of view.
- **Don’t oversimplify.** Developing your point of view doesn’t mean coming up with as many examples as you can. Rushing to give multiple relevant examples can lead you to oversimplify a complex topic. An essay with one or two thoughtful, well-developed reasons or examples is more likely to get a high score than an essay with three short, simplistic examples.
- **There’s nothing wrong with “I.”** You are asked to develop your point of view on the issue, not give a straight report of the facts. This is your opinion, so feel free to use “I,” and give examples that are meaningful to you, even ones from your personal life or experiences. Of course you need to support your ideas appropriately and show that you can use language well, but remember: The essay is an opportunity for you to say what you think about an issue relevant to your life.

Directions

The essay gives you an opportunity to show how effectively you can develop and express ideas. You should, therefore, take care to develop your point of view, present your ideas logically and clearly, and use language precisely.

Your essay must be written on the lines provided on your answer sheet — you will receive no other paper on which to write. You will have enough space if you write on every line, avoid wide margins, and keep your handwriting to a reasonable size. Remember that people who are not familiar with your handwriting will read what you write. Try to write or print so that what you are writing is legible to those readers.

Important Reminders:

- **A pencil is required for the essay.** An essay written in ink will receive a score of zero.
- **Do not write your essay in your test book.** You will receive credit only for what you write on your answer sheet.
- **An off-topic essay will receive a score of zero.**
- **If your essay does not reflect your original and individual work, your scores for the entire test may be canceled.**
- **An electronic copy of your essay will be made available to each of your designated score recipients: colleges, universities, and scholarship programs.**

You have twenty-five minutes to write an essay on the topic assigned below.

Think carefully about the issue presented in the following excerpt and the assignment below.

Many persons believe that to move up the ladder of success and achievement, they must forget the past, repress it, and relinquish it. But others have just the opposite view. They see old memories as a chance to reckon with the past and integrate past and present.

Adapted from Sara Lawrence-Lightfoot,
I’ve Known Rivers: Lives of Loss and Liberation

Assignment: Do memories hinder or help people in their effort to learn from the past and succeed in the present? Plan and write an essay in which you develop your point of view on this issue. Support your position with reasoning and examples taken from your reading, studies, experience, or observations.

Sample Essays

Score of 6:

Without our past, our future would be a tortuous path leading to nowhere. In order to move up the ladder of success and achievement we must come to terms with our past and integrate it into our future. Even if in the past we made mistakes, this will only make wiser people out of us and guide us to where we are supposed to be.

This past year, I was auditioning for the fall play, “Cat on a Hot Tin Roof.” To my detriment I thought it would be a good idea to watch the movie in order to prepare. For two hours I studied Elizabeth Taylor’s mannerisms, attitude, and diction, hoping I could mimic her performance. I auditioned for the part of “Maggie” feeling perfectly confident in my portrayal of Elizabeth Taylor, however, I was unaware that my director saw exactly what I had been thinking. Unfortunately, I didn’t get the part, and my director told me that he needed to see “Maggie” from my perspective, not Elizabeth Taylor’s.

I learned from this experience, and promised myself I would not try to imitate another actress, in order to create my character. Persevering, I was anxious to audition for the winter play just two months later. The play was Neil Simon’s “Rumors,” and would get the opportunity to play “Chris,” a sarcastic yet witty role, which would be my final performance in high school. In order to develop my character, I planned out her life just as I thought it should be, gave her the voice I thought was right, and the rest of her character unfolded beautifully from there. My director told me after the first show that “Rumors” was the best work he’d ever seen from me, and that he was amazed at how I’d developed such a believable character. Thinking back to my first audition I was grateful for that chance I had to learn and to grow, because without that mistake I might have tried to base “Chris” off of someone I’d known or something I’d seen instead of becoming my own character. I utilized the memory of the Elizabeth Taylor debacle to improve my approach to acting and gave the best performance of my life so far.

This essay effectively and insightfully develops its point of view (*In order to move up the ladder of success and achievement we must come to terms with our past and integrate it into our future*) through a clearly appropriate extended example drawing on the writer’s experience as an actor. The essay exhibits outstanding critical thinking by presenting a well-organized and clearly focused narrative that aptly illustrates the value of memory. The essay also uses language skillfully, demonstrating meaningful variety in sentence structure (*To my detriment I thought it would be a good idea to watch the movie in order to prepare. For two hours I studied Elizabeth Taylor’s mannerisms, attitude, and diction, hoping I could mimic her performance. I auditioned for the part of “Maggie” feeling perfectly confident in my portrayal of Elizabeth Taylor, however, I was unaware that my director...*). Despite minor errors, the essay demonstrates clear and consistent mastery and is scored a 6.

Score of 5:

I agree with Ms. Sara Lawrence-Lightfoot in saying that some people “see old memories as a chance to reckon with the past and integrate past and present.” Many people are so troubled by things that happened in their past that they are not able to focus on the present. For example, in the book *Ceremony*, by Leslie Marmon Silko, Tayo, the main character, can not concentrate on the present because he constantly hounds himself over things that happened during World War II and his troubled childhood. However, past memories can help people to succeed in the present. An historical example of people learning from the past would be the Marshall Plan. After the conclusion of World War II there were many countries around the world in need of economical assistance to help rebuild their war torn countries, and the United States would have to be the one to provide that assistance. Many American politicians thought it was foolish for the US government to spend money abroad on countries that would not be able to repay the loan for a long time. However, George Marshall, a former general and later Secretary of State under President Truman, remembered how the exact same argument of “why should we spend money on war torn nations that really owe us reparations?” had been used after World War I towards Germany. The lack of assistance towards Germany after World War I had caused a gigantic economic depression in Germany that had made the Mark (German money) virtually worthless. The German people became so desperate that they started supporting an extreme German nationalist named Adolf Hitler, who eventually started World War II. Marshall knew that if the US did not help war torn Germany and, especially, Japan, we could eventually have a World War III on our hands.

This focused essay effectively develops its point of view and demonstrates strong critical thinking (*Many people are so troubled by things that happened in their past that they are not able to focus on the present. . . . However, past memories can help people to succeed in the present*). The essay uses appropriate reasoning and examples and demonstrates coherence and progression of ideas (*Many American politicians thought it was foolish for the US government to spend money abroad on countries that would not be able to repay the loan for a long time. However, George Marshall . . . remembered how the exact same argument . . . had been used after World War I towards Germany*). The essay also exhibits facility in the use of language. To earn a score of 6, the writer needs to achieve clearer coherence and smoother progression of ideas by integrating the example of *Ceremony* more effectively into the overall essay, perhaps through an extended comparison of Tayo’s and Marshall’s experiences of World War II. The essay demonstrates reasonably consistent mastery and is scored a 5.

Score of 4:

Interestingly enough, I fall in the middle of these statements. I believe that one should remember the past and learn from those events. However, I also believe that many bad memories harm the present and the future. The only way to continue, many times, is to forget and forgive.

My brother, who is college, has proved to me the importance of getting good grades and actively participating in extracurricular activities. These two ideas helped him to get into the prestigious college of the University of Notre Dame. His education there will allow him to have a prosperous career as an adult. Reviewing these facts and ideas has led me to believe if I do the same, I will have a similar promising career. Consequently, I have gotten good grades and have seen interest from many prestigious programs.

Through my knowledge, I have learned that in many bad instances, time to forget is very important. Ireland, for example, had been persecuted for many hundreds of years from 1000 AD to 1900 AD. After being granted the Irish Free State, they attacked many parts of Britain for retribution of those many years of being oppressed. Consequently there has been on going hostility between the two peoples. This hostility has cost the lives of many hundreds of people. A quote once said, "Violence begets violence" is the perfect phrase for this warfare. The only way to stop the loss of life is to forget and forgive; start anew.

Different situations require different actions to proceed in a positive manner. Many times, people are required to use both elements. For example, let's forget this part and concentrate on how to bring this positive part into light. Both of the ideas on remembering and forgetting have their reasons for existing and both are positive.

This essay provides adequate reasons and examples to support both aspects of its point of view (*I believe that one should remember the past and learn from those events. However, I also believe that many bad memories harm the present and the future*), thus demonstrating competent critical thinking. The essay is generally organized and focused and features coherence and progression of ideas. Facility in the use of language is adequate, despite some inconsistencies (*Through my knowledge, I have learned that in many bad instances, time to forget is very important*). The essay also has some errors in grammar, usage, and mechanics. To earn a higher score, the writer should provide additional appropriate evidence and use critical thinking to extend the discussion of situations in which "people are required to use both elements." The essay demonstrates adequate mastery and receives a 4.

Score of 3:

Memories can be helpful to some and hinder others. I believe that memories from different aspects of ones life have different consequences. One memory may be bad and it may be best forgotten about, when trying to succeed. Though some memories may give on strength to succeed in achieving a higher status in life.

When a person completes a task they have done once before, it triggers a memory and lets the reader reflect on that particular time in life. For example, a sporting team at the local high school makes it to the state championships, but severely loses to their opponent, the next time they get to the state championships they may think about the past and how they lost before, and it may hinder there feelings and they may once again lose. This demonstrates how a memory can ruin a certain activity for ever. On the other hand a memory can also help someone to move up the ladder of success. As an example if a person has cancer and is given treatment then diagnosed in remission they feel like they have beat the cancer. When the patient in remission is later told that the cancer has grown back, the patient might feel that they can kill the cancer again because when looking at the past they see they have beat it once why not beat it again. This demonstrates how a memory can be helpful to a person. In this case it did not help the person climb the ladder of success though it helped the to continue climbing the ladder of life to the extent that they were able to climb.

Those two short examples just go to demonstrate how memories of the past can both help and hinder a person in their path of not only success but also in the path of life.

This essay develops a point of view (*Memories can be helpful to some and hinder others*) and shows some critical thinking by providing examples of the positive and negative effects of memories. However, the examples are limited in focus, featuring some lapses in coherence and progression of ideas, and are thus inadequate to support the position. The essay also demonstrates occasional problems in sentence structure and mechanics. To achieve a higher score, this writer needs to use critical thinking to clarify and expand each example by adding additional focused reasoning and details. The writer also needs to avoid using run-on sentences (*. . . when looking at the past they see they have beat it once why not beat it again*). The essay demonstrates developing mastery and earns a 3.

Score of 2:

I think it is wrong to believe that to move up the ladder of success and achievement, that they must forget the past, repress it, and relinquish it. Everything you did and saw in the past helps you to move on. Every single happy moment, every mistake you make is getting a part of you. Your actions become habits which creates your personality and helps you to make your own experience. Therefore memories help people in their effort to learn from the past and succeed in the present. Everything we do has to do with our experiences in the past, the way we get along with people or treat them, the way we turn out to be an adult. If you don't live with making your own decisions, mistakes, and your experience with people and the world or school you won't have any examples to compare or to handle any coming situations in the future. If you get everything told you by someone, you will always wait for other people to make decisions for you and won't have your own point of view. For succeed you have to know what you want, to find that out, you have to have been through some difficult situations in the PAST.

Although it expresses a point of view (*I think it is wrong to believe that to move up the ladder of success and achievement, that they must forget the past, repress it, and relinquish it*), this essay is seriously limited, exhibiting weak critical thinking, insufficient use of evidence, and serious problems with progression of ideas. The essay also demonstrates frequent problems in usage, grammar, and sentence structure. To achieve a higher score, the writer needs to develop the point of view with reasons and specific examples instead of merely repeating the same vague ideas (*Everything you did and saw in the past helps you to move on. . . . Everything we do has to do with our experiences in the past*). The essay demonstrates little mastery and is scored a 2.

Score of 1:

My oppion on this topic are oposing memories and favoring them. People do succed with repeating their memories. They might have horrible memories but also succeed because they don't repeat the past. I also think memories should not rule the present. If you let the past overcome the preset you won't get any where. This is why memories should be guidelines, not rules. If you repeat the past it won't come out as well as it did because the world has changed. See the past will never change with the world, but the world will change to overcome the past. So in conclusion don't forget the past or live in it, and the past is only guidelines.

This minimal essay demonstrates very little mastery, offering only a collection of general ideas in support of the writer's point of view (*don't forget the past or live in it, and the past is only guidelines*). The evidence presented is disorganized and unfocused, resulting in a disjointed essay. To earn a higher score, this writer needs to provide additional focused evidence that develops the point of view, including specific examples. The essay demonstrates very little mastery and receives a 1.

Official SAT Practice Test

About the Practice Test

Take the practice test, which starts on page 42, to reinforce your test-taking skills and to be more comfortable when you take the SAT. This practice test will give you a good idea of what to expect on the actual test.

Of course, the test you eventually take will differ in some ways. For example, its sections may be in a different order. Your actual test will also be longer than the practice test, because it will contain an additional 25-minute, unscored section (unless you are approved to take the SAT with extended time or a similar accommodation).

The practice test originally contained an unscored section, Section 3, when it was given in a test center. Section 3 is omitted in this booklet, so you need to **set aside three hours and 35 minutes to take the test** — 25 minutes less than the actual testing time you'll experience on test day.

Approaches to the Practice Test

The practice test will help you most if you take it under conditions as close as possible to those of the actual test.

- Plan to complete the entire test in one sitting.
 - You get three five-minute breaks. Take a break after every other 25-minute section, then work through all the shorter sections without a break.
 - Allow yourself the specified amount of time for each section. Pace yourself by using a watch (without an audible alarm).
- Sit at a desk or table cleared of any other papers or books. Do not use any prohibited items such as dictionaries, notes or scratch paper.
- Use an acceptable calculator that is familiar to you for the mathematics section.
- Read the test instructions carefully.

Marking the Answer Sheet

Getting credit for the right answer depends on marking it correctly. On test day, and when filling out your answer sheet for the practice test, follow these important instructions:

- Make sure you use a No. 2 pencil.
- Fill in the entire circle on the answer sheet darkly and completely.
- If you change your response, erase it as completely as possible.

Calculating Your Scores

To score your test, follow the instructions on page 82. You'll need to count the right and wrong answers for each section, and then convert your "raw" score to the College Board scale of 200 to 800.

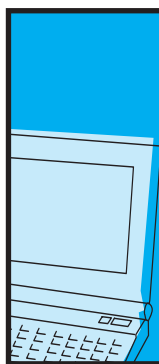
You will need to choose a score for your essay. Use the Scoring Guide on page 81 to determine how your particular essay might be scored.

Reviewing Your Performance

After you score your practice test, review your performance and ask yourself these questions:

- **Did I run out of time before I finished a section?**
Remember, all questions count the same. Be prepared to keep moving on test day and not spend too much time on any one question.
- **Did I make careless mistakes?**
You may have misread the question, neglected to notice a word like "except" or "best," or solved for the wrong value. Recognizing these small errors will help you avoid them on test day.
- **Did I spend too much time reading directions?**
Review any directions that gave you trouble so you don't have to spend as much time reading them when you take the actual test.

Visit collegeboard.org/satpracticetest to read sample scored essays and take an online practice test with automatic scoring.



The Official SAT Online Course™

- Take a practice test online
- Receive an immediate essay score
- Practice with more tests and quizzes

Visit:

collegeboard.org/satonlinecourse

SECTION

1

- I understand that my essay (without my name) may be reproduced in other College Board materials. If I mark this circle, I withhold my permission to reproduce my essay for any purposes beyond score reporting and the assessment of my writing skills. Marking this circle will have no effect on my score, nor will it prevent my essay from being made available to any college to which I send my SAT scores.

IMPORTANT: USE A NO. 2 PENCIL. DO NOT WRITE OUTSIDE THE BORDER!
Words written outside the essay box or written in ink **WILL NOT APPEAR** in the copy sent to be scored, and your score will be affected.

Begin your essay on this page. If you need more space, continue on the next page.

Essay writing area with horizontal lines.

COMPLETE MARK ●

EXAMPLES OF INCOMPLETE MARKS



You must use a No. 2 pencil and marks must be complete. Do not use a mechanical pencil. It is very important that you fill in the entire circle darkly and completely. If you change your response, erase as completely as possible. Incomplete marks or erasures may affect your score.

SECTION 2

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SECTION 3

- 1 (A B C D E) 11 (A B C D E) 21 (A B C D E) 31 (A B C D E)
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CAUTION

Grid answers in the section below for SECTION 2 or SECTION 3 only if directed to do so in your test book.

Student-Produced Responses

ONLY ANSWERS THAT ARE GRIDDED WILL BE SCORED. YOU WILL NOT RECEIVE CREDIT FOR ANYTHING WRITTEN IN THE BOXES.

Quality Assurance Mark

SECT. 2 OR 3 ONLY

Grid-in response area for questions 9-18. Each question has a 4-column grid with rows for digits 0-9. Questions 9, 10, 11, 12, and 13 have the first two columns shaded. Questions 14, 15, 16, 17, and 18 have the first column shaded.

COMPLETE MARK EXAMPLES OF INCOMPLETE MARKS

You must use a No. 2 pencil and marks must be complete. Do not use a mechanical pencil. It is very important that you fill in the entire circle darkly and completely. If you change your response, erase as completely as possible. Incomplete marks or erasures may affect your score.

SECTION 4

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| 1 | (A)(B)(C)(D)(E) | 11 | (A)(B)(C)(D)(E) | 21 | (A)(B)(C)(D)(E) | 31 | (A)(B)(C)(D)(E) |
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SECTION 5

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CAUTION

Grid answers in the section below for **SECTION 4** or **SECTION 5** only if directed to do so in your test book.

Student-Produced Responses

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Quality Assurance Mark

SECT. 4 OR 5 ONLY

9		10		11		12		13	
14		15		16		17		18	

COMPLETE MARK ●

EXAMPLES OF
INCOMPLETE MARKS



You must use a No. 2 pencil and marks must be complete. Do not use a mechanical pencil. It is very important that you fill in the entire circle darkly and completely. If you change your response, erase as completely as possible. Incomplete marks or erasures may affect your score.

SECTION
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SECTION
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Quality
Assurance
Mark

SECTION
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- 40 (A) (B) (C) (D) (E)



ESSAY

Time — 25 minutes

Turn to page 2 of your answer sheet to write your ESSAY.

The essay gives you an opportunity to show how effectively you can develop and express ideas. You should, therefore, take care to develop your point of view, present your ideas logically and clearly, and use language precisely.

Your essay must be written on the lines provided on your answer sheet—you will receive no other paper on which to write. You will have enough space if you write on every line, avoid wide margins, and keep your handwriting to a reasonable size. Remember that people who are not familiar with your handwriting will read what you write. Try to write or print so that what you are writing is legible to those readers.

Important Reminders:

- **A pencil is required for the essay.** An essay written in ink will receive a score of zero.
- **Do not write your essay in your test book.** You will receive credit only for what you write on your answer sheet.
- **An off-topic essay will receive a score of zero.**
- **If your essay does not reflect your original and individual work, your scores for the entire test may be canceled.**
- **An electronic copy of your essay will be made available to each of your designated score recipients: colleges, universities, and scholarship programs.**

You have twenty-five minutes to write an essay on the topic assigned below.

Think carefully about the issue presented in the following excerpt and the assignment below.

A colleague of the great scientist James Watson remarked that Watson was always “lounging around, arguing about problems instead of doing experiments.” He concluded that “There is more than one way of doing good science.” It was Watson’s form of idleness, the scientist went on to say, that allowed him to solve “the greatest of all biological problems: the discovery of the structure of DNA.” It is a point worth remembering in a society overly concerned with efficiency.

Adapted from John C. Polanyi, “Understanding Discovery”

Assignment: Do people accomplish more when they are allowed to do things in their own way? Plan and write an essay in which you develop your point of view on this issue. Support your position with reasoning and examples taken from your reading, studies, experience, or observations.

BEGIN WRITING YOUR ESSAY ON PAGE 2 OF THE ANSWER SHEET.

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.**



SECTION 2
Time — 25 minutes
20 Questions

Turn to Section 2 (page 4) of your answer sheet to answer the questions in this section.

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

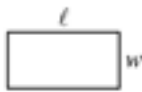
1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
4. Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information



$$A = \pi r^2$$

$$C = 2\pi r$$



$$A = \ell w$$



$$A = \frac{1}{2}bh$$



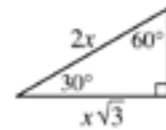
$$V = \ell wh$$



$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

1. When 70,000 is written as 7.0×10^n , what is the value of n ?
 - (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
 - (E) 5

2. On a car trip Sam drove m miles, Kara drove twice as many miles as Sam, and Darin drove 20 fewer miles than Kara. In terms of m , how many miles did Darin drive?
 - (A) $2m + 20$
 - (B) $2m - 20$
 - (C) $\frac{m}{2} + 20$
 - (D) $\frac{m + 20}{2}$
 - (E) $\frac{m}{2} - 20$

3. If x and y are positive integers, what are all the solutions (x, y) of the equation $3x + 2y = 11$?
 - (A) (1,4) only
 - (B) (3,1) only
 - (C) (1,4) and (2,2)
 - (D) (1,4) and (3,1)
 - (E) (2,2) and (3,1)

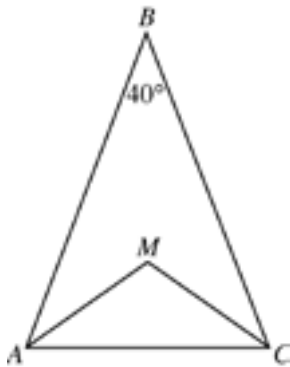
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4. A company's profit, P , in dollars, for producing x machines in one day is given by $P = 500x - 20x^2$. If the company produces 10 machines in one day, then, according to this formula, what is the profit for that day?
- (A) \$5,000
(B) \$4,000
(C) \$3,000
(D) \$2,000
(E) \$1,000

$$12 - n, 12, 12 + n$$

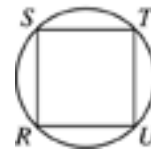
5. What is the average (arithmetic mean) of the 3 quantities in the list above?
- (A) 4
(B) 12
(C) 18
(D) $4 + \frac{n}{3}$
(E) $12 + \frac{n}{3}$



6. In isosceles triangle ABC above, \overline{AM} and \overline{CM} are the angle bisectors of angle BAC and angle BCA . What is the measure of angle AMC ?
- (A) 110°
(B) 115°
(C) 120°
(D) 125°
(E) 130°

7. A fruit salad is made from pineapples, pears, and peaches mixed in the ratio of 2 to 3 to 5, respectively, by weight. What fraction of the mixture by weight is pineapple?

- (A) $\frac{1}{5}$
(B) $\frac{3}{10}$
(C) $\frac{2}{5}$
(D) $\frac{1}{2}$
(E) $\frac{2}{3}$



8. In the figure above, square $RSTU$ is inscribed in the circle. What is the degree measure of arc \widehat{ST} ?
- (A) 45°
(B) 60°
(C) 90°
(D) 120°
(E) 180°

-
9. If P and Q are two sets of numbers, and if every number in P is also in Q , which of the following CANNOT be true?
- (A) 4 is in both P and Q .
(B) 5 is in neither P nor Q .
(C) 6 is in P , but not in Q .
(D) 7 is in Q , but not in P .
(E) If 8 is not in Q , then 8 is not in P .

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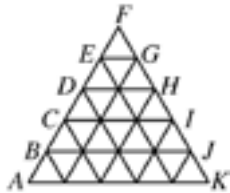


10. What is the maximum number of rectangular blocks measuring 3 inches by 2 inches by 1 inch that can be packed into a cube-shaped box whose interior measures 6 inches on an edge?

(A) 24
(B) 28
(C) 30
(D) 36
(E) 40

11. If $a \neq 0$ and $\frac{5}{x} = \frac{5+a}{x+a}$, what is the value of x ?

(A) -5
(B) -1
(C) 1
(D) 2
(E) 5



12. The figure above is composed of 25 small triangles that are congruent and equilateral. If the area of $\triangle DFH$ is 10, what is the area of $\triangle AFK$?

(A) 40
(B) 42.5
(C) 50
(D) 52.5
(E) 62.5

$$3x + 2y + 2z = 19$$

$$3x + y + z = 14$$

13. If the equations above are true, which of the following is the value of $y + z$?

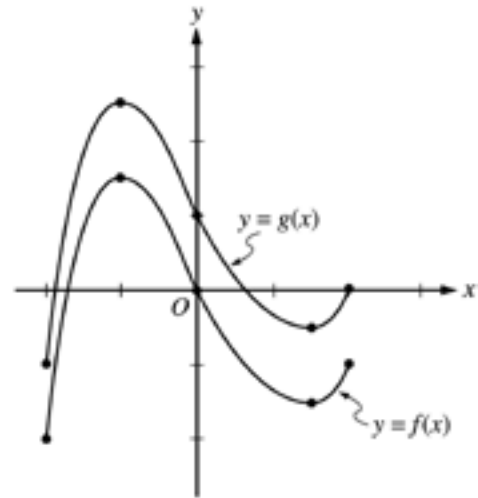
(A) -5
(B) -4
(C) 0
(D) 4
(E) 5

14. A boat costs x dollars, and this cost is to be shared equally by a group of people. In terms of x , how many dollars less will each person contribute if there are 4 people in the group instead of 3?

(A) $\frac{x}{12}$
(B) $\frac{x}{4}$
(C) $\frac{x}{3}$
(D) $\frac{7x}{12}$
(E) $7x$

15. If $y = 2x + 3$ and $x < 2$, which of the following represents all the possible values for y ?

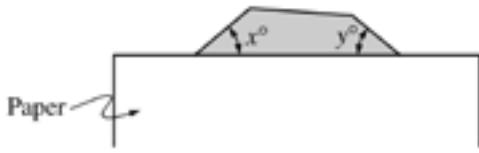
(A) $y < 7$
(B) $y > 7$
(C) $y < 5$
(D) $y > 5$
(E) $5 < y < 7$



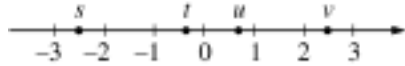
16. The graphs of the functions f and g in the interval from $x = -2$ to $x = 2$ are shown above. Which of the following could express g in terms of f ?

(A) $g(x) = f(x + 1)$
(B) $g(x) = f(x) + 1$
(C) $g(x) = f(x + 1) + 1$
(D) $g(x) = f(x - 1)$
(E) $g(x) = f(x) - 1$

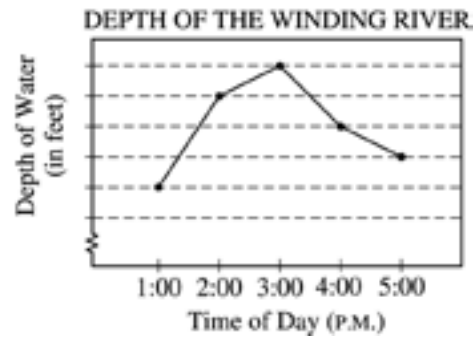
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17. In the figure above, a shaded polygon which has equal sides and equal angles is partially covered with a sheet of blank paper. If $x + y = 80$, how many sides does the polygon have?
- (A) Ten
(B) Nine
(C) Eight
(D) Seven
(E) Six



18. If s , t , u , and v are the coordinates of the indicated points on the number line above, which of the following is greatest?
- (A) $|s + t|$
(B) $|s + v|$
(C) $|s - t|$
(D) $|s - v|$
(E) $|s + u|$



19. On the day of a rainstorm, the depth of the water at a certain location along the Winding River was recorded hourly, and the results are indicated in the line graph above. Each unit on the vertical axis represents 1 foot. If the depth of the water decreased 10 percent from 3:00 P.M. to 4:00 P.M., what was the depth of the water at 4:00 P.M.?
- (A) 3 feet
(B) 15 feet
(C) 18 feet
(D) 20 feet
(E) 30 feet

20. For all numbers a and b , let $a \odot b$ be defined by $a \odot b = ab + a + b$. For all numbers x , y , and z , which of the following must be true?
- I. $x \odot y = y \odot x$
II. $(x - 1) \odot (x + 1) = (x \odot x) - 1$
III. $x \odot (y + z) = (x \odot y) + (x \odot z)$
- (A) I only
(B) II only
(C) III only
(D) I and II only
(E) I, II, and III

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

SECTION 4
Time — 25 minutes
24 Questions

Turn to Section 4 (page 5) of your answer sheet to answer the questions in this section.

Directions: For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

Example:

Hoping to ----- the dispute, negotiators proposed a compromise that they felt would be ----- to both labor and management.

(A) enforce . . useful
 (B) end . . divisive
 (C) overcome . . unattractive
 (D) extend . . satisfactory
 (E) resolve . . acceptable

(A) (B) (C) (D)

1. Some fans feel that sports events are ----- only when the competitors are of equal ability, making the outcome of the game -----.
2. Alfred Schnittke’s musical compositions are -----: phrases are clipped, broken into sections, and split apart by long rests.
3. The consumer advocate claimed that while drug manufacturers ----- the supposed advantages of their proprietary brands, generic versions of the same medications are often equally -----.

4. Latoya’s ----- is shown by her ability to be -----: she can see her own faults more clearly than anyone else can.
5. The bearded dragon lizard is a voracious eater, so ----- that it will consume as many insects as possible.
6. Because drummer Tony Williams paved the way for later jazz-fusion musicians, he is considered a ----- of that style.
7. The politician’s speech to the crowd was composed of nothing but -----, a bitter railing against the party’s opponents.
8. Favoring economy of expression in writing, the professor urged students toward a ----- rather than an ----- prose style.

GO ON TO THE NEXT PAGE 

The passages below are followed by questions based on their content; questions following a pair of related passages may also be based on the relationship between the paired passages. Answer the questions on the basis of what is stated or implied in the passages and in any introductory material that may be provided.

Questions 9-12 are based on the following passages.

Passage 1

Food has always been considered one of the most salient markers of cultural traditions. When I was a small child, food was the only thing that helped identify my family as Filipino American. We ate *pansit lug-lug* (a noodle dish) and my father put *patis* (salty fish sauce) on everything. However, even this connection lessened as I grew older. As my parents became more acculturated, we ate less typically Filipino food. When I was twelve, my mother took cooking classes and learned to make French and Italian dishes. When I was in high school, we ate chicken marsala and shrimp fra diablo more often than Filipino dishes like *pansit lug-lug*.

Passage 2

Jean Anthelme Brillat-Savarin—who in 1825 confidently announced, “Tell me what you eat, and I will tell you who you are”—would have no trouble describing cultural identities of the United States. Our food reveals us as tolerant adventurers who do not feel constrained by tradition. We “play with our food” far more readily than we preserve the culinary rules of our varied ancestors. Americans have no single national cuisine. What unites American eaters culturally is how we eat, not what we eat. As eaters, Americans mingle the culinary traditions of many regions and cultures. We are multiethnic eaters.

9. Which of the following statements best captures the relationship between the two passages?
- (A) Passage 1 notes problems for which Passage 2 proposes solutions.
 - (B) Passage 1 presents claims that are debunked by Passage 2.
 - (C) Passage 2 furnishes a larger context for the experiences described in Passage 1.
 - (D) Passage 2 provides an update of the situation depicted in Passage 1.
 - (E) Passage 2 uses material presented in Passage 1 to correct a popular misconception.

10. The author of Passage 2 would most likely regard the mother’s willingness to “make French and Italian dishes” (lines 9-10, Passage 1) as
- (A) laughably pretentious
 - (B) understandably conservative
 - (C) typically American
 - (D) a regrettable compromise
 - (E) a surprising attitude
11. The two passages differ in their discussions of food primarily in that Passage 1
- (A) considers specific dishes eaten by particular people, whereas Passage 2 comments on a culture’s general attitude toward eating
 - (B) contrasts the cuisines of different cultures, whereas Passage 2 emphasizes culinary practices common to all cultures
 - (C) presents an abstract theory of food, whereas Passage 2 offers a historical analysis of consumption
 - (D) emphasizes the role of nostalgia in food preferences, whereas Passage 2 rejects that approach as overly sentimental
 - (E) outlines some popular choices in cuisine, whereas Passage 2 underscores those that are more unusual
12. Unlike the author of Passage 2, the author of Passage 1 makes significant use of
- (A) direct quotation
 - (B) sociological analysis
 - (C) hypothetical assumptions
 - (D) historical sources
 - (E) personal experience

GO ON TO THE NEXT PAGE 

Questions 13-24 are based on the following passages.

The passages below discuss the possibility of locating intelligent life on other planets. Passage 1 has been adapted from a 1999 book on the history of the universe. Passage 2 was excerpted from a 2000 book on the scientific quest for extraterrestrial life.

Passage 1

Line Generations of science-fiction movies have conditioned
 5 us to consider bug-eyed monsters, large-brained intellectual
 humanoid, and other rather sophisticated extraterrestrial
 creatures as typical examples of life outside Earth. The
 reality, however, is that finding any kind of life at all, even
 something as simple as bacteria, would be one of the most
 exciting discoveries ever made.

The consensus within the scientific community seems to
 be that we eventually will find not only life in other parts of
 10 the galaxy but also intelligent and technologically advanced
 life. I have to say that I disagree. While I believe we will
 find other forms of life in other solar systems (if not in
 our own), I also feel it is extremely unlikely that a large
 15 number of advanced technological civilizations are out
 there, waiting to be discovered. The most succinct support
 for my view comes from Nobel laureate physicist
 Enrico Fermi, the man who ran the first nuclear reaction
 ever controlled by human beings. Confronted at a 1950
 luncheon with scientific arguments for the ubiquity of
 20 technologically advanced civilizations, he supposedly
 said, "So where is everybody?"

This so-called Fermi Paradox embodies a simple logic.
 Human beings have had modern science only a few hun-
 25 dred years, and already we have moved into space. It is not
 hard to imagine that in a few hundred more years we will
 be a starfaring people, colonizing other systems. Fermi's
 argument maintains that it is extremely unlikely that many
 other civilizations discovered science at exactly the same
 30 time we did. Had they acquired science even a thousand
 years earlier than we, they now could be so much more
 advanced that they would already be colonizing our solar
 system.

If, on the other hand, they are a thousand years behind
 us, we will likely arrive at their home planet before they
 35 even begin sending us radio signals. Technological
 advances build upon each other, increasing technological
 abilities faster than most people anticipate. Imagine, for
 example, how astounded even a great seventeenth-century
 scientist like Isaac Newton would be by our current global
 40 communication system, were he alive today. Where are
 those highly developed extraterrestrial civilizations so dear
 to the hearts of science-fiction writers? Their existence is
 far from a foregone conclusion.

Passage 2

Although posed in the most casual of circumstances,
 45 the Fermi Paradox has reverberated through the decades
 and has at times threatened to destroy the credibility
 of those scientists seriously engaged in the Search for
 Extraterrestrial Intelligence (SETI) research program.

One possible answer to Fermi's question ("If there are
 50 extraterrestrials, where are they?") is that extraterrestrials
 have in fact often visited Earth, and continue to do so.
 This is the answer of those who believe in the existence
 of unidentified flying objects, or UFO's. But few scien-
 tists, even those engaged in SETI, take the UFO claims
 55 seriously. "You won't find anyone around here who
 believes in UFO's," says Frank Drake, a well-known
 SETI scientist. If one discounts the UFO claims, yet still
 believes that there are many technological civilizations in
 the galaxy, why have they not visited us? Drake's answer
 60 is straightforward: "High-speed interstellar travel is so
 demanding of resources and so hazardous that intelligent
 civilizations don't attempt it." And why should they
 attempt it, when radio communication can supply all
 the information they might want?

At first glance, Drake's argument seems very persua-
 65 sive. The distances between stars are truly immense.
 To get from Earth to the nearest star and back, traveling
 at 99 percent of the speed of light, would take 8 years.
 And SETI researchers have shown that, to accelerate
 a spacecraft to such a speed, to bring it to a stop, and
 70 to repeat the process in the reverse direction, would
 take almost unimaginable amounts of energy.

Astronomer Ben Zuckerman challenges Drake's
 75 notion that technological beings would be satisfied with
 radio communication. "Drake's implicit assumption is
 that the only thing we're going to care about is intelli-
 gent life. But what if we have an interest in simpler
 life-forms? If you turn the picture around and you have
 80 some advanced extraterrestrials looking at the Earth, until
 the last hundred years there was no evidence of intelligent
 life but for billions of years before that they could have
 deduced that this was a very unusual world and that there
 were probably living creatures on it. They would have had
 85 billions of years to come investigate." Zuckerman contends
 that the reason extraterrestrials haven't visited us is that so
 few exist.

13. Which statement about the Fermi Paradox is supported by both passages?
- (A) It articulates a crucial question for those interested in the existence of extraterrestrials.
 - (B) It clarifies the astronomical conditions required to sustain life on other planets.
 - (C) It reveals the limitations of traditional ideas about the pace of technological change.
 - (D) It demonstrates the scientific community's fascination with the concept of interstellar travel.
 - (E) It suggests that advanced extraterrestrial civilizations may be uninterested in our culture.
14. Which statement best describes a significant difference between the two passages?
- (A) Passage 1 analyzes a literary form, while Passage 2 argues that literature has little bearing on science.
 - (B) Passage 1 presents an argument, while Passage 2 surveys current opinion in a debate.
 - (C) Passage 1 concludes by rejecting the Fermi Paradox, while Passage 2 opens by embracing it.
 - (D) Passage 1 describes a phenomenon, while Passage 2 details a belief system that would reject such a phenomenon.
 - (E) Passage 1 defends a viewpoint, while Passage 2 questions that viewpoint's place in scientific research.
15. The author of Passage 1 mentions "monsters," "humanoids," and "creatures" (lines 2-4) primarily to
- (A) question the literary value of science fiction
 - (B) contrast fictional notions with a scientific perspective
 - (C) offer examples of the human fear of the unknown
 - (D) criticize science fiction for being unduly alarmist
 - (E) suggest that scientific research has been influenced by science fiction
16. In line 17, "ran" most nearly means
- (A) fled
 - (B) accumulated
 - (C) traversed
 - (D) managed
 - (E) incurred
17. Passage 1 suggests that the Fermi Paradox depends most directly on which assumption?
- (A) Extraterrestrial civilizations may not wish to be discovered by human beings.
 - (B) Extraterrestrial civilizations would most likely have discovered technology at about the same time human beings discovered it.
 - (C) Extraterrestrial technology would develop at roughly the same rate as human technology.
 - (D) Extraterrestrial civilizations would inevitably use technology for aggressive ends.
 - (E) Science is a more powerful form of human knowledge than are art and literature.
18. The claim made in Passage 1 that a "consensus" exists (lines 8-11) would most likely be interpreted by the author of Passage 2 as
- (A) evidence of compromise in the scientific community
 - (B) an attack on SETI researchers
 - (C) support for Fermi's analysis
 - (D) a revelation of an unexpected truth
 - (E) an oversimplification of a complex debate
19. The author of Passage 1 mentions Isaac Newton (lines 37-40) in order to
- (A) emphasize the rapid rate of technological innovation
 - (B) acknowledge the impact of a profound thinker
 - (C) criticize the inflexibility of Newton's contemporaries
 - (D) speculate about Newton's influence on current research
 - (E) highlight the value of scientific curiosity
20. In lines 44-48, the author of Passage 2 indicates that the Fermi Paradox has been
- (A) thoroughly misunderstood
 - (B) surprisingly influential
 - (C) overwhelmingly perplexing
 - (D) intermittently popular
 - (E) frequently misquoted

21. How would Frank Drake (line 56, Passage 2) most likely respond to the statement by the author of Passage 1 about humans “colonizing other systems” (line 26) ?
- (A) The means to accomplish such a project may be beyond our reach.
 - (B) Interstellar colonization is as morally problematic as was colonization on Earth.
 - (C) We would do better to study indigenous life-forms rather than search for extraterrestrial creatures.
 - (D) Humans would be wise to consider that they themselves are subject to colonization.
 - (E) Funding for such an undertaking would pose a thorny political issue for any government.
22. In line 57, “claims” most nearly means
- (A) demands
 - (B) assertions
 - (C) rights
 - (D) territories
 - (E) compensations
23. In line 63, “radio communication” is cited as a
- (A) complex interaction
 - (B) technological relic
 - (C) common occurrence
 - (D) practical alternative
 - (E) dramatic advance
24. Both the author of Passage 1 and Ben Zuckerman (line 73, Passage 2) imply that researchers seeking life on another planet should focus on which of the following?
- (A) Seasonal variations in color due to plant life
 - (B) Evidence of the most basic forms of life
 - (C) Signs of artificially created structures
 - (D) Signals that might be radio communications
 - (E) Changes in geological surface features

NOTE: The reading passages in this test are generally drawn from published works, and this material is sometimes adapted for testing purposes. The ideas contained in the passages do not necessarily represent the opinions of the College Board.

S T O P

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.**

SECTION 5

Time — 25 minutes

35 Questions

Turn to Section 5 (page 5) of your answer sheet to answer the questions in this section.**Directions:** For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

The following sentences test correctness and effectiveness of expression. Part of each sentence or the entire sentence is underlined; beneath each sentence are five ways of phrasing the underlined material. Choice A repeats the original phrasing; the other four choices are different. If you think the original phrasing produces a better sentence than any of the alternatives, select choice A; if not, select one of the other choices.

In making your selection, follow the requirements of standard written English; that is, pay attention to grammar, choice of words, sentence construction, and punctuation. Your selection should result in the most effective sentence—clear and precise, without awkwardness or ambiguity.

EXAMPLE:

Laura Ingalls Wilder published her first book and she was sixty-five years old then.

- (A) and she was sixty-five years old then
- (B) when she was sixty-five
- (C) at age sixty-five years old
- (D) upon the reaching of sixty-five years
- (E) at the time when she was sixty-five

A B C D E

1. The library is older than it but still just as beautiful as the courthouse.
 - (A) older than it but still just as beautiful as the courthouse
 - (B) older and it is just as beautiful as the courthouse
 - (C) older than the courthouse; it is just as beautiful as it
 - (D) older than the courthouse but just as beautiful
 - (E) just as beautiful as the courthouse and it is older than it
2. Winslow Homer, one of America's foremost artists, spent his last 27 years and painted on the scenic Maine coast.
 - (A) spent his last 27 years and painted
 - (B) spent his last 27 years having painted
 - (C) spent his last 27 years painting
 - (D) having spent his last 27 years doing his painting
 - (E) spending his last 27 years painting
3. Researchers are experimenting with various techniques for preventing the accumulation in water of high levels of nitrogen, which can kill plants and animals.
 - (A) nitrogen, which can kill plants and animals
 - (B) nitrogen; plants and animals can be killed
 - (C) nitrogen, that is what can kill plants and animals
 - (D) nitrogen, they could kill plants and animals
 - (E) nitrogen, and they can kill plants and animals
4. When the news spread how new goldfields were discovered in Nome, Alaska, thousands abandoned Dawson, the site of the previous gold rush.
 - (A) how new goldfields were discovered
 - (B) how there was discovery of new goldfields
 - (C) about new goldfields, which they discovered
 - (D) about new goldfields, and they were discovered
 - (E) about new goldfields that had been discovered
5. When the Berlin Wall, long a symbol of the Cold War, began to be torn down in 1989, five million people went to Berlin to celebrate that.
 - (A) to celebrate that
 - (B) for its celebration
 - (C) to celebrate
 - (D) in celebration of that
 - (E) in celebrating

GO ON TO THE NEXT PAGE 



6. To complete the music program, a student must present one vocal performance, one instrumental performance, and composing one original work.
- (A) and composing one original work
(B) and one original composition
(C) with one original composition
(D) and to compose one original work
(E) as well as the student's original composition
7. Zookeepers have expanded one's definition of care to include concern for the animal's mental state as well as for its physical well-being.
- (A) have expanded one's definition of care to include
(B) have expanded one's definition of care, including
(C) expand their definition of care, they include
(D) expanding the definition of care to include
(E) have expanded their definition of care to include
8. The time and the place for such a large event is subject to approving from the mayor's office.
- (A) The time and the place for such a large event is subject to approving from the mayor's office.
(B) For such a large event, the time and the place are subject to the mayor's office's approving them.
(C) The time and the place for such a large event are subject to the approval of the mayor's office.
(D) The time and place for such a large event are subject to be approved by the office of the mayor.
(E) Subject to the approval of the mayor's office are the time and place for such a large event taking place.
9. New Zealand's Kaikoura Peninsula, a ruggedly beautiful spit of land, borders an undersea canyon that is home to the sperm whale and the giant squid.
- (A) borders an undersea canyon that is
(B) bordering an undersea canyon,
(C) and it borders an undersea canyon, which is
(D) which borders an undersea canyon,
(E) is the border of an undersea canyon, being
10. In similarity with some other great works, the enduring horror tale *Frankenstein* was first published anonymously; its author, Mary Shelley, wrote the novel when she was not quite nineteen years old.
- (A) In similarity with
(B) As
(C) Like what happened with
(D) Like the case with
(E) Like
11. The book is useful because it offers not just philosophy and theory but also tells you what and how to live every day.
- (A) but also tells you what and how to live every day
(B) but also it gives ways of everyday living
(C) but also advice for everyday living
(D) but also it gives practical advice for everyday life
(E) and also tells you what to do and how to live every day

The following sentences test your ability to recognize grammar and usage errors. Each sentence contains either a single error or no error at all. No sentence contains more than one error. The error, if there is one, is underlined and lettered. If the sentence contains an error, select the one underlined part that must be changed to make the sentence correct. If the sentence is correct, select choice E. In choosing answers, follow the requirements of standard written English.

EXAMPLE:

The other delegates and him immediately
 A B C
 accepted the resolution drafted by the
 D
 neutral states. No error
 E



12. The country found that its economy was growing
 A
more stronger, with an improved outlook and more
 B C
 opportunities for training and employment. No error
 D E
13. The iris, the colored part of the eye, contains delicate
 A
 patterns that are unique to each person, offering a
 B C
 powerful means of identification. No error
 D E

14. The newly elected Prime Minister, to the dismay
 A B
 of opponents from other parties, have argued for
 C
the strict regulation of campaign financing. No error
 D E
15. Studies have suggested that eating nuts—almonds
 A
 in particular—might help to lower blood cholesterol
 B
 levels in humans and reducing the risk of heart disease
 C
by protecting the blood vessels. No error
 D E
16. In English literature James Boswell is the prime
 A
 example of a biographer who, by ensuring the
 B
 immortality of another author, has achieved
 C
 immortality for himself. No error
 D E
17. Because the garden was untended, the windows
 A
had no shutters, and the lawn overrun by weeds,
 B C
 people passing by the old house assumed that
 D
 it was unoccupied. No error
 E

GO ON TO THE NEXT PAGE 

26. Ongoing research by several scientists suggest that
 A B
 regular periods of meditation reduce blood pressure
 C
 and are likely to contribute to other improvements
 D
 in health. No error
 E

27. Because the American Indian rodeo includes games
 and exhibitions developed as early as the seventeenth
 A
 century, they predate by a few hundred years
 B C
the form of rodeo now seen on television. No error
 D E

28. Five years in the writing, her new book is
 A
both a response to her critics' mistrust with
 B C
 her earlier findings and an elaboration of her
 D
 original thesis. No error
 E

29. Despite its cultural importance, the *Daily Gazette*
 A
lost 70 percent of its subscribers since 1920 and,
 B
 by 1955, was losing as much as \$200,000 a year.
 C D
No error
 E

Directions: The following passage is an early draft of an essay. Some parts of the passage need to be rewritten.

Read the passage and select the best answers for the questions that follow. Some questions are about particular sentences or parts of sentences and ask you to improve sentence structure or word choice. Other questions ask you to consider organization and development. In choosing answers, follow the requirements of standard written English.

Questions 30-35 are based on the following passage.

(1) No one owns Antarctica. (2) The nations of the world agreed—some of them reluctantly—that all countries would share the continent for the purposes of scientific research. (3) Governed by the Antarctic Treaty, written in 1959 and adopted in 1961, which has been signed by 27 countries. (4) Another 17 countries have agreed to abide by the treaty in order to participate in research being done in Antarctica.

(5) In Antarctica, relations among the researchers and their countries are both simpler and more complicated than in the rest of the world. (6) Relations are simpler because each country has only a few scientists on this isolated continent. (7) Treaty clauses assure that the research there is nonmilitary. (8) On the other hand, when conflicts do arise, there is no clear process for dealing with them. (9) Decisions that can make or break the preservation of Antarctica's unique environment and its scientific opportunities depend on a political system designed to have nobody in command.

(10) Clear decision making has become a more urgent challenge as more tourists are attracted to Antarctica. (11) Scientists living on Antarctica were not always as careful to preserve the pristine environment as they are now. (12) Tour operators are working with treaty members to devise regulations, and there are plans to assess the environmental impacts of tours. (13) But regulations and assessment plans may prove difficult to settle on and enforce in a place where jurisdiction is unclear.

30. What must be done to sentence 3 ?

- (A) Combine it with sentence 2, putting a comma after "research".
- (B) Begin it with the words "Antarctica is".
- (C) Replace the comma after "1961" with a semicolon.
- (D) Place the words "it was" before "written".
- (E) Change "1961, which" to "1961. It".

GO ON TO THE NEXT PAGE 

31. What should be done with sentence 7 ?
- (A) Change “assure” to “make sure”.
 - (B) Change “Treaty clauses” to “The clauses agreed to by the diverse countries represented there”.
 - (C) Place sentence 7 before sentence 6.
 - (D) Combine sentence 7 with sentence 6 by changing the period after “continent” to a comma.
 - (E) Combine sentence 7 with sentence 6 by changing “continent. Treaty” to “continent and also because treaty”.
32. In context, which is the best revision of the underlined portion of sentence 9 (reproduced below) ?
- Decisions that can make or break the preservation of Antarctica’s unique environment and its scientific opportunities depend on a political system designed to have nobody in command.*
- (A) create or destroy
 - (B) support or dispute
 - (C) be determined by
 - (D) be critical to
 - (E) be an adjustment to
33. The purpose of the second paragraph is to
- (A) present a situation that has contradictory elements
 - (B) offer a solution to a problem discussed in the first paragraph
 - (C) present an argument and its final resolution
 - (D) examine a theory in light of new discoveries
 - (E) discuss a theory that will be refuted in the third paragraph
34. Which sentence should be deleted?
- (A) 1
 - (B) 2
 - (C) 11
 - (D) 12
 - (E) 13
35. The third paragraph would be improved if which of the following sentences were added?
- (A) Scientists collect ice cores by driving a hollow tube deep into the miles-thick ice sheets.
 - (B) If the West Antarctic ice sheet melted, global seas would rise by 15 to 20 feet.
 - (C) It is the driest place in the world, yet it contains 70 percent of Earth’s freshwater.
 - (D) One cruise ship encountered 30-foot waves all the way across the Drake Passage.
 - (E) Last year, more than 10,000 tourists visited Antarctica, bringing soiled boots, climbing gear, and trash to many locations.

S T O P

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.**



SECTION 6

Time — 25 minutes

18 Questions

Turn to Section 6 (page 6) of your answer sheet to answer the questions in this section.

Directions: This section contains two types of questions. You have 25 minutes to complete both types. For questions 1-8, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

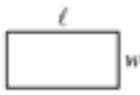
- The use of a calculator is permitted.
- All numbers used are real numbers.
- Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
- Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information



$$A = \pi r^2$$

$$C = 2\pi r$$



$$A = \ell w$$



$$A = \frac{1}{2}bh$$



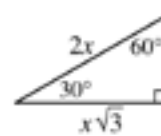
$$V = \ell wh$$



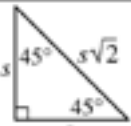
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles

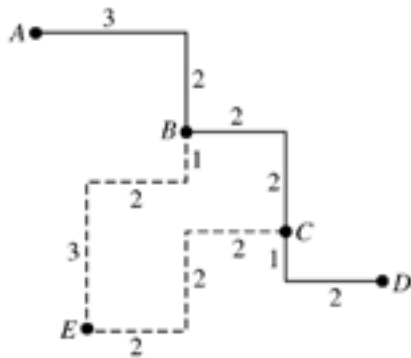


The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

- If $x + k = 12$ and $p(x + k) = 36$, what is the value of p ?
 - 3
 - 4
 - 6
 - 9
 - 12
- If 13 is added to one-half of a certain number, the result is 37. What is the original number?
 - 24
 - 40
 - 48
 - 61
 - 80

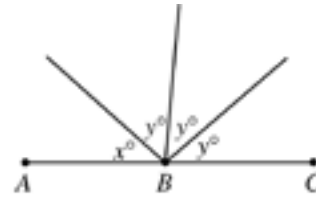
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3. In the figure above, the usual route from Town A to Town D is indicated by the solid line. The broken line indicates a detour route from B to C through E . Each line segment is labeled with its length in miles. How many more miles is the trip from Town A to Town D via the detour than via the usual route?
- (A) 4
(B) 8
(C) 10
(D) 12
(E) 18

x	y
1	7.5
2	13.0
3	18.5
4	24.0

4. Which of the following equations expresses y in terms of x for each of the four pairs of values shown in the table above?
- (A) $y = 5x + 7.5$
(B) $y = 5.5x + 2$
(C) $y = 5.5x + 7.5$
(D) $y = 7.5x$
(E) $y = 7.5x + 5.5$



Note: Figure not drawn to scale.

5. In the figure above, point B lies on \overline{AC} . If x and y are integers, which of the following is a possible value of x ?
- (A) 30
(B) 35
(C) 40
(D) 50
(E) 55
-
6. The least and greatest numbers in a list of 7 real numbers are 2 and 20, respectively. The median of the list is 6, and the number 3 occurs most often in the list. Which of the following could be the average (arithmetic mean) of the numbers in the list?
- I. 7
II. 8.5
III. 10
- (A) I only
(B) I and II only
(C) I and III only
(D) II and III only
(E) I, II, and III

GO ON TO THE NEXT PAGE



7. In the xy -coordinate plane, how many points are a distance of 4 units from the origin?
- (A) One
(B) Two
(C) Three
(D) Four
(E) More than four

Family	Number of Consecutive Nights
Jackson	10
Callan	5
Epstein	8
Liu	6
Benton	8

8. The table above shows the number of consecutive nights that each of five families stayed at a certain hotel during a 14-night period. If the Liu family's stay did not overlap with the Benton family's stay, which of the 14 nights could be a night on which only one of the five families stayed at the hotel?
- (A) The 3rd
(B) The 5th
(C) The 6th
(D) The 8th
(E) The 10th

GO ON TO THE NEXT PAGE 



Directions: For Student-Produced Response questions 9-18, use the grids at the bottom of the answer sheet page on which you have answered questions 1-8.

Each of the remaining 10 questions requires you to solve the problem and enter your answer by marking the circles in the special grid, as shown in the examples below. You may use any available space for scratchwork.

Write answer in boxes.

Grid in result.

Answer: $\frac{7}{12}$

Fraction line

Answer: 2.5

Decimal point

Answer: 201

Either position is correct.

Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

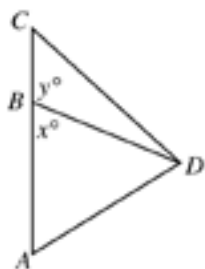
- Mark no more than one circle in any column.
- Because the answer sheet will be machine-scored, **you will receive credit only if the circles are filled in correctly.**
- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or $7/2$. (If $\frac{31}{2}$ is gridded, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)

- **Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid. For example, if you obtain an answer such as 0.6666..., you should record your result as .666 or .667. A **less accurate value such as .66 or .67 will be scored as incorrect.**
- Acceptable ways to grid $\frac{2}{3}$ are:

9. If a cake is cut into thirds and each third is cut into fourths, how many pieces of cake are there?

10. If $y = \frac{h}{x}$, where h is a constant, and if $y = 3$ when $x = 4$, what does y equal when $x = 6$?

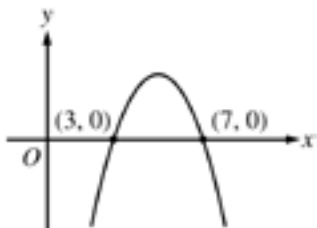
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Note: Figure not drawn to scale.

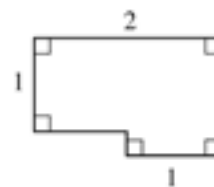
11. In the figure above, point B lies on side \overline{AC} . If $55 < x < 60$, what is one possible value of y ?

12. The price of a certain item was \$10 in 1990 and it has gone up by \$2 per year since 1990. If this trend continues, in what year will the price be \$100?



13. The figure above shows the graph of a quadratic function in the xy -plane. Of all the points (x, y) on the graph, for what value of x is the value of y greatest?

14. The number n is a 2-digit number. When n is divided by 10, the remainder is 9, and when n is divided by 9, the remainder is 8. What is the value of n ?



15. The area of the figure above is $\frac{9}{4}$. What is the perimeter of the figure?

16. If j is chosen at random from the set $\{4, 5, 6\}$ and k is chosen at random from the set $\{10, 11, 12\}$, what is the probability that the product of j and k is divisible by 5?

17. Tom and Alison are both salespeople. Tom's weekly compensation consists of \$300 plus 20 percent of his sales. Alison's weekly compensation consists of \$200 plus 25 percent of her sales. If they both had the same amount of sales and the same compensation for a particular week, what was that compensation, in dollars? (Disregard the dollar sign when gridding your answer.)

$$tx + 12y = -3$$

18. The equation above is the equation of a line in the xy -plane, and t is a constant. If the slope of the line is -10 , what is the value of t ?

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.



SECTION 7

Time — 25 minutes

24 Questions

Turn to Section 7 (page 6) of your answer sheet to answer the questions in this section.

Directions: For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

Example:

Hoping to ----- the dispute, negotiators proposed a compromise that they felt would be ----- to both labor and management.

- (A) enforce . . . useful
- (B) end . . . divisive
- (C) overcome . . . unattractive
- (D) extend . . . satisfactory
- (E) resolve . . . acceptable



1. *Black Americans in Flight*, a mural honoring several aviation pioneers, also ----- the 1992 spaceflight of astronaut Mae Jemison.
- (A) discerns
 - (B) introduces
 - (C) approximates
 - (D) commemorates
 - (E) asserts

2. The new antifungal agent has such ----- uses, from treating Dutch elm disease to rescuing water-damaged works of art from molds, that it is considered one of the more ----- antibiotics.

- (A) disturbing . . . explicit
- (B) innovative . . . precipitous
- (C) mysterious . . . recognized
- (D) varied . . . versatile
- (E) similar . . . discriminating

3. The child had a tendency toward aggressive behavior, a ----- fighting rather than resolving differences amicably.

- (A) propensity for
- (B) confusion about
- (C) disregard of
- (D) hostility toward
- (E) compunction about

4. Physical exercise often has a ----- effect, releasing emotional tension and refreshing the spirit.

- (A) pejorative
- (B) debilitating
- (C) cathartic
- (D) retentive
- (E) tenacious

5. Because rap and hip-hop offer such ----- commentary on contemporary issues, they are often said to be sharp-edged musical genres.

- (A) nebulous
- (B) trenchant
- (C) circumspect
- (D) prosaic
- (E) benign

GO ON TO THE NEXT PAGE



Each passage below is followed by questions based on its content. Answer the questions on the basis of what is stated or implied in each passage and in any introductory material that may be provided.

Questions 6-7 are based on the following passage.

Line “Mechanical pencils rule,” my fifteen-year-old
grandniece, Genevieve, declared when I invited her to
be her generation’s voice on school supplies. “Nobody
5 sharpens anymore.” Then, continuing with a fashion
maven’s hyperbole and arbitrary imperatives, she gave
a passionate disquisition on types of clickers, new grips,
smaller lead sizes, and other niceties of pencil selection.
As she consigned the yellow-painted wooden pencil to
the wastebasket of history, I felt a rush of nostalgia for
10 the perfumed sharpener shavings of my youth.

6. In lines 4-5, the author refers to a “fashion maven’s” tone primarily in order to
- (A) imply that Genevieve has only a superficial appreciation of mechanical pencils
 - (B) suggest that Genevieve is excessively concerned about her clothing
 - (C) illustrate some of the exaggerated claims made by mechanical pencil manufacturers
 - (D) emphasize the unpredictability of trends in consumer tastes
 - (E) indicate that Genevieve expresses her opinions with authority and flair
7. The author mentions “sharpener shavings” (line 10) in order to portray a mood of
- (A) unrestrained joy
 - (B) sentimental reminiscence
 - (C) bitter disappointment
 - (D) cautious optimism
 - (E) dark foreboding

Questions 8-9 are based on the following passage.

Line Black holes are the most efficient engines of destruction
known to humanity. Their intense gravity is a one-way
ticket to oblivion, and material spiraling into them can
5 heat up to millions of degrees and glow brightly. Yet, they
are not all-powerful. Even supermassive black holes are
minuscule by cosmic standards. They typically account for
less than one percent of their galaxy’s mass. Accordingly,
astronomers long assumed that supermassive holes, let
alone their smaller cousins, would have little effect beyond
10 their immediate neighborhoods. So it has come as a sur-
prise over the past decade that black hole activity is closely
intertwined with star formation occurring farther out in the
galaxy.

8. Which best describes the function of the statement in lines 10-13 (“So it . . . galaxy”)?
- (A) It summarizes the points made in the first four lines of the passage.
 - (B) It provides support for the argument asserted in the preceding statement.
 - (C) It introduces a new view of information presented earlier in the passage.
 - (D) It challenges recent scientific findings.
 - (E) It offers examples to support a theory.
9. Which of the following most resembles the relationship between “black hole activity” and “star formation” (lines 11-12) as described in the passage?
- (A) A volcanic eruption on one continent results in higher rainfall totals on another continent.
 - (B) Industrial emissions in one region lead to an increase in airborne pollutants in adjacent regions.
 - (C) A drought in a wilderness area causes a significant loss of vegetation in that area.
 - (D) Decreased oil production in one country results in higher gas prices in oil-dependent countries.
 - (E) Overfishing in a gulf leads to an increase in the population of smaller aquatic organisms.

GO ON TO THE NEXT PAGE 



Questions 10-15 are based on the following passage.

The following passage is an excerpt from a 1909 novel. Georgia, the main character, is a reporter in an otherwise all-male newsroom.

Georgia was to be married. It was the week before Christmas, and on the last day of the year she would become Mrs. Joseph Tank. She had told Joe that if they were to be married at all they might as well get it over with this year, and still there was no need of being married any earlier in the year than was necessary. She assured him that she married him simply because she was tired of having paper bags waved before her eyes everywhere she went and she thought if she were once officially associated with him people would not flaunt his idiosyncrasies at her that way. And then Ernestine, her best friend, approved of getting married, and Ernestine's ideas were usually good. To all of which Joe responded that she certainly had a splendid head to figure it out that way. Joe said that to his mind reasons for doing things weren't very important anyhow; it was doing them that counted.

Yesterday had been her last day on the paper. She had felt queer about that thing of taking her last assignment, though it was hard to reach just the proper state, for the last story related to pork-packers, and pork-packing is not a setting favorable to sentimental regrets. It was just like the newspaper business not even to allow one a little sentimental harrowing over one's exodus from it. But the time for gentle melancholy came later on when she was sorting her things at her desk just before leaving, and was wondering what girl would have that old desk—if they cared to risk another girl, and whether the other poor girl would slave through the years she should have been frivolous, only to have some man step in at the end and induce her to surrender the things she had gained through sacrifice and toil.

As she wrote a final letter on her typewriter—she did hate letting the old machine go—Georgia did considerable philosophizing about the irony of working for things only to the end of giving them up. She had waded through snowdrifts and been drenched in pouring rains, she had been frozen with the cold and prostrated with the heat, she had been blown about by Chicago wind until it was strange there was any of her left in one piece, she had had front doors—yes, and back doors too—slammed in her face, she had been the butt of the alleged wit of menials and hirelings, she had been patronized by vapid women as the poor girl who must make her living some way, she had been roasted by—but never mind—she had had a beat* or two! And now she was to wind it all up by marrying Joseph Tank, who had made a great deal of

money out of the manufacture of paper bags. This from her—who had always believed she would end her days in New York, or perhaps write a realistic novel exposing some mighty evil!

* the area regularly covered by a reporter

- 10. Based on information presented in the passage, which best describes what Georgia was "tired of" (line 8)? (A) Being forced to earn a living (B) Being teased about Joseph Tank (C) Being considered a hack writer by some of her colleagues (D) Being betrayed by her supposed friends (E) Being the only woman in the newsroom
11. The second paragraph suggests that Georgia believes the "proper state" (line 19) would be one of (A) excitement (B) wistfulness (C) amusement (D) annoyance (E) relief
12. In line 27, "poor" most nearly means (A) pitiable (B) indigent (C) inferior (D) humble (E) petty
13. Which most resembles the "irony" mentioned in line 34? (A) A worker moving to a distant state to take a job, only to be fired without warning (B) An executive making an important decision, only to regret it later (C) An athlete earning a starting position on a good team, only to quit in midseason (D) A student studying for a major exam, only to learn that it has been postponed (E) A person purchasing an expensive umbrella, only to lose it on the first rainy day



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14. The description in lines 35-45 (“She . . . two!”) primarily serves to
- (A) suggest that Georgia envied those women who did not have to work
 - (B) imply that Georgia would be unlikely ever to consider working as a reporter again
 - (C) indicate the role that weather plays in the everyday life of a reporter
 - (D) exaggerate Georgia’s reluctance to relinquish her job
 - (E) show the adversities Georgia had to overcome as a reporter

15. In context, the phrase “This from her” (lines 47-48) helps to suggest that a
- (A) specific feeling is quite heartfelt
 - (B) stated viewpoint is highly personal
 - (C) certain decision is out of character
 - (D) particular behavior is extremely upsetting
 - (E) given attitude is unsurprising

GO ON TO THE NEXT PAGE 



Questions 16-24 are based on the following passage.

The following passage is adapted from a book about television and popular culture.

Ridiculing television, and warning about its inherent evils, is nothing new. It has been that way since the medium was invented, and television hasn't exactly been lavished with respect as the decades have passed. I suspect, though, that a lot of the fear and loathing directed at television comes out of a time-honored, reflexive overreaction to the dominant medium of the moment. For the past several decades, television has been blamed for corrupting our youth and exciting our adults, distorting reality, and basically being a big, perhaps dangerous, waste of time. Before TV, radio and film were accused of the same things. And long before that—in fact, some 2,500 years earlier—philosophers were arguing that poetry and drama should be excluded from any ideal city on much the same grounds.

In Book 10 of the Republic, Plato (428-348 B.C.) attacks epic poet Homer (c. 850 B.C.) and the tragedians on several grounds, all of which have a familiar ring. "Their productions are appearances and not realities," he gripes. "Drawing, and in fact all imitation . . . [is] quite removed from the truth." The audience, as well as the art form, troubled Plato, whose remarks are colored by an implied disdain for the popularity of public performances. The "common people," as Plato so charitably calls them, are drawn to "peevish and diverse" characters—such as Odysseus and other heroes in the Iliad and the Odyssey—who (to Plato, anyway) engage in such questionable displays of emotion as "spinning out a long melancholy lamentation" or "disfiguring themselves in grief." To Plato, baring such intimate sorrows is not to be condoned. (Clearly, he would have given thumbs down to the central characters of Shakespeare's Hamlet and Macbeth.) "If you receive the pleasure-seasoned Muse¹ of song and epic," Plato warns, "pleasure and pain will be kings in your city, instead of law." Finally, Plato sums up his anti-arts argument with the cold, sweeping pronouncement that "poetry is not to be taken seriously."

One academic who has studied and written extensively about both Plato and television suggests that Plato, rather than being anti-arts, was merely an elitist. Plato wanted to ban poetry readings and live theater, the argument goes, because, being free and accessible and raucous and extremely popular, they were the mass entertainment of that era. "If, instead of 'tragedy' and 'poetry,' and 'Homer' and 'Aeschylus,'² you read 'mass entertainment' or 'popular media,' you'll recognize Plato's arguments as the ancestor of all the reasons we have today for being suspicious of television."

To wit: poetry, by which Plato means drama, confuses us between appearance and reality. The action it presents

is too extreme and violent. Most important, it's a corrupting influence, perverting its audience by bombarding it with inferior characters and vulgar subjects—and constituting, in Plato's own words, "a harm to the mind of its audience."

If Plato's Republic had become reality, it would have been a republic with a lot of empty libraries, theaters, and museums—if, indeed, those repositories of the arts would have survived at all. Plato's personal utopia never came to pass—but throughout the centuries, wherever and whenever a new medium of artistic expression attracted a lot of people, someone has been ready, waiting, and eager to attack its content and fear its impact.

¹ The Muses inspired poetry and song in Greek mythology.

² Aeschylus (525-456 B.C.) was a Greek tragic dramatist.

16. The opening paragraph primarily serves to

- (A) criticize the way television distorts the truth
- (B) examine the evolution of television as a medium
- (C) place contemporary criticism of television in a historical context
- (D) directly compare television and drama as art forms
- (E) explain why television, radio, and drama appeal to the masses

17. Which of the following television shows would be LEAST vulnerable to the criticism expressed in lines 8-11 ("For . . . time")?

- (A) A melodrama in which police detectives attempt to solve crimes
- (B) A soap opera depicting interpersonal conflicts in a fictional law firm
- (C) A comedy whose primary characters are supernatural
- (D) A documentary on the state of education in the nation
- (E) A talk show that encourages people to confront each other in front of a studio audience

18. In line 26, "drawn" most nearly means

- (A) brought
- (B) depicted
- (C) selected
- (D) attracted
- (E) shaped

GO ON TO THE NEXT PAGE



19. Which of the following best characterizes Plato's view of the heroes mentioned in line 27 ?
- (A) Admiration
 - (B) Curiosity
 - (C) Distrust
 - (D) Disappointment
 - (E) Contempt
20. The "academic" (line 39) indicates that Plato was primarily characterized by his
- (A) insight
 - (B) artistry
 - (C) cynicism
 - (D) irreverence
 - (E) snobbishness
21. The primary purpose of the statements in lines 39-45 ("One . . . that era") is to
- (A) provide an interpretation of a viewpoint described in the previous paragraph
 - (B) show how Plato's view of politics should be understood in today's terms
 - (C) put divergent interpretations of Plato into historical perspective
 - (D) account for the appeal of Plato's writings
 - (E) signal a digression in the passage
22. The fourth paragraph (lines 50-56) indicates that Plato's principal objection to "poetry" (line 50) was its
- (A) confusing language
 - (B) widespread popularity
 - (C) depiction of turbulent events
 - (D) influence on people's morals
 - (E) misrepresentation of historical figures
23. The author of the passage would probably agree with which of the following statements about the "utopia" referred to in line 60 ?
- (A) It would have encouraged new artistic ventures.
 - (B) It would have stifled human creativity.
 - (C) It is an ideal that we should continue to work towards.
 - (D) It may come to pass because of the popularity of television.
 - (E) It was a notion rejected by Greek philosophers.
24. The comment about "a new medium of artistic expression" (line 62) primarily suggests that
- (A) the author holds a fatalistic view of the future for artistic expression
 - (B) certain societies in the past have been slow to accept new art forms
 - (C) people often disguise their true feelings when it comes to art
 - (D) the popular response to a new art form will often overcome opposition to it
 - (E) a popular new art form will always receive some form of negative response

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.



SECTION 8

Time — 20 minutes

19 Questions

Turn to Section 8 (page 7) of your answer sheet to answer the questions in this section.

Directions: For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

Example:

Hoping to ----- the dispute, negotiators proposed a compromise that they felt would be ----- to both labor and management.

- (A) enforce . . useful
(B) end . . divisive
(C) overcome . . unattractive
(D) extend . . satisfactory
(E) resolve . . acceptable

(A) (B) (C) (D) (E)

- As a child, Mary ----- her stringent upbringing; however, as she grew older she began to appreciate her grandmother's strict -----.
(A) tolerated . . autonomy
(B) despised . . discipline
(C) embraced . . authority
(D) disavowed . . abstinence
(E) loathed . . liberality
- His mouth stinging and burning, Virgil hurried to the kitchen for water to wash away the dish's ----- taste.
(A) earthy (B) exotic (C) cloying
(D) acrid (E) succulent
- Since other seabirds customarily nest in colonies on ocean cliffs and islands, the marbled murrelet's ----- nesting in forests many miles from the sea must be considered -----.
(A) ambivalence about . . hypothetical
(B) indifference to . . bold
(C) insistence upon . . evident
(D) aversion to . . dangerous
(E) predilection for . . atypical
- The cause of Mozart's ----- is a long-standing medical -----: over the years, physicians have suggested more than 100 possibilities, including poisoning, malnutrition, kidney disease, and heart failure.
(A) mortality . . phenomenon
(B) bereavement . . controversy
(C) genius . . enigma
(D) demise . . mystery
(E) death . . trial
- At first the children were -----, but as the morning progressed they began to laugh and talk eagerly.
(A) ostentatious (B) myopic (C) solicitous
(D) puerile (E) reticent
- Oren missed the play's overarching significance, focusing instead on details so minor that they would best be described as -----.
(A) pragmatic (B) indelible (C) moribund
(D) picayune (E) impervious

GO ON TO THE NEXT PAGE 



The passage below is followed by questions based on its content. Answer the questions on the basis of what is stated or implied in the passage and in any introductory material that may be provided.

Questions 7-19 are based on the following passage.

The following passage is from a 1979 essay by a Native American writer.

An understanding of any national literature depends very much on an awareness of the larger cultural context. Without some knowledge of language, of history, of inflection, of the position of the storyteller within the group, without a hint of the social roles played by males and females in the culture, without a sense of the society's humor or priorities—without such knowledge, how can we, as reader or listener, penetrate to the core of meaning in an expression of art?

The difficulty of gaining access to the literature of a different culture may be illustrated by an exemplary folk-tale (in translation) from the Tanaina (Athabaskan) culture of south-central Alaska. It would typically be told to a general audience within the society, including the full range of ages from young children to grandparents; it would be recounted with gesticulation and exaggeration by a performance specialist. It would be expected to have different meanings to the various categories of listeners— instructive, entertaining, reinforcing, or all three. Here is a brief version of the story:

“Once upon a time there was a porcupine woman who decided to do some hunting on the far side of the river. She went to the bank, where she met a beaver.

‘Hello,’ she said to him. ‘I need to do some hunting over there. Will you ride me across on your back?’

‘I’d be glad to,’ replied the beaver. ‘Hop on.’

So the porcupine woman climbed on his back, and he started swimming for the other side. When he had almost made it, the porcupine woman said, ‘Oh my! I’ve forgotten to bring my sack. I’ll need to go back to the other bank and get it.’

‘All right,’ said the beaver, and swam back. He was panting while the porcupine woman went to get her sack.

‘Okay,’ she said. ‘Let’s go.’ So they started across again. The beaver was swimming much more slowly. When they had practically reached the other side, she said, ‘Oh my! I’ve forgotten to bring my needle. We’ll have to go back and get it.’

This time the beaver didn’t say anything—he didn’t have enough breath! But he turned around and pulled them back to the shore and nearly passed out while she got her needle.

‘Hurry up, now,’ the porcupine woman said as she climbed back on his back. He could hardly keep his nose above water, but he had almost made it to the far bank again when she said, ‘Oh my! I’ve forgotten my staff. We’ll have to . . .’

Before she had finished her sentence the beaver had flipped over in the water and dragged himself onto the bank, where he lay half dead. The porcupine woman managed to make the shore too, and climbed up onto a bear path. When she had caught her breath, she turned on the beaver and quilled him to death.”

The Tanaina live in an environment that could euphemistically be described as “difficult.” Survival, especially in the wild, is always precarious. Further, they were, in the precontact period, a nonliterate people. Oral communication was therefore the method of cultural transmission, legal understanding, and meaningful communication. It is also necessary to know that a “staff,” as mentioned in the story, functions as both a walking stick and a weapon, and that in the Tanaina symbol system, porcupines were supposed to be rather ponderous, dull-witted creatures, and beavers were thought to be energetic and industrious but overly spontaneous and erratic.

For the reader armed with these data, the story becomes more accessible as a lesson in contract law, with several additional minor themes. A culturally attuned listener would notice, for instance, that when the porcupine woman proposed passage to the beaver, he agreed without any stipulations or clarifications of the terms. He gave a basically open-ended agreement—made a contract—and hence the porcupine woman was perfectly within her rights both in demanding that he return three times and in quilling him to death when he reneged.

The story is not, however, without its moral for the porcupine women of this world. Her stated aim is to go hunting, and yet she sets out without the three essentials of that endeavor: a sack in which to carry home her game, a needle with which to sew up the intestines, and, most important, an implement with which to hunt and defend herself. True, she had an open-ended contract, but where does she wind up at the conclusion of the story? Sitting, exhausted, quills used up, weaponless, and not only on the wrong side of the river from her home but on a bear path! The hunter is about to become the hunted, and all because of her own improvidence.



7. In the opening paragraph, the author assumes that the “meaning” (line 8) is
- (A) culturally determined
 - (B) intensely personal
 - (C) essentially moralistic
 - (D) permanently inscrutable
 - (E) uniquely artistic
8. In the context of the passage, which “expression of art” (line 9) would be the most difficult to interpret?
- (A) A contemporary play written by a prolific playwright
 - (B) A fable from a nonliterate society with which anthropologists are very familiar
 - (C) A single text produced by a previously unknown society
 - (D) A sitcom from the early days of television
 - (E) A single myth from an ancient culture with a well-documented mythological structure
9. How does the author respond to the question posed in lines 3-9?
- (A) By proposing an innovative strategy
 - (B) By confirming the futility of such analysis
 - (C) By describing a personal experience with the problem
 - (D) By illustrating his point within a particular context
 - (E) By documenting a traditional approach to the problem
10. The author discusses Tanaina culture from the perspective of
- (A) a concerned parent
 - (B) a bewildered visitor
 - (C) a performance artist
 - (D) an informed outsider
 - (E) an indignant reader
11. The sentence in which “difficult” appears (lines 54-55) indicates that the author considers the word to be
- (A) an exaggeration
 - (B) an estimate
 - (C) an understatement
 - (D) a contradiction
 - (E) a preconception
12. In relation to the passage, the statements in lines 59-65 serve a function most similar to which of the following items?
- (A) A menu in a restaurant
 - (B) The key or legend to a map
 - (C) A department store directory
 - (D) The outline of a term paper
 - (E) An illustration of a fairytale
13. The author’s analysis of the folktale offers which insight into Tanaina beliefs?
- (A) A fanciful story is most suitable for an audience of children.
 - (B) A verbal exchange can establish a binding contract.
 - (C) A person who behaves impulsively is most often sincere.
 - (D) A shared task should be divided fairly between two people.
 - (E) A painstaking plan may nonetheless fail to anticipate all problems.
14. The “porcupine women of this world” (lines 76-77) are best described as people who
- (A) plan inadequately for their own needs
 - (B) postpone necessary work in favor of leisure
 - (C) depend heavily upon help from their close friends
 - (D) return repeatedly to their favorite places
 - (E) flee quickly from any laborious task
15. The final paragraph (lines 76-87) suggests that the bear path mentioned in lines 51-52 is significant because it
- (A) foreshadows the arrival of a benevolent character from Tanaina folklore
 - (B) suggests an alarming alternative to crossing the river
 - (C) marks the boundary of the beaver’s natural surroundings
 - (D) explains the porcupine woman’s fear of unfamiliar territory
 - (E) poses a new peril for the porcupine woman



16. In lines 83-87, the description of the porcupine woman emphasizes the discrepancy between her
- (A) social position and her private feelings
 - (B) physical wealth and her moral poverty
 - (C) hostile action and her ultimate gratitude
 - (D) original goal and her actual situation
 - (E) grandiose ambition and her real needs
17. As a commentary on legal relations, this folktale is best described as
- (A) an example of traditional practices
 - (B) an outline for social behavior
 - (C) a warning about ill-conceived assent
 - (D) a criticism of obsolete customs
 - (E) a parody of actual situations
18. The author's attitude toward the Tanaina folktale is best described as
- (A) excitement at an unexpected discovery
 - (B) admiration of the storyteller's performance
 - (C) appreciation of the folktale as a means of communicating values
 - (D) enthusiasm for the Tanaina culture's concept of legality
 - (E) enjoyment of the comical aspects of the folktale
19. Which statement is most consistent with the author's argument?
- (A) Translating a literary text requires formal linguistic training.
 - (B) Tales transmitted by a nonliterate society elude transcription in later eras.
 - (C) Listening to a skilled storyteller is more instructive than entertaining.
 - (D) Simple enjoyment of a tale is incompatible with scholarly analysis.
 - (E) To read a text is not necessarily to understand it.

S T O P

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.



SECTION 9

Time — 20 minutes

16 Questions

Turn to Section 9 (page 7) of your answer sheet to answer the questions in this section.

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

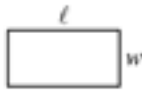
- The use of a calculator is permitted.
- All numbers used are real numbers.
- Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
- Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information



$$A = \pi r^2$$

$$C = 2\pi r$$



$$A = \ell w$$



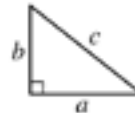
$$A = \frac{1}{2}bh$$



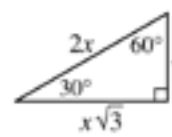
$$V = \ell wh$$



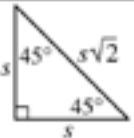
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles

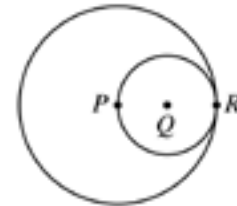


The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

1. If $\frac{1}{3}y + 9 = 0$, then $y =$

- (A) -27
(B) -9
(C) -3
(D) 3
(E) 27



2. In the figure above, P , Q , and R lie on the same line. P is the center of the larger circle, and Q is the center of the smaller circle. If the radius of the larger circle is 4, what is the radius of the smaller circle?

- (A) 1
(B) 2
(C) 4
(D) 8
(E) 16

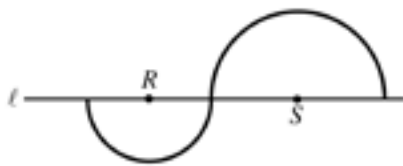
GO ON TO THE NEXT PAGE



3. Roy planted corn on $\frac{1}{5}$ of his land. If he planted 45 acres of corn, how many acres of land does he have?
- (A) 90
(B) $112\frac{1}{2}$
(C) 135
(D) 225
(E) $337\frac{1}{2}$

6, 10, 18, 34, 66

4. The first number in the list above is 6. Which of the following gives a rule for finding each successive number in the list?
- (A) Add 4 to the preceding number.
(B) Take $\frac{1}{2}$ of the preceding number and then add 7 to that result.
(C) Double the preceding number and then subtract 2 from that result.
(D) Subtract 2 from the preceding number and then double that result.
(E) Triple the preceding number and then subtract 8 from that result.



5. The two semicircles in the figure above have centers R and S , respectively. If $RS = 12$, what is the total length of the darkened curve?
- (A) 8π
(B) 9π
(C) 12π
(D) 15π
(E) 16π

6. If h and k are positive numbers and $h + k = 7$, then $\frac{7-k}{h} =$
- (A) 1
(B) 0
(C) -1
(D) h
(E) $k - 1$

Country	Total Population	Population Density
A	6,500,000 people	600 people per square mile
B	7,600,000 people	400 people per square mile

7. The table above shows the populations of two countries and their population densities. The number of square miles in the area of Country B is approximately how much greater than the number of square miles in the area of Country A ?
- (A) 200
(B) 3,600
(C) 5,000
(D) 8,000
(E) 905,000,000

8. If $x^2 = x + 6$, which of the following must be true?
- (A) $x = 6$
(B) $x < 3$
(C) $x > 0$
(D) $x^2 < x$
(E) $x^2 > x$

GO ON TO THE NEXT PAGE



9. Let the function f be defined by $f(x) = 5x - 2a$, where a is a constant. If $f(10) + f(5) = 55$, what is the value of a ?

(A) -5
 (B) 0
 (C) 5
 (D) 10
 (E) 20

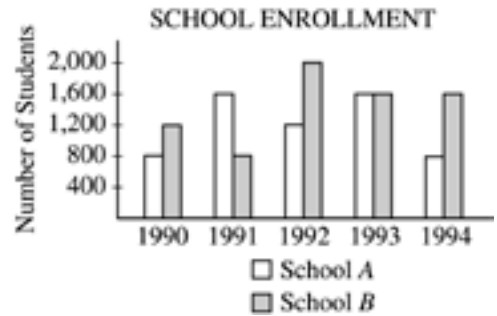
10. A number is called “even-odd” if it is halfway between an even integer and an odd integer. If x is an even-odd number, which of the following must be true?

I. $2x$ is an integer.
 II. $2x$ is even-odd.
 III. x is halfway between two even integers.

(A) I only
 (B) II only
 (C) I and II only
 (D) II and III only
 (E) I, II, and III

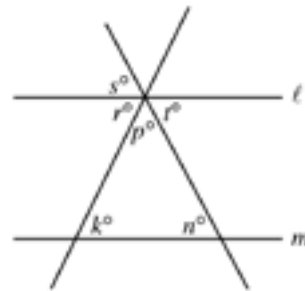
11. If m is a positive integer, which of the following is NOT equal to $(2^4)^m$?

(A) 2^{4m}
 (B) 4^{2m}
 (C) $2^m(2^{3m})$
 (D) $4^m(2^m)$
 (E) 16^m



12. According to the graph above, in which year was the ratio of the number of students enrolled at School B to the number of students enrolled at School A the greatest?

(A) 1990
 (B) 1991
 (C) 1992
 (D) 1993
 (E) 1994



13. In the figure above, $l \parallel m$. Which of the following must equal 180?

(A) $k + n + r$
 (B) $k + p + s$
 (C) $n + p + s$
 (D) $n + p + t$
 (E) $r + s + t$

GO ON TO THE NEXT PAGE



14. How many different ordered pairs (x, y) are there such that x is an even integer, where $4 \leq x \leq 10$, and y is an integer, where $4 < y < 10$?

(A) 8
(B) 12
(C) 20
(D) 30
(E) 36

16. A sphere of radius r inside a cube touches each one of the six sides of the cube. What is the volume of the cube, in terms of r ?

(A) r^3
(B) $2r^3$
(C) $4r^3$
(D) $\frac{4}{3}\pi r^3$
(E) $8r^3$

$$n(t) = 500(0.81)^t$$

15. The function above can be used to model the population of a certain endangered species of animal. If $n(t)$ gives the number of the species living t decades after the year 1900, which of the following is true about the population of the species from 1900 to 1920 ?

(A) It increased by about 1,000.
(B) It increased by about 320.
(C) It decreased by about 180.
(D) It decreased by about 320.
(E) It decreased by about 1,000.

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.



SECTION 10

Time — 10 minutes

14 Questions

Turn to Section 10 (page 7) of your answer sheet to answer the questions in this section.

Directions: For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

The following sentences test correctness and effectiveness of expression. Part of each sentence or the entire sentence is underlined; beneath each sentence are five ways of phrasing the underlined material. Choice A repeats the original phrasing; the other four choices are different. If you think the original phrasing produces a better sentence than any of the alternatives, select choice A; if not, select one of the other choices.

In making your selection, follow the requirements of standard written English; that is, pay attention to grammar, choice of words, sentence construction, and punctuation. Your selection should result in the most effective sentence—clear and precise, without awkwardness or ambiguity.

EXAMPLE:

Laura Ingalls Wilder published her first book and she was sixty-five years old then.

- (A) and she was sixty-five years old then
- (B) when she was sixty-five
- (C) at age sixty-five years old
- (D) upon the reaching of sixty-five years
- (E) at the time when she was sixty-five

A B C D E

1. The Amazon River carries more water than the water carried in any of the world's other rivers.
 - (A) the water carried in any of the world's other rivers
 - (B) the water elsewhere in the world's rivers
 - (C) any other river in the world
 - (D) all rivers in the world
 - (E) any of the world's rivers elsewhere
2. The owners of stadiums that bear the names of now bankrupt companies have a problem what to do about the names.
 - (A) what to do about the names
 - (B) what they should do about the names
 - (C) deciding what to do about those names
 - (D) to decide as to whether the names should stay
 - (E) should they change those names or not
3. During the Fourth of July weekend in 1947, about six million people crowded onto the beach and into the amusements at Coney Island, "America's Playground," in Brooklyn, New York.
 - (A) During the Fourth of July weekend in 1947,
 - (B) It was the Fourth of July weekend in 1947 that
 - (C) The Fourth of July weekend that occurred in 1947 was when
 - (D) The Fourth of July weekend in 1947,
 - (E) Occurring in 1947 over the Fourth of July weekend,
4. Because fiscal problems will force some cities to lay off firefighters, and so the state legislature must decide whether to provide those cities with financial aid.
 - (A) firefighters, and so
 - (B) firefighters is a matter
 - (C) firefighters,
 - (D) firefighters; then
 - (E) firefighters; this is a problem
5. A recently published history of comic books reveal that *Batman* was begun as an experiment but became an institution.
 - (A) recently published history of comic books reveal that *Batman* was begun as an experiment
 - (B) recently published history of comic books reveals that *Batman* began as an experiment
 - (C) recent published history of comic books revealed that *Batman*, who began as an experiment
 - (D) history of comic books, recently published, revealing *Batman* first began as an experiment
 - (E) history of comic books having been recently published, it reveals how *Batman* began as an experiment

GO ON TO THE NEXT PAGE



6. A discovery in New Jersey actually contributed to the early economic development of America and, in 1714, a worker uncovered a green rock containing copper.
- (A) America and, in 1714, a worker uncovered
 (B) America when, in 1714, a worker uncovered
 (C) America, thus, in 1714, a worker uncovered
 (D) America, that being a worker in 1714 uncovering
 (E) America, it was in 1714 a worker uncovered
7. Selected as an astronaut by NASA in 1990, over 719 hours in space were spent by Dr. Ellen Ochoa on three flights by 2001.
- (A) over 719 hours in space were spent by Dr. Ellen Ochoa on three flights by 2001
 (B) by 2001, and on three flights, Dr. Ellen Ochoa spent over 719 hours in space
 (C) three flights and 719 hours were spent by Dr. Ellen Ochoa in space by 2001
 (D) Dr. Ellen Ochoa, by 2001 spending over 719 hours in space on three flights
 (E) Dr. Ellen Ochoa had spent over 719 hours in space on three flights by 2001
8. The old maxim “Let the buyer beware” suggests that as a buyer we are responsible for inspecting merchandise for flaws before paying for it.
- (A) as a buyer we are responsible
 (B) as a buyer it is their responsibility
 (C) the buyer is the responsible one
 (D) buyers are responsible
 (E) buyers are to be the ones responsible
9. The same analysts who once favored public-opinion polls now see them as hampering representative government.
- (A) The same analysts who once favored public-opinion polls now see them
 (B) The same analysts which were once in favor of public-opinion polls now have come to see them
 (C) Public-opinion polls, once favored by analysts, but now seen by these same analysts
 (D) As for favoring public-opinion polls, the same analysts now see them
 (E) Analysts once were in favor of public-opinion polls, which these same analysts now see
10. Santa Fe is one of the oldest cities in the United States, its adobe architecture, spectacular setting, and clear, radiant light have long made it a magnet for artists.
- (A) Santa Fe is one of the oldest cities in the United States, its
 (B) Santa Fe, which is one of the oldest cities in the United States, its
 (C) Santa Fe, which is one of the oldest cities in the United States, has
 (D) Santa Fe is one of the oldest cities in the United States; its
 (E) Santa Fe, one of the oldest cities in the United States, and its
11. Dime novels, known in nineteenth-century England as “penny dreadfuls,” flourished because increased mechanization of printing and increased literacy rates made production of large numbers of these books profitable.
- (A) and increased literacy rates made
 (B) with increased literacy rates also made
 (C) and also literacy rates increased and made
 (D) as well as increased literacy rates, making
 (E) and literacy rates increased, making
12. Frequently on tour, a band called the Chieftains revered internationally as spirited performers of traditional Irish music.
- (A) revered internationally as spirited performers
 (B) revered internationally and they are spirited performers
 (C) is revered internationally for its spirited performances
 (D) is revered internationally as giving spirited performances
 (E) are revered internationally as being spirited performers



13. Psychologists advise that before making any major changes in your life, a person needs to focus on one's goals.

- (A) your life, a person needs to focus on one's goals
- (B) their life, a person needs to focus on their goals
- (C) their lives, focus on the goals
- (D) one's life, you should focus on your goals
- (E) their lives, people should focus on their goals

14. Some beaches are frequently contaminated by untreated sewage that flows into the ocean, which can last for several days.

- (A) ocean, which can last for several days
- (B) ocean that can last for several days
- (C) ocean, it can last for several days
- (D) ocean, while contamination can last several days
- (E) ocean; the contamination can last for several days

S T O P

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

Correct Answers and Difficulty Levels for the Official SAT Practice Test

Critical Reading

Section 4

COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.
1. E 1	13. A 3	
2. C 1	14. B 4	
3. A 4	15. B 3	
4. E 2	16. D 1	
5. D 4	17. C 3	
6. E 4	18. E 5	
7. B 5	19. A 3	
8. A 5	20. B 4	
9. C 3	21. A 4	
10. C 2	22. B 2	
11. A 2	23. D 3	
12. E 1	24. B 3	

Number correct

Number incorrect

Section 7

COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.
1. D 1	13. C 3		
2. D 1	14. E 3		
3. A 2	15. C 3		
4. C 5	16. C 3		
5. B 5	17. D 2		
6. E 3	18. D 2		
7. B 1	19. E 4		
8. C 4	20. E 5		
9. A 5	21. A 4		
10. B 3	22. D 3		
11. B 5	23. B 3		
12. A 3	24. E 3		

Number correct

Number incorrect

Section 8

COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.
1. B 1	11. C 3
2. D 2	12. B 3
3. E 3	13. B 3
4. D 3	14. A 2
5. E 5	15. E 3
6. D 5	16. D 2
7. A 3	17. C 4
8. C 3	18. C 3
9. D 3	19. E 3
10. D 3	

Number correct

Number incorrect

Math

Section 2

COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.
1. D 1	11. E 3
2. B 1	12. E 2
3. D 1	13. E 3
4. C 1	14. A 4
5. B 2	15. A 4
6. A 2	16. B 4
7. A 2	17. B 5
8. C 3	18. D 4
9. C 3	19. C 5
10. D 2	20. D 5

Number correct

Number incorrect

Section 6

Multiple-Choice Questions		Student-Produced Response Questions		DIFF. LEV.
COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	
1. A 1	9. 12			1
2. C 1	10. 2			2
3. B 2	11. $120 < x < 125$			2
4. B 2	12. 2035			3
5. A 3	13. 5			3
6. E 5	14. 89			3
7. E 4	15. $13/2$ or 6.5			4
8. A 4	16. $5/9$, .555 or .556			4
	17. 700			5
	18. 120			4

Number correct

Number incorrect

Number correct
(9-18)

Section 9

COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.
1. A 1	9. C 3
2. B 1	10. A 3
3. D 1	11. D 3
4. C 1	12. E 4
5. C 3	13. B 4
6. A 2	14. C 4
7. D 3	15. C 5
8. E 3	16. E 5

Number correct

Number incorrect

Writing

Section 5

COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.
1. D 1	10. E 3	19. E 3	28. C 5
2. C 1	11. C 3	20. A 3	29. B 5
3. A 1	12. B 1	21. C 3	30. B 3
4. E 1	13. E 3	22. B 3	31. E 3
5. C 1	14. C 2	23. B 3	32. D 3
6. B 1	15. C 2	24. A 3	33. A 3
7. E 2	16. E 3	25. C 4	34. C 4
8. C 2	17. C 3	26. B 3	35. E 3
9. A 2	18. B 3	27. B 4	

Number correct

Number incorrect

Section 10

COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.	COR. DIFF. ANS. LEV.
1. C 1	6. B 2	11. A 3
2. C 1	7. E 1	12. C 4
3. A 1	8. D 3	13. E 5
4. C 2	9. A 3	14. E 5
5. B 1	10. D 3	

Number correct

Number incorrect



Get a score report and answer explanations! Enter your answers online at collegeboard.org/satpracticetest.

NOTE: Difficulty levels are estimates of question difficulty for a reference group of college-bound seniors. Difficulty levels range from 1 (easiest) to 5 (hardest).

Scoring the Essay

Essays are scored in a manner that is fair and consistent, using a holistic approach. In holistic scoring, a piece of writing is considered as a total work, the whole of which is greater than the sum of its parts. Essays are scored by experienced high school teachers and college faculty members. The majority of essay readers teach English, composition, or language arts courses. Each essay is scored independently by two readers on a scale of 1 to 6, with 6 being the highest score. The combined score for both readers will range from 2 to 12. If the two readers' scores are more than one point apart, a third reader resolves the discrepancy.

In scoring the essays, readers follow the scoring guide below.

The scoring guide describes the features typically found in essays at each score point, including critical thinking, development, organization, language use, and sentence structure. A student can get a top score on the essay even with minor errors in grammar, usage, and mechanics. The SAT essay neither rewards nor penalizes formulaic approaches to writing, such as the five-paragraph essay.

There is no formula for effective writing, no single best way to communicate an idea. Any essay that features clear lines of reasoning, appropriate choices of evidence, ample development of ideas, effective organization, and precise use of language will receive a high score, regardless of style or approach. Readers are trained to recognize and reward a wide variety of essays at each score point.

SAT ESSAY Scoring Guide

SCORE OF 6	SCORE OF 5	SCORE OF 4
An essay in this category demonstrates <i>clear and consistent mastery</i> , although it may have a few minor errors. A typical essay	An essay in this category demonstrates <i>reasonably consistent mastery</i> , although it will have occasional errors or lapses in quality. A typical essay	An essay in this category demonstrates <i>adequate mastery</i> , although it will have lapses in quality. A typical essay
<ul style="list-style-type: none"> effectively and insightfully develops a point of view on the issue and demonstrates outstanding critical thinking, using clearly appropriate examples, reasons, and other evidence to support its position 	<ul style="list-style-type: none"> effectively develops a point of view on the issue and demonstrates strong critical thinking, generally using appropriate examples, reasons, and other evidence to support its position 	<ul style="list-style-type: none"> develops a point of view on the issue and demonstrates competent critical thinking, using adequate examples, reasons, and other evidence to support its position
<ul style="list-style-type: none"> is well organized and clearly focused, demonstrating clear coherence and smooth progression of ideas 	<ul style="list-style-type: none"> is well organized and focused, demonstrating coherence and progression of ideas 	<ul style="list-style-type: none"> is generally organized and focused, demonstrating some coherence and progression of ideas
<ul style="list-style-type: none"> exhibits skillful use of language, using a varied, accurate, and apt vocabulary 	<ul style="list-style-type: none"> exhibits facility in the use of language, using appropriate vocabulary 	<ul style="list-style-type: none"> exhibits adequate but inconsistent facility in the use of language, using generally appropriate vocabulary
<ul style="list-style-type: none"> demonstrates meaningful variety in sentence structure 	<ul style="list-style-type: none"> demonstrates variety in sentence structure 	<ul style="list-style-type: none"> demonstrates some variety in sentence structure
<ul style="list-style-type: none"> is free of most errors in grammar, usage, and mechanics 	<ul style="list-style-type: none"> is generally free of most errors in grammar, usage, and mechanics 	<ul style="list-style-type: none"> has some errors in grammar, usage, and mechanics
SCORE OF 3	SCORE OF 2	SCORE OF 1
An essay in this category demonstrates <i>developing mastery</i> , and is marked by ONE OR MORE of the following weaknesses:	An essay in this category demonstrates <i>little mastery</i> , and is flawed by ONE OR MORE of the following weaknesses:	An essay in this category demonstrates <i>very little or no mastery</i> , and is severely flawed by ONE OR MORE of the following weaknesses:
<ul style="list-style-type: none"> develops a point of view on the issue, demonstrating some critical thinking, but may do so inconsistently or use inadequate examples, reasons, or other evidence to support its position 	<ul style="list-style-type: none"> develops a point of view on the issue that is vague or seriously limited, and demonstrates weak critical thinking, providing inappropriate or insufficient examples, reasons, or other evidence to support its position 	<ul style="list-style-type: none"> develops no viable point of view on the issue, or provides little or no evidence to support its position
<ul style="list-style-type: none"> is limited in its organization or focus, or may demonstrate some lapses in coherence or progression of ideas 	<ul style="list-style-type: none"> is poorly organized and/or focused, or demonstrates serious problems with coherence or progression of ideas 	<ul style="list-style-type: none"> is disorganized or unfocused, resulting in a disjointed or incoherent essay
<ul style="list-style-type: none"> displays developing facility in the use of language, but sometimes uses weak vocabulary or inappropriate word choice 	<ul style="list-style-type: none"> displays very little facility in the use of language, using very limited vocabulary or incorrect word choice 	<ul style="list-style-type: none"> displays fundamental errors in vocabulary
<ul style="list-style-type: none"> lacks variety or demonstrates problems in sentence structure 	<ul style="list-style-type: none"> demonstrates frequent problems in sentence structure 	<ul style="list-style-type: none"> demonstrates severe flaws in sentence structure
<ul style="list-style-type: none"> contains an accumulation of errors in grammar, usage, and mechanics 	<ul style="list-style-type: none"> contains errors in grammar, usage, and mechanics so serious that meaning is somewhat obscured 	<ul style="list-style-type: none"> contains pervasive errors in grammar, usage, or mechanics that persistently interfere with meaning

Essays not written on the essay assignment will receive a score of zero.

Scoring the Official SAT Practice Test

To have your score calculated automatically, go to collegeboard.org/satpracticetest. You'll receive:

- A detailed score report
- Answer explanations

To calculate your score on paper, check your responses with the correct answers on page 80. Fill in the blanks below and do the calculations to get your mathematics, critical reading, and writing raw scores. Use the tables on pages 83–84 to find your scaled scores.

Get Your Critical Reading Score

How many critical reading questions did you get **right**?

Section 4: Questions 1–24 _____

Section 7: Questions 1–24 + _____

Section 8: Questions 1–19 + _____

Total = _____ (A)

How many critical reading questions did you get **wrong**?

Section 4: Questions 1–24 _____

Section 7: Questions 1–24 + _____

Section 8: Questions 1–19 + _____

Total = _____

× 0.25 = _____ (B)

A – B = _____
Critical Reading
Raw Score

Round the critical reading raw score to the nearest whole number.

Use the table on page 83 to find your critical reading scaled score.

Get Your Mathematics Score

How many mathematics questions did you get **right**?

Section 2: Questions 1–20 _____

Section 6: Questions 1–18 + _____

Section 9: Questions 1–16 + _____

Total = _____ (A)

How many **multiple-choice** mathematics questions did you get **wrong**?

Section 2: Questions 1–20 _____

Section 6: Questions 1–8 + _____

Section 9: Questions 1–16 + _____

Total = _____

× 0.25 = _____ (B)

A – B = _____
Mathematics Raw Score

Round the mathematics raw score to the nearest whole number.

Use the table on page 83 to find your mathematics scaled score.

Get Your Writing Score

How many multiple-choice writing questions did you get **right**?

Section 5: Questions 1–35 _____

Section 10: Questions 1–14 + _____

Total = _____ (A)

How many multiple-choice writing questions did you get **wrong**?

Section 5: Questions 1–35 _____

Section 10: Questions 1–14 + _____

Total = _____

× 0.25 = _____ (B)

A – B = _____
Writing Multiple-Choice
Raw Score

Round the writing multiple-choice raw score to the nearest whole number.

_____ (C)

Use the table on page 83 to find your writing multiple-choice scaled score.

Estimate your essay score using the Essay Scoring Guide on page 81.

_____ × 2 = _____ (D)

Use the table on page 84, your multiple-choice raw score (C), and your essay score (D) to find your writing composite scaled score.

SAT Score Conversion Table

Raw Score	Critical Reading Scaled Score	Math Scaled Score	Writing Multiple-Choice Scaled Score*	Raw Score	Critical Reading Scaled Score	Math Scaled Score	Writing Multiple-Choice Scaled Score*
67	800			31	510	560	54
66	800			30	500	550	54
65	800			29	500	540	53
64	780			28	490	530	52
63	760			27	480	530	51
62	750			26	480	520	50
61	730			25	470	510	49
60	720			24	460	500	48
59	710			23	460	490	47
58	700			22	450	480	47
57	690			21	450	470	46
56	680			20	440	460	45
55	670			19	430	450	44
54	660	800		18	430	440	43
53	650	800		17	420	430	42
52	640	780		16	410	420	41
51	640	760		15	410	420	41
50	630	740		14	400	410	40
49	620	730	80	13	390	400	39
48	610	720	78	12	380	390	38
47	610	710	75	11	380	380	37
46	600	700	73	10	370	370	36
45	590	690	71	9	360	360	35
44	590	680	69	8	350	350	34
43	580	670	67	7	340	330	33
42	580	660	66	6	330	320	32
41	570	650	65	5	320	310	31
40	560	640	64	4	310	290	30
39	560	630	62	3	300	280	28
38	550	620	61	2	280	260	27
37	540	620	60	1	270	240	25
36	540	610	59	0	250	210	24
35	530	600	58	-1	230	200	22
34	530	590	57	-2	210	200	20
33	520	580	56	-3	200	200	20
32	510	570	55	and below			

This table is for use only with the test in this booklet.

*The writing multiple-choice score is reported on a 20-80 scale. Use the table on the following page for the writing composite scaled score.

SAT Writing Composite Score Conversion Table

Writing MC Raw Score	Essay Raw Score											
	12	11	10	9	8	7	6	5	4	3	2	0
49	800	800	800	800	790	760	750	730	720	710	690	680
48	800	800	780	770	750	720	710	690	680	670	650	640
47	790	770	760	740	720	700	680	660	650	640	630	620
46	770	750	740	720	700	680	660	650	630	620	610	600
45	750	740	720	710	690	660	650	630	620	610	590	580
44	740	730	710	690	670	650	630	620	600	590	580	570
43	730	710	700	680	660	640	620	600	590	580	560	550
42	720	700	680	670	650	630	610	590	580	570	550	540
41	700	690	670	660	640	610	600	580	570	560	540	530
40	690	680	660	650	630	600	590	570	560	550	530	520
39	690	670	650	640	620	590	580	560	550	540	520	510
38	680	660	640	630	610	590	570	550	540	530	510	500
37	670	650	640	620	600	580	560	540	530	520	500	490
36	660	640	630	610	590	570	550	530	520	510	490	490
35	650	640	620	600	580	560	540	530	510	500	490	480
34	640	630	610	590	570	550	530	520	510	490	480	470
33	630	620	600	590	570	540	530	510	500	490	470	460
32	630	610	600	580	560	540	520	500	490	480	460	450
31	620	600	590	570	550	530	510	500	480	470	460	450
30	610	600	580	560	540	520	500	490	480	460	450	440
29	610	590	570	560	540	520	500	480	470	460	440	430
28	600	580	570	550	530	510	490	470	460	450	430	420
27	590	580	560	540	520	500	480	470	450	440	430	420
26	580	570	550	540	510	490	480	460	450	440	420	410
25	580	560	550	530	510	490	470	450	440	430	410	400
24	570	550	540	520	500	480	460	450	430	420	410	400
23	560	550	530	510	490	470	450	440	430	410	400	390
22	560	540	520	510	490	470	450	430	420	410	390	380
21	550	530	520	500	480	460	440	420	410	400	380	380
20	540	530	510	490	470	450	430	420	400	390	380	370
19	530	520	500	490	470	440	430	410	400	390	370	360
18	530	510	500	480	460	440	420	400	390	380	360	350
17	520	500	490	470	450	430	410	400	380	370	360	350
16	510	500	480	470	440	420	400	390	380	360	350	340
15	510	490	470	460	440	420	400	380	370	360	340	330
14	500	480	470	450	430	410	390	370	360	350	330	330
13	490	480	460	440	420	400	380	370	350	340	330	320
12	480	470	450	440	410	390	380	360	350	340	320	310
11	480	460	440	430	410	390	370	350	340	330	310	300
10	470	450	440	420	400	380	360	340	330	320	300	300
9	460	450	430	410	390	370	350	340	320	310	300	290
8	450	440	420	400	380	360	340	330	320	300	290	280
7	440	430	410	400	380	350	340	320	310	300	280	270
6	440	420	400	390	370	350	330	310	300	290	270	260
5	430	410	390	380	360	340	320	300	290	280	260	250
4	420	400	380	370	350	330	310	290	280	270	250	240
3	410	390	370	360	340	320	300	280	270	260	240	230
2	390	380	360	350	320	300	290	270	260	250	230	220
1	380	370	350	330	310	290	270	260	240	230	220	210
0	370	350	340	320	300	280	260	240	230	220	200	200
-1	350	340	320	300	280	260	240	230	210	200	200	200
-2	340	320	300	290	270	250	230	210	200	200	200	200
-3	320	300	290	270	250	230	210	200	200	200	200	200
-4 and below	310	300	280	260	240	220	200	200	200	200	200	200

This table is for use only with the test in this booklet.

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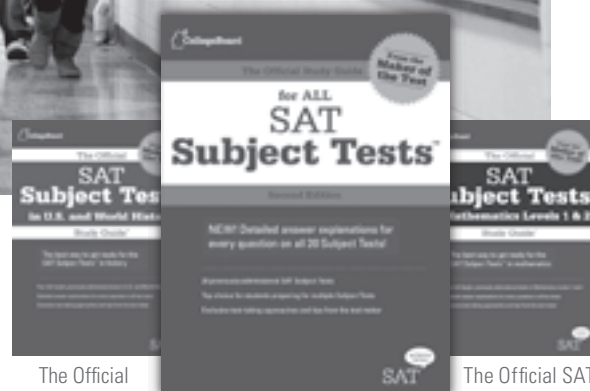
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