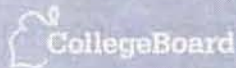


Form Codes AETZ, BWTZ, CFTZ



# The SAT<sup>®</sup>

**Question-and-Answer Service**

**January 2010 Administration**

**INSIDE:**

- Test questions and correct answers
- The difficulty level for each question
- Your essay prompt and all other essay prompts administered on your test day
- Instructions for scoring your test
- Suggestions for using this report

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SAT<sup>®</sup>

## Using Your Question-and-Answer Service (QAS) Report

This booklet contains the SAT® you took in January 2010, starting with all the essay prompts given in January, including the one you answered. It also includes scoring information. If the SAT you took included an unscored “equating” section, this booklet will not include that section.

### Reviewing Your SAT Results

To make the best use of your personalized QAS report, we suggest that you:

- Read each question in the booklet, then check the report for the type of question, the correct answer, how you answered it and the difficulty level.
- Analyze test questions you answered incorrectly to understand why your answer was incorrect. Check to see whether you might have misread the question or mismarked the answer.
- Keep track of how you did on the different types of questions (as labeled on your QAS report), either by using the table below or by printing your online score report at [www.collegeboard.com/mysat](http://www.collegeboard.com/mysat). This can help you understand your academic strengths and identify areas for improvement.

Section	Type of Question	Number Correct	Number Incorrect	Number Omitted
Critical Reading	C Sentence completion			
	R Passage-based reading			
Mathematics	N Number and operations			
	A Algebra and functions			
	G Geometry and measurement			
	D Data analysis, statistics and probability			
Writing Multiple-Choice	S Improving sentences			
	E Identifying sentence errors			
	P Improving paragraphs			

### Reviewing Your Essay

View a copy of your essay online at [www.collegeboard.com/viewessay](http://www.collegeboard.com/viewessay). On the practice sheets in the back of this booklet, you can try writing your essay again or practice writing an essay for one of the other prompts in this booklet.

### Scoring Your Test

Use the Scoring Worksheet, SAT Essay Scoring Guide and score conversion tables at the back of this booklet to verify the score on your test. Use the Form Code shown at the top of your personalized QAS report to locate your particular score conversion tables. The Scoring Worksheet and score conversion tables are specific to the test you took. Do not try to score any other tests using them.

### Practicing to Take the SAT Again

The best way to prepare for the SAT is to take challenging high school classes, read extensively and practice writing as often as possible. Also check out the College Board’s free and low-cost practice tools for the SAT, such as The Official Question of the Day™, and be sure to visit SAT Skills Insight™ at [www.collegeboard.com/satskillsinsight](http://www.collegeboard.com/satskillsinsight). It provides you with the types of skills that are tested on the SAT, suggestions for improvement and sample SAT questions and answers to help you do better in the classroom, on the test and in college. When you are ready, you can register to take the SAT again at [www.collegeboard.com/mysat](http://www.collegeboard.com/mysat).

Now that you’re familiar with the test, you’re more prepared for the kinds of questions on the SAT. You’re also likely to be more comfortable with the test-taking process, including the time limits. On average, students who take the SAT a second time increase their combined critical reading, mathematics and writing scores by about 40 points.



## ESSAY

Time — 25 minutes

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 test scores may be canceled.**

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.

External constraints—factors that limit people's plans and projects—can create stress, but this stress is not always bad and may even be necessary. In fact, the pressure of deadlines, budgets, rules, and the demands imposed by others can push people to accomplish things that they would find impossible to accomplish with unlimited time, money, and the absence of pressure.

Adapted from Jena Pincott, *Success: Advice for Achieving Your Goals from Remarkably Accomplished People*

**Assignment:** Do the demands of others tend to make people more productive than they would be without such pressure? 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.**

**ESSAY****Time — 25 minutes**

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.

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- **An off-topic essay will receive a score of zero.**
- **If your essay does not reflect your original and individual work, your test scores may be canceled.**

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.

Are people entitled to have their own opinions? Yes and no. People can have virtually *any* opinion, no matter how illogical, uninformed, or foolish. But this does not mean that they are entitled to have their uninformed opinions taken seriously or that their opinions should be considered as valuable as informed opinions. Opinions are valuable only when they are backed up by thorough knowledge of the subject.

Adapted from John Chaffee, *The Thinker's Way*

**Assignment:** Should all people's opinions be valued equally, or should only informed opinions be taken seriously? 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.**

**ESSAY****Time — 25 minutes**

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.

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- **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 test scores may be canceled.**

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.

There are books that try to show the world as it is and books that try to show the world as it should or could be. Which sort of books should we be offering children and reading ourselves? One answer is the argument for the value of truth, for “telling it like it is.” Writers could promote certain positive ideals by being less realistic, but all of us—especially children—have a right to be told the truth.

Adapted from Claudia Mills, “The Ethics of Representation: Realism and Idealism in Children’s Fiction”

**Assignment:** Should books portray the world as it is or as it should be? 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.**

**ESSAY****Time — 25 minutes**

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.

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- **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 test scores may be canceled.**

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.

Great discoveries often occur when a person explores the unknown, venturing far from what is familiar. But important breakthroughs — innovative solutions to difficult problems, for example — can also result when people take the time to look closely at their daily surroundings. In fact, the greatest discoveries often occur when people recognize in their familiar surroundings certain opportunities that others have overlooked or when people recognize that the way things have always been done is unjust or ineffective or unnecessary.

**Assignment:** Do people make the greatest discoveries by exploring what is unfamiliar to them or by paying close attention to what seems familiar? 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

24 Questions

Turn to Section 2 (page 4) 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. Deer overbrowsing has dramatically reduced plant ----- in many eastern United States forests; the few surviving plant species are those that regrow quickly or that deer find -----.
- (A) dominance . . edible  
(B) longevity . . nutritious  
(C) diversity . . unpalatable  
(D) mortality . . inaccessible  
(E) disease . . toxic
2. The teacher unabashedly used -----, flattering his students in an attempt to coax them to ----- research projects for extra credit.
- (A) subterfuge . . suppress  
(B) coercion . . accept  
(C) innuendo . . synthesize  
(D) cajolery . . undertake  
(E) chicanery . . glorify
3. No ----- the case exists: in reaching a decision, the court is bound to break new legal ground.
- (A) interest in (B) demand for  
(C) precedent for (D) authentication of  
(E) record of
4. Her actions did nothing but good, but since she performed them out of self-interest, they could not be called -----.
- (A) altruistic (B) placatory (C) benign  
(D) fortuitous (E) punctilious
5. Max Roach is regarded as a ----- of modern jazz drumming because he was one of the first artists to ----- the melodic, rather than merely rhythmic, possibilities of his instrument.
- (A) pioneer . . mimic  
(B) progenitor . . exploit  
(C) devotee . . jettison  
(D) chronicler . . explore  
(E) forebear . . repudiate



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 6-9 are based on the following passages.

**Passage 1**

Being funny has no place in the workplace and can easily wreak havoc on an otherwise blossoming career. Of course, laughter is necessary in life. But if you crack jokes and make snide remarks at work, you will eventually not be taken seriously by others. You will be seen as someone who wastes time that could better be spent discussing a project or an issue. Additionally, many corporate-minded individuals do not have the time to analyze comments with hidden meanings—they will take what you say as absolute and as an accurate representation of your professionalism in the workplace.

**Passage 2**

Are we now compelled, as a culture, to be comical, no matter the setting or the endeavor? And if so, what on earth gave rise to this troubling idea? One possible culprit may be corporate America, where being funny is now seen as a valuable asset. Fortune 500 companies actually dole out big fees to comedy consultants who offer humor seminars and improvisational workshops—all in the name of improved productivity. But how exactly are funnier employees better for business? According to Tim Washer, a former improv performer who is now a communications executive at a large corporation, humor helps foster team building and, of course, “thinking outside the box.”

6. Lines 3-12 (“But if . . . workplace”) serve primarily to
- (A) provide a creative solution to an ongoing problem
  - (B) mock a particular way of behaving
  - (C) outline the consequences of particular actions
  - (D) suggest a more tolerant approach
  - (E) criticize a common practice

7. In Passage 2, the author’s attitude toward the value of “comedy consultants” (line 18) is best described as
- (A) fascination
  - (B) approval
  - (C) ambivalence
  - (D) skepticism
  - (E) hostility
8. Tim Washer (lines 21-24, Passage 2) would most likely respond to the author of Passage 1 by
- (A) arguing that humorous employees can help to create a more productive work environment
  - (B) suggesting that corporate executives spend more time analyzing humorous comments
  - (C) agreeing that humor can harm the careers of ambitious corporate employees
  - (D) challenging the assertion that laughter is necessary in life
  - (E) disagreeing that humor occurs regularly in the workplace
9. Both authors would agree with which of the following statements?
- (A) Workplace culture has gradually changed over time.
  - (B) Consultants can help employees learn how to succeed professionally.
  - (C) Humorous employees are usually popular.
  - (D) Humor is not appropriate in all situations.
  - (E) Humor is not valued by corporate executives.





Questions 10-15 are based on the following passage.

The following is adapted from a 1992 autobiography by an African American writer traveling to Africa for the first time.

I walk through the center of Tunis and I look into the eyes of the strangers I pass. The face of Africa here has Arab eyes. All the eyes are brown, a deep rich and dark brown, eyes that speak to me but in a language I do not understand. Every woman sneaks a glance; every man stares. I am more than stranger, I am also strange.

I am tall and I am very dark. I have not shaved my beard and there is not another beard in this city. I wear clothes that set me apart and attract attention: a bright red T-shirt with long sleeves, baggy pants held up by blue suspenders, hiking boots that are heavy and durable. From a belt loop on my trousers hangs a watch I refuse to wear. My clothes are not African clothes.

By journey's end, I will not be the man I am today. Africa will have changed me in ways I cannot predict, perhaps in ways profound, perhaps only superficial. Perhaps I will lose a few pounds, perhaps the arrogance in my walk. Perhaps my walk, even my way of looking at things, will be a little more African. But for now, I am different. I am not one of these Africans. Not yet, and may not ever be. The color of my skin says that I could be Algerian or Senegalese or from Chad. But the Tunisian eyes that watch me can see that I at least am not from Tunisia. They know I am not one of them, but they do not know where I come from.

The whole of Africa lies before me and I have no plan, no itinerary. It might be better if I were searching for some three-legged zebra, for at least I would know when I found it. Without a plan, without a goal, a traveler is at the mercy of the road. Traveling overland is not like traveling on a river. The river has a beginning. It has an end. The path, though not straight, is defined. Not so traveling overland. The prospects, like the possibilities and promises of life, are endless and varied and arbitrary.

An old man asks, "Where in Tunisia do you want to go?"

I have no idea. It isn't always the getting there that is important. Sometimes it's just the going.

"Go to Sousse," he tells me. "Go to Sfax."

I have been feeling my way through town, searching the brown eyes of Arabs for some sign of recognition. Somewhere on this continent there is a man who looks like me. When I find him, our hearts will shake hands.

10. The primary purpose of the passage is to

- (A) relate a traveler's experience of feeling foreign
- (B) illustrate certain aspects of Tunisian culture
- (C) contrast two different cultures
- (D) describe a mysterious set of circumstances
- (E) argue that traveling alone is ultimately unrewarding

11. The statement in line 6 ("I am more . . . strange") primarily refers to the

- (A) author's inability to understand the local language
- (B) difference between the author's appearance and that of native Tunisians
- (C) changes that Africa will make in the author's behavior
- (D) aimlessness of the author's itinerary
- (E) author's search for someone from his own country

12. Word repetition is used in lines 15-19 primarily to

- (A) stress the likelihood of an encounter
- (B) create a sense of continuous confusion
- (C) demonstrate a breadth of knowledge
- (D) emphasize the uncertainty of an outcome
- (E) illustrate a decision-making process

13. In lines 14-20 ("By . . . different"), the author implies that, compared to himself, Africans typically

- (A) are less conscious of people's nationalities
- (B) travel with less advance planning
- (C) walk more modestly
- (D) dress more colorfully
- (E) speak more effusively



14. As presented in lines 30-34, the most significant difference between traveling on a river and traveling overland is that
- (A) rivers follow an unambiguous path
  - (B) rivers offer a faster means of traveling
  - (C) river travel requires careful planning
  - (D) overland travel requires no special equipment
  - (E) overland travel can occur in a straight line
15. The old man's question in lines 35-36 primarily serves to
- (A) dramatize the Tunisians' interest in the author
  - (B) emphasize the Tunisians' pride in, and knowledge of, their culture
  - (C) allow the author to further emphasize his lack of a clear destination
  - (D) enable the author to express a judgment about the character of Tunisians
  - (E) highlight the author's ability to converse with people from different cultures



Questions 16-24 are based on the following passage.

This passage is adapted from a 1983 book based on interviews with women in the sciences.

Line Laboratory research is at the heart of scientific life; scientists' real work consists of testing out ideas that come to them as they ponder the mysteries of the world around them. A natural biologist walks through a city park  
5 or across a suburban lawn and is half-consciously wondering: Why two leaves instead of three? Why pink flowers instead of white? Such rumination goes on without end in a scientist's mind, a continuous accompaniment to the rhythm of daily life. Whatever a scientist is doing—  
10 reading, cooking, talking, playing—science thoughts are always there at the edge of the mind. They are the way the world is taken in; all that is seen is filtered through an ever-present scientific musing.

15 How a would-be scientist decides on a discipline, settles on a problem, and goes to work is often as much a matter of chance as it is of temperament. One can as easily become a chemist or a neuroanatomist because of where one went to school or whose influence one happened to come under as because of a compelling early response to the logic of  
20 chemistry or the beauty of the human nervous system. No matter. Once the discipline is established, the problem chosen, and the scientist immersed in the work, he or she becomes as persuaded as need be of the centrality and urgency of the particular work being done. Such adaptive  
25 myopia is necessary in science because the grinding, repetitive minuteness of daily laboratory work is so time-consuming (for weeks, months, even years at a time) that, often, even to remember the original impetus for the work is a psychological trick of the highest order. To stimulate  
30 the memory back into existence with fair regularity, one must believe in the fundamental importance of what one is doing. Those who do are the most energetic, vital, exciting, and excited of scientists.

35 Carol Steiner, a geneticist, comes up with a fine metaphor for how to make a working proposition of scientific mystery. "Imagine," she says, "that you have a jigsaw puzzle with no picture printed on it. All you have are pieces you haven't a clue how to make sense of. The pieces are your separate scientific observations. Here's  
40 an example of how you might try to get a handle on the puzzle:

45 "We have a microorganism with a secretory structure on one end. We know this structure is always on the same place in the cell and that the position of this structure is inherited. The question we want to answer is, how can inherited information be translated into positional information? Why in that one place and no place else? Is the genetic code involved, and if so, how? The answer will tell us how the genes work in concert with the rest of  
50 the cell to put things where they belong.

55 "In order to gather pieces of the jigsaw puzzle (that is, pieces of information), we poke at the cell. We change it a little . . . A specific mutation that altered the membrane structure of the cell was found to turn off the synthesis of the secretory structure. This was a piece of the jigsaw puzzle. But just one piece. Because we hadn't a clue as to how this *had* happened or *could* happen." Steiner indicates that there will be many further questions that will suggest experiments whose results may allow us to print  
60 pictures on the pieces of the jigsaw puzzle: "Not put the puzzle together, mind you. But help us think about what the picture will ultimately look like."

65 The realized picture on Carol Steiner's jigsaw puzzle is the map of gene expression laid out clearly with all roads, pathways, connecting signal points, and railway junctions marked so that any tourist can find his or her way in this beautiful country, which is confusing only when one is wandering about in ignorance—as we all are now—with a highly incomplete map.

16. The primary purpose of the passage is to convey information about the
- (A) occupational hazards encountered by laboratory workers
  - (B) problem-solving skills taught by chemists and neuroanatomists
  - (C) puzzling nature of everyday phenomena
  - (D) professional collaboration necessary for geneticists
  - (E) thought processes distinctive to research scientists
17. In line 1, the author characterizes "Laboratory research" as something that is
- (A) fundamental
  - (B) ambitious
  - (C) challenging
  - (D) time-consuming
  - (E) well regarded
18. The author indicates that the process of "rumination" (line 7) is
- (A) subjective
  - (B) vexatious
  - (C) incessant
  - (D) innovative
  - (E) futile



19. In line 21, "No matter" dismisses as irrelevant the means by which
- (A) science students learn research skills
  - (B) scientists choose research specialties
  - (C) laboratory reports explain methodologies
  - (D) scientific knowledge is perceived by the public
  - (E) researchers make use of laboratory workers
20. In line 29, "trick" most nearly means
- (A) ruse
  - (B) feat
  - (C) prank
  - (D) illusion
  - (E) peculiarity
21. The "memory" referred to in line 30 is that of the
- (A) initial fascination with a scientific goal
  - (B) steps required to establish scientific truth
  - (C) data collection process used in the experiment
  - (D) day-to-day repetitiveness of the work
  - (E) relevant training in the academic field
22. In lines 32-33 ("Those . . . scientists"), the author's feeling toward certain scientists is best described as one of
- (A) astonishment
  - (B) appreciation
  - (C) perplexity
  - (D) envy
  - (E) reproach
23. The passage implies that the discovery of the "specific mutation" (line 53) was most significant for
- (A) demonstrating the random nature of scientific breakthroughs
  - (B) proving that multiple factors affect microorganisms
  - (C) providing a clue to the solution of a research question
  - (D) justifying the expense of a major research project
  - (E) revealing a flaw in a scientific methodology
24. Which best describes the function of Steiner's account of her research in the overall development of the passage?
- (A) A digression from the author's central argument
  - (B) A refutation of criticisms raised earlier in the passage
  - (C) A recapitulation of points made in the opening paragraph
  - (D) An observation that challenges previous assertions
  - (E) An example that expands upon preceding generalizations

**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 3

Time — 25 minutes

20 Questions

Turn to Section 3 (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 scratch work.

Notes

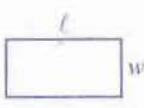
- The use of a calculator is permitted.
- All numbers used are real numbers.
- Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not 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



$$A = \pi r^2$$

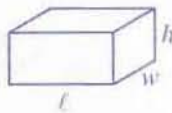
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$$A = lw$$



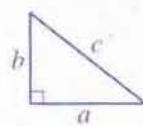
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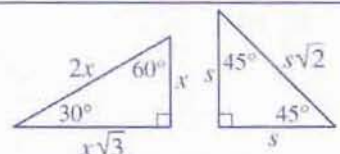
$$V = lwh$$



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



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



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  $9x + 3 = 30$ , what is the value of  $3x + 1$ ?

- (A) 8  
(B) 9  
(C) 10  
(D) 27  
(E) 28

NUMBER OF DEMOCRATIC  
UNITED STATES SENATORS, 1993–2002

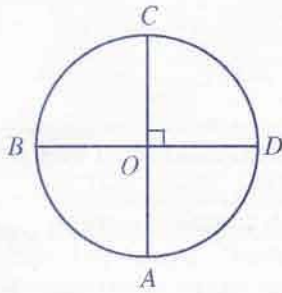
1993–1994	
1995–1996	
1997–1998	
1999–2000	
2001–2002	

= 10 senators    = 5 senators    = 1 senator

2. According to the pictogram above, how many more Democratic senators were there in the years 1993–1994 than in the years 1999–2000?

- (A) 2  
(B) 7  
(C) 8  
(D) 12  
(E) 17

GO ON TO THE NEXT PAGE



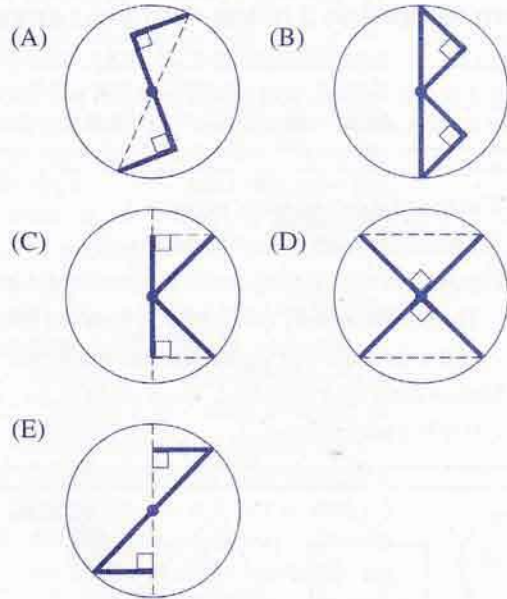
3. In the figure above,  $O$  is the center of the circle and diameters  $\overline{AC}$  and  $\overline{BD}$  are perpendicular. If the length of arc  $\widehat{AB}$  is 12, what is the length of semicircle  $\widehat{CDA}$ ?

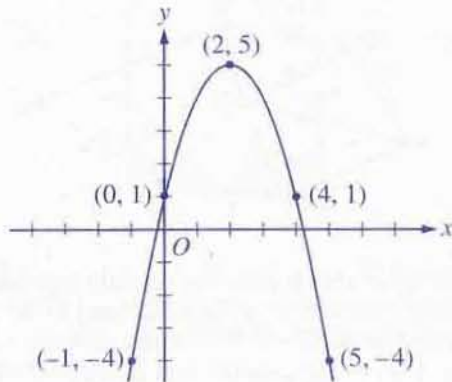
- (A) 24  
(B) 30  
(C) 36  
(D) 48  
(E) 60

4. When printing a line of text, a printer begins 1 inch from the left edge of the paper and ends  $1\frac{1}{4}$  inches from the right edge. If the paper is  $8\frac{1}{2}$  inches wide, how many inches can be used for printing each line?

- (A) 6  
(B)  $6\frac{1}{4}$   
(C)  $6\frac{1}{2}$   
(D)  $6\frac{3}{4}$   
(E) 7

5. Each of the designs below is based on two identical isosceles right triangles that meet at the center of a circle. If each circle has the same radius, in which one do the right triangles have the greatest area?





6. The graph above is a parabola. For points  $(x, y)$  on the graph, the maximum value of  $y$  is attained at what value of  $x$ ?

(A) -1  
 (B) 0  
 (C) 2  
 (D) 4  
 (E) 5

7. If a number  $x$  is increased by 2 and the result is squared, the final value will be 49. Which of the following could be the value of  $x$ ?


(A) -9  
 (B) -7  
 (C) -5  
 (D) -3  
 (E) -1

8. In the  $xy$ -plane, line  $\ell$  has a slope of 2 and line  $m$  has a slope of  $-\frac{1}{2}$ . Which of the following statements must be true?

(A) Lines  $\ell$  and  $m$  are parallel.  
 (B) Lines  $\ell$  and  $m$  are perpendicular.  
 (C) Line  $\ell$  is a horizontal line.  
 (D) Line  $m$  is a vertical line.  
 (E) Line  $m$  passes through the point  $(0, 0)$ .

9. If  $x$ ,  $y$ , and  $z$  are integers, which of the following is NOT a possible value for  $2x + 4y + 6z$ ?

(A) 4  
 (B) 8  
 (C) 12  
 (D) 26  
 (E) 29

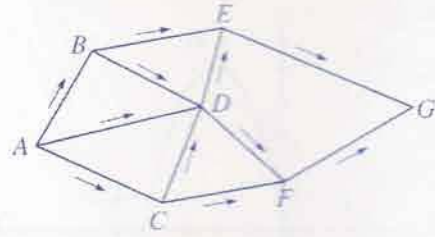
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10. Points  $P$ ,  $Q$ ,  $R$ , and  $S$  lie on a line, in that order, so that  $Q$  is the midpoint of  $\overline{PR}$ ,  $R$  is the midpoint of  $\overline{QS}$ , and  $PS = 18$ . If point  $X$  lies between  $Q$  and  $R$  and  $QX = 4$ , what is the length of  $\overline{XS}$ ?

- (A) 2  
(B) 4  
(C) 6  
(D) 8  
(E) 10

11. The number  $x$  is 4 more than 3 times the number  $y$ . What is  $y$  in terms of  $x$ ?

- (A)  $3x + 4$   
(B)  $4x + 3$   
(C)  $\frac{x - 4}{3}$   
(D)  $\frac{x + 3}{4}$   
(E)  $\frac{x + 4}{3}$



12. In the figure above, each line segment represents a one-way road with travel permitted only in the direction indicated by the arrow. How many different routes from  $A$  to  $G$  that pass through  $F$  are possible?

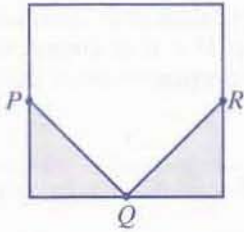
- (A) One  
(B) Two  
(C) Three  
(D) Four  
(E) Seven

13. The digits 1, 2, 3, and 4 are to be arranged randomly to make a positive four-digit integer. What is the probability that the digits 1, 2, and 3 will be directly next to each other, in that order, from left to right?

- (A)  $\frac{1}{12}$   
(B)  $\frac{1}{8}$   
(C)  $\frac{1}{6}$   
(D)  $\frac{1}{4}$   
(E)  $\frac{1}{3}$

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14. In the figure above,  $P$ ,  $Q$ , and  $R$  are midpoints of the sides of the square as shown. If the total area of the shaded regions is 9, what is the length of a side of the square?

- (A) 3  
 (B) 6  
 (C) 9  
 (D)  $3\sqrt{2}$   
 (E)  $6\sqrt{2}$

15. The function  $f$  is defined by  $f(x) = \frac{x}{|x-4|-2}$ .

What are all values of  $x$  for which  $f(x)$  is NOT defined?

- (A)  $x = 0$  and  $x = 2$   
 (B)  $x = 0$  and  $x = 4$   
 (C)  $x = 2$  and  $x = 4$   
 (D)  $x = 2$  and  $x = 6$   
 (E)  $x = 4$  and  $x = 6$

16. The cost of a piece of a certain type of lumber is directly proportional to its length. A piece of this lumber that is 8 feet long costs \$6.00. What is the cost, in dollars, of a piece of this lumber that is  $y$  yards long? (1 yard = 3 feet)

- (A)  $y - 2$   
 (B)  $3y - 2$   
 (C)  $\frac{3}{4}y$   
 (D)  $\frac{9}{4}y$   
 (E)  $4y$

17. Prime numbers  $k$  and  $n$  are each greater than 2, and they differ by 4. If there is no prime number between  $k$  and  $n$ , what is the least possible value of  $k + n$ ?

- (A) 8  
 (B) 10  
 (C) 12  
 (D) 16  
 (E) 18

GO ON TO THE NEXT PAGE

18. If  $-1 < x < 0$  and  $0 < y < 1$ , which of the following must be true?

I.  $-1 < xy < 0$

II.  $-1 < \frac{x}{y} < 0$

III.  $y - x < 1$

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

20. The lengths of the sides of an isosceles triangle are 20,  $n$ , and  $n$ . If  $n$  is an integer, what is the smallest possible perimeter of the triangle?

- (A) 40  
(B) 41  
(C) 42  
(D) 44  
(E) 60

19. At North High School, the ski club has 15 members and the debate club has 12 members. If a total of 11 students belong to only one of the two clubs, how many students belong to both clubs?

- (A) 2  
(B) 7  
(C) 8  
(D) 12  
(E) 16

**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

25 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)

- Since codfish are ----- part of the marine ecosystem, their ----- would adversely affect the animals who depend on them as a source of food.
 

(A) a negligible . . migration  
(B) a vital . . existence  
(C) a compatible . . proximity  
(D) an integral . . extinction  
(E) an inexplicable . . eradication
- The gifted child-poet Minou Drouet, hailed in the 1950s as an artistic -----, now lives in relative -----, enjoying a privacy unavailable to her as a child.
 

(A) paragon . . opulence  
(B) dilettante . . oblivion  
(C) prodigy . . anonymity  
(D) guru . . passivity  
(E) charlatan . . seclusion
- The legislator is known on Capitol Hill for his oratorical spontaneity, his ability to deliver ----- speech.
 

(A) an enigmatic (B) an abrasive  
(C) an impromptu (D) a meticulous  
(E) a lackluster
- Ms. Núñez was -----, remaining assured and self-controlled even in the most volatile of situations.
 

(A) ungainly (B) autocratic (C) unflappable  
(D) egotistical (E) demonstrative
- The delegates' behavior at the convention was utterly disgraceful and fully deserving of the ----- it provoked.
 

(A) rancor (B) lethargy (C) commiseration  
(D) forbearance (E) compunction
- Gwen's ambitious desert hike was impeded by the heat that sapped her strength and resolve, leaving her ----- and ----- .
 

(A) disoriented . . unerring  
(B) dexterous . . circumspect  
(C) dehydrated . . dissolute  
(D) feverish . . resilient  
(E) debilitated . . disheartened
- Because of their spare, white appearance, ancient Greek statues in modern museums are often considered -----; yet newly unearthed antiquities showing traces of bright pigment are not so ----- .
 

(A) plain . . ornate  
(B) elaborate . . spartan  
(C) ostentatious . . vivid  
(D) austere . . unadorned  
(E) commonplace . . unattainable
- Former news anchor Dan Rather had ----- for colorful -----: for example, he once described a political race as "Spandex tight."
 

(A) a distaste . . aphorisms  
(B) a knack . . epistles  
(C) a penchant . . locutions  
(D) a yen . . paradigms  
(E) an antipathy . . euphemisms

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 9-10 are based on the following passage.

From the earliest times, the complications inherent in deciphering the movements of planets in the night sky must have seemed a curse to baffled astronomers. In the long run, though, they proved a blessing to the development of cosmology, the study of the physical universe. Had the celestial motions been simple, it might have been possible to explain them solely in terms of the simple, poetic tales that had characterized the early cosmologies. Instead, these motions proved to be so intricate and subtle that astronomers could not predict them accurately without eventually coming to terms with the physical reality of how and where the Sun, Moon, and planets actually move in real, three-dimensional space.

9. The primary purpose of the passage is to
- (A) emphasize the importance of myth in ancient civilizations
  - (B) explain how an astronomical problem affected the development of a physical science
  - (C) predict the motions of planets outside of our solar system
  - (D) challenge the major achievements of some ancient astronomers
  - (E) compare celestial movements in different time periods
10. The passage indicates that ancient astronomers were "baffled" (line 3) because
- (A) their observations disproved the poetic tales of early cosmologies
  - (B) they lacked the mathematical sophistication needed to calculate astronomical distances
  - (C) they did not properly distinguish between astronomy and cosmology
  - (D) their theories of planetary movements were more complicated than the movements themselves
  - (E) they could not reliably predict observable celestial phenomena

Questions 11-12 are based on the following passage.

Most advertising researchers who work for and advise businesses assume that consistent, long-term advertising campaigns are an effective way to project a solid, enduring image and to maintain an ongoing relationship between consumers and the company's products; however, there is little published research on the effectiveness of such a strategy. This is partly because most advertising studies, in an attempt to control for "background knowledge," focus on new ads or fictitious brands. Also, while the proverbial wisdom may be to use a consistent, long-term campaign, businesses rarely do so. More commonplace is the switching of campaigns to gain consumers' interest.

11. The author indicates that the assumption described in lines 2-5 ("that . . . products") is
- (A) unsubstantiated
  - (B) self-defeating
  - (C) self-serving
  - (D) trendy
  - (E) reckless
12. The passage implies that advertisers frequently attempt to "gain consumers' interest" (line 12) by using
- (A) flattery
  - (B) novelty
  - (C) persistence
  - (D) shock
  - (E) humor



Questions 13-25 are based on the following passage.

*This passage, adapted from a novel, is set during the 1950s. A boy and his father are driving to New York City, where the father, Earl, hopes to begin a career as a musician.*

Earl's aim was to take two-lane highways all the way from Chicago to New York. "This way," he explained, as we moved out into the hot July dawn, "we'll actually see where we're going. I hate those turnpikes, Virgil. They're inhuman and, just you wait, one day they'll take over the whole country. Everything will be concrete." There were other, less sentimental reasons for taking the back roads: no tolls to pay, cheaper gasoline stations, and a chance to price shop when we were hungry.

He had me laughing from the moment we left town. I'd never seen him in better spirits. He did imitations all across Indiana. In Ohio, our road sometimes moved right alongside the turnpike and we could see the new cars, with their outlandish fins, passing us as regularly as cards being dealt off the top of an endless deck. Earl urged the Pontiac on with whoops and slaps at the steering wheel, like a cowboy racing his horse against a train. He made remarks to the waitresses in the little restaurants we'd stop in every three hours, coolly demanding boiling water for his imported tea bags and then lavishly complimenting their culinary skills. He even let me listen to the car radio and seemed to develop a taste for Elvis Presley singing "Won't You Wear My Ring Around Your Neck." We were like convicts escaping; every mile crossed testified to our incredible good fortune, our giddy peril.

Earl wanted to make it across the country in one sprint, without wasting money on a motel. He asked me to keep an eye out for hitchhikers, so we might have someone to share the driving. My father had, however, exacting tastes in hitchhikers and though we passed perhaps a half dozen, I had no luck in finding someone who met Earl's standards.

"No, I won't ride with servicemen," said my casually seditious father, as he slowed down and peered at a young soldier and then resumed his full cruising speed, while I, patriotically offended, watched the stunned defender of my freedoms kicking at his duffle bag and getting smaller and smaller as planet Pontiac continued its fuming orbit. We passed teenagers, we passed old men, we passed a man in a suit who held a gas can, and each time Earl had a different excuse for not stopping.

Finally, I felt the sullen rage of one whose suggestions have been systematically rejected and I exploded, "Why don't you ever stop? It's not fair to look at people and then not stop!"

Earl looked at my face. "I don't know, Virgil," he said. "I think the reason is that I don't want anyone in the car. We never have any time alone and I like it with just the two of us."

"But you're getting so tired." It was no use, though. My reply was a weak reflex and it could not control the surprise I felt at his unexpected tenderness nor could it conceal the tears in my eyes. He wanted us to be alone! How wonderful, yet how disturbing, and how unprepared I was to hear it.

We pulled in for the night some twelve hours after leaving Chicago and checked into a nameless motel. We stayed in a cabin that smelled like a brand new shoe. It had two double beds, soft as éclairs, pink walls, sanitized glasses, and a TV that received but one channel and even that rather ectoplasmically. It was in this motel that my father and I spent one of the best nights of our lives. He watched television with me for a while and then he cadged a deck of cards from the motel manager and did card tricks for me—a talent I had no idea he possessed. Then my father and I played casino and were so entertained and comforted by the game that we took the deck with us when we drove for a late night snack of ham and eggs. The sky was riddled with stars and before we went to bed we turned out all the lights in our room and looked out the window. I thought about my mother because I always imagined her beneath a sky bright and thick with stars, planets, comets, and moons. Earl had a soft, distant expression on his face and I was certain his thoughts moved in the same direction as mine, and for that moment our loss combined with our blood, and he was my friend. We whispered to each other in bed, like boys who fear they might be overheard. He told me what he remembered of New York, a city which, in his mind, held hope itself in its huge electronic fist. I don't remember what I said, but I was sure he was listening, and certain that, perhaps for the very first time, I truly interested him.

13. The passage is primarily concerned with

- (A) presenting a portrait of an era
- (B) reflecting on a difficult decision
- (C) describing a memorable experience
- (D) acknowledging a lifelong regret
- (E) articulating a childhood grievance

14. Virgil suggests that Earl's explanation in lines 2-6 ("This . . . concrete") should be viewed as

- (A) narrow-minded
- (B) defensible
- (C) incomplete
- (D) commonplace
- (E) amusing



15. Which would best serve as an additional example of the "reasons" (line 7)?
- (A) Faster travel
  - (B) Scenic views
  - (C) Less pollution
  - (D) Fewer cities
  - (E) Inexpensive motels
16. The reference to "cards" (line 15) serves to suggest
- (A) a foolish gamble
  - (B) a continuous sequence
  - (C) the randomness of fate
  - (D) the deceptiveness of appearances
  - (E) the importance of luck
17. In line 17, Earl is compared to a "cowboy" in order to emphasize his
- (A) wild exuberance
  - (B) rugged appearance
  - (C) quest for freedom
  - (D) mistrust of technology
  - (E) love of the outdoors
18. The reference to "convicts escaping" (line 24) is primarily used to express a sense of
- (A) grim pursuit
  - (B) stealthy progress
  - (C) inevitable punishment
  - (D) unaccustomed freedom
  - (E) unspoken regret
19. Earl's remark in line 32 ("No . . . servicemen") strikes Virgil as being
- (A) disloyal
  - (B) shrewd
  - (C) confusing
  - (D) humorous
  - (E) irrational
20. In line 43, "fair" most nearly means
- (A) right
  - (B) attractive
  - (C) impartial
  - (D) adequate
  - (E) moderate
21. The final paragraph primarily suggests a growing sense of
- (A) companionship
  - (B) responsibility
  - (C) tolerance
  - (D) upheaval
  - (E) danger
22. Virgil's reference to a "brand new shoe" (line 57) does which of the following?
- (A) Offers a surprising discovery
  - (B) Introduces a recurrent symbol
  - (C) Indicates a feeling of discomfort
  - (D) Evokes a sensory impression
  - (E) Implies a sense of regret
23. In line 72, "soft" most nearly means
- (A) comfortable
  - (B) lenient
  - (C) impressionable
  - (D) weak
  - (E) tender



24. The mood in lines 70-75 ("I thought . . . friend") is best characterized as one of

- (A) lightheartedness
- (B) apprehension
- (C) isolation
- (D) despair
- (E) wistfulness

25. The passage suggests that Virgil is most impressed by which aspect of the day's events?

- (A) The revelation of his father's affection for him
- (B) The celebratory nature of the car trip
- (C) The discovery of his father's philosophical beliefs
- (D) The excitement of seeing new places and trying new foods
- (E) The vastness and beauty of the night sky

**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 6**

Time — 25 minutes

35 Questions

**Turn to Section 6 (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.

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. By the beginning of 1755, events are reaching a stage that made war between Britain and France all but inevitable.

- (A) are reaching
- (B) will reach
- (C) could reach
- (D) having reached
- (E) had reached

2. The chair of the school board announced a plan to build two new elementary schools during an interview with a local news reporter.

- (A) The chair of the school board announced a plan to build two new elementary schools during an interview with a local news reporter.
- (B) The chair of the school board announced that two new elementary schools were planned to be built during an interview with a local news reporter.
- (C) The chair of the school board, during an interview with a local news reporter, announced a plan building two new elementary schools.
- (D) During an interview with a local news reporter, the chair of the school board announcing a plan to build two new elementary schools.
- (E) During an interview with a local news reporter, the chair of the school board announced a plan to build two new elementary schools.

3. The new political science curriculum at some high schools in India, encouraging teachers to use cartoons and newspaper clippings to provoke classroom debate on contemporary issues.

- (A) India, encouraging teachers to use cartoons and newspaper clippings to provoke
- (B) India, which encourages teachers to use cartoons and newspaper clippings, and provokes
- (C) India is encouraging teachers to use cartoons and newspaper clippings and then provoking
- (D) India encourages teachers to use cartoons and newspaper clippings to provoke
- (E) India so encourages teachers to use cartoons and newspaper clippings as provoking





4. The museum experienced a greatly increased number of visitors in one year, and analysts cited the museum's expansion, free admission, and new family-oriented education center to be reasons for their appeal.
- (A) to be reasons for their  
(B) to be a reason for their  
(C) as being reasons for their  
(D) as reasons for its  
(E) as a reason for its
5. Critics often equate the popular appeal of a work of art with inferiority, forgetting that Shakespeare wrote his extraordinary plays primarily to please his audience.
- (A) Critics often equate the popular appeal of a work of art with inferiority, forgetting  
(B) Critics often equate the popular appeal of a work of art with inferiority, they forget  
(C) Critics, who often equate the popular appeal of a work of art with inferiority, forgetting  
(D) Often equating the popular appeal of a work of art with inferiority are critics, they forget  
(E) The popular appeal of a work of art often equated by critics as being the same as inferiority, they forget
6. The beaver is the largest rodent in North America, it has a large, flat, nearly hairless tail; webbed hind feet; and short front legs with hairy claws.
- (A) The beaver is the largest rodent in North America, it  
(B) The beaver being the largest rodent in North America, it  
(C) The beaver, the largest rodent in North America, which  
(D) The largest rodent in North America, the beaver  
(E) The largest rodents in North America, the beaver
7. To persuade his parents to let him study abroad, Kenneth described other students' positive experiences, explains how foreign study would benefit his future career, and assured them that he could get financial aid.
- (A) explains how foreign study would benefit his future career, and assured  
(B) explained how foreign study would benefit his future career, and assured  
(C) explaining how foreign study is beneficial to his future career, and assures  
(D) he explained how foreign study would benefit his future career, and assuring  
(E) in explaining how foreign study would benefit his future career, and he assures
8. The art classes at the village museum are more important for their social value than for their educational contributions.
- (A) than for their educational contributions  
(B) than in the contributions they make educationally  
(C) rather than for the contributions they make educationally  
(D) instead of for their educational contributions  
(E) not the educational contributions they make
9. The vice president of the United States is also the president of the Senate, the vice president is not a senator and does not vote on Senate matters except to break a tie.
- (A) the vice president is not  
(B) the vice president, who is not  
(C) however, the vice president, not being  
(D) although the vice president is not  
(E) and the vice president, who is not
10. Although numbered among the most technically demanding pieces ever created for piano, Frédéric Chopin wrote compositions that emphasize nuance and expressive depth over mere technical display.
- (A) Frédéric Chopin wrote compositions that emphasize  
(B) Frédéric Chopin wrote compositions emphasizing  
(C) when Frédéric Chopin wrote compositions, they emphasized  
(D) Frédéric Chopin's compositions that emphasized  
(E) Frédéric Chopin's compositions emphasize
11. By painting them this afternoon, the walls would be completely dry by tomorrow evening.
- (A) By painting them  
(B) If they would have been painted  
(C) Were they to be painted  
(D) After painting them  
(E) They would be painted



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

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

12. Learning a foreign language is difficult not only  
 A  
 because most languages contain an enormous number  
 B  
 of words and because people need to use a language  
 C  
 often to become comfortable with it. No error  
 D E
13. Nellie Lutchter did not achieve success quickly: she  
 A  
 had been giving live performances for over a decade  
 B C  
 before she will record her first hit song. No error  
 D E

14. Ken Alice N'doye, who earned a reputation as  
 A B  
 a caterer and then opened her own bakery, but first  
 C  
 learned to cook by preparing food for her own family.  
 D  
No error  
 E
15. The introduction of paraffin wax in 1830  
 A  
enabled candle makers to produce candles  
 B  
 that burned more clean than those made with  
 C D  
 tallow or beeswax. No error  
 E
16. The sculptures of Michael Kapetan function as  
 A  
 sundials, kept time by casting shadows that show  
 B C D  
 the path of the Sun. No error  
 E
17. It is now generally agreed that the rings of the  
 A B  
 planet Saturn are composed of several billion  
 C D  
 small ice particles. No error  
 E



18. Cuban music was so popular in the Colombian city of Cali thus becoming the basis for the dance scene that predominated there during the 1940s. No error
- A  
B  
C  
D  
E
19. The X chromosome was named "X" because researchers were baffled by its behavior, not because of its resemblance to the letter X. No error
- A  
B  
C  
D  
E
20. A big vegetable salad is generally more nutritious than a low-fat pasta dish, but either meal would be good choices for the health-conscious eater. No error
- A  
B  
C  
D  
E
21. Seventy-five percent of the apples sold in New York City come from the West Coast or overseas, even though New York State produces more than enough apples to meet the city's needs. No error
- A  
B  
C  
D  
E
22. Despite the heavy rain, the television reporter, accompanied by her loyal film crew, were willing to wait outside the hotel until the delegates finished their meeting. No error
- A  
B  
C  
D  
E
23. The number of travelers which reached the Americas, by accident or design, well before Columbus is enormous, if we are to believe every claim. No error
- A  
B  
C  
D  
E
24. The people sitting behind me in the movie theater were talking throughout the film and would not keep their voice down even after being asked to do so. No error
- A  
B  
C  
D  
E
25. Of the more than 50 entries in the high school science fair, Sarah's project was declared more innovative by the panel of six judges. No error
- A  
B  
C  
D  
E



26. Perhaps the most extraordinary feature of the African elephant is their amazingly versatile trunk. No error
- A  
B C D E
27. Langston Hughes may be best known for his poetry, but included among his many published works are a sizable collection of short stories. No error
- A  
B C D E
28. In 1988 a Soviet icebreaking ship helped free three gray whales that had become trapped in the Arctic ice after they had swam into the coastal waters of Alaska to feed. No error
- A  
B C D E
29. The Bactrian camel is well adapted to the extreme climate of its native Mongolia, having thick fur and underwool that keeps it warm in winter and also insulate against summer heat. No error
- A  
B C D 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 refer to the following passage.**

(1) Over 5,000 years ago, the early Egyptians used the wind to power their sailing ships. (2) Windmills were invented in Persia in the ninth century, where their first use was to grind grains. (3) Windmills were later used to pump water and run sawmills. (4) Today, windmills, or wind turbines, are used primarily to generate electricity, especially in Europe. (5) Another renewable energy source with many useful applications is solar power.

(6) In recent years, wind power has demonstrated many advantages over conventional power sources. (7) Because wind power is a renewable resource, it does not deplete Earth's natural resources.

(8) Wind power may seem to offer a perfect solution to the world's increasing need for safe, clean energy sources. (9) Many people worry that birds, particularly birds of prey, may be harmed by wind turbines. (10) Some people are also concerned that large wind farms may interrupt birds' migratory patterns, although they counter that conventional electrical power lines pose much more of a threat to birds. (11) Also, you have the fields of large wind turbines that are typically placed on ridgelines in hilly or mountainous regions, where many people feel that they spoil the beauty of the natural landscape. (12) Finally, because wind is variable even in the windiest locations, maintaining a steady supply of wind-generated electricity poses a significant challenge.



30. Which of the following sentences would be best to place at the beginning of the passage—before sentence 1?

- (A) People stopped building windmills when steam power replaced wind power as an economical way of generating energy.
- (B) Since ancient times, people have produced flour by using stones to grind grain.
- (C) Even in works of fiction, such as *Don Quixote de la Mancha*, windmills appear.
- (D) Sailing ships operate on many of the same principles as windmills.
- (E) The harnessing of the wind to generate power for human activity has ancient origins.

31. In context, which of the following is the best way to deal with sentence 5 (reproduced below)?

*Another renewable energy source with many useful applications is solar power.*

- (A) Change “Another” to “An equally”.
- (B) Change “with” to “that is known to have”.
- (C) Change “many useful” to “widespread practical”.
- (D) Move it to the beginning of the next paragraph.
- (E) Delete it from the passage.

32. In context, the second paragraph (sentences 6-7) would be most improved by including

- (A) a brief list of reasons why some people prefer conventional power sources to wind power
- (B) information on how ancient windmills differed from modern ones
- (C) additional examples of advantages that wind power has over conventional power
- (D) a list of countries that depend on windmills to produce energy
- (E) an account of how windmills are constructed

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

*Some people are also concerned that large wind farms may interrupt birds' migratory patterns, although they counter that conventional electrical power lines pose much more of a threat to birds.*

- (A) they would like to argue
- (B) their argument for wind power is
- (C) the people who were for wind power argued
- (D) people in favor of wind power argue
- (E) to argue in favor of wind power means

34. In context, which of the following is the best version of the underlined portion of sentence 11 (reproduced below)?

*Also, you have the fields of large wind turbines that are typically placed on ridgelines in hilly or mountainous regions, where many people feel that they spoil the beauty of the natural landscape.*

- (A) Fortunately, there are
- (B) Granted, there are also
- (C) In addition, not everyone welcomes
- (D) In this case, the exception is
- (E) Alternatively, this points to

35. In context, where should the following sentence be placed?

*It presents problems of its own, however.*

- (A) Before sentence 2
- (B) Before sentence 4
- (C) Before sentence 8
- (D) Before sentence 9
- (E) Before sentence 12

**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  
18 Questions

**Turn to Section 7 (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 scratch work.

Notes

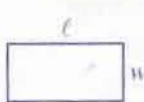
1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is 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



$$A = \pi r^2$$

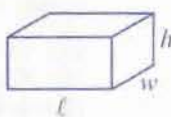
$$C = 2\pi r$$



$$A = \ell w$$



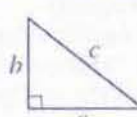
$$A = \frac{1}{2}bh$$



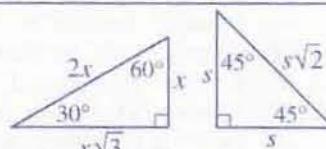
$$V = \ell wh$$



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



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



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. Ellen washed  $x$  cars each day for 5 days. Which of the following represents the total number of cars Ellen washed during this period?

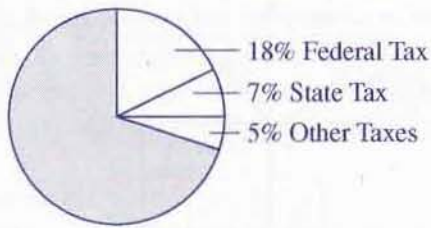
- (A)  $\frac{x}{5}$   
 (B)  $x - 5$   
 (C)  $x + 5$   
 (D)  $x^5$   
 (E)  $5x$

2. If  $\frac{c}{d} = 2$ , then  $\frac{d}{c} + \frac{1}{2} =$

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

**GO ON TO THE NEXT PAGE**

## DISTRIBUTION OF EARNINGS



3. The circle graph above shows the taxes deducted from an employee's weekly earnings of \$600. The shaded region represents the portion remaining after taxes have been deducted. What amount of money does the shaded portion represent?

(A) \$70  
 (B) \$180  
 (C) \$252  
 (D) \$350  
 (E) \$420

4. What is the radius of the largest sphere that will fit inside a cube with edges of length 2?

(A) 1  
 (B)  $\sqrt{2}$   
 (C)  $\frac{3\sqrt{2}}{2}$   
 (D) 2  
 (E)  $2\sqrt{2}$

1, 2, 3, 1, 2, 3, ...

5. The first term of the sequence above is 1, and the terms 1, 2, and 3 repeat in that order infinitely. What is the sum of the 48th and 49th terms of this sequence?

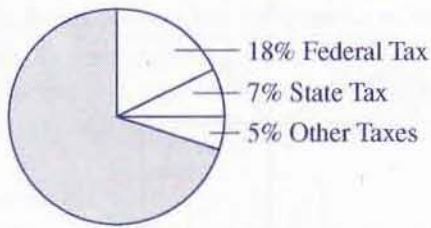
(A) 3  
 (B) 4  
 (C) 5  
 (D) 6  
 (E) 8

6. For all numbers  $x$  and  $y$  such that  $x < y$ , which of the following is true about the expression  $x - |y|$ ?

(A) It is equal to 0.  
 (B) It is negative.  
 (C) It is positive.  
 (D) It is equal to  $2x$ .  
 (E) It is equal to  $2y$ .

GO ON TO THE NEXT PAGE 

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1, 2, 3, 1, 2, 3, ...

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(C) 5  
(D) 6  
(E) 8

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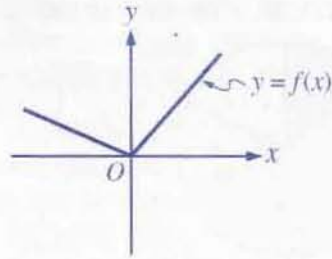
(A) It is equal to 0.  
(B) It is negative.  
(C) It is positive.  
(D) It is equal to  $2x$ .  
(E) It is equal to  $2y$ .

GO ON TO THE NEXT PAGE 



7. If the angles of a triangle measure  $x^\circ$ ,  $y^\circ$ , and  $z^\circ$  and these measures are in the ratio of 3:4:5, respectively, what is the value of  $z$ ?

(A) 45  
(B) 60  
(C) 75  
(D) 90  
(E) 105



8. The graph of the function  $f$  is shown above. If  $a$ ,  $b$ , and  $c$  are values of  $x$  for which  $f(x)$  is defined, which of the following must be true?

(A)  $f(0) + f(a) = f(a)$   
(B)  $f(-a) = f(a)$   
(C) If  $a < b$ , then  $f(a) < f(b)$ .  
(D) If  $a < 0$ , then  $f(a) < 0$ .  
(E) If  $a + b = c$ , then  $f(a) + f(b) = f(c)$ .

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 scratch work.

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

Write answer in boxes.

Grid in result.

Fraction line

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

Answer: 2.5

Decimal point

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

Answer: 201

Either position is correct.

	2	0	1
	○	○	○
1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○

	2	0	1
	○	○	○
1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○

**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:

	2	/	3
	○	○	○
1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○
5	○	○	○
6	○	○	○

	.	6	6	6
	○	○	○	○
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○

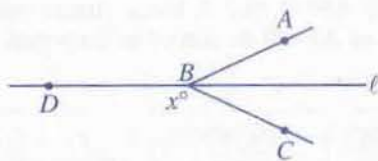
	.	6	6	7
	○	○	○	○
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○

9. Working at a constant rate, a water hose can fill empty tank  $S$  in 4 minutes. Working at the same constant rate, the hose can fill empty tank  $T$  in 30 minutes. The capacity of tank  $T$  is how many times the capacity of tank  $S$ ?

10. If  $a = 12 - b$ , what is the value of  $4a$  when  $b = 10$ ?

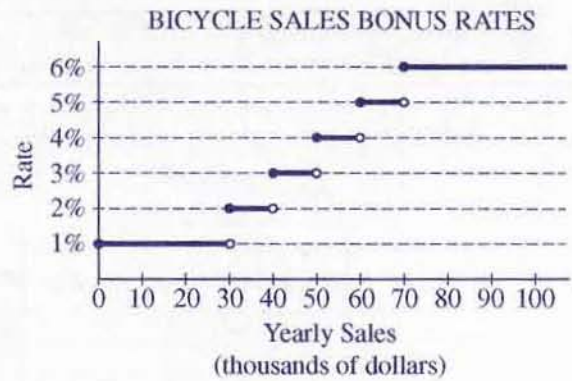
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11. The average (arithmetic mean) of five numbers is 80. If a sixth number, 80, is added to the group, what is the average of the six numbers?

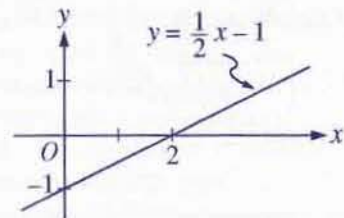


Note: Figure not drawn to scale.

12. In the figure above, line  $l$  bisects  $\angle ABC$ , and the measure of  $\angle ABC$  is  $80^\circ$ . What is the value of  $x$ ?



13. A bicycle salesperson's end-of-year bonus is determined by yearly sales. The graph above shows the relationship between the yearly sales and the rate of the bonus. The bonus is computed by multiplying the dollar amount of the yearly sales by the corresponding rate. What is the bonus, in dollars, for a salesperson whose yearly sales total \$65,000? (Disregard the \$ sign when gridding your answer.)

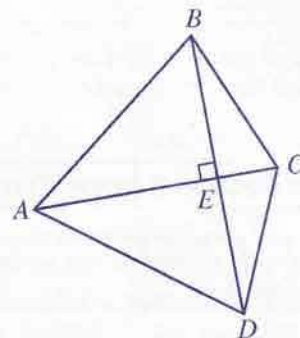


14. The line with equation  $y = \frac{1}{2}x - 1$  is shown in the figure above. Point  $P$  (not labeled) lies on the line and has a positive  $y$ -coordinate that is less than  $\frac{1}{2}$ . What is one possible value of the  $x$ -coordinate of  $P$ ?

GO ON TO THE NEXT PAGE

15. In a certain high school, there are three times as many band members as orchestra members and twice as many orchestra members as jazz choir members. If no student can be enrolled in more than one of the three activities and there are 108 members in the three activities, how many students are in the band?

16. Let the function  $h$  be defined by  $h(x) = 3x - 5$  for all values of  $x$ . If  $h(5) = t$ , what is the value of  $h(t)$ ?



17. In quadrilateral  $ABCD$  above,  $AB = AD = AC = 15$  and  $AE = 12$ . What is the area of quadrilateral  $ABCD$ ?

18. The integer  $x$  is the sum of 3 different positive integers, each less than 10. The integer  $y$  is the sum of 3 different positive integers, each less than 20. What is the smallest possible value of  $\frac{x}{y}$ ?

**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

18 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)

- Lan Cao describes her novel *Monkey Bridge* as autobiographical "in mood rather than fact," claiming it depicts -----, not -----, truth.
 

(A) poetic . . . artistic  
(B) common . . . romanticized  
(C) intimate . . . personal  
(D) emotional . . . literal  
(E) objective . . . actual
- Because Alejandra and Raina have never allowed their differences of opinion to come between them, their friendship remains ----- .
 

(A) conditional (B) exciting (C) distant  
(D) secretive (E) steadfast
- In a grievous example of ----- behavior, the consultants repeatedly managed to dupe the team of scientists by presenting fabricated data.
 

(A) incompetent (B) contentious (C) expansive  
(D) abstruse (E) fraudulent
- Elephants have a sense of smell that is remarkably -----: they can reportedly smell water up to several miles away.
 

(A) tacit (B) acute (C) aromatic  
(D) sonorous (E) ubiquitous
- Some environmentalists fear that the practices contributing to global warming are so ----- in industrialized nations that there are no simple ways to ----- their effects.
 

(A) established . . . mitigate  
(B) latent . . . exacerbate  
(C) negligible . . . alleviate  
(D) ephemeral . . . palliate  
(E) pervasive . . . enhance
- The testimony of the witness, meant to ----- the defense of the man accused of theft, actually strengthened the case of his accusers.
 

(A) appease (B) deprecate (C) enlighten  
(D) initiate (E) bolster



The two passages below are followed by questions based on their content and on the relationship between the two 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 7-18 are based on the following passages.

*In Passage 1, an experienced fiction writer provides advice to her daughter, a beginning author. In Passage 2, a literary critic analyzes some attitudes among twentieth-century novelists.*

### Passage 1

Do not try to puzzle your reader unnecessarily; a puzzled reader is an antagonistic reader. Do not expect readers to guess why a character does something or how it happens that some remark is made. It may be that you want readers to stop and wonder for a minute; if so make it perfectly clear that everything is going to be all right later on. If you want readers to be troubled by a nagging question, and go through a part of your story with a kind of expectancy, let one of your characters do something outrageous—turn, perhaps, and throw an apple core through an open window. But then be sure that before your story is finished you explain in some manner that inside the open window lives the character's great-uncle, who keeps a monkey who devours apple cores and catches them on the fly as they come through the window. Readers bring with them a great body of knowledge which you may assume, but they must rely on you for all information necessary to the understanding of this story which, after all, you have written.

Someone—I forget who—once referred to the easier sections of his fiction as “benches for the reader to sit down upon,” meaning, of course, that the poor readers who had struggled through the complex maze of ideas for several pages could rest gratefully at last on a simple clear paragraph. Provide your readers with such assistance. If you would like them to rest for a minute so you can sneak up behind them and stun them with something new, let them have a little peaceful description, or perhaps a little something funny to smile over, or a little moment of superiority. If you want them to stop dead and think, do something that will make them stop dead: use a wholly inappropriate word or a startling phrase—“pretty as a skunk”—or an odd juxtaposition: “Her hair was curly and red and she had great big feet.” Give them something to worry about: “Although the bank had stood on that corner for fifty years, it had never been robbed.” Or something to figure out: “If John had not had all that tooth trouble, there would never have been any question about the rabbits.” In all this, though, don't let the readers stop for more than a second or they might get away. Catch them fast with your next sentence and send them reeling along.

### Passage 2

True artists, we have been told again and again, take no thought of their readers. They write for themselves and the reader is beside the point. “Is the writer under any obligation to the reader?” an interviewer once asked a Nobel Prize-winning novelist. “I don't care about John Doe's opinion on my or anyone else's work,” came the answer. “Mine is the standard which has to be met.”

In recent years it is really only in handbooks about how to write best sellers that we find very much open advice to the author to think of readers and write accordingly. The predominant fashion among serious writers has been to consider any recognizable concern for the reader as a commercial blemish on the otherwise spotless face of art. If someone is rude enough to ask who the serious writers are, the answer is easy: they are those whom one could never suspect of writing with their readers in mind.

“I write. Let the reader learn to read”—such a motto, adopted openly by one widely read author, might serve as the credo for many twentieth-century novelists. “There is easy reading. And there is literature,” the author explained. “The novelist depends upon that relatively small audience which brings to reading a frame of reference, a sophistication, a level of understanding not lower than the novelist's own . . . I resist, as true novelists do, the injunction (usually a worried editor's) to be clearer, to be easier, to explain, if I feel that the request is for the convenience of the reader at the expense of the craft.”

“I write. Let the reader learn to read.” Authors who make this their motto, in the name of artistic integrity, can hardly be expected to tolerate the attitudes of critically acclaimed nineteenth-century novelists, who believed that their first duty was to try to seem “pleasant,” and that to do so they must render their meanings “without an effort to the reader.”

7. The author of Passage 1 assumes that a successful author must

- (A) anticipate the reader's responses
- (B) challenge the reader's beliefs
- (C) acknowledge the reader's sophistication
- (D) ignore the reader's shortcomings
- (E) share the reader's convictions



8. In line 17, "assume" most nearly means
- (A) receive
  - (B) seize
  - (C) take responsibility for
  - (D) pretend to have
  - (E) take for granted
9. The description of the "readers" (line 22) suggests that the author of Passage 1 views them with
- (A) indifference
  - (B) sympathy
  - (C) puzzlement
  - (D) impatience
  - (E) disdain
10. In line 43, "True" most nearly means
- (A) fair
  - (B) loyal
  - (C) accurate
  - (D) honest
  - (E) genuine
11. The author of Passage 1 would most likely give which response to the question in lines 45-46, Passage 2 ("Is . . . reader")?
- (A) Yes, the writer is obligated to present an uplifting image of the world.
  - (B) Yes, the writer must provide a narrative that holds the reader's interest.
  - (C) Yes, the writer should give highest priority to the reader's requests.
  - (D) No, the writer must protect the artistic vision that shapes the novel.
  - (E) No, the writer should focus on the concerns of the critics and the prize givers.
12. In lines 53-57 ("The predominant . . . art"), the author of Passage 2 indicates that serious writers
- (A) welcome the widespread popularity of their books
  - (B) articulate the values of the larger society
  - (C) are overly concerned with the physical appearance of their books
  - (D) are more responsive to their readers than their predecessors were
  - (E) believe that worrying about readers' needs would compromise their work
13. Compared to the "serious writers" in Passage 2 (line 54), the author of Passage 1 would probably be
- (A) more concerned about protecting the artistic integrity of a literary work
  - (B) more likely to write for highly skilled readers
  - (C) more likely to resist an editor's recommendations
  - (D) less worried about the negative effects of commercial considerations
  - (E) less willing to give advice to other writers
14. The tone of the statement in lines 61 and 72 ("I write . . . read") is best described as
- (A) arrogant
  - (B) magnanimous
  - (C) dejected
  - (D) diffident
  - (E) apologetic
15. The author mentioned in line 62, Passage 2, would most likely consider "benches" (line 21, Passage 1) to be
- (A) considerate acknowledgments of readers' exhaustion
  - (B) pleasant intervals in otherwise somber texts
  - (C) unfortunate accidents due to careless writing
  - (D) inappropriate concessions to the needs of readers
  - (E) troubling examples of an editor's tyrannical power
16. The statements in line 64 ("There . . . literature") are primarily intended to
- (A) challenge the terms of a formal argument
  - (B) establish a significant distinction
  - (C) describe a new and unusual concept
  - (D) propose an important change
  - (E) express a feeling of regret



17. The opinions expressed by the author of Passage 1 are most similar to the opinions expressed in Passage 2 by which of the following?

- (A) "a Nobel Prize-winning novelist" (line 47)
- (B) "serious writers" (line 54)
- (C) "one widely read author" (line 62)
- (D) "Authors" (line 72)
- (E) "nineteenth-century novelists" (line 75)

18. Compared with the tone adopted by the author of Passage 2, the tone of Passage 1 is more

- (A) confidential
- (B) reflective
- (C) somber
- (D) didactic
- (E) hostile

**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 9**  
Time — 20 minutes  
16 Questions

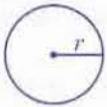
Turn to Section 9 (page 7) of your answer sheet to answer the questions in this section.

**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 scratch work.

Notes

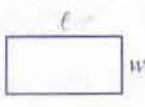
1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is 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

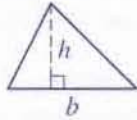


$$A = \pi r^2$$

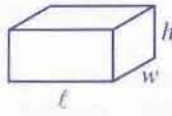
$$C = 2\pi r$$



$$A = \ell w$$



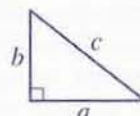
$$A = \frac{1}{2}bh$$



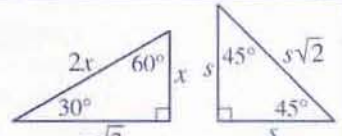
$$V = \ell wh$$



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



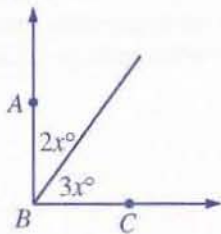
$$c^2 = a^2 + b^2$$



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.



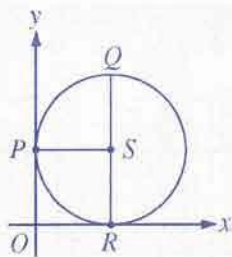
1. In the figure above,  $\angle ABC$  is a right angle. What is the value of  $x$ ?

- (A) 18  
(B) 30  
(C) 36  
(D) 54  
(E) 72

2. The sum of two numbers is 17. If  $x$  is one of the numbers, what is the other number in terms of  $x$ ?

- (A)  $x + 17$   
(B)  $x - 17$   
(C)  $17 - x$   
(D)  $17x$   
(E)  $\frac{17}{x}$

GO ON TO THE NEXT PAGE



3. In the figure above, the circle with center  $S$  is tangent to the  $x$ - and  $y$ -axes at points  $R$  and  $P$ , respectively.

If  $QR = 14$ , what are the coordinates of point  $P$ ?

- (A)  $(14, 0)$   
 (B)  $(7, 0)$   
 (C)  $(7, 14)$   
 (D)  $(0, 14)$   
 (E)  $(0, 7)$



4. The graph above shows the minimum wage in the United States at the end of each year from 1977 to 1996. Of the following two-year intervals, which shows the greatest increase, in dollars per hour, of the minimum wage?

- (A) 1977–1979  
 (B) 1980–1982  
 (C) 1983–1985  
 (D) 1989–1991  
 (E) 1993–1995

5. For positive integers  $a$  and  $b$ , let  $a \blacksquare b$  be defined by  $a \blacksquare b = a^b$ . Which of the following is equal to  $125$ ?

- (A)  $3 \blacksquare 5$   
 (B)  $5 \blacksquare 3$   
 (C)  $5 \blacksquare 5$   
 (D)  $3 \blacksquare 25$   
 (E)  $25 \blacksquare 3$



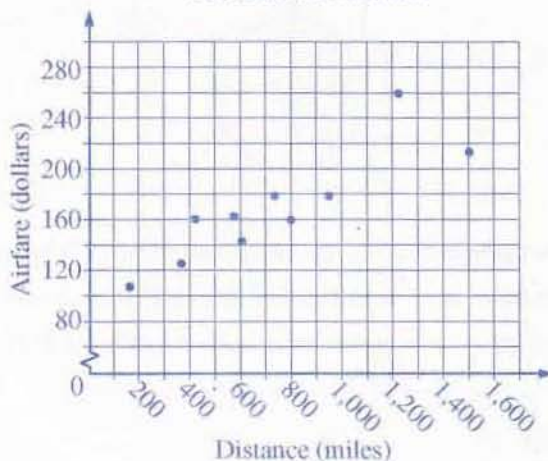
6. A colony of bacteria grows so that  $t$  days after the start of an experiment, the number of bacteria is  $n \cdot 2^{\frac{t}{6}}$ , where  $n$  is the number of bacteria at the start of the experiment. If there are 10,000 bacteria 6 days after the experiment's start, what is the value of  $n$ ?

- (A) 1,250  
(B) 1,667  
(C) 2,500  
(D) 3,333  
(E) 5,000

7. The perimeter of a triangle with sides of length 10, 6, and  $x$  is equal to the perimeter of an equilateral triangle with sides of length 7. What is the value of  $x$ ?

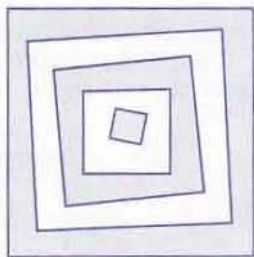
- (A) 3  
(B) 4  
(C) 5  
(D) 6  
(E) 7

LOWEST-PRICED AIRFARES  
FROM BALTIMORE



8. The scatterplot above shows airfares in relation to the flight distance, in miles, for the ten lowest-priced airfares from Baltimore. Based on the scatterplot, which of the following statements are true?
- I. 80% of the ten airfares were for distances of less than 1,000 miles.
  - II. The highest-priced of the ten airfares was for the greatest distance.
  - III. The slope, in dollars per mile, of the line of best fit for the data is negative.
- (A) I only  
(B) II only  
(C) I and II only  
(D) I and III only  
(E) I, II, and III

GO ON TO THE NEXT PAGE

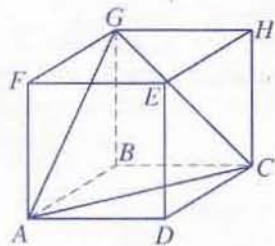


9. The five squares in the figure above have sides of lengths 1, 3, 5, 7, and 9, respectively. What is the sum of the areas of the shaded regions?

(A) 64  
(B) 52  
(C) 49  
(D) 36  
(E) 32

10. If the value of a certain building increased from \$1.6 million to \$2.0 million, what was the percent increase in the value?

(A) 4%  
(B) 8%  
(C) 16%  
(D) 25%  
(E) 80%



11. In the cube above, diagonals of three faces form  $\triangle AGC$ . What is the measure of  $\angle AGC$ ?

(A)  $30^\circ$   
(B)  $45^\circ$   
(C)  $60^\circ$   
(D)  $90^\circ$   
(E)  $120^\circ$

GO ON TO THE NEXT PAGE



12. If  $2(x+5)(x-5) = a$ , what does  $x^2 - 25$  equal in terms of  $a$ ?


- (A)  $a^2$
- (B)  $\sqrt{a}$
- (C)  $2a$
- (D)  $a$
- (E)  $\frac{a}{2}$

13. For their graduation ceremony, the 100 students in Arlene's senior class were each assigned a different whole number from 1 to 100. Arlene and her classmates entered the auditorium in numerical order, and every 20 students filled a different row, maintaining that order. There were aisles on both ends of each row, and only one student sat between Arlene and the aisle. Which of the following CANNOT be Arlene's number?

- (A) 19
- (B) 42
- (C) 59
- (D) 69
- (E) 82

14. If  $3x + 2y = 7$  and  $2y - 3z = 8$ , then  $x + z =$

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

GO ON TO THE NEXT PAGE 

15. When the positive integers  $w$  and  $n$  are divided by 6, the remainders are 3 and 2, respectively. What is the remainder when the product  $wn$  is divided by 6?

- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) 5

$$6x + 3 \geq a$$

16. If the inequality above is true for the constant  $a$ , which of the following could be a value of  $x$ ?

- (A)  $\frac{a}{6}$
- (B)  $\frac{a}{6} - 1$
- (C)  $\frac{a}{6} - 3$
- (D)  $\frac{a - 4}{6}$
- (E)  $\frac{a - 5}{6}$

**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. In the early 1900s, the businessman Abiko Kyutaro envisioned a Japanese American community rooted in agriculture and encouraged Japanese immigrants to seek success through farming.

- (A) to seek success
- (B) that success was sought
- (C) seek success
- (D) they sought success
- (E) they were seeking success

2. Mary Wollstonecraft's *A Vindication of the Rights of Woman*, published in 1792, being one of the first texts that addresses women's rights.

- (A) published in 1792, being one of the first texts that addresses
- (B) published in 1792, was one of the first texts to address
- (C) published in 1792 as one of the first texts that address
- (D) it was published in 1792, one of the first texts to address
- (E) one of the first texts, published in 1792, that addresses

3. In 1882 there were only seven female doctors practicing in France, when in 1903 the number rising to 95.

- (A) when in 1903 the number rising
- (B) but by 1903 the number had risen
- (C) its number rising in 1903
- (D) there in 1903 the number rose
- (E) however, in 1903 when the number had risen

4. Frustrated and bored by rambling lectures, Professor Moore's introductory philosophy course was dropped by many students before the middle of the semester.

- (A) Professor Moore's introductory philosophy course was dropped by many students
- (B) Professor Moore's introductory philosophy course would be dropped by many students
- (C) Professor Moore's introductory philosophy course, having been dropped by many students,
- (D) many students dropping Professor Moore's introductory philosophy course
- (E) many students dropped Professor Moore's introductory philosophy course



5. A promising food source, the winged bean is rich in protein, needs no fertilizer, and even enriches the soil in which it grows.
- (A) enriches the soil in which it grows  
 (B) enriching the soil where they grow  
 (C) where they grow they enrich the soil  
 (D) the soil is enriched where they grow it  
 (E) the soil in which it grows is enriched, too
6. The dragonfly, like the closely related damselfly, reproduces themselves by laying eggs in freshwater and then fiercely defends the eggs from predators.
- (A) reproduces themselves  
 (B) reproduce themselves  
 (C) are reproduced  
 (D) reproducing  
 (E) reproduces
7. Some scientists believe that mentally stimulating activities may increase the number of brain cells available to replace if any are lost through aging.
- (A) available to replace if any  
 (B) available to replace any that  
 (C) available, which replaces any that  
 (D) available, replacing if any  
 (E) available, they replace any which
8. The rescuers reached the skiers, found them apparently unharmed, but they nevertheless were taken to the hospital for observation.
- (A) skiers, found them apparently unharmed, but they nevertheless were taken  
 (B) skiers, finding them apparently unharmed, and nevertheless taking them  
 (C) skiers, who were found apparently unharmed, nevertheless taking them  
 (D) skiers and found them apparently unharmed but nevertheless took them  
 (E) skiers, apparently found unharmed, but nevertheless were taken
9. Sugar alcohols—sugar substitutes used in various brands of sugar-free chewing gum—do not cause tooth decay, however, they contain calories.
- (A) decay, however, they contain calories  
 (B) decay, they contain calories though  
 (C) decay; although they contain calories  
 (D) decay yet contain calories in them  
 (E) decay but do contain calories
10. Captive-bred whooping cranes have no parents to teach them migratory habits, this fact explaining why they must be led on their first migration by humans flying microlight aircraft.
- (A) this fact explaining why they  
 (B) this means that they  
 (C) this is why they  
 (D) so they  
 (E) they
11. Unlike other predators, which are being studied because their populations are declining, ecologists are studying coyotes because the coyote population is growing in suburban areas.
- (A) ecologists are studying coyotes  
 (B) ecologists have been studying coyotes  
 (C) ecologists, who are studying coyotes  
 (D) coyotes are being studied by ecologists  
 (E) coyotes, being studied by ecologists
12. Increased competition in this market will certainly lower prices, which some economists are warning that it may also lower the quality of service.
- (A) which some economists are warning  
 (B) however, some economists have warned  
 (C) but some economists warn  
 (D) although some economists warning  
 (E) and some economists who warn





13. One of the earliest of the ancient Greek writers of love poetry, Sappho has had such a profound influence on later lyric poets that she came to be known as "the tenth Muse."
- (A) has had such a profound influence on
  - (B) has had so profound an influence on
  - (C) has so profoundly influenced
  - (D) so profoundly influenced
  - (E) profoundly influenced
14. The agency reports that by rigorously enforcing state regulations, industrial pollution has been successfully reduced to acceptable levels.
- (A) industrial pollution has been successfully reduced to acceptable levels
  - (B) acceptable levels of industrial pollution have been successfully reduced
  - (C) a reduction of industrial pollution to acceptable levels has succeeded
  - (D) they have succeeded to reduce industrial pollution to acceptable levels
  - (E) it has succeeded in reducing industrial pollution to acceptable levels

## 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.

## Correct Answers and Difficulty Levels Form Codes AETZ, BWTZ, CFTZ

### Critical Reading

Section 2				Section 4				Section 8									
COR. DIFF.		COR. DIFF.		COR. DIFF.		COR. DIFF.		COR. DIFF.		COR. DIFF.							
ANS. LEV.		ANS. LEV.		ANS. LEV.		ANS. LEV.		ANS. LEV.		ANS. LEV.							
1.	C	3	13.	C	3	1.	D	3	14.	C	5	1.	D	2	10.	E	2
2.	D	3	14.	A	2	2.	C	3	15.	E	3	2.	E	3	11.	B	2
3.	C	3	15.	C	1	3.	C	3	16.	B	2	3.	E	3	12.	E	2
4.	A	4	16.	E	3	4.	C	3	17.	A	1	4.	B	3	13.	D	3
5.	B	5	17.	A	3	5.	A	4	18.	D	2	5.	A	4	14.	A	2
6.	C	2	18.	C	4	6.	E	4	19.	A	4	6.	E	5	15.	D	3
7.	D	4	19.	B	3	7.	D	5	20.	A	1	7.	A	3	16.	B	2
8.	A	1	20.	B	4	8.	C	5	21.	A	1	8.	E	3	17.	E	3
9.	D	3	21.	A	3	9.	B	3	22.	D	2	9.	B	2	18.	D	5
10.	A	2	22.	B	3	10.	E	4	23.	E	3						
11.	B	1	23.	C	4	11.	A	3	24.	E	5						
12.	D	1	24.	E	4	12.	B	5	25.	A	2						
						13.	C	1									

Number correct

Number incorrect

Number correct

Number incorrect

Number correct

Number incorrect

### Mathematics

Section 3				Section 7				Section 9									
COR. DIFF.		COR. DIFF.		COR. DIFF.		COR. DIFF.		COR. DIFF.		COR. DIFF.							
ANS. LEV.		ANS. LEV.		ANS. LEV.		ANS. LEV.		ANS. LEV.		ANS. LEV.							
1.	C	1	11.	C	4	Multiple-Choice Questions		Student-Produced Response Questions		1.	A	1	9.	C	3		
2.	D	1	12.	D	3					1.	E	1	2.	C	2	10.	D
3.	A	1	13.	A	3	2.	C	2	9.	15/2 or 7.5	1	3.	E	2	11.	C	3
4.	B	2	14.	B	4	3.	E	2	10.	8	2	4.	D	1	12.	E	3
5.	D	1	15.	D	4	4.	A	3	11.	80	2	5.	B	2	13.	D	3
6.	C	1	16.	D	4	5.	B	2	12.	140	2	6.	A	3	14.	B	4
7.	A	2	17.	E	4	6.	B	2	13.	3250	2	7.	C	2	15.	A	4
8.	B	3	18.	A	4	7.	C	4	14.	$2 < x < 3$	3	8.	A	2	16.	A	4
9.	E	3	19.	C	5	8.	A	5	15.	72	3						
10.	D	3	20.	C	5				16.	25	4						
									17.	135	4						
									18.	1/9 or .111	4						

Number correct

Number incorrect

Number correct

Number incorrect

Number correct  
(9-18)

Number correct

Number incorrect

### Writing Multiple-Choice

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

Number correct

Number incorrect

Number correct

Number incorrect

**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).

## SAT Score Conversion Table Form Codes AETZ, BWTZ, CFTZ

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	500	540	54
66	800			30	490	530	53
65	790			29	480	530	52
64	770			28	480	520	51
63	750			27	470	510	50
62	730			26	470	500	50
61	720			25	460	490	49
60	700			24	450	490	48
59	690			23	450	480	47
58	680			22	440	470	46
57	670			21	430	460	45
56	660			20	430	450	44
55	650			19	420	450	44
54	640	800		18	420	440	43
53	630	770		17	410	430	42
52	630	740		16	400	420	41
51	620	720		15	390	410	40
50	610	710		14	390	410	39
49	600	690	80	13	380	400	39
48	600	680	78	12	370	390	38
47	590	670	75	11	360	380	37
46	590	660	73	10	360	370	36
45	580	650	71	9	350	360	35
44	570	650	69	8	340	350	34
43	570	640	67	7	330	340	33
42	560	630	66	6	320	330	32
41	560	620	65	5	310	320	31
40	550	610	63	4	290	300	30
39	540	610	62	3	280	290	29
38	540	600	61	2	270	280	27
37	530	590	60	1	250	260	26
36	530	580	59	0	230	240	24
35	520	570	58	-1	210	220	22
34	510	570	57	-2	200	200	20
33	510	560	56	and			
32	500	550	55	below			

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

## SAT Writing Composite Score Conversion Table Form Code AETZ

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

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

## SAT Writing Composite Score Conversion Table Form Code BWTZ

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

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

## SAT Writing Composite Score Conversion Table Form Code CFTZ

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

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