April 2017

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TABLE OF CONTENTS

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April QAS 2017

Introduction

Congratulations on taking the SAT®! This booklet contains the SAT you took in April 2017. There are also two Essay prompts here; if you took the SAT with Essay, you responded to one of these. This booklet contains every question that was scored.

As part of the Question-and-Answer Service (QAS) you also have received:

1. A customized report that lists the following details about each question:
   - answer you gave
   - correct answer
   - question type
   - difficulty level
2. A QAS Student Guide that explains your scores and how to interpret them.

The test begins on the next page.

Reading Test

65 MINUTES, 52 QUESTIONS

Turn to Section 1 of your answer sheet to answer the questions in this section.

DIRECTIONS

Each passage or pair of passages below is followed by a number of questions. After reading each passage or pair, choose the best answer to each question based on what is stated or implied in the passage or passages and in any accompanying graphics (such as a table or graph).

Questions 1-10 are based on the following passage.

This passage is adapted from Amit Chaudhuri, *A Strange and Sublime Address*. ©1991 by Amit Chaudhuri. A ten-year-old boy named Sandeep travels with his mother, his aunt (Mamima), and his uncle (Chhotomama) to visit family in Calcutta, India.

Two boys were playing carrom on the steps of a small, painted shed which had the following words on its wall in large, black letters: NATIONAL ASSOCIATION OF SPORTSMEN. A single table-tennis table inside the shed could be glimpsed through the window. The boys interrupted their game to give Chhotomama directions to the house in a series of sporadic, enthusiastic gestures. Oh yes, they knew the old couple. And yes, their son and daughter-in-law had arrived last night with their first child.

"Is it a girl or a boy?" asked Mamima, rolling down the window.

"A girl," said the boy.

Mamima rolled up her window before the mosquitoes came in. The two boys vanished behind them. When they reached the house, they found that the old man was waiting on the verandah with a lantern in his hand. Moths were shuddering round and round the lantern, though the old man was oblivious to them. He had come out because he had heard the throbbing of the engine in the distance. The night had been silent except for the questioning cry of an owl and the continual orchestral sound of crickets in the bushes. The throbbing of the engine had, therefore, travelled through the silence to the old man's listening ear, and to his wife's ear, even when the car was relatively far away and beyond their range of vision. They had pondered over the sound, and finally, he had lit the lantern and shuffled out. "I told her," he said, referring to his wife. "I told her that I heard the car, I knew it was the car, I told her you were coming."

Once they were inside, Mamima gave the pot of yoghurt and the pot of sweetmeats to the old lady. "There was no need," she said. "Oh really," she said. "This is too much," she insisted, with the air of one who has just received the Kohinoor diamond as a birthday present. "Come, come, come," said Chhotomama, with the air of someone who has just given the Kohinoor diamond as a birthday present, and refuses to be overawed by his own generosity. "It's nothing." It *was* nothing, of course, only Ganguram's sweets and yoghurt, but they fussed and fussed and created the illusion that it was something, something unique and untasted and unencountered.

The son and the daughter-in-law emerged shyly from the anteroom. They both stooped gently to touch Chhotomama's feet, and Sandeep's aunt's and his mother's feet, a traditional greeting and a mark of obeisance towards one's elders.

"Oh no no no," said Chhotomama, struggling to keep the son's hand away from his feet. "There's no need for all this." This was half a token gesture towards modesty, and half towards the new, "modern" India—Nehru's secular India, free of ritual and religion.

CONTINUE

"I have not met you for two years, Dada," said the son, struggling to get his hands near Chhotomama's toes. "You must not stop me." This was half a token gesture towards modesty, and half towards the old, "traditional" India—Gandhi's India of ceremony and custom.

Sandeep, meanwhile, had come to the conclusion that the grown-ups were mad, each after his or her own fashion. Simple situations were turned into complex, dramatic ones; not until then did everyone feel important and happy. Will they never grow up? thought Sandeep irately. He glanced around him. A single blue, fluorescent tube was burning on the wall. It was not a big room. Despite its bareness, the impression it gave was of austerity rather than poverty. It made one remember that poverty meant displacement as well as lack, while austerity meant being poor in a rooted way, within a tradition and culture of sparseness, which transformed even the lack, the paucity, into a kind of being.

1

According to the passage, the old man was standing on the verandah because

A) he was watching cars travel down the road.
B) the two boys had reported the visitors would soon arrive.
C) he had heard what he believed to be the visitors' car.
D) he enjoyed listening to the quiet sounds of the evening.

2

In the passage, the yoghurt and sweetmeats are compared to a

A) jewel.
B) cuisine.
C) wedding gift.
D) generous donation.

3

As used in lines 37 and 40, "air" most nearly means

A) atmosphere.
B) absence.
C) demeanor.
D) melody.

4

The characters' behavior during the gift giving mainly serves to

A) emphasize the lavish value of the gift.
B) inflate the significance of the gesture.
C) convey indifference toward the gift.
D) stress the need for polite behavior.

5

Which choice provides the best evidence for the answer to the previous question?

A) Lines 43-44 ("It *was* . . . yoghurt")
B) Lines 44-46 ("they . . . unencountered")
C) Lines 52-54 ("Oh no . . . all this")
D) Lines 58-60 ("I have . . . stop me")

6

The description of Chhotomama and the son's interaction mainly serves to

A) show how the characters diverge in their approaches to cultural practices.
B) emphasize the characters' complex relationship.
C) stress the characters' misinterpretations of Indian history.
D) depict how the characters created gestures that became routine.

CONTINUE

7

Over the course of the passage, Sandeep comes to view the adults as

A) strict.
B) reserved.
C) sophisticated.
D) immature.

8

Sandeep would be most critical of which action from the passage?

A) The two boys playing carrom
B) Mamima's inquiry about the gender of the child
C) The old lady's reaction to the gift
D) The son and daughter-in-law waiting in the anteroom

9

Which lines from the passage most strongly suggest that India has experienced social change?

A) Lines 36-37 ("There was . . . she insisted")
B) Lines 48-51 ("They both . . . elders")
C) Lines 54-57 ("This was . . . religion")
D) Lines 73-76 ("It made . . . sparseness")

10

As used in line 72, "impression" most nearly means

A) appearance.
B) belief.
C) imitation.
D) recollection.

Questions 11-21 are based on the following passage and supplementary material.

This passage is adapted from Nicholas Epley, *Mindwise: How We Understand What Others Think, Believe, Feel, and Want*. ©2014 by Nicholas Epley.

Knowing your own reputation can be surprisingly difficult. Consider, for instance, a study that analyzed a set of published experiments all sharing the same basic design. In these experiments, people working in a group would be asked to predict how the other group members would rate them on a series of different traits. Researchers then compared these predicted ratings to the other group members' actual ratings on the very same traits. The traits varied from one experiment to another and included qualities like intelligence, sense of humor, consideration, defensiveness, friendliness, and leadership ability. The groups varied in familiarity, with the members of some groups being fairly unfamiliar with one another (such as having met only once, in a job interview) and the members of other groups being very familiar with one another (such as having lived together for an extended time as roommates). If people knew exactly what others were thinking, then there would be a perfect correspondence between predicted and actual ratings. If people were clueless, then there would be no correspondence between the two. Statistically speaking, you measure relationships like these with a correlation, where perfect correspondence yields a correlation of 1 and no correspondence yields a correlation of 0. The closer the correlation is to 1, the stronger the relationship.

First, the good news. These experiments suggested that people are pretty good, overall, at guessing how a group of others would evaluate them, on average. The overall correlation in these experiments between predicted impressions and the average actual impression of the group was quite high (.55, if you are quantitatively inclined). To put that in perspective, this is roughly the same magnitude as the correlation between the heights of fathers and the heights of sons (around .5). It is not perfect insight, but it is also very far from being clueless. In other words, you probably have a decent sense of what others generally think of you, on average.

Now the bad news. These experiments also assessed how well people could predict the impression of any single individual within a given group. You may know, for instance, that your

CONTINUE

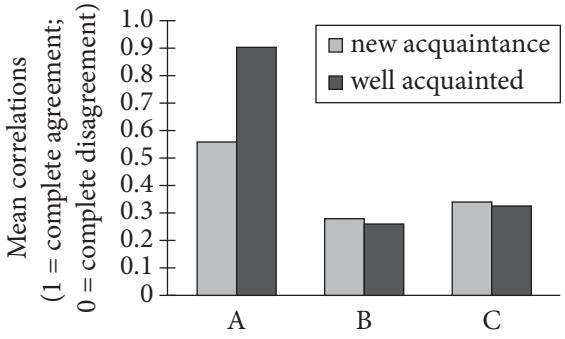
coworkers in general think you are rather smart, but those coworkers also vary in their impression of you. Some think you are as sharp as a knife. Others think you are as sharp as a spoon. Do you know the difference?

Evidently, no. The accuracy rate across these experiments was barely better than random guessing (an overall correlation of .13 between predicted and actual evaluations, only slightly higher than no relationship whatsoever). Although you might have some sense of how smart your coworkers think you are, you appear to have no clue about which coworkers in particular find you smart and which do not. As one author of the study writes, "People seem to have just a tiny glimmer of insight into how they are uniquely viewed by particular other people."

But perhaps this is holding your mind-reading abilities to too high a standard? It's hard, after all, to define traits like intelligence and trustworthiness precisely, so it might not be so surprising that we have difficulty guessing how others will evaluate us on these ambiguous traits. What about predicting something simpler, such as how much other people like you? Surely you are better at this. You learn over time to hang around people who smile at you and avoid those who spit at you. You must have a much better sense of who likes you and who hates you within a group. Yes?

I'm afraid not. These studies found that people are only slightly better than chance at guessing who in a group likes them and who does not (the average correlation here was a meager .18). Some of your coworkers like you and others do not, but I wouldn't count on you knowing the difference. The same barely-better-than-guessing accuracy is also found in experiments investigating how well speed daters can assess who wants to date them and who does not, how well job candidates can judge which interviewers were impressed by them and which were not, and even how well teachers can predict their course evaluations. Granted, it's rare that you are completely clueless about how you are evaluated. Accuracy tends to be better than chance in these experiments, but not necessarily by very much.

Mean Correlations of Perceptions of Individuals among New Acquaintances and Old Acquaintances in Twenty-One Studies



A = correlation between individuals' self-perception and those individuals' predictions of how others perceive them

B = correlation between individuals' self-perception and actual perception of those individuals by others

C = correlation between individuals' predictions of how others perceive them and actual perception of those individuals by others

Adapted from Erika N. Carlson and Simine Vazire, "Meta-Insight: Do People Really Know How Others See Them?" ©2011 by American Psychological Association.

11

Which choice best supports the claim in the first sentence of the passage?

A) Lines 2-4 ("Consider . . . design")
B) Lines 21-23 ("If people . . . two")
C) Lines 26-27 ("The closer . . . relationship")
D) Lines 54-58 ("Although . . . not")

CONTINUE

12

The information about statistical measurement in lines 23-27 ("Statistically . . . relationship") is presented in order to

A) correct a common misunderstanding of how researchers quantify certain data from experiments.

B) forestall potential objections to how data from the experiments were analyzed in the study.

C) draw attention to a pattern evident in the conclusions of the experiments.

D) provide context for a way in which the results of the experiments will be discussed.

13

Based on the passage, in which situation would an individual stand the greatest chance of accurately predicting how he or she is perceived?

A) An intern predicts the impression that her direct supervisor holds of her.

B) A manager predicts the collective opinion of employees about her ability.

C) An instructor predicts the enthusiasm of his class after talking with two students.

D) A biographer predicts the esteem in which he is held by the living subject of his book.

14

Which choice provides the best evidence for the answer to the previous question?

A) Lines 9-13 ("The traits . . . familiarity")

B) Lines 28-33 ("These experiments . . . high")

C) Lines 41-44 ("Now the . . . group")

D) Lines 68-70 ("Surely . . . at you")

15

As used in line 35, "magnitude" most nearly means

A) strength.

B) influence.

C) severity.

D) reality.

16

What main effect do the words "clueless" (line 38) and "mind-reading" (line 61) have on the tone of the passage?

A) They contribute to a casual and gently humorous tone that renders a potentially specialized discussion more approachable.

B) They contribute to a slyly mocking and disapproving tone that reinforces the author's criticisms of the researchers' conclusions.

C) They contribute to a deeply pessimistic tone that stresses the impossibility of ever knowing how people truly perceive each other.

D) They contribute to a thoughtful yet uncertain tone that casts doubt on the real-world usefulness of experimental data.

17

The author quoted in lines 58-60 expresses which view of the study's results?

A) They indicate that there is a small but promising chance of correctly predicting how one is perceived.

B) They show that individuals generally know very little about how they are regarded by groups of people.

C) They reveal that one individual hardly knows what another individual thinks of him or her.

D) They confirm that one's predictions about other people's impressions are no better than random guesses.

CONTINUE

18

The main reason that the author includes the information about speed daters, job candidates, and teachers in lines 78-85 is to

A) caution against making assumptions about certain individuals' motives.

B) distinguish among certain behaviors observed in three different scenarios.

C) indicate certain settings where further study by researchers is needed.

D) offer examples of situations in which a certain finding holds true.

19

According to the figure, the mean correlation that most nearly approaches complete agreement exists between individuals' self-perception and

A) how those individuals are actually perceived by new acquaintances.

B) actual perceptions of those individuals by people with whom they are well acquainted.

C) the individuals' predictions of how they are perceived by people with whom they are well acquainted.

D) the predictions those individuals make about how they are perceived by new as well as old acquaintances.

20

Which statement best exemplifies the distinction made by correlation C in the figure?

A) Sally believes she is outgoing but thinks that others will describe her as reserved.

B) Sally expects that others will say she is outgoing, but many describe her as reserved.

C) Sally has been told that she is outgoing but only by people with whom she is well acquainted.

D) Sally is outgoing with those with whom she is well acquainted but reserved around new acquaintances.

21

Information in the figure is most useful for addressing which question provoked by the passage?

A) What determined the traits that researchers tended to focus on in the experiments being analyzed?

B) Why are individuals more likely to accurately predict the impressions of groups than of specific individuals within groups?

C) To what degree are people able to predict how individual acquaintances perceive them?

D) Is one person's understanding of trustworthiness really so different from another person's understanding of that trait?

CONTINUE

Questions 22-32 are based on the following passage and supplementary material.

This passage is adapted from David Shiga, "Has Pluto Sent Us a Message in Ceres?" ©2008 by Reed Business Information, Ltd.

Does Pluto have a wayward cousin lurking in the inner solar system? The dwarf planet Ceres—and other icy chunks—may have been born in the same realm as Pluto, but travelled all the way to the asteroid belt between the orbits of Mars and Jupiter. If so, it would be further evidence that a massive upheaval rearranged the early solar system.

At 950 kilometres in diameter, Ceres is by far the largest object in the asteroid belt. And that's not the only reason it doesn't quite fit in with many of its companions, according to William McKinnon of Washington University.

McKinnon points out that Ceres has a low density, which suggests it is 25 to 30 per cent water ice. That's a high proportion for an asteroid, but closely matches Pluto and other icy objects native to the outer solar system, known as trans-Neptunian objects (TNOs). What's more, a dip in Ceres's light spectrum may be a sign of ammonium-rich clay at the surface. This material has never been found in the fragments of asteroids that have fallen to Earth, but fits the expected ammonia-rich composition of a TNO.

So if Ceres formed in Pluto's neighbourhood, how did it end up 2 to 4 billion kilometres away? Some researchers think that the orbits of the planets were once unstable. According to this idea—known as the Nice model—Uranus and Neptune went rampaging through the outer solar system around 3.9 billion years ago. As a result, many of the icy objects that formed in the outer solar system were pulled inward by the gravity of the two planets, and some ended up joining the rocky asteroids that were born in the asteroid belt. Ceres would simply be the largest of these immigrants. "The odds for this seem low, but it is not inconceivable," says Bill Bottke of the Southwest Research Institute (SwRI) in Boulder, Colorado.

Bottke and Hal Levison of SwRI led a pair of studies which support the idea of refugees from the outer solar system orbiting in the asteroid belt. They focused on the so-called D- and P-type asteroids that comprise 20 per cent of the population in the outer part of the belt. These objects are a dark reddish colour that suggests they are covered in carbon-rich gunk—just the sort of residue that might have been left behind on an icy object that had its outermost layers vaporised in the bright sunlight of the inner solar system. Bottke and Levison's computer simulations show that the observed number of objects is about right if they are immigrants, though they have assumed many of the objects broke up after transport.

Thomas McCord of the Bear Fight Center in Winthrop, Washington, who was not involved in any of the three studies, agrees that the asteroid belt probably hosts some small refugees from the outer solar system, but says there is no reason to believe Ceres is a stranger there. Its ice-to-rock ratio matches the expected composition of the raw materials that would have been available at its current position early on, he says. What's more, objects of its size are expected to have formed in the inner solar system. New measurements of Ceres's composition by NASA's Dawn mission, for which McCord is a team member, could help pin down its birthplace.

Properties of Selected Solar System Objects

Object	Average distance from Sun (Earth distance = 1)	Radius (Earth = 1)	Mass (Earth = 1)	Average density (g/cm^3)
Earth	1.0	1.0	1.0	5.5
Mars	1.52	0.53	0.11	3.9
Juno (asteroid)	2.7	0.019	0.000003	2.8
Ceres (dwarf planet)	2.8	0.073	0.00015	2.7
Jupiter	5.2	11.2	318.0	1.3
Saturn[1]	9.5	9.5	95.0	0.7
Uranus	19.2	4.0	15.0	1.3
Neptune	30.1	3.9	17.0	1.6
Pluto (dwarf planet)	39.5	0.2	0.002	2.1

[1]Properties given do not include Saturn's ring system.

Source: Data from the National Aeronautics and Space Administration (NASA).

CONTINUE

22

In McKinnon's view, Ceres differs from other objects in the asteroid belt in which significant way?

A) The surface temperature of Ceres is lower than the temperatures of the other objects.
B) The dimensions of Ceres have varied more over time than the dimensions of the other objects have.
C) The surface composition of Ceres is dissimilar to the composition of the other objects.
D) The light reflected by Ceres is more intense than the light reflected by the other objects.

23

Which choice provides the best evidence for the answer to the previous question?

A) Lines 2-5 ("The dwarf . . . Jupiter")
B) Lines 8-9 ("At 950 . . . belt")
C) Lines 18-20 ("What's . . . surface")
D) Lines 20-23 ("This . . . TNO")

24

According to the passage, the Nice model is based on the idea that

A) Uranus and Neptune were not always locked into their current orbital paths.
B) Ceres traveled a greater distance than any other object in the solar system did.
C) objects formed in the inner solar system were able to resist the gravitational pull of Uranus and Neptune.
D) icy objects like Ceres were formed in the inner solar system.

25

As used in line 34, "simply" most nearly means

A) wholly.
B) sincerely.
C) plainly.
D) merely.

26

Based on the passage, Bottke and Levison's conclusions would be most weakened by a study that

A) confirmed that heat from the Sun burned away the outer layers of all immigrant objects.
B) established that the orbits of certain objects of the inner solar system were once less stable.
C) demonstrated that very few objects broke up after migrating to the asteroid belt.
D) proved that not all immigrants from the outer solar system survive in the asteroid belt today.

27

Which choice provides the best evidence for the answer to the previous question?

A) Lines 39-41 ("Bottke . . . belt")
B) Lines 42-44 ("They . . . belt")
C) Lines 44-49 ("These . . . system")
D) Lines 49-53 ("Bottke . . . transport")

28

As used in line 60, "raw" most nearly means

A) original.
B) young.
C) exposed.
D) inexperienced.

CONTINUE

29

The last sentence of the passage serves mainly to

A) hint at a possible weakness in a claim.

B) emphasize the critical nature of a decision.

C) allude to a potential resolution to a puzzle.

D) reconcile two opposing positions on an issue.

30

According to the table, which object has the lowest average density?

A) Earth

B) Ceres

C) Saturn

D) Pluto

31

Which statement is supported by data represented in the table?

A) Earth shows greater variation in density than Ceres does.

B) Juno's average distance from the Sun is less than that of Ceres.

C) Some objects in the asteroid belt are greater in mass than Ceres is.

D) No other dwarf planet has a radius as large as that of Ceres.

32

Which data presented in the table would McKinnon find most useful to his argument?

A) The average density of Pluto is similar to that of Ceres.

B) Neptune is located much farther from the Sun than is Ceres.

C) The mass of Ceres is only slightly greater than that of Juno.

D) Ceres is denser, on average, than either Neptune or Uranus.

Questions 33-42 are based on the following passages.

Passage 1, by Patrick Henry, and Passage 2, by Edmund Pendleton, are adapted from speeches delivered to the Virginia ratifying convention in 1788. Both are in response to the proposal by the 1787 Constitutional Convention in Philadelphia to replace the Articles of Confederation with a new constitution establishing a national government.

Passage 1

If a wrong step be now made, the republic may be lost forever. If this new government will not come up to the expectation of the people, and they shall be disappointed, their liberty will be lost, and tyranny must and will arise.

. . . And here I would make this inquiry of those worthy characters who composed a part of the late federal Convention. I am sure they were fully impressed with the necessity of forming a great consolidated government, instead of a confederation. That this is a consolidated government is demonstrably clear; and the danger of such a government is, to my mind, very striking.

I have the highest veneration for those gentlemen; but, sir, give me leave to demand, What right had they to say, We, the people? My political curiosity, exclusive of my anxious solicitude for the public welfare, leads me to ask, Who authorized them to speak the language of, We, the people, instead of, We, the states? States are the characteristics and the soul of a confederation. If the states be not the agents of this compact, it must be one great, consolidated, national government, of the people of all the states. . . .

The people gave them no power to use their name. That they exceeded their power is perfectly clear. It is not mere curiosity that actuates me: I wish to hear the real, actual, existing danger, which should lead us to take those steps, so dangerous in my conception. Disorders have arisen in other parts of America; but here, sir, no dangers, no insurrection or tumult have happened; every thing has been calm and tranquil. But, notwithstanding this, we are wandering on the great ocean of human affairs. I see no landmark to guide us. We are running we know not whither. Difference of opinion has gone to a degree of inflammatory resentment in different parts of the country, which has been occasioned by this perilous innovation. The federal Convention ought to have amended the old system; for this purpose they were solely delegated; the object of their mission

CONTINUE

extended to no other consideration. You must, therefore, forgive the solicitation of one unworthy member to know what danger could have arisen under the present Confederation, and what are the causes of this proposal to change our government.

Passage 2

Mr. Chairman, my worthy friend (Mr. Henry) has expressed great uneasiness in his mind, and informed us that a great many of our citizens are also extremely uneasy, at the proposal of changing our government. . . .

. . . [A]n objection is made to the form: the expression, We, the people, is thought improper. Permit me to ask the gentleman who made this objection, who but the people can delegate powers? Who but the people have a right to form government? The expression is a common one, and a favorite one with me. The representatives of the people, by their authority, is a mode wholly inessential. If the objection be, that the Union ought to be not of the people, but of the state governments, then I think the choice of the former very happy and proper. What have the state governments to do with it? . . .

But the power of the Convention is doubted. What is the power? To propose, not to determine. This power of proposing was very broad; it extended to remove all defects in government: the members of that Convention, who were to consider all the defects in our general government, were not confined to any particular plan. Were they deceived? This is the proper question here. Suppose the paper on your table dropped from one of the planets; the people found it, and sent us here to consider whether it was proper for their adoption; must we not obey them? Then the question must be between this government and the Confederation. The latter is no government at all. It has been said that it has carried us, through a dangerous war, to a happy issue. Not that Confederation, but common danger, and the spirit of America, were bonds of our union: union and unanimity, and not that insignificant paper, carried us through that dangerous war. "United, we stand—divided, we fall!" echoed and reëchoed through America—from Congress to the drunken carpenter—was effectual, and procured the end of our wishes, though now forgotten by gentlemen, if such there be, who incline to let go this stronghold, to catch at feathers; for such all substituted projects may prove.

33

In Passage 1, Henry states that Virginia differs from other areas of the country in that

A) there is no evidence of civil unrest.

B) the federal convention is widely praised.

C) opposition to a consolidated government is strong.

D) tyranny and loss of liberty are greatly feared.

34

The figurative language in lines 33-35 ("But, notwithstanding . . . guide us") serves mainly to suggest

A) impatience.

B) uncertainty.

C) optimism.

D) indignation.

35

In Passage 2, Pendleton indicates that the phrase "We, the people" is

A) objectionable to most citizens.

B) appropriate for the proposed type of government.

C) popular among proponents of states' rights.

D) overused by supporters of a federal system.

36

As used in line 79, "issue" most nearly means

A) misgiving.

B) publication.

C) proceeding.

D) outcome.

37

Based on Passage 2, which statement best reflects Pendleton's view of the Articles of Confederation?

A) They were a source of great concern to a large number of American citizens.

B) They gave too much power to the elected representatives.

C) They served to unite the country in ways that were unprecedented.

D) They had little to do with America's having prevailed in its most recent conflict.

38

Which choice provides the best evidence for the answer to the previous question?

A) Lines 47-51 ("Mr. Chairman . . . government")

B) Lines 58-60 ("The representatives . . . inessential")

C) Lines 79-83 ("Not . . . war")

D) Lines 83-89 ("United . . . feathers")

39

Which statement best describes the relationship between the views expressed in the two passages?

A) Henry and Pendleton both disagreed with the conclusions of the federal Convention.

B) Henry and Pendleton held similar beliefs about the new Constitution.

C) Henry asked questions that Pendleton admitted he could not answer.

D) Pendleton disagreed with most of the points made by Henry.

40

Which statement best expresses Henry's and Pendleton's respective views of the Confederation?

A) Henry felt it was flawed but correctable, while Pendleton felt that it had served no useful purpose.

B) Henry viewed it as a perfect expression of democracy, while Pendleton viewed it as fundamentally authoritarian.

C) Henry regarded it as adequate in its current form, while Pendleton regarded it as a transitional system only.

D) Henry considered it an unavoidable compromise during a time of crisis, while Pendleton considered it to have harmed the nation's future prospects.

41

Henry would most likely have responded to Pendleton's claim about the members of the Convention by asserting that they

A) did not sufficiently address the defects of the Confederation.

B) should not have proposed an entirely new form of government.

C) were seeking only to enact the wishes of the American people.

D) failed to understand the danger of taking no significant action.

42

Which choice provides the best evidence for the answer to the previous question?

A) Lines 6-10 ("And here . . . confederation")

B) Lines 11-13 ("That . . . striking")

C) Lines 39-42 ("The federal . . . consideration")

D) Lines 42-46 ("You . . . government")

CONTINUE

Questions 43-52 are based on the following passage.

This passage is adapted from Catherine Clabby, "A Tangled Tale of Plant Evolution." ©2009 by Sigma Xi, The Scientific Research Society.

As ancestors of land plants abandoned their aquatic nurseries for life on shore, they needed the means to seal in water and hold themselves up to thrive. Lignin, a strengthening and stiffening polymer common in woody plant cells, contributes to both extremely well.

Lignin production for those tasks was considered a key adaptive achievement of vascular plants, which descend from green algae. Now a University of British Columbia botanist and some highly specialized chemists have strong evidence for lignin in a red alga called *Calliarthron cheilosporioides*.

The finding suggests that a biological building block fundamental to the success of land plants has roots that stretch back far deeper—and maybe wider—through evolutionary time than was known. "This pathway is involved in the production of other secondary metabolites like pigments in plants. A lot of that is likely to be conserved pretty far back in the evolutionary history of algae," says Patrick T. Martone, the botanist who led the study.

Martone didn't set out to locate lignin in algae. The biomechanist simply wanted to better understand the toughness of *C. cheilosporioides*, which dwells in the harsh habitat of intertidal zones along rocky shores.

During high tides, waves pummel the alga with water velocities exceeding 20 meters per second and with forces that exceed those generated by hurricane winds. The calcified, or rigid-bodied, seaweed has multiple noncalcified joints that make it flexible yet strong enough to handle that setting.

When collaborator Jose Estevez at the Carnegie Institution for Science examined the joints for Martone with a transmission electron microscope, he saw secondary cell walls, features commonly found in land plants. That prompted Martone and Estevez to seek out experts in lignin, a molecule of great research interest right now because its toughness impedes the use of some plants as sources of biofuel and animal feed.

John Ralph and colleagues at the University of Wisconsin-Madison's Great Lakes Bioenergy Research Center detected lignin in *C. cheilosporioides*. They found the same telltale components derived from radical coupling reactions of hydroxycinnamyl alcohols used to describe lignins in terrestrial plants.

At the Centre de Recherches sur les Macromolécules Végétales in France, Katia Ruel applied antibodies designed to locate lignin within land plants to samples of *C. cheilosporioides*. Her tests detected lignin in the seaweed too.

The amounts are much smaller than what is found in land plants. But lignin is most abundant in the parts of the seaweed that are most mechanically stressed, which suggests to Martone that there could be some environmental stimulation that increases production of the polymer in the organism. The puzzling thing is that it's also present in calcified portions of the algae. "We don't know what it's doing there," Martone says.

Martone's working hypothesis is that the molecular pathways producing lignin emerged long before land plants evolved from green algae, back to some ancestor shared with red algae more than a billion years ago. Molecular evidence and comparisons of the biological gear the algae use to harvest light convince him that both red and green algae descend from one endosymbiotic event, when a eukaryote cell engulfed a photosynthesizing cyanobacterium and gained the ability to make its own food.

Karl J. Niklas, a Cornell University botanist, considers Martone's evidence for lignin in *C. cheilosporioides* exceptionally strong. But he thinks that red and green algae evolved from separate endosymbiotic events. Still, the progenitors of the two algae may both have carried genes similar to those participating in the lignin production pathways seen today, he says.

CONTINUE

43

The passage is primarily concerned with

A) narrating how a finding was arrived at and indicating possible implications.

B) explaining some differences among specialists in different fields of science.

C) identifying a particularly vexing phenomenon and endorsing a single explanation.

D) describing the properties of an organism and showing how they can be exploited.

44

As presented in the passage, the conclusion that lignin is present in *C. cheilosporioides* can best be described as

A) theorized previously within the larger scientific community.

B) founded on empirical evidence and thus persuasive.

C) certain to disprove most earlier theories of algal evolution.

D) supported by an abundance of conjectural reports.

45

It can reasonably be inferred from the passage that Martone's research interest in lignin should be considered

A) unusually insightful, because it has fundamentally changed the way lignin is understood.

B) somewhat questionable, because Martone based his conclusions on an atypical sample.

C) properly cautious, because Martone checked his findings about *C. cheilosporioides* multiple times.

D) initially secondary, because it was undertaken to support particular questions about *C. cheilosporioides*.

46

Which choice provides the best evidence for the answer to the previous question?

A) Lines 7-9 ("Lignin . . . algae")

B) Lines 13-16 ("The finding . . . known")

C) Lines 23-26 ("The biomechanist . . . shores")

D) Lines 59-61 ("The puzzling . . . algae")

47

The passage indicates that the structure of *C. cheilosporioides* consists of components that

A) change density in response to external conditions.

B) protect the cell interior from exposure to seawater.

C) regenerate as the seaweed colony matures.

D) operate together to allow for suppleness.

48

As used in line 32, "handle" most nearly means

A) train for.

B) survive in.

C) engage in.

D) act on.

49

Scientists who specialized in lignin were useful to Martone and Estevez because

A) the toughness of *C. cheilosporioides* made it difficult to analyze without the use of specialized chemistry.

B) *C. cheilosporioides* was found to contain features typically found in plants known to contain lignin.

C) prior research suggested that seaweed species contain molecules of a particularly durable chemical compound.

D) some unexpected measurement results from tests for lignin required specialist interpretation.

CONTINUE

50

Which choice provides the best evidence for the answer to the previous question?

A) Line 22 ("Martone . . . algae")
B) Lines 30-32 ("The calcified . . . setting")
C) Lines 33-37 ("When . . . plants")
D) Lines 42-45 ("John Ralph . . . *C. cheilosporioides*")

51

As used in line 76, "strong" most nearly means

A) compelling.
B) distinctive.
C) impervious.
D) vigorous.

52

Niklas counters Martone's proposal about the evolutionary history of red and green algae by suggesting that the

A) major molecular pathways present in red and green algae must have been in place long before their evolutionary lines separated.
B) evidence uncovered in Martone's research does not directly address the issue of when the last common ancestor of red and green algae existed.
C) evolutionary lines leading to the two kinds of algae might have diverged before they acquired the ability to photosynthesize.
D) process by which *C. cheilosporioides* produces lignin might be different from the process by which ancestral species of algae produced it.

STOP

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

Writing and Language Test

35 MINUTES, 44 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

DIRECTIONS

Each passage below is accompanied by a number of questions. For some questions, you will consider how the passage might be revised to improve the expression of ideas. For other questions, you will consider how the passage might be edited to correct errors in sentence structure, usage, or punctuation. A passage or a question may be accompanied by one or more graphics (such as a table or graph) that you will consider as you make revising and editing decisions.

Some questions will direct you to an underlined portion of a passage. Other questions will direct you to a location in a passage or ask you to think about the passage as a whole.

After reading each passage, choose the answer to each question that most effectively improves the quality of writing in the passage or that makes the passage conform to the conventions of standard written English. Many questions include a "NO CHANGE" option. Choose that option if you think the best choice is to leave the relevant portion of the passage as it is.

Questions 1-11 are based on the following passage.

The Case for Electronic Health Records

The US health-care system has made significant strides in the implementation of systems that manage electronic health records, which include information such as a patient's medical history, medications currently 1 prescribed, and a list of allergies. From 2001 to 2013, the use of electronic health record systems by

1

A) NO CHANGE
B) prescribed; and
C) prescribed: and
D) prescribed and,

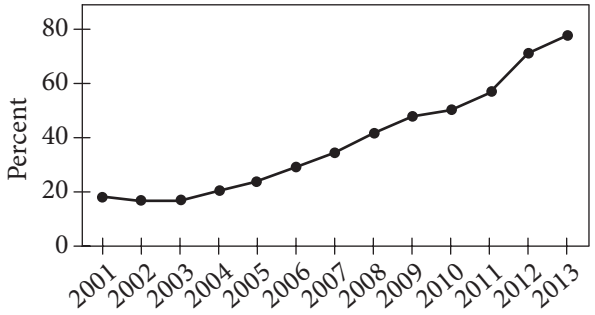
CONTINUE

office-based physicians 2 began to decline only in the last three years. While this progress is commendable, the US health-care system needs to make the full transition to electronic health records a high priority.

2

The writer wants to complete the sentence with accurate and relevant information from the graph to support the claim made about advances in the implementation of electronic health record systems. Which choice best accomplishes this goal?

Percentage of Office-Based Physicians with Electronic Health Record Systems, 2001–2013



Adapted from National Center for Health Statistics, *Data Brief Number 143*, US Department of Health and Human Services, Centers for Disease Control and Prevention. Published in 2014.

A) NO CHANGE

B) increased most dramatically between 2011 and 2012.

C) increased from less than 20 percent of physicians to nearly 80 percent of physicians.

D) fluctuated from year to year until about 80 percent of physicians were using electronic health records.

3 Regrettably, electronic medical records require infrastructure that can be expensive to build: they don't require physical storage space, they don't need to be photocopied and collated, and 4 they are less likely to be physically misplaced. More importantly, electronic records accelerate communication between 5 different and various health-care providers, allowing for more efficient patient treatment. For example, when paramedics have access to electronic records in ambulances, they can learn what kinds of treatment they should immediately begin on a 6 patient. Immediate treatment results in safer and earlier care. Even small improvements in efficiency add up. The Veterans Health Administration, the largest integrated health-care system in the United States, reports that after the implementation of electronic health records in 1995, its total productivity has increased by 6 percent per year.

3

Which phrase most effectively sets up the examples in the second part of the sentence?

A) NO CHANGE
B) Electronic health records provide many advantages over paper ones:
C) Researchers have weighed the benefits and drawbacks of electronic health records:
D) Typically, electronic health records need a full-time staff to maintain them:

4

A) NO CHANGE
B) because they are
C) being
D) DELETE the underlined portion.

5

A) NO CHANGE
B) different
C) diverse, different
D) singularly different

6

Which choice most effectively combines the sentences at the underlined portion?

A) patient, resulting
B) patient and results
C) patient, and those treatments result
D) patient because it results

CONTINUE

[1] These concerns, however, are also problems for paper records. [2] Despite these clear benefits, some patients and medical professionals still harbor concerns about the potential for error and the violation of patient privacy when electronic records are used. [3] By no means free from errors, handwritten records are especially prone to errors resulting from illegible handwriting. [4] Electronic health record systems can actually reduce errors by, for instance, cross-referencing drug **7** information, this provides doctors with automatic warnings about possible adverse drug interactions. [5] **8** Likewise, at Brigham and Women's Hospital in Boston, Massachusetts, serious medical errors decreased by 55 percent after an electronic record system was implemented. [6] Furthermore, patient privacy is no more threatened by electronic records than it is by paper records, which **9** are—according to the US Department of Health and Human Services, typically accessed by at least 150 different health-care professionals. **10**

The best way to address these concerns about accuracy and privacy **11** are not to avoid adopting electronic health record systems but rather to implement them effectively. The benefits of fully transitioning from paper to electronic health records far outweigh any perceived disadvantages.

7

A) NO CHANGE
B) information to provide
C) information; providing
D) information, provides

8

A) NO CHANGE
B) Still,
C) In this case,
D) In fact,

9

A) NO CHANGE
B) are
C) are,
D) are;

10

To make this paragraph most logical, sentence 2 should be placed

A) where it is now.
B) before sentence 1.
C) after sentence 5.
D) after sentence 6.

11

A) NO CHANGE
B) have been
C) had been
D) is

CONTINUE

Questions 12-22 are based on the following passage and supplementary material.

The Beaver as Ecosystem Engineer

[1] An ecosystem is a complex web of interactions between organisms and their habitats. [2] Each component is **12** vital to the sustainability of the others and to the system as a whole. [3] Beavers, large rodents that use sticks, mud, and leaves to build dams in streams, are perhaps one of the best examples of the **13** interpersonal relationship among all aspects of an ecosystem. [4] New efforts to cultivate beaver populations reflect a growing recognition of the vital role beaver dams play in combating the effects of drought and preserving species diversity. [5] Beavers fell trees to build their dams, and the ponds that form behind a dam can flood the surrounding area. [6] Despite the seeming drawbacks to beaver dams, emerging research confirms that they actually provide significant environmental benefits. **14**

Scientists have called the beaver an "ecosystem engineer" because its dams can alter the ecological makeup of its habitat. By regulating water flow in **15** streams. Dams have ripple effects that radiate to

12

A) NO CHANGE
B) vital: to the sustainability of the others
C) vital, to the sustainability of the others,
D) vital; to the sustainability of the others

13

A) NO CHANGE
B) interdependent
C) societal
D) associative

14

To make this paragraph most logical, sentence 4 should be placed

A) where it is now.
B) after sentence 1.
C) after sentence 5.
D) after sentence 6.

15

A) NO CHANGE
B) streams; dams
C) streams, dams
D) streams—dams

CONTINUE

all surrounding organisms. **16** The ponds that form as a result of dams retain nutrient-rich sediment, **17** fostering a variety of plant life and multiplying food sources such as plankton. Attracted by these resources, many different kinds of wildlife **18** inhabits beaver ponds.

16

At this point, the writer is considering adding the following sentence.

A beaver's life span averages 10–12 years.

Should the writer make this addition here?

A) Yes, because it reinforces the scientists' characterization of beavers as "ecosystem engineers."
B) Yes, because it clarifies information in the previous sentence about the impact of beavers.
C) No, because the detail is not necessary for understanding beavers' impact on their ecosystems.
D) No, because it does not provide enough explanation of the factors affecting the beaver's life span.

17

A) NO CHANGE
B) adopting
C) raising
D) rearing

18

A) NO CHANGE
B) inhabit
C) are inhabited
D) have inhabited

Recent studies suggest that beaver dams not only create diversely populated ecosystems but also **19** preserve them during times of environmental stress. A landmark 2008 study by ecologists at the University of Alberta found that the presence of beaver populations can mitigate the effects of drought on wetlands. The researchers observed that ponds in Elk Island National Park in Canada that had developed active beaver colonies held significantly more water during years when beavers were present than they did during years when beavers were absent. Furthermore, a group of ponds that had not been recolonized by beavers showed a **20** smaller increase in area of open water over the same period.

19

A) NO CHANGE
B) to preserve them
C) preserving them
D) they are preserved

20

Which choice best reflects the information provided in figures 1 and 2?

A) NO CHANGE
B) marked decline
C) greater increase
D) gradual reduction

CONTINUE

Figure 1

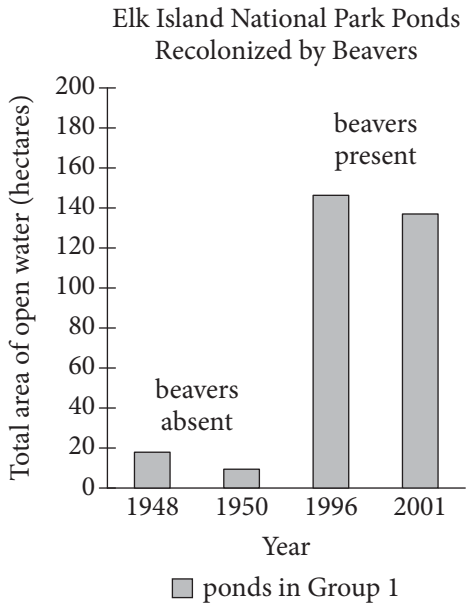
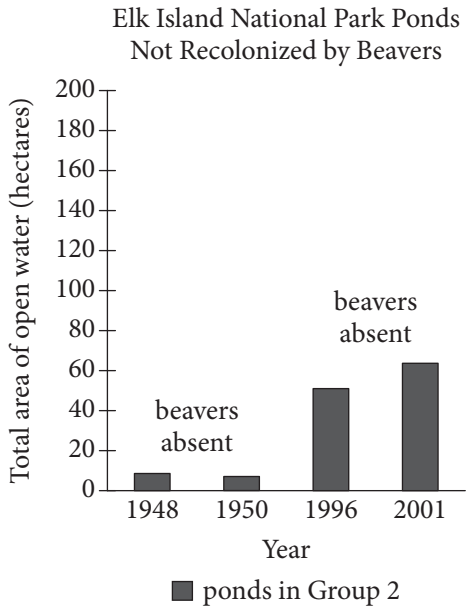


Figure 2



Figures adapted from Glynnis A. Hood and Suzanne E. Bayley, "Beaver (*Castor canadensis*) Mitigate the Effects of Climate on the Area of Open Water in Boreal Wetlands in Western Canada." ©2008 by Biological Conservation.

21 In addition to studying wildlife, researchers are collaborating with local officials to promote beaver populations in habitats where they might be beneficial. Washington State's Lands Council, a nonprofit organization, has begun working with the state's Department of Ecology to reintroduce beavers to 10,000 miles of suitable habitat. Officials predict that beaver dams could help retain more than 650 trillion gallons of springtime melted snow, which could help stabilize water levels in streams during dry months. This project provides a low-cost alternative to the construction of artificial dams, which could cost billions of dollars. Through such initiatives, beaver populations are doing what they do **22** best; "engineering" healthier, more stable ecosystems.

21

Which choice provides the best transition from the previous paragraph?

A) NO CHANGE
B) Despite the beaver's reputation as a nuisance,
C) Spurred by these findings,
D) Motivated by this opportunity,

22

A) NO CHANGE
B) best—"engineering,"
C) best: "engineering"
D) best, "engineering,"

CONTINUE

Questions 23-33 are based on the following passage.

The Giant: Michelangelo's Victory

Toward the end of the 1400s, as the Renaissance was reaching 23 its height in Florence, Italy, members of the city's powerful Wool Guild were celebrating their recently completed city cathedral. It was a triumph that added to Florence's reputation 24 from sophistication and beauty, yet the guild members were eager to 25 fancy it up even more. They wanted a series of statues to adorn the cathedral's exterior, 26 placing high on buttresses so that the art could be admired from afar. The first result of the members' plan brought great acclaim, though not quite in the way they had anticipated.

23

A) NO CHANGE
B) it's
C) its'
D) their

24

A) NO CHANGE
B) for
C) to
D) with

25

A) NO CHANGE
B) make it look super rich.
C) increase its splendor.
D) give it a wow factor.

26

A) NO CHANGE
B) they were placed
C) which were placed
D) placed

CONTINUE

In 1501, guild members began the project by commissioning a statue of David, a biblical hero who had defeated a giant named Goliath. The sculptor chosen was Michelangelo, a twenty-six-year-old artist who already had a reputation for great talent. He was directed to use an enormous block of marble from the cathedral's workshop to create the statue. Nicknamed "the Giant," the block had many problems. It had been quarried more than forty years earlier and had started to weather from exposure to the elements. Even worse, 27 they had previously used it, chipping away material to rough out a basic shape but giving up midtask. 28 The marble came from the Fantiscritti quarries in Carrara, a small town almost 80 miles north of Florence. Michelangelo was faced with trying to sculpt a monumental statue out of a stone that was generally considered ruined.

27

A) NO CHANGE
B) other sculptors had previously used it,
C) it was used by them before,
D) they used it previously to begin other sculptures,

28

The writer is considering deleting the underlined sentence. Should the sentence be kept or deleted?

A) Kept, because it provides evidence to support the claim that Michelangelo would succeed where others had failed.
B) Kept, because it includes details that explain why the citizens of Florence might have been critical of commissioning a sculptor from a different city.
C) Deleted, because it adds irrelevant information that distracts from the paragraph's focus on the obstacles Michelangelo faced.
D) Deleted, because it fails to explain why the block had not already been made into a sculpture.

CONTINUE

[1] His seventeen-foot-high, intricately detailed figure depicts David in the act of confronting Goliath. [2] Michelangelo had solved the problem of the awkward size and shape of the marble block by positioning David turned slightly sideways with his weight shifted onto one leg, poised as if ready to burst into action. [3] But Michelangelo took on the Giant with zeal and finished the statue in just two years. [4] The statue's form and posture echoed the proportions of classical Roman sculpture, but its expressiveness and level of detail **29** has reflected Renaissance sensibilities. [5] Michelangelo had overcome the limitations of the marble block and, moreover, had turned it into a technical and artistic masterpiece. **30**

Upon viewing the stunning statue, guild members discarded the plan to hoist the statue to an exterior buttress. It was far too beautiful (**31** and was unlike other Renaissance depictions of David) to be placed high above its viewers. After meeting with city officials and

29

A) NO CHANGE
B) reflected
C) had reflected
D) will reflect

30

To make this paragraph most logical, sentence 3 should be placed

A) where it is now.
B) before sentence 1.
C) after sentence 1.
D) after sentence 4.

31

Which choice gives a second reason and additional support for the main idea of the paragraph?

A) NO CHANGE
B) and depicted a favorite biblical story of the citizens of Florence
C) and later would come to symbolize Florence's defense of its civil liberties
D) and, at more than eight tons, far too heavy

CONTINUE

prominent citizens, the members agreed that the statue should instead stand outside of Florence's town hall 32 as a symbol and representation of the city's strength and independence. Thus, the guild members achieved their goal of enhancing Florence's 33 prestige.

32

A) NO CHANGE
B) to symbolize and represent
C) as a symbol of
D) as a representation that symbolized

33

The writer wants to revise the underlined portion so that the concluding sentence summarizes the main ideas of the passage. Which choice best accomplishes this goal?

A) prestige, and Michelangelo was hailed as a hero in his own right for conquering the Giant and giving Florence a fitting monument.
B) prestige, and Michelangelo would soon leave Florence for Rome, where he would paint the ceiling of the Sistine Chapel.
C) prestige, especially after parts of the statue were decorated with gold.
D) prestige, but even though it boasts works of art like Michelangelo's *David*, Italy today ranks only fifth in terms of revenue generated by tourism.

CONTINUE

Questions 34-44 are based on the following passage.

Sharing for Success

34 The twenty-first century has presented both unique challenges and innovative solutions to work-related issues. Both Julie Levine and Julie Rocco desired a healthier work/life balance, but they were hesitant to give up their managerial roles overseeing the production of new vehicles. In order to retain these top engineers, the company proposed a creative 35 solution; job sharing.

As the demand for flexible working options in today's marketplace has grown, job 36 sharing, an arrangement in which one full-time job is split between two employees—has become more common. For

34

Which choice provides the best introduction to the paragraph?

A) NO CHANGE
B) Companies are always searching for new and innovative ways to recruit the best employees.
C) In 2007, two highly successful full-time engineers at a US car company faced the same dilemma.
D) According to one national survey, the average full-time US employee works about 1,700 hours per year.

35

A) NO CHANGE
B) solution. Job
C) solution job
D) solution: job

36

A) NO CHANGE
B) sharing—
C) sharing;
D) sharing:

CONTINUE

employees, it provides an appealing alternative to other forms of part-time work, which might not offer comparable health benefits, salary, or stability. For Levine and Rocco, who were compensated at 80 percent of their full-time salaries and benefits, job sharing was a way of continuing to climb the career 37 ladder. They didn't have to work the long hours usually demanded of an employee in a high-level position.

Effective communication is crucial to the success of a job-sharing arrangement. In determining how working time and responsibilities would be divided, 38 steps were taken by Levine and Rocco to ensure that the arrangement provided fluidity and consistency for the employees whom they jointly managed. "It's our job to be seamless," they noted. 39 Nevertheless, they each planned to work three days a week, with a day of overlap on Wednesdays; they also planned to talk on the phone

37

Which choice best combines the sentences at the underlined portion?

A) ladder, and they weren't having
B) ladder; however, they didn't have
C) ladder without having
D) ladder while still not having

38

A) NO CHANGE
B) there were steps taken by Levine and Rocco to ensure
C) Levine and Rocco took steps to ensure
D) Levine and Rocco's steps ensured

39

A) NO CHANGE
B) To this end,
C) However,
D) Similarly,

each evening to discuss the day's work. 40 The job shared by Levine and Rocco was the highest-ranking shared job at the company: when "you have to analyze your day and share it with another brain, you show up the next day ready to run," Levine said. Studies have confirmed that job sharing can improve work quality by encouraging teamwork. In a 2003 survey of employees at the UK National Health Service, for example, more than 70 percent of job sharers felt that communicating with their partners improved their ability to understand and execute their jobs.

41 Job sharing may present some challenges, though. If job sharers have 42 discordant capabilities or are unable to communicate effectively, the arrangement may not be successful. Job-sharing initiatives may also involve some extra cost for companies, since the salaries

40

Which choice best sets up the information that follows in the next part of the sentence?

A) NO CHANGE
B) Levine and Rocco initially had doubts that the arrangement would be successful:
C) The job shared by Levine and Rocco requires about 80 hours of work total per week:
D) Both Levine and Rocco found that this collaboration enhanced their job performance:

41

Which choice best sets up the main discussion of the paragraph?

A) NO CHANGE
B) Moreover, some workers have responsibilities that are difficult to share.
C) Still, only some positions are suitable for job sharing.
D) Flexible work arrangements can reduce stress in employees.

42

A) NO CHANGE
B) contrary
C) irreconcilable
D) mismatched

CONTINUE

and cost of benefits for two job-sharing employees are usually higher than **43** being for a single employee. However, proponents contend that the investment is worthwhile because **44** they enable companies to retain the most talented employees. As can be seen from Levine and Rocco's success in developing a best-selling 2011 sport-utility vehicle, job sharing provides an effective flexible working solution when undertaken by motivated employees and companies.

43

A) NO CHANGE
B) that of
C) those for
D) DELETE the underlined portion.

44

A) NO CHANGE
B) those enable
C) any of them enables
D) it enables

STOP

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

April QAS 2017

CONTINUE

Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

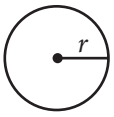
DIRECTIONS

For questions 1-15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 16-20**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

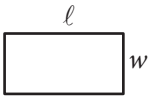
NOTES

1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

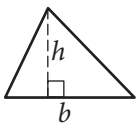
REFERENCE



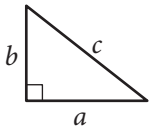
$A = \pi r^2$
$C = 2\pi r$



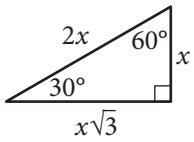
$A = \ell w$

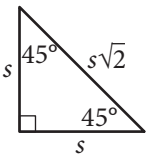


$A = \frac{1}{2}bh$

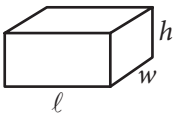


$c^2 = a^2 + b^2$

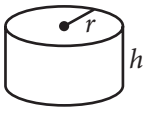




Special Right Triangles

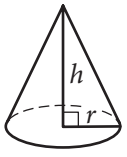


$V = \ell wh$

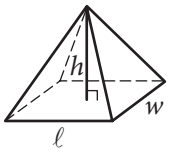


$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$



$V = \frac{1}{3}\pi r^2 h$



$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

CONTINUE

1

A farmer sold 108 pounds of produce that consisted of z pounds of zucchini and c pounds of cucumbers. The farmer sold the zucchini for \$1.69 per pound and the cucumbers for \$0.99 per pound and collected a total of \$150.32. Which of the following systems of equations can be used to find the number of pounds of zucchini that were sold?

A) $\begin{aligned} z + c &= 150.32 \\ 1.69z + 0.99c &= 108 \end{aligned}$

B) $\begin{aligned} z + c &= 108 \\ 1.69z + 0.99c &= 150.32 \end{aligned}$

C) $\begin{aligned} z + c &= 108 \\ 0.99z + 1.69c &= 150.32 \end{aligned}$

D) $\begin{aligned} z + c &= 150.32 \\ 0.99z + 1.69c &= 108 \end{aligned}$

2

$$C = 10x + 4y$$

The formula above gives the monthly cost C, in dollars, of operating a delivery truck when the driver works a total of x hours and when y gallons of gasoline are used. If, in a particular month, it cost no more than \$2,000 to operate the truck and at least 150 gallons of gas were used, what is the maximum number of hours the driver could have worked?

A) 125

B) 140

C) 500

D) 1,400

3

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

Which of the following polynomials is equivalent to the expression above?

A) $3x^2 - 7x - 3$

B) $3x^2 + 7x - 3$

C) $5x^2 - 5x - 3$

D) $5x^2 - 9x - 3$

4

$$x(x + 2) = 8$$

Which of the following lists all solutions to the quadratic equation above?

A) 8 and 6

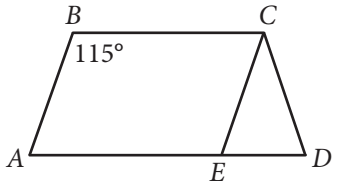
B) 4 and -2

C) -4 and 2

D) $\sqrt{6}$

CONTINUE

5



Note: Figure not drawn to scale.

In the figure above, $\overline{BC}$ and $\overline{AD}$ are parallel, $\overline{AB}$ and $\overline{EC}$ are parallel, $CD = CE$, and the measure of $\angle ABC$ is 115°. What is the measure of $\angle BCD$?

A) 85°

B) 115°

C) 125°

D) 140°

6

$$0.8p = t$$

At a store, a coat originally priced at p dollars is on sale for t dollars, and the relationship between p and t is given in the equation above. What is p in terms of t ?

A) $p = t - 0.8$

B) $p = 0.8t$

C) $p = \dfrac{0.8}{t}$

D) $p = \dfrac{t}{0.8}$

7

$$x + 2y = 16$$

$$0.5x - y = 10$$

The solution to the system of equations above is (x, y). What is the value of x ?

A) -2

B) 2

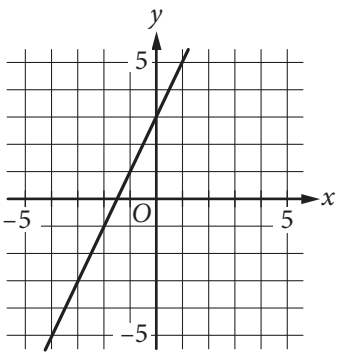
C) 18

D) 36

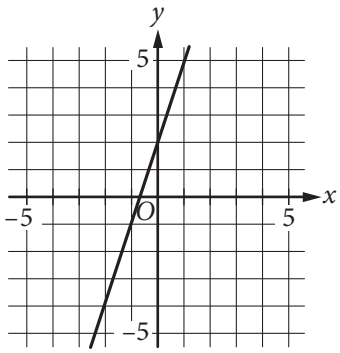
8

Which of the following is the graph of the equation $y = 2x + 3$ in the xy-plane?

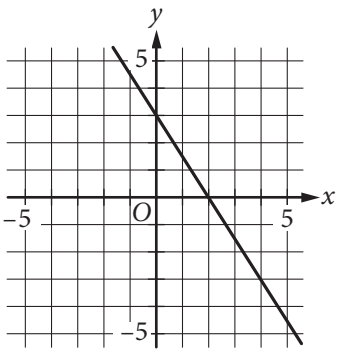
A)



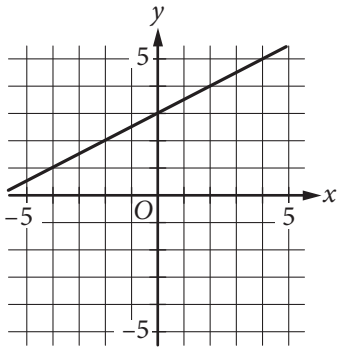
B)



C)



D)



9

$$x^2 - 6x + 11 = y$$
$$x = y + 1$$

The system of equations above is graphed in the xy-plane. Which of the following is the y-coordinate of an intersection point (x, y) of the graphs of the two equations?

A) -4

B) -2

C) 2

D) 4

10

$$\frac{5}{x-1} + \frac{8}{2(x-1)}$$

Which of the following expressions is equivalent to the one above, where $x \neq 1$?

A) $\frac{9}{x-1}$

B) $\frac{14}{x-1}$

C) $\frac{15}{2x-2}$

D) $\frac{21}{2x-2}$

CONTINUE

11

For a positive real number x, where $x^8 = 2$, what is the value of x^{24} ?

A) $\sqrt[3]{24}$

B) 4

C) 6

D) 8

12

Which of the following is an equivalent form of $\sqrt[3]{f^{6a}k^2}$, where $f > 0$ and $k > 0$?

A) $f^{\frac{1}{3a}}k^{-1}$

B) $f^{\frac{1}{2a}}k^{\frac{3}{2}}$

C) $f^{3a}k^{-1}$

D) $f^{2a}k^{\frac{2}{3}}$

13

$$g(t) = \frac{5(7t - 12c)}{2} - 25$$

The number of people who go to a public swimming pool can be modeled by the function g above, where c is a constant and t is the air temperature in degrees Fahrenheit (°F) for $70 < t < 100$. If 350 people are predicted to go to the pool when the temperature is 90°F, what is the value of c ?

A) 20

B) 40

C) 60

D) 80

CONTINUE

14

The boiling point of water at sea level is 212 degrees Fahrenheit (°F). For every increase of 1,000 feet above sea level, the boiling point of water drops approximately 1.84°F. Which of the following equations gives the approximate boiling point B, in °F, at h feet above sea level?

A) $B = 212 - 1.84h$

B) $B = 212 - (0.00184)h$

C) $B = 212h$

D) $B = 1.84(212) - 1{,}000h$

15

The graph of $x^2 - 4x + y^2 + 6y - 24 = 0$ in the xy-plane is a circle. What is the radius of the circle?

A) $2\sqrt{6}$

B) $\sqrt{11}$

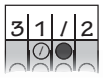
C) $\sqrt{37}$

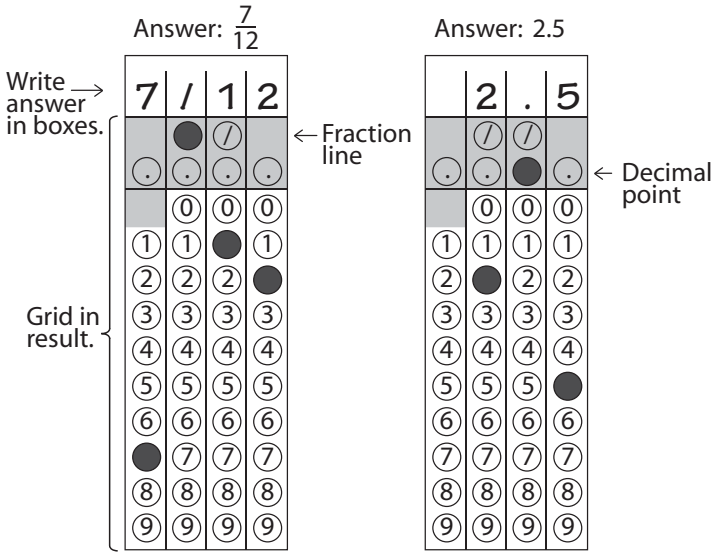
D) $\sqrt{76}$

CONTINUE

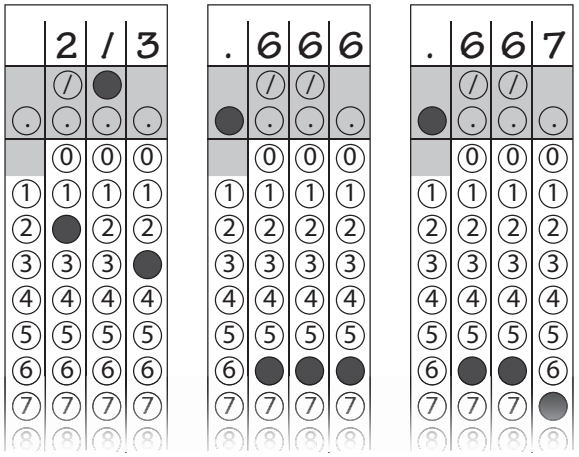
DIRECTIONS

For questions 16-20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

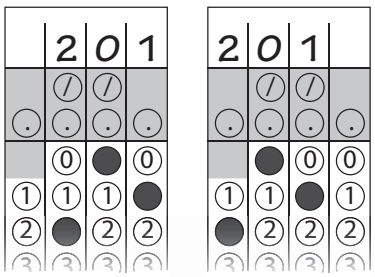
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **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.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

16

$$|5 - x| = 4$$

The value of one solution to the equation above is 1. What is the value of the other solution?

17

If $f(x) = x^2 - 4x + 10$ and c is a positive integer less than 5, what is one possible value of $f(c)$?

18

Students in a science lab are working in groups to build both a small and a large electrical circuit. A large circuit uses 4 resistors and 2 capacitors, and a small circuit uses 3 resistors and 1 capacitor. There are 100 resistors and 70 capacitors available, and each group must have enough resistors and capacitors to make one large and one small circuit. What is the maximum number of groups that could work on this lab project?

19

An angle with a measure of $\frac{7\pi}{6}$ radians has a measure of d degrees, where $0 \leq d < 360$. What is the value of d ?

20

The function f is defined by $f(r) = (r - 4)(r + 1)^2$. If $f(h - 3) = 0$, what is one possible value of h ?

STOP

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

CONTINUE

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

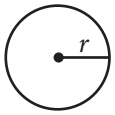
DIRECTIONS

For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 31-38**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

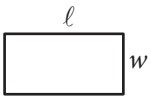
NOTES

1. The use of a calculator **is permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

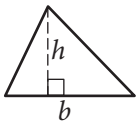
REFERENCE



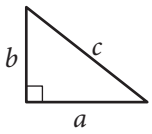
$A = \pi r^2$
$C = 2\pi r$



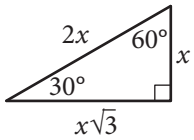
$A = \ell w$

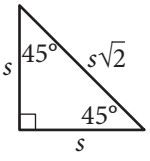


$A = \frac{1}{2}bh$

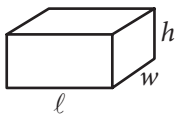


$c^2 = a^2 + b^2$

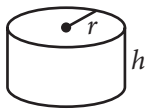




Special Right Triangles

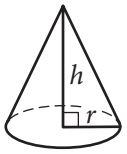


$V = \ell wh$

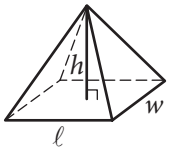


$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$



$V = \frac{1}{3}\pi r^2 h$



$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

1

If $m = 3$, how much greater is $10m$ than $6m$?

A) 3

B) 4

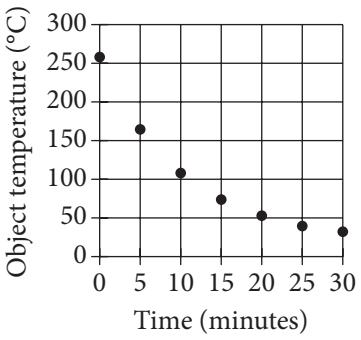
C) 12

D) 30

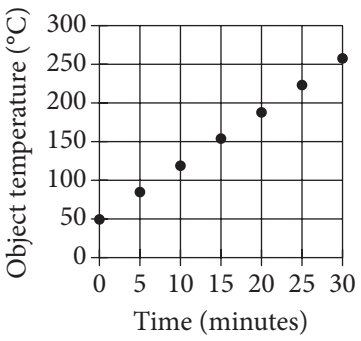
2

The temperature, in degrees Celsius (°C), of a hot object placed in a room is recorded every five minutes. The temperature of the object decreases rapidly at first, then decreases more slowly as the object's temperature approaches the temperature of the room. Which of the following graphs could represent the temperature of this object over time?

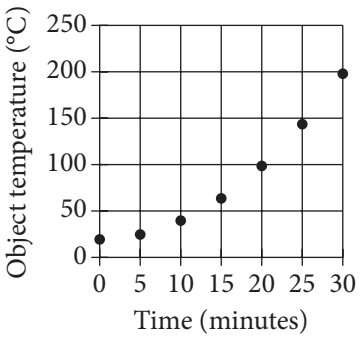
A)



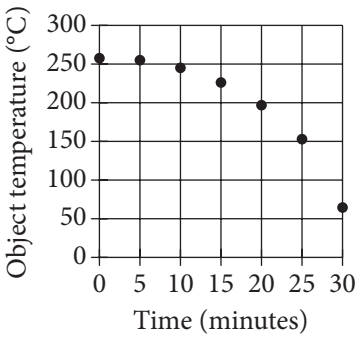
B)



C)



D)



CONTINUE

3

$$x - 2 = \sqrt{x + 10}$$

Which of the following values of x is a solution to the equation above?

A) -1

B) 1

C) 4

D) 6

4

Last year, 800 students attended the career fair at West High School. This year, the number of students who attended the career fair increased by 5%. How many students attended the career fair at West High School this year?

A) 804

B) 805

C) 840

D) 1,200

Questions 5 and 6 refer to the following information.

Nutritional Information for 1-Ounce Servings of Seeds and Nuts

Seed or nut	Calories	Total fat (grams)	Protein (grams)
Pecan	198	20.2	3.0
Pistachio	80	6.5	3.0
Pumpkin	159	13.9	8.5
Sunflower	166	14.6	5.9
Walnut	185	18.5	4.3

The table above shows the calories, grams of fat, and grams of protein in 1-ounce servings of selected seeds and nuts.

5

How many more grams of protein are in one pound of pumpkin seeds than are in one pound of pistachios? (1 pound = 16 ounces)

A) 48

B) 72

C) 88

D) 136

CONTINUE

6

Lionel purchases 1-pound bags of each of the five seeds and nuts shown in the table. Of the following, which best approximates the average (arithmetic mean) number of calories per bag? (1 pound = 16 ounces)

A) 150
B) 250
C) 1,500
D) 2,500

7

A pool initially contains 1,385 cubic feet of water. A pump begins emptying the water at a constant rate of 20 cubic feet per minute. Which of the following functions best approximates the volume $v(t)$, in cubic feet, of water in the pool t minutes after pumping begins, for $0 \le t \le 69$?

A) $v(t) = 1{,}385 - 20t$
B) $v(t) = 1{,}385 - 69t$
C) $v(t) = 1{,}385 + 20t$
D) $v(t) = 1{,}385 + 69t$

8

At a snack bar, each medium drink costs \$1.85 and each large drink costs c more dollars than a medium drink. If 5 medium drinks and 5 large drinks cost a total of \$20.50, what is the value of c ?

A) 0.45
B) 0.40
C) 0.30
D) 0.25

9

Kate bought a bus pass that had an initial value of \$90. For every bus ride Kate takes, \$1.80, the cost of one bus ride, is subtracted from the value of the pass. What percent of the initial value of Kate's bus pass is the cost of one bus ride?

A) 1.8%
B) 2%
C) 5%
D) 98%

CONTINUE

10

To determine whether residents of a community would vote in favor of a ballot proposal to use $100,000 of local taxes for additional playground equipment at a community park, Jennifer surveyed 60 adults visiting the park with their children during one week in June. She found that 45 of those surveyed reported that they would vote in favor of the proposal. Which of the following statements must be true?

A) When the actual vote is taken, 75 percent of the votes will be in favor of the proposal.

B) No prediction should be made about the vote on the proposal because the sample size is too small.

C) The sampling method is flawed and may produce biased results.

D) The sampling method is not flawed and is likely to produce unbiased results.

11

If $x^4 - y^4 = -15$ and $x^2 - y^2 = -3$, what is the value of $x^2 + y^2$?

A) 5

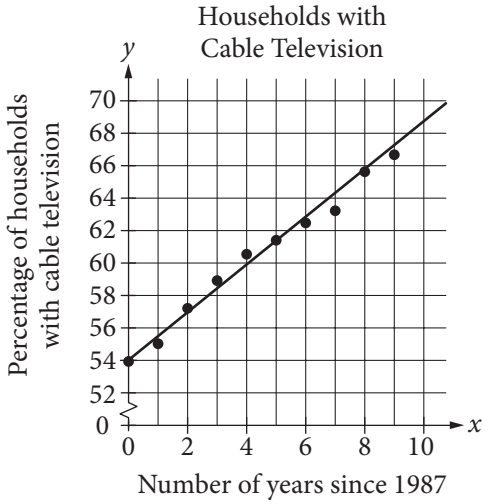
B) 4

C) 2

D) 1

Questions 12 and 13 refer to the following information.

A cable company recorded the percentage of households in the United States that had cable television from 1987 to 1997. In the scatterplot below, x represents the number of years since 1987 and y represents the percentage of households with cable television. The line of best fit for the data is shown.



12

Which of the following is closest to the equation of the line of best fit shown?

A) $y = 54x + \frac{7}{5}$

B) $y = \frac{7}{5}x - 54$

C) $y = \frac{7}{5}x + 54$

D) $y = \frac{7}{5}x$

CONTINUE

13

Which of the following is the best interpretation of the slope of the line of best fit shown for these data?

A) The actual increase in the percentage of households with cable television each year

B) The predicted increase in the percentage of households with cable television each year

C) The actual increase in the number of households with cable television each year

D) The predicted increase in the number of households with cable television each year

14

A greenhouse owner purchases fertilizer in 60-gallon drums. The fertilizer is mixed with water to make several batches of solution. Each batch of solution is made by mixing 3 quarts of fertilizer with water. What is the maximum number of batches of solution that can be made from one 60-gallon drum of fertilizer? (1 gallon = 4 quarts)

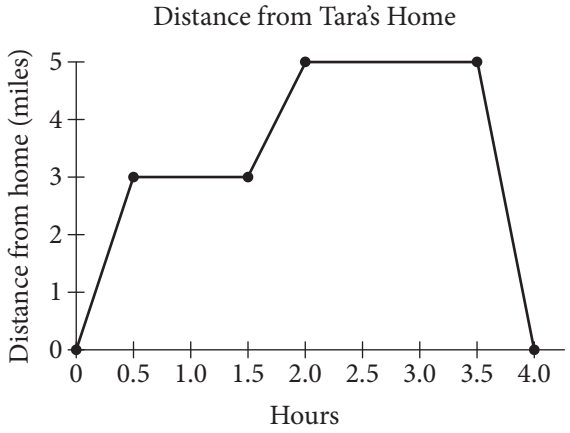
A) 45

B) 60

C) 80

D) 180

15



Tara rode her bicycle along a straight road from her home to a restaurant and ate lunch. She then continued along the same road to a movie theater to see a movie. Finally, she returned home on the same road after the movie. Tara's distance from home during the 4 hours she was out is shown in the graph above. How many total miles did she ride her bicycle?

A) 5

B) 10

C) 16

D) 20

CONTINUE

16

Ryan has 1,500 yards of yarn. He wants to knit at least 2 scarves and at least 3 hats. Each scarf requires 300 yards of yarn, and each hat requires 120 yards of yarn. If s represents the number of scarves and h represents the number of hats, which of the following systems of inequalities represents this situation?

A) $s + h \leq 1{,}500$
$s \geq 2$
$h \geq 3$

B) $2s + 3h \leq 1{,}500$
$s \geq 2$
$h \geq 3$

C) $2s + 3h \leq 1{,}500$
$s \geq 300$
$h \geq 120$

D) $300s + 120h \leq 1{,}500$
$s \geq 2$
$h \geq 3$

17

Michael performed an experiment where he tossed two coins, one dime and one nickel, at the same time and recorded whether each one landed on heads or tails. His results are shown in the table below.

		Nickel	
		Heads	Tails
Dime	Heads	27	26
	Tails	24	23

For what percent of the tosses did the dime Michael tossed land on heads?

A) 47%

B) 49%

C) 51%

D) 53%

18

During a storm, the atmospheric pressure in a certain location fell at a constant rate of 3.4 millibars (mb) per hour over a 24-hour time period. Which of the following is closest to the total drop in atmospheric pressure, in millimeters of mercury (mm Hg), over the course of 5 hours during the 24-hour time period?
(Note: 1,013 mb = 760 mm Hg)

A) 2.6

B) 12.8

C) 17.0

D) 22.7

19

On its opening day, a car dealership had an inventory of 29 cars. During the first 6 months, 18 additional cars were purchased by the dealership each week, and the sales team sold an average of 15 cars per week. During the first six months, which of the following equations best models the car inventory, c, at the dealership t weeks after opening day?

A) $c = -t + 29$

B) $c = t + 29$

C) $c = \frac{3}{2}t + 29$

D) $c = 3t + 29$

CONTINUE

20

If $2\sqrt{2x} = a$, what is $2x$ in terms of a ?

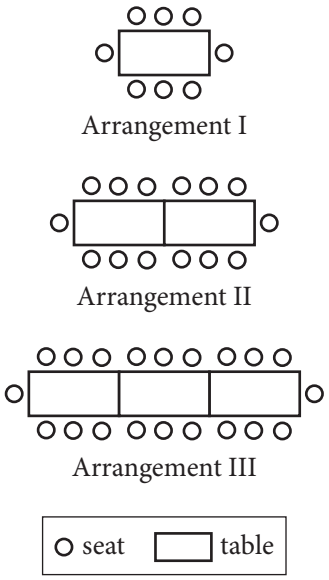
A) $\frac{a}{2}$

B) $\frac{a^2}{4}$

C) $\frac{a^2}{2}$

D) $4a^2$

21



A project coordinator at a banquet hall is given the task of arranging seating for an awards ceremony. The figure above shows the first three possible arrangements of tables and the maximum number of seats in each arrangement. If the number of seats in each successive arrangement is increased by 6 over the preceding arrangement, which of the following represents the maximum number of seats around n tables?

A) $6n$

B) $2(3n + 1)$

C) $6(n + 1)$

D) $6(n + 3)$

CONTINUE

22

The graphs in the xy-plane of the following quadratic equations each have x-intercepts of -2 and 4. The graph of which equation has its vertex farthest from the x-axis?

A) $y = -7(x+2)(x-4)$

B) $y = \frac{1}{10}(x+2)(x-4)$

C) $y = -\frac{1}{2}(x+2)(x-4)$

D) $y = 5(x+2)(x-4)$

23

$$2x + 3y = 5$$
$$4x + cy = 8$$

In the system of equations above, c is a constant. For what value of c will there be no solution (x, y) to the system of equations?

A) 3

B) 4

C) 5

D) 6

24

The polynomial $p^4 + 4p^3 + 3p^2 - 4p - 4$ can be written as $(p^2 - 1)(p + 2)^2$. What are all of the roots of the polynomial?

A) -2 and 1

B) $-2, 1,$ and 4

C) $-2, -1,$ and 1

D) $-1, 1,$ and 2

25

Which of the following describes an exponential relationship between the pair of variables listed?

A) For every 3-millimeter increase m in the thickness of a piece of glass, the intensity of light I traveling through the glass decreases by 20%.

B) Each second s, a car's speed C decreases at a constant rate of 10 meters per second.

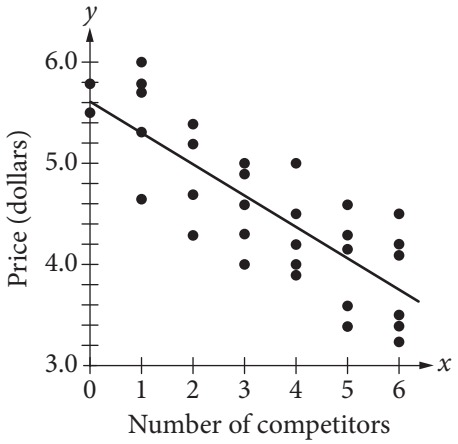
C) With every 33-foot increase in depth d below the surface of water, the pressure p on an object increases by 14.7 pounds per square inch.

D) The depth d of water remaining in a reservoir decreases by 15 inches each minute m as the water is being pumped out at a constant rate.

CONTINUE

Questions 26 and 27 refer to the following information.

A researcher is investigating the relationship between the price of a four-pack of AA batteries at a convenience store and the number of competitors the store has. She defines a store's competitor as another similar store within a 1-mile radius of the store she selects. She selects 32 convenience stores across a state at random, and for each store, she records the number of its competitors and its price for a four-pack of AA batteries. The results are shown, along with the line of best fit, in the scatterplot below.



26

Another convenience store in the same state sells a four-pack of AA batteries for $4.89. If the store's price is more than that predicted by the line of best fit, what is the least number of competitors the store could have?

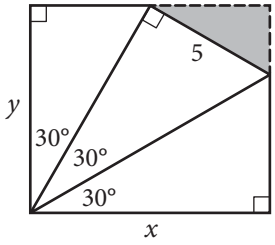
A) 1
B) 2
C) 3
D) 4

27

The line of best fit passes through the point $(18, -0.12)$. Which of the following can be concluded from this?

A) The line of best fit will not model the price well for a store with a large number of competitors.
B) A convenience store with 17 competitors can no longer sell four-packs of AA batteries.
C) A convenience store with 17 competitors cannot decrease its price any further.
D) A convenience store cannot have more than 17 competitors.

28

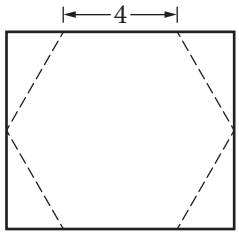


The figure above shows that the shaded triangular region with a hypotenuse of 5 centimeters (cm) has been removed from a rectangular tile with dimensions x cm by y cm. Of the following, which best approximates the area, in square centimeters, of the tile before the piece was removed?

A) 15
B) 43
C) 50
D) 65

CONTINUE

29



Thomas is making a sign in the shape of a regular hexagon with 4-inch sides, which he will cut out from a rectangular sheet of metal, as shown in the figure above. What is the sum of the areas of the four triangles that will be removed from the rectangle?

A) $8\sqrt{3}$

B) $8\sqrt{2}$

C) $4\sqrt{2}$

D) 16

30

Which of the following equations describes a circle with radius 10 that passes through the origin when graphed in the *xy*-plane?

A) $(x-5)^2+(y+5)^2=10$

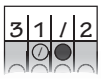
B) $(x-5)^2+(y+5)^2=100$

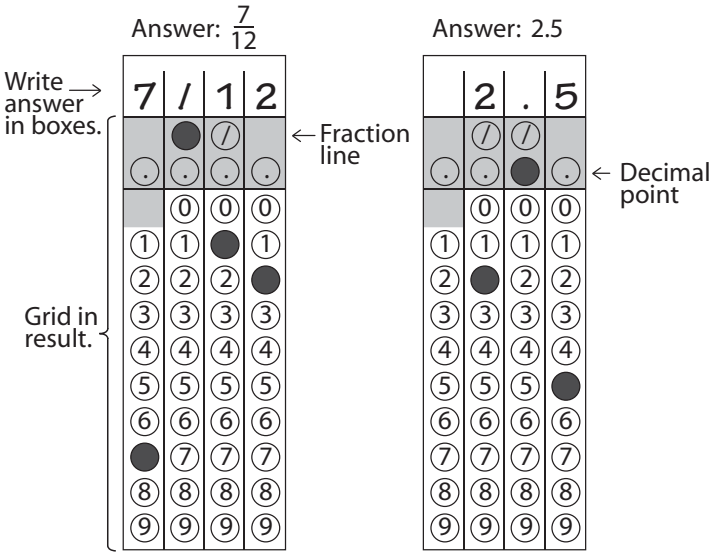
C) $(x-10)^2+(y-10)^2=100$

D) $(x-5\sqrt{2})^2+\left(y+5\sqrt{2}\right)^2=100$

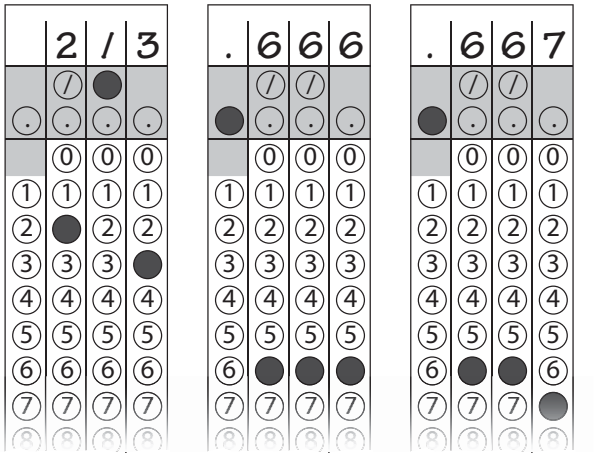
DIRECTIONS

For questions 31-38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

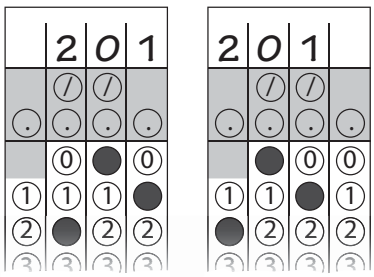
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **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.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

31

In the xy-plane, the graph of $y = (x - 6)^2 + 3$ is the image of the graph of $y = (x + 5)^2 + 3$ after a translation of how many units to the right?

32

When 9 is increased by $3x$, the result is greater than 36. What is the least possible integer value for x ?

33

Century and Region of United States Presidents' Births as of 2014

	Century		
	18th	19th	20th
Northeast	5	6	3
South	9	4	3
Midwest	0	9	2
West	0	0	2

The table above shows the distribution of United States presidents according to the century and the region of the country in which they were born. Based on the information in the table, what fraction of presidents who were not born in the nineteenth century were born in the South?

34

If $x \neq -1$, what is the value of $\left(\frac{1}{x+1}\right)(2 + 2x)$?

CONTINUE

35

Ticket Prices by Row Number

Row number	Ticket price
1–2	$25
3–10	$20
11–20	$15

The price of a ticket to a play is based on the row the seat is in, as shown in the table above. A group wants to purchase 10 tickets for the play.

They will purchase 3 tickets for seats in row 1.

They will purchase 2 tickets for seats in row 3.

They will purchase 2 tickets for seats in row 4.

They will purchase 3 tickets for seats in row 12.

What is the average (arithmetic mean) ticket price, in dollars, for the 10 tickets? (Disregard the $ sign when gridding your answer.)

36

A fashion buyer for a large retail store purchased 315 items directly from the manufacturer for a total of $6000. Some of the items were dresses purchased for $25 each, and the rest were shirts purchased for $10 each. How many more dresses than shirts did the buyer purchase?

Questions 37 and 38 refer to the following information.

An instrument shows the number of revolutions per minute made by each tire of a car. In each revolution, the car travels a distance equal to the circumference of one of its tires. The circumference of each tire is equal to $2\pi r$, where r is the radius of the tire.

37

If the radius of each tire on Maria's car is 0.30 meter, what is the approximate speed of Maria's car, to the nearest kilometer per hour, when the instrument is showing 779 revolutions per minute?
(1 kilometer = 1000 meters)

38

Maria gets new tires for her car. The radius of each of her old tires is 0.30 meter, and the radius of each of her new tires is 11% larger than the radius of one of her old tires. What is the circumference of each new tire, to the nearest tenth of a meter?

STOP

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

CONTINUE

Essay

DIRECTIONS

The essay gives you an opportunity to show how effectively you can read and comprehend a passage and write an essay analyzing the passage. In your essay, you should demonstrate that you have read the passage carefully, present a clear and logical analysis, and use language precisely.

Your essay must be written on the lines provided in your answer booklet; except for the Planning Page of the answer booklet, 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.

REMINDERS

1. **Do not write your essay in this booklet.** Only what you write on the lined pages of your answer booklet will be evaluated.
2. **An off-topic essay will not be evaluated.**

You have 50 minutes to read the passage and write an essay in response to the prompt provided inside this booklet.

As you read the passage below, consider how Todd Davidson uses

- evidence, such as facts or examples, to support claims.
- reasoning to develop ideas and to connect claims and evidence.
- stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.

Adapted from Todd Davidson, "Government Must Preserve National Parks." ©2014 by Capitol Hill Publishing Corp. Originally published in the *Hill*, September 18, 2013.

1 The world has an enduring love affair with America's national parks. Conceived nearly 100 years ago, national parks connect us with our shared heritage and tell our nation's stories. Who among us has stared into the deep blue caldera of Crater Lake, looked up at Half Dome as the special time of winter approaches in the Yosemite Valley, or witnessed the spectacular October fall colors of red maples, oaks and hickories in the forests of the Great Smoky Mountains and not been overcome by the incredible, almost magical grandeur that has been preserved for us and future generations?

2 Collectively, our national parks, monuments, seashores, recreation areas, historic sites, military parks, battlefields and heritage areas represent the very best our nation has to offer. Along with their intrepid and iconic Park Rangers, they embody the true spirit of our country, bringing our nation's history to life.

3 In addition to being stunning and educational, national parks are immensely affordable destinations for American families and are top U.S. tourist attractions. Each year, nearly 300 million people visit one or more of America's 401 national parks, ranging from educational Civil War battlefields to awe-inspiring places like Yellowstone, Acadia National Park and the Grand Canyon. These park visitors are a significant component of the U.S. tourism economy. They stay in nearby hotels, rent cars, dine at local restaurants, buy at retail shops and visit other neighboring attractions, generating more than $30 billion in spending and supporting a quarter-million jobs. National parks are clearly a winning economic scenario for visitors, the economies of nearby towns and communities and ultimately our nation.

4 But now, these prolific economic engines are at risk. Over the last decade, national park budgets have seen a steady decline in funding, and currently suffer from an annual operations shortfall of more than $500 million. The National Park Service budget for construction and maintenance is only half of the amount necessary to maintain park sewer systems, roofs, foundations and road surfaces.

5 The sequester[1] cut another $153 million to national park budgets. Before Congress left for recess, each chamber shared a funding proposal with completely opposite visions for our national parks: one that cuts even deeper, affecting rangers, visitor centers and campgrounds, and another that would get our parks on the road to recovery. Through the across-the-board sequester cuts, parks have fewer rangers to protect and maintain historic sites and greet visitors, minimized visitor center hours, closed campgrounds, restrooms and picnic areas and reduced road and trail maintenance that is essential for park accessibility and enjoyment.

6 There is an irony to all this, because national parks are one of the best investments this country has ever made. In addition to supporting the U.S. travel and tourism industry, which is a cornerstone of the U.S. economy that represents $1.8 trillion in economic output and supports 14 million American jobs, every dollar invested in the National Park Service generates $10 in economic activity. National parks are veritable economic engines critical to supporting the livelihood of businesses and communities across the country.

7 Last year, President Obama called for a national travel and tourism strategy to make the United States the world's top travel and tourism destination, as part of a comprehensive effort to spur job creation. The White House released the strategy just over a year ago—an important step that officially elevates the travel and tourism industry to what it should be: a national priority. It also recognizes the industry for its fundamental contribution to our economy, national security and public diplomacy.

8 Our national parks can play an important role in making the U.S. a top travel destination. As the National Park System approaches its centennial in 2016, there should be a robust national park centennial initiative to help attract international visitors and provide needed support for our national parks to flourish into the next century.

Write an essay in which you explain how Todd Davidson builds an argument to persuade his audience that the US government must continue to fund national parks. In your essay, analyze how Davidson uses one or more of the features listed in the box above (or features of your own choice) to strengthen the logic and persuasiveness of his argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Davidson's claims, but rather explain how Davidson builds an argument to persuade his audience.

[1] A cut in spending by the federal government

As you read the passage below, consider how Patrick T. Harker uses

- evidence, such as facts or examples, to support claims.
- reasoning to develop ideas and to connect claims and evidence.
- stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.

Adapted from Patrick T. Harker, "Student Athletes Shouldn't Unionize."

1 Last week's ruling by a regional director of the National Labor Relations Board that players on Northwestern University's football team were school employees, and thus eligible to unionize, has been celebrated by those who believe that it will benefit student athletes everywhere.

2 It won't. Player unions would be a disaster for universities, for college sports fans and, most important, for student athletes themselves. The prospect of college football players bargaining to exchange scholarships for salaries is still remote, but if it comes about, even the most valuable athletes would be worse off.

3 Turning student athletes into salaried employees would endanger the existence of varsity sports on many college campuses. Only about 10 percent of Division I college sports programs turn a profit, and most of them, like our $28 million athletic program at the University of Delaware, lose money. Changing scholarship dollars into salary would almost certainly increase the amount schools have to spend on sports, since earnings are taxed and scholarships are not. In order just to match the value of a scholarship, the university would have to spend more.

4 We are among the many schools that have already had to trim varsity sports in recent years. Should costs increase, we and many other schools would face pressure to cut back further.

5 Without question, some big schools have lost their way. On some campuses the pursuit of athletic dominance has eroded the ideal of the student athlete. Players at these schools have every right to complain, particularly when the demands of competition effectively prevent them from being students. But the answer is not to organize and essentially turn pro. This would only further lessen the priority on learning. If scholarship athletes already find it hard to balance schoolwork with team commitments, under arrangements that obligate educational opportunity, think how much harder it would be if they were being paid to play.

6 The answer for young athletes who want to be paid to play is not to target universities, which have a different mission, but professional sports leagues like the National Basketball Association and the National Football League, which still bar high school athletes from turning pro. If players are good enough to earn a living at that age, I say, let them. Very few, however, are that good. At the college level, even the highest-ranked teams field relatively few players who will ever play a day of professional sports.

7 Strong athletic departments do two things well. They afford young athletes the chance to reach their full potential, and they prepare them for life when the cheering stops. For the vast majority of student athletes, that life begins at graduation. For the exceptional ones who make it to the pros, post-sport life begins soon enough. The average length of a pro football career is only about three years.

8 Valuing education doesn't have to compromise an athlete's potential. Here at the University of Delaware, Elena Delle Donne played women's basketball from 2009 to 2013, earning top collegiate honors and helping the team become one of the best in the nation. She was a top pick in the Women's National Basketball Association draft and was later named rookie of the year. In college, she maintained a 3.6 G.P.A., earning a degree in human services.

9 My own experience as a student athlete was more typical. I was a good student in high school, and a good football player. My options at graduation were greatly multiplied by my success as an athlete. I accepted financial help to play at the University of Pennsylvania, where I majored in engineering. An injury in my junior year brought my football career to an end. Then I discovered my passion for research, went on to earn a Ph.D. in engineering and embarked on a path that has taken me places I never imagined when playing on a defensive line.

10 This is the reality for most college athletes, even in the five major conferences. If the football players at Northwestern think they will do better for themselves by collecting a salary in college, they're wrong.

11 My advice, even to those talented enough to turn pro straight out of high school, is the same: Play ball but be smart. Earn a degree.

Write an essay in which you explain how Patrick T. Harker builds an argument to persuade his audience that college athletes should not be allowed to form unions. In your essay, analyze how Harker uses one or more of the features listed in the box above (or features of your own choice) to strengthen the logic and persuasiveness of his argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Harker's claims, but rather explain how Harker builds an argument to persuade his audience.

KJMI	NCMI	NLMI	NXMI	ZKMI
KWMI	NGMI	NNMI	ZBMI	ZLMI
KXMI	NJMI	NRMI	ZCMI	ZNMI
NBMI	NKMI	NWMI	ZGMI	ZRMI

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April 2017

The SAT®

Question-and-Answer Service Student Guide

Ideas for using the QAS report

The answer key for the test you took

Instructions for scoring your test

CollegeBoard

About the College Board

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

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Table of Contents

Introduction

Congratulations on taking the SAT! Your Question-and-Answer Service (QAS) for the April 2017 SAT includes three parts: this guide, which will help you understand your scores; a copy of the test you took; and a customized QAS report that lists these details about each question:

- Answer you gave
- Best or correct answer
- Question type
- Difficulty level

USING YOUR QAS REPORT

To make the best use of your personalized QAS report, consider these steps:

- With the report in hand, read each question in your test booklet, then check your results. Look at questions you answered incorrectly to see whether you might have misread the question or mismarked the answer.
- Print your online score report at **studentscores.collegeboard.org** to keep track of how you did on the different types of questions. This can help you understand your academic strengths and identify areas for improvement.
- If you think you detect errors in how you recorded your answers—for example, a group of questions that you recall answering differently than what you see on the report—you may want to consider ordering a more rigorous form of score verification. See **sat.org/verify-scores** for more details.
- If you took the optional SAT Essay, view a copy of your essay online at **collegeboard.org/viewessay**. Take a look at the Essay scoring information on pages 14–16 of this guide to help you interpret your scores.

SCORING YOUR TEST

Use the scoring information and score conversion tables on pages 4–13 to verify the score on your test. The scoring worksheets and score conversion tables are specific to the test you took. Don't try to score any other tests using them.

LEARNING FROM YOUR SAT EXPERIENCE

Now that you're familiar with the test, you should have a better sense of the kinds of questions you'll see on the SAT. You're also likely to be more comfortable with the test-taking process, including the time limits. If you're thinking of taking the test again, you should know that on average, students who take the SAT a second time see an increase in their scores. In addition, your test results are a powerful tool for getting personalized instruction to improve your scores. At **satpractice.org** you can access Official SAT Practice on Khan Academy, where you can use your actual SAT results to receive practice recommendations tailored to help you work on the areas that you need to focus on. Visit **satpractice.org** to learn more.

Scoring Your SAT

SCORES OVERVIEW

The new SAT provides more information about your learning by reporting more scores than ever before. Each of the SAT Suite of Assessments (SAT, PSAT/NMSQT®, PSAT™ 10, and PSAT™ 8/9) reports test scores and cross-test scores on a common scale. Additionally, subscores provide more diagnostic information. For more details about scores, visit **sat.org/scores**.

HOW TO CALCULATE YOUR TEST SCORES

Get Set Up

1. You'll need the customized QAS report with your answers. You'll also need the answer key (pages 4–5) and conversion tables (pages 11–13) provided in this section.
2. Using the answer key, count up your total correct answers for each section. You may want to write the number of correct answers for each section at the bottom of that section in the answer key.
3. Using your marked-up answer key and the conversion tables, follow the directions on the next few pages to get all of your scores.

GET SECTION AND TOTAL SCORES

Your total score on the SAT is the sum of your Evidence-Based Reading and Writing section score and your Math section score. To get your total score, you will convert your raw score for each section—the number of questions you got right in that section—into the scaled score for that section, then calculate the total score.

Calculating Your Evidence-Based Reading and Writing Section Score

Calculate your SAT Evidence-Based Reading and Writing Section score (it's on a scale of 200–800) by first determining your Reading Test score and your Writing and Language Test score. Here's how:

1. Use the Answer Key to determine your raw scores (the number of correct answers).
2. Go to Raw Score Conversion Table 1: Section and Test Scores on page 11. Look in the "Raw Score" column for your raw score, and match it to the number in the "Reading Test Score" column.
3. Do the same with Section 2 to determine your Writing and Language Test score.
4. Add your Reading Test score to your Writing and Language Test score.
5. Multiply that number by 10. This is your Evidence-Based Reading and Writing Section score.

Calculating Your Math Section Score

Calculate your SAT Math section score (it's on a scale of 200–800), as follows:

1. Count the number of correct answers you got on the Math Test – No Calculator and the Math Test – Calculator.
2. Add the number of correct answers you got on each portion.
3. As you did with your Reading and Writing and Language Test scores, go to the Raw Score Conversion Table 1: Section and Test Scores to turn your raw score into your Math section score. Find your raw score in the "Raw Score" column and match it to the number in the same row in the "Math Test Score" column.

Calculating Your Total Score

Add your Evidence-Based Reading and Writing section score to your Math section score. The result is your total score on the SAT, on a scale of 400–1600.

Answer Key – Determine Raw Scores

Reading Test Answers

Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer
1	C	14	B	27	D	40	A
2	A	15	A	28	A	41	B
3	C	16	A	29	C	42	C
4	B	17	C	30	C	43	A
5	B	18	D	31	B	44	B
6	A	19	C	32	A	45	D
7	D	20	B	33	A	46	C
8	C	21	C	34	B	47	D
9	C	22	C	35	B	48	B
10	A	23	D	36	D	49	B
11	D	24	A	37	D	50	C
12	D	25	D	38	C	51	A
13	B	26	C	39	D	52	C

Reading Test Raw Score
(Number of Correct Answers)

Writing and Language Test Answers

Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer
1	A	12	A	23	A	34	C
2	C	13	B	24	B	35	D
3	B	14	D	25	C	36	B
4	A	15	C	26	D	37	C
5	B	16	C	27	B	38	C
6	A	17	A	28	C	39	B
7	B	18	B	29	B	40	D
8	D	19	A	30	B	41	A
9	C	20	A	31	D	42	D
10	B	21	C	32	C	43	C
11	D	22	C	33	A	44	D

Writing and Language Test Raw Score
(Number of Correct Answers)

"U" indicates a question that did not perform as expected and has been removed from scoring.

Answer Key – Determine Raw Scores (continued)

Math Test – No Calculator Answers

Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer
1	B	5	B	9	C	13	B
2	B	6	D	10	A	14	B
3	A	7	C	11	D	15	C
4	C	8	A	12	D		

Question #	Correct Answer
16	9
17	6,7,10
18	14
19	210
20	2,7

Math Test – No Calculator Raw Score
(Number of Correct Answers)

Math Test – Calculator Answers

Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer
1	C	9	B	17	D	25	A
2	A	10	C	18	B	26	C
3	D	11	A	19	D	27	A
4	C	12	C	20	B	28	D
5	C	13	B	21	B	29	A
6	D	14	C	22	A	30	D
7	A	15	B	23	D		
8	B	16	D	24	C		

Question #	Correct Answer
31	11
32	10
33	1/2,.5
34	2
35	20
36	65
37	88
38	2.1,21/10

Math Test – Calculator Raw Score
(Number of Correct Answers)

"U" indicates a question that did not perform as expected and has been removed from scoring.

GET CROSS-TEST SCORES

The new SAT also reports two cross-test scores: Analysis in History/Social Studies and Analysis in Science. These scores are based on questions in the Reading, Writing and Language, and Math Tests that ask you to think analytically about texts and questions in these subject areas.

Cross-test scores are reported on a scale of 10–40.

Calculating Your Cross-Test Scores

You can calculate your cross-test scores as follows:

1. Use the tables on the next page to calculate your cross-test scores:
2. Find the questions in each section that count toward each cross-test score. These are shown with a "Y" next to the question number in the tables. Refer to your QAS report to see which of those questions you answered correctly on the test, and then check the box for each correct answer.
3. Count the number of correct answers for each cross-test area and record that as your raw score for that area.
4. Use the conversion table on page 12 to determine your scaled score (10–40) for each area.

Cross-Test Scores Tables – Determine Cross-Test Raw Scores

Y = Counts toward Cross-Test score. On your QAS report, look up every question marked "Y" below to see if you answered it correctly. If so, check off the box for that question below.

Analysis in History/Social Studies (HSS)

Reading		Writing and Language		Math Test - Calculator		Math Test - No Calculator	
1		1		1		1	Y ☐
2		2	Y ☐	2		2	
3		3	Y ☐	3		3	
4		4		4	Y ☐	4	
5		5	Y ☐	5		5	
6		6	Y ☐	6		6	
7		7		7		7	
8		8	Y ☐	8		8	
9		9		9		9	
10		10	Y ☐	10	Y ☐	10	
11	Y ☐	11		11		11	
12	Y ☐	12		12	Y ☐	12	
13	Y ☐	13		13	Y ☐	13	
14	Y ☐	14		14		14	
15	Y ☐	15		15		15	
16	Y ☐	16		16		16	
17	Y ☐	17		17		17	
18	Y ☐	18		18		18	
19	Y ☐	19		19		19	
20	Y ☐	20		20		20	
21	Y ☐	21		21			
22		22		22			
23		23		23			
24		24		24			
25		25		25			
26		26		26	Y ☐		
27		27		27	Y ☐		
28		28		28			
29		29		29			
30		30		30			
31		31		31			
32		32		32			
33	Y ☐	33		33	Y ☐		
34	Y ☐	34		34			
35	Y ☐	35		35			
36	Y ☐	36		36			
37	Y ☐	37		37			
38	Y ☐	38		38			
39	Y ☐	39					
40	Y ☐	40					
41	Y ☐	41					
42	Y ☐	42					
43		43					
44		44					
45							
46							
47							
48							
49							
50							
51							
52							

HSS Raw Score

Analysis in Science (SCI)

Reading		Writing and Language		Math Test - Calculator		Math Test - No Calculator	
1		1		1		1	
2		2		2	Y ☐	2	
3		3		3		3	
4		4		4		4	
5		5		5	Y ☐	5	
6		6		6	Y ☐	6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
11		11		11		11	
12		12		12		12	
13		13	Y ☐	13		13	
14		14	Y ☐	14		14	Y ☐
15		15		15		15	
16		16	Y ☐	16		16	
17		17	Y ☐	17		17	
18		18		18	Y ☐	18	Y ☐
19		19		19		19	
20		20	Y ☐	20		20	
21		21	Y ☐	21			
22	Y ☐	22		22			
23	Y ☐	23		23			
24	Y ☐	24		24			
25	Y ☐	25		25	Y ☐		
26	Y ☐	26		26			
27	Y ☐	27		27			
28	Y ☐	28		28			
29	Y ☐	29		29			
30	Y ☐	30		30			
31	Y ☐	31		31			
32	Y ☐	32		32			
33		33		33			
34		34		34			
35		35		35			
36		36		36			
37		37		37	Y ☐		
38		38		38			
39		39					
40		40					
41		41					
42		42					
43	Y ☐	43					
44	Y ☐	44					
45	Y ☐						
46	Y ☐						
47	Y ☐						
48	Y ☐						
49	Y ☐						
50	Y ☐						
51	Y ☐						
52	Y ☐						

SCI Raw Score

GET SUBSCORES

Subscores provide more detailed information about your strengths in specific areas within literacy and math.

Subscores are reported on a scale of 1–15.

- The **Command of Evidence** subscore is based on questions from both the Reading Test and the Writing and Language Test that ask you to interpret and use evidence found in a wide range of passages and informational graphics, such as graphs, tables, and charts.
- The **Words in Context** subscore is based on questions from both the Reading Test and the Writing and Language Test that address the meaning in context of words/phrases and rhetorical word choice.
- The **Expression of Ideas** subscore is based on questions from the Writing and Language Test that focus on topic development, organization, and rhetorically effective use of language.
- The **Standard English Conventions** subscore is based on questions from the Writing and Language Test that focus on sentence structure, usage, and punctuation.
- The **Heart of Algebra** subscore is based on questions from the Math Test that focus on linear equations and inequalities.
- The **Problem Solving and Data Analysis** subscore is based on questions from the Math Test that focus on quantitative reasoning, the interpretation and synthesis of data, and solving problems in rich and varied contexts.
- The **Passport to Advanced Math** subscore is based on questions from the Math Test that focus on topics central to the ability of students to progress to more advanced mathematics, such as understanding the structure of expressions, reasoning with more complex equations, and interpreting and building functions.

Calculating Your Subscores

You can use the subscore tables beginning on the next page to calculate your subscores as follows:

1. Find the questions that count toward each subscore. These are shown with a "Y" next to the question number in the tables. Refer to your QAS report to see which of those questions you answered correctly on the test, and then check the box for each correct answer.
2. Count the number of correct answers for each area and record that as your raw score for that area.
3. Finally, use the conversion table on page 13 to determine your scaled score (1–15) for each area.

Subscores Tables – Determine Subscore Raw Scores

Y = Counts toward subscore. On your QAS report, look up every question marked "Y" to see if you answered it correctly. If so, check off the box for that question.

Command of Evidence (COE)

	Reading		Writing and Language	
1			1	
2			2	Y ☐
3			3	Y ☐
4			4	
5	Y ☐		5	
6			6	
7			7	
8			8	
9			9	
10			10	
11	Y ☐		11	
12			12	
13			13	
14			14	
15			15	
16			16	Y ☐
17			17	
18			18	
19	Y ☐		19	
20			20	Y ☐
21			21	
22			22	
23			23	
24			24	
25			25	
26	Y ☐		26	
27			27	
28			28	Y ☐
29			29	
30			30	
31	Y ☐		31	Y ☐
32	Y ☐		32	
33			33	
34			34	
35			35	
36			36	
37			37	
38	Y ☐		38	
39			39	
40			40	Y ☐
41			41	Y ☐
42	Y ☐		42	
43			43	
44			44	
45				
46	Y ☐			
47				
48				
49				
50	Y ☐			
51				
52				

COE Raw Score

Expression of Ideas (EOI)

	Reading		Writing and Language	
1			1	
2			2	Y ☐
3			3	Y ☐
4			4	
5			5	Y ☐
6			6	Y ☐
7			7	
8			8	Y ☐
9			9	
10			10	Y ☐
11			11	
12			12	
13			13	Y ☐
14			14	Y ☐
15			15	
16			16	Y ☐
17			17	Y ☐
18			18	
19			19	
20			20	Y ☐
21			21	Y ☐
22			22	
23			23	
24			24	
25			25	Y ☐
26			26	
27			27	
28			28	Y ☐
29			29	
30			30	Y ☐
31			31	Y ☐
32			32	Y ☐
33			33	Y ☐
34			34	Y ☐
35			35	
36			36	
37			37	Y ☐
38			38	
39			39	Y ☐
40			40	Y ☐
41			41	Y ☐
42			42	Y ☐
43			43	
44			44	
45				
46				
47				
48				
49				
50				
51				
52				

WIC Raw Score

Words in Context (WIC)

	Reading		Writing and Language	
1			1	
2			2	
3	Y ☐		3	
4			4	
5			5	Y ☐
6			6	Y ☐
7			7	
8			8	
9			9	
10	Y ☐		10	
11			11	
12			12	
13			13	Y ☐
14			14	
15	Y ☐		15	
16	Y ☐		16	
17			17	Y ☐
18			18	
19			19	
20			20	
21			21	
22			22	
23			23	
24			24	
25	Y ☐		25	Y ☐
26			26	
27			27	
28	Y ☐		28	
29			29	
30			30	
31			31	
32			32	Y ☐
33			33	
34	Y ☐		34	
35			35	
36	Y ☐		36	
37			37	Y ☐
38			38	
39			39	
40			40	
41			41	
42			42	Y ☐
43			43	
44			44	
45				
46				
47				
48	Y ☐			
49				
50				
51	Y ☐			
52				

EOI Raw Score

Standard English Conventions (SEC)

	Reading		Writing and Language	
1			1	Y ☐
2			2	
3			3	
4			4	Y ☐
5			5	
6			6	
7			7	Y ☐
8			8	
9			9	Y ☐
10			10	
11			11	Y ☐
12			12	Y ☐
13			13	
14			14	
15			15	Y ☐
16			16	
17			17	
18			18	Y ☐
19			19	Y ☐
20			20	
21			21	
22			22	Y ☐
23			23	Y ☐
24			24	Y ☐
25			25	
26			26	Y ☐
27			27	Y ☐
28			28	
29			29	Y ☐
30			30	
31			31	
32			32	
33			33	
34			34	
35			35	Y ☐
36			36	Y ☐
37			37	
38			38	Y ☐
39			39	
40			40	
41			41	
42			42	
43			43	Y ☐
44			44	Y ☐
45				
46				
47				
48				
49				
50				
51				
52				

SEC Raw Score

Subscores Tables – Determine Subscore Raw Scores (continued)

Y = Counts toward Subscore. On your QAS report, look up every question marked "Y" to see if you answered it correctly. If so, check off the box for that question.

Heart of Algebra (HOA)

Math Test – Calculator			Math Test – No Calculator		
1	Y	☐	1	Y	☐
2			2	Y	☐
3			3		
4			4		
5			5		
6			6		
7	Y	☐	7	Y	☐
8	Y	☐	8	Y	☐
9			9		
10			10		
11			11		
12	Y	☐	12		
13	Y	☐	13	Y	☐
14			14	Y	☐
15			15		
16	Y	☐	16	Y	☐
17			17		
18			18	Y	☐
19	Y	☐	19		
20			20		
21	Y	☐			
22					
23	Y	☐			
24					
25					
26					
27					
28					
29					
30					
31					
32	Y	☐			
33					
34					
35					
36	Y	☐			
37					
38					

Problem Solving and Data Analysis (PSD)

Math Test – Calculator			Math Test – No Calculator	
1			1	
2	Y	☐	2	
3			3	
4	Y	☐	4	
5	Y	☐	5	
6	Y	☐	6	
7			7	
8			8	
9	Y	☐	9	
10	Y	☐	10	
11			11	
12			12	
13			13	
14	Y	☐	14	
15	Y	☐	15	
16			16	
17	Y	☐	17	
18	Y	☐	18	
19			19	
20			20	
21				
22				
23				
24				
25	Y	☐		
26	Y	☐		
27	Y	☐		
28				
29				
30				
31				
32				
33	Y	☐		
34				
35	Y	☐		
36				
37	Y	☐		
38	Y	☐		

Passport to Advanced Math (PAM)

Math Test – Calculator			Math Test – No Calculator		
1			1		
2			2		
3	Y	☐	3	Y	☐
4			4	Y	☐
5			5		
6			6	Y	☐
7			7		
8			8		
9			9	Y	☐
10			10	Y	☐
11	Y	☐	11	Y	☐
12			12	Y	☐
13			13		
14			14		
15			15		
16			16		
17			17	Y	☐
18			18		
19			19		
20	Y	☐	20	Y	☐
21					
22	Y	☐			
23					
24	Y	☐			
25					
26					
27					
28					
29					
30					
31	Y	☐			
32					
33					
34	Y	☐			
35					
36					
37					
38					

HOA Raw Score	PSD Raw Score	PAM Raw Score

CONVERSION TABLES

Raw Score Conversion – Section and Test Scores

Section and Test Scores

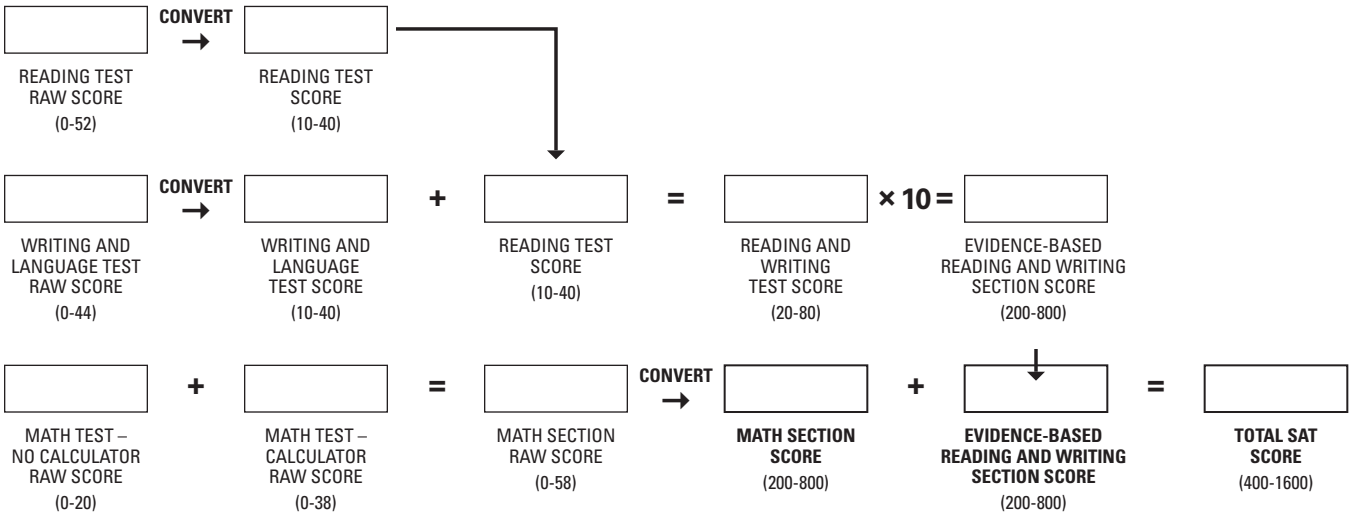
RAW SCORE CONVERSION TABLE 1

Raw Score (# of correct answers)	Math Section Score	Reading Test Score	Writing and Language Test Score
0	200	10	10
1	210	10	10
2	220	10	10
3	230	10	11
4	250	11	12
5	260	12	13
6	280	13	13
7	290	14	14
8	310	15	15
9	320	15	16
10	340	16	17
11	350	17	18
12	360	17	18
13	380	18	19
14	390	19	20
15	400	19	20
16	420	20	21
17	430	20	22
18	440	21	22
19	450	22	23
20	460	22	23
21	470	23	24
22	480	24	25
23	490	24	25
24	500	25	26
25	510	25	26
26	520	26	27
27	520	27	27
28	530	27	28
29	540	28	29

Raw Score (# of correct answers)	Math Section Score	Reading Test Score	Writing and Language Test Score
30	540	28	29
31	550	29	30
32	560	29	30
33	570	30	31
34	580	30	31
35	590	31	32
36	590	31	33
37	600	32	33
38	610	32	34
39	620	33	35
40	630	33	35
41	640	34	36
42	650	34	38
43	650	35	39
44	660	35	40
45	670	36	
46	680	36	
47	690	37	
48	700	37	
49	710	38	
50	720	39	
51	730	39	
52	740	40	
53	750		
54	770		
55	780		
56	790		
57	800		
58	800		

Section and Test Scores

CONVERSION EQUATION 1



Raw Score Conversion – Cross-Test Scores

Cross-Test Scores

RAW SCORE CONVERSION | TABLE 2

Raw Score (# of correct answers)	Analysis in History/Social Studies Cross-Test Score	Analysis in Science Cross-Test Score	Raw Score (# of correct answers)	Analysis in History/Social Studies Cross-Test Score	Analysis in Science Cross-Test Score
0	10	10	18	27	27
1	10	11	19	28	28
2	10	12	20	28	29
3	11	14	21	29	30
4	13	15	22	29	30
5	14	16	23	30	31
6	15	17	24	31	32
7	16	18	25	31	32
8	17	19	26	32	33
9	18	20	27	33	34
10	19	21	28	33	34
11	21	22	29	34	35
12	22	22	30	35	36
13	23	23	31	35	37
14	23	24	32	36	38
15	24	25	33	37	39
16	25	26	34	38	40
17	26	27	35	40	40

Cross-Test Scores

CONVERSION EQUATION 2

Raw Score Conversion – Subscores

Subscores

RAW SCORE CONVERSION TABLE 3

Raw Score (# of correct answers)	Expression of Ideas	Standard English Conventions	Heart of Algebra	Problem Solving and Data Analysis	Passport to Advanced Math	Words in Context	Command of Evidence
0	1	1	1	1	1	1	1
1	1	1	2	1	3	1	3
2	2	1	3	1	4	1	4
3	3	2	4	3	5	2	5
4	3	3	5	4	6	3	5
5	4	4	5	5	7	4	6
6	5	4	6	7	8	5	7
7	5	5	7	8	9	6	7
8	6	5	8	8	9	7	8
9	7	6	8	9	10	8	9
10	7	7	9	10	10	8	9
11	8	7	9	10	11	9	10
12	8	8	10	11	12	10	11
13	9	9	10	12	13	11	11
14	9	9	11	13	14	11	12
15	10	10	11	14	14	12	13
16	10	11	12	14	15	13	13
17	11	12	13	15		14	14
18	11	13	14			15	15
19	12	14	15				
20	13	15					
21	13						
22	14						
23	15						
24	15						

Subscores

CONVERSION EQUATION 3

COMMAND OF EVIDENCE RAW SCORE (0-18) CONVERT → **COMMAND OF EVIDENCE SUBSCORE** (1-15)

WORDS IN CONTEXT RAW SCORE (0-18) CONVERT → **WORDS IN CONTEXT SUBSCORE** (1-15)

EXPRESSION OF IDEAS RAW SCORE (0-24) CONVERT → **EXPRESSION OF IDEAS SUBSCORE** (1-15)

STANDARD ENGLISH CONVENTIONS RAW SCORE (0-20) CONVERT → **STANDARD ENGLISH CONVENTIONS SUBSCORE** (1-15)

HEART OF ALGEBRA RAW SCORE (0-19) CONVERT → **HEART OF ALGEBRA SUBSCORE** (1-15)

PROBLEM SOLVING AND DATA ANALYSIS RAW SCORE (0-17) CONVERT → **PROBLEM SOLVING AND DATA ANALYSIS SUBSCORE** (1-15)

PASSPORT TO ADVANCED MATH RAW SCORE (0-16) CONVERT → **PASSPORT TO ADVANCED MATH SUBSCORE** (1-15)

THE SAT ESSAY

The SAT Essay assesses reading, analysis, and writing skills. It's optional and given at the end of the SAT. Essays are evaluated for demonstrated comprehension of a source text, quality of analysis, and quality of writing. See the Essay Scoring Guide on pages 15 and 16 for more information.

- Total questions: 1 prompt, with points to consider and directions
- 1 passage
- Time allotted: 50 minutes to read and analyze the passage and to develop a written response

On the SAT Essay, you're asked to demonstrate college- and career-readiness proficiency in **reading**, **analysis**, and **writing** through comprehending a high-quality source text, producing a cogent and clear written analysis of that text, and supporting that analysis with critical reasoning and evidence drawn from the source. The essay prompt doesn't ask you to take a stand on the author's point of view but instead to analyze how the author builds a persuasive argument.

Your essay will receive three scores, each on a scale of 2–8:

1. **Reading:** Demonstrated comprehension of the passage, its main ideas, and its important details.
2. **Analysis:** Demonstrated understanding of the analytical task, and effective analysis of the author's use of evidence, reasoning, and/or stylistic or persuasive elements (and/or features of your own choice).
3. **Writing:** Communication of information and ideas in a structured, cohesive manner, using precise language and a variety of sentence structures and showing a command of the conventions of standard written English.

Your Essay scores aren't combined with each other or with any other scores on the SAT. (They don't, for instance, affect the Evidence-Based Reading and Writing section score or the total test score.)

ESSAY SCORING GUIDE

Score	Reading	Analysis	Writing
4	**ADVANCED:** The response demonstrates thorough comprehension of the source text. The response shows an understanding of the text's central idea(s) and of most important details and how they interrelate, demonstrating a comprehensive understanding of the text. The response is free of errors of fact or interpretation with regard to the text. The response makes skillful use of textual evidence (quotations, paraphrases, or both), demonstrating a complete understanding of the source text.	**ADVANCED:** The response offers an insightful analysis of the source text and demonstrates a sophisticated understanding of the analytical task. The response offers a thorough, well-considered evaluation of the author's use of evidence, reasoning, and/or stylistic and persuasive elements, and/or feature(s) of the student's own choosing. The response contains relevant, sufficient, and strategically chosen support for claim(s) or point(s) made. The response focuses consistently on those features of the text that are most relevant to addressing the task.	**ADVANCED:** The response is cohesive and demonstrates a highly effective use and command of language. The response includes a precise central claim. The response includes a skillful introduction and conclusion. The response demonstrates a deliberate and highly effective progression of ideas both within paragraphs and throughout the essay. The response has a wide variety in sentence structures. The response demonstrates a consistent use of precise word choice. The response maintains a formal style and objective tone. The response shows a strong command of the conventions of standard written English and is free or virtually free of errors.
3	**PROFICIENT:** The response demonstrates effective comprehension of the source text. The response shows an understanding of the text's central idea(s) and important details. The response is free of substantive errors of fact and interpretation with regard to the text. The response makes appropriate use of textual evidence (quotations, paraphrases, or both), demonstrating an understanding of the source text.	**PROFICIENT:** The response offers an effective analysis of the source text and demonstrates an understanding of the analytical task. The response competently evaluates the author's use of evidence, reasoning, and/or stylistic and persuasive elements, and/or feature(s) of the student's own choosing. The response contains relevant and sufficient support for claim(s) or point(s) made. The response focuses primarily on those features of the text that are most relevant to addressing the task.	**PROFICIENT:** The response is mostly cohesive and demonstrates effective use and control of language. The response includes a central claim or implicit controlling idea. The response includes an effective introduction and conclusion. The response demonstrates a clear progression of ideas both within paragraphs and throughout the essay. The response has variety in sentence structures. The response demonstrates some precise word choice. The response maintains a formal style and objective tone. The response shows a good control of the conventions of standard written English and is free of significant errors that detract from the quality of writing.

Score	Reading	Analysis	Writing
2	**PARTIAL:** The response demonstrates some comprehension of the source text. The response shows an understanding of the text's central idea(s) but not of important details. The response may contain errors of fact and/or interpretation with regard to the text. The response makes limited and/or haphazard use of textual evidence (quotations, paraphrases, or both), demonstrating some understanding of the source text.	**PARTIAL:** The response offers limited analysis of the source text and demonstrates only partial understanding of the analytical task. The response identifies and attempts to describe the author's use of evidence, reasoning, and/or stylistic and persuasive elements, and/or feature(s) of the student's own choosing, but merely asserts rather than explains their importance. Or one or more aspects of the response's analysis are unwarranted based on the text. The response contains little or no support for claim(s) or point(s) made. The response may lack a clear focus on those features of the text that are most relevant to addressing the task.	**PARTIAL:** The response demonstrates little or no cohesion and limited skill in the use and control of language. The response may lack a clear central claim or controlling idea or may deviate from the claim or idea over the course of the response. The response may include an ineffective introduction and/or conclusion. The response may demonstrate some progression of ideas within paragraphs but not throughout the response. The response has limited variety in sentence structures; sentence structures may be repetitive. The response demonstrates general or vague word choice; word choice may be repetitive. The response may deviate noticeably from a formal style and objective tone. The response shows a limited control of the conventions of standard written English and contains errors that detract from the quality of writing and may impede understanding.
1	**INADEQUATE:** The response demonstrates little or no comprehension of the source text. The response fails to show an understanding of the text's central idea(s), and may include only details without reference to central idea(s). The response may contain numerous errors of fact and/or interpretation with regard to the text. The response makes little or no use of textual evidence (quotations, paraphrases, or both), demonstrating little or no understanding of the source text.	**INADEQUATE:** The response offers little or no analysis or ineffective analysis of the source text and demonstrates little or no understanding of the analytic task. The response identifies without explanation some aspects of the author's use of evidence, reasoning, and/or stylistic and persuasive elements, and/or feature(s) of the student's choosing. Or numerous aspects of the response's analysis are unwarranted based on the text, The response contains little or no support for claim(s) or point(s) made, or support is largely irrelevant. The response may not focus on features of the text that are relevant to addressing the task. Or the response offers no discernible analysis (e.g., is largely or exclusively summary).	**INADEQUATE:** The response demonstrates little or no cohesion and inadequate skill in the use and control of language. The response may lack a clear central claim or controlling idea. The response lacks a recognizable introduction and conclusion. The response does not have a discernible progression of ideas. The response lacks variety in sentence structures; sentence structures may be repetitive. The response demonstrates general and vague word choice; word choice may be poor or inaccurate. The response may lack a formal style and objective tone. The response shows a weak control of the conventions of standard written English and may contain numerous errors that undermine the quality of writing.

Show up ready on test day.

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CollegeBoard SAT® | KHANACADEMY

KJMI	NCMI	NLMI	NXMI	ZKMI
KWMI	NGMI	NNMI	ZBMI	ZLMI
KXMI	NJMI	NRMI	ZCMI	ZNMI
NBMI	NKMI	NWMI	ZGMI	ZRMI

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