Practice Test 4

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 *Jane Eyre,* a nineteenth-century English novel by Charlotte Brontë.

While he spoke my very conscience and reason turned traitors against me, and charged me with crime in resisting him. They spoke almost as loud as Feeling: and that clamored wildly. "Oh, comply!" it said. "Think of his misery; think of his danger—look at his state when left alone; remember his headlong nature; consider the recklessness following on despair—soothe him; save him; love him; tell him you love him and will be his. Who in the world cares for you or who will be injured by what you do?"

Still indomitable was the reply—"I care for myself. The more solitary, the more friendless, the more unsustained I am, the more I will respect myself. I will keep the law given by God; sanctioned by man. I will hold to the principles received by me when I was sane, and not mad—as I am now. Laws and principles are not for the times when there is no temptation: they are for such moments as this, when body and soul rise in mutiny against their rigor; stringent are they; inviolate they shall be. If at my individual convenience I might break them, what would be their worth? They have a worth—so I have always believed; and if I cannot believe it now, it is because I am insane—quite insane: with my veins running fire, and my heart beating faster than I can count its throbs. Preconceived opinions, foregone determinations, are all I have at this hour to stand by: there I plant my foot."

I did. Mr. Rochester, reading my countenance, saw I had done so. His fury was wrought to the highest: he must yield to it for a moment, whatever followed; he crossed the floor and seized my arm and grasped my waist. He seemed to devour me with his flaming glance: physically, I felt, at the moment, powerless as stubble exposed to the draught and glow of a furnace: mentally, I still possessed my soul, and with it the certainty of ultimate safety. The soul, fortunately, has an interpreter—often an unconscious, but still a truthful interpreter—in the eye. My eye rose to his; and while I looked in his fierce face I gave an involuntary sigh; his gripe was painful, and my over-taxed strength almost exhausted.

"Never," said he, as he ground his teeth, "never was anything at once so frail and so indomitable. A mere reed she feels in my hand!" And he shook me with the force of his hold. "I could bend her with my finger and thumb: and what good would it do if I bent, if I uptore, if I crushed her? Consider that eye: consider the resolute, wild, free thing looking out of it, defying me, with more than courage—with a stern triumph. Whatever I do with its cage, I cannot get at it—the savage, beautiful creature! If I tear, if I rend the slight prison, my outrage will only let the captive loose. Conqueror I might be of the house; but the inmate would escape to heaven before I could call myself possessor of its clay dwelling-place. And it is you, spirit—with will and energy, and virtue and purity—that I want: not alone your brittle frame. Of yourself

CONTINUE

you could come with soft flight and nestle against my heart, if you would: seized against your will, you will elude the grasp like an essence—you will vanish ere I inhale your fragrance. Oh! Come, Jane, come!"

As he said this, he released me from his clutch, and only looked at me. The look was far worse to resist than the frantic strain: only an idiot, however, would have succumbed now. I had dared and baffled his fury; I must elude his sorrow: I retired to the door.

"You are going, Jane?"

"I am going, sir."

"You are leaving me?"

"Yes."

"You will not come? You will not be my comforter, my rescuer? My deep love, my wild woe, my frantic prayer, are all nothing to you?"

What unutterable pathos was in his voice! How hard it was to reiterate firmly, "I am going."

1

Jane's attitude toward Mr. Rochester is best characterized as

A) sympathetic.

B) uncaring.

C) despising.

D) reckless.

2

Based on the information in the passage, it can be inferred that Jane refuses Rochester's advances because

A) she does not love him as much as he loves her.

B) it would violate her personal ideals.

C) he thinks that she is weak and frail.

D) she wishes to cause him injury.

3

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

A) Lines 1–3 ("While . . . him")

B) Lines 13–16 ("I will . . . now")

C) Lines 36–38 ("The soul . . . eye")

D) Lines 50–51 ("Whatever . . . creature")

4

In context, the phrase "I am insane—quite insane" in line 23 refers chiefly to

A) a severe mental illness that Jane suffers from.

B) a mental state brought on by God's law.

C) a feeling that currently urges Jane to reject Rochester.

D) a reduction of judgment due to emotion.

5

As used in line 29, "wrought" most nearly means

A) hammered.

B) made.

C) excited.

D) wrung.

6

The fourth paragraph (lines 42–61) provides a contrast between

A) Jane's body and her will.

B) Rochester's love and anger toward Jane.

C) a bird and its cage.

D) Jane's purity and impurity.

7

The inmate Rochester mentions in line 53 refers to

A) a criminal locked away in jail.

B) Rochester trapped in his emotions.

C) Jane stuck in the traditions of her time.

D) the possible behavior of Jane's spirit.

CONTINUE

8

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

A) Lines 38–41 ("My eye . . . exhausted")

B) Lines 45–47 ("I could . . . her")

C) Lines 55–57 ("And it . . . frame")

D) Lines 63–65 ("The look . . . now")

9

As used in line 63, "worse" most nearly means

A) less desirable.

B) more difficult.

C) of lower quality.

D) unskillful.

10

Based on the information in the final paragraph, it can be reasonably inferred that Jane values

A) her emotions over her reason.

B) freedom over social convention.

C) her principles over her feelings.

D) true love above all else.

CONTINUE

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

This passage is adapted from Hillary Clinton's remarks to the U.N. Fourth World Conference on Women Plenary Session in 1995 in Beijing, China.

There are some who question the reason for this conference. Let them listen to the voices of women in their homes, neighborhoods, and workplaces. There are some who wonder whether the lives of women and girls matter to economic and political progress around the globe. Let them look at the women gathered here and at Huairou—the homemakers and nurses, the teachers and lawyers, the policymakers and women who run their own businesses. It is conferences like this that compel governments and peoples everywhere to listen, look, and face the world's most pressing problems. Wasn't it after all—after the women's conference in Nairobi ten years ago that the world focused for the first time on the crisis of domestic violence?

The great challenge of this conference is to give voice to women everywhere whose experiences go unnoticed, whose words go unheard. Women comprise more than half the world's population, 70 percent of the world's poor, and two-thirds of those who are not taught to read and write. We are the primary caretakers for most of the world's children and elderly. Yet much of the work we do is not valued—not by economists, not by historians, not by popular culture, not by government leaders.

At this very moment, as we sit here, women around the world are giving birth, raising children, cooking meals, washing clothes, cleaning houses, planting crops, working on assembly lines, running companies, and running countries. Women also are dying from diseases that should have been prevented or treated. They are watching their children succumb to malnutrition caused by poverty and economic deprivation. They are being denied the right to go to school by their own fathers and brothers. They are being forced into prostitution, and they are being barred from the bank lending offices and banned from the ballot box.

Those of us who have the opportunity to be here have the responsibility to speak for those who could not. As an American, I want to speak for those women in my own country, women who are raising children on the minimum wage, women who can't afford health care or child care, women whose lives are threatened by violence, including violence in their own homes.

Speaking to you today, I speak for them, just as each of us speaks for women around the world who are denied the chance to go to school, or see a doctor, or own property, or have a say about the direction of their lives, simply because they are women. The truth is that most women around the world work both inside and outside the home, usually by necessity.

We need to understand there is no one formula for how women should lead their lives. That is why we must respect the choices that each woman makes for herself and her family. Every woman deserves the chance to realize her own God-given potential. But we must recognize that women will never gain full dignity until their human rights are respected and protected.

Tragically, women are most often the ones whose human rights are violated. Even now, in the late twentieth-century, the rape of women continues to be used as an instrument of armed conflict. Women and children make up a large majority of the world's refugees. And when women are excluded from the political process, they become even more vulnerable to abuse. I believe that now, on the eve of a new millennium, it is time to break the silence. It is time for us to say for the world to hear that it is no longer acceptable to discuss women's rights as separate from human rights.

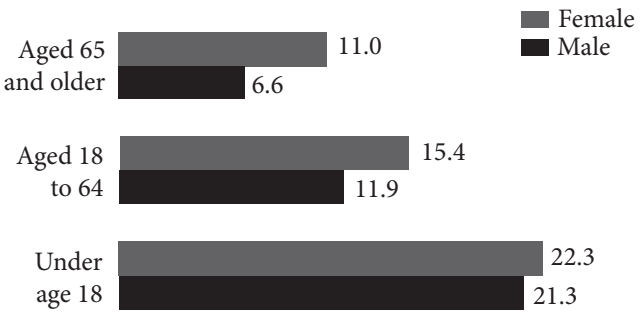
If there is one message that echoes forth from this conference, let it be that human rights are women's rights and women's rights are human rights once and for all. Let us not forget that among those rights are the right to speak freely—and the right to be heard.

Women must enjoy the rights to participate fully in the social and political lives of their countries, if we want freedom and democracy to thrive and endure. It is indefensible that many women in nongovernmental organizations who wished to participate in this conference have not been able to attend—or have been prohibited from fully taking part.

As long as discrimination and inequities remain so commonplace everywhere in the world, as long as girls and women are valued less, fed less, fed last, overworked, underpaid, not schooled, subjected to violence in and outside their homes—the potential of the human family to create a peaceful, prosperous world will not be realized.

CONTINUE

Poverty Rates by Age and Gender: 2012
(in percent)



Poverty rates in the United States, divided by age and gender. Image courtesy the U.S. Census Bureau.

11

The position that Clinton takes in her speech can best be described as that of

A) a critic countering a series of arguments.

B) a scholar analyzing social phenomena.

C) an advocate seeking a particular outcome.

D) a mediator seeking a fair compromise.

12

As used in line 23, "valued" most nearly means

A) increased.

B) considered.

C) bought.

D) insured.

13

In lines 12–13, what is the most likely reason that Clinton mentions the prior "women's conference in Nairobi"?

A) To provide an example of a previous, failed attempt to solve the problem of domestic violence

B) To disagree with those who question the reason for the current conference

C) To contend that a great number of women and their experiences have gone unnoticed

D) To offer evidence for the claim that conferences compel people to address problems

14

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

A) Lines 1–2 ("There are . . . conference")

B) Lines 9–12 ("It is . . . problems")

C) Lines 21–22 ("We are . . . elderly")

D) Lines 30–32 ("Women . . . treated")

15

In lines 39–45, Clinton draws a distinction between

A) those who work at schools and hospitals.

B) people who can and cannot speak out.

C) employed and unemployed women.

D) women who can and cannot vote.

16

Based on the information in the passage, women face each of the following challenges EXCEPT

A) lack of access to health care.

B) violence in their homes.

C) limited financial resources.

D) widespread unemployment.

CONTINUE

17

As used in line 40, "speak" most nearly means

A) talk aloud.

B) scold.

C) advocate.

D) gossip.

18

The principal rhetorical effect of the phrase in lines 73–75 ("let it be that…once and for all") is to

A) argue against attempts to understand women's rights as distinct from other rights.

B) show that many women who should be at the conference are unable to attend.

C) emphasize the special nature of women's rights as they relate to human rights at large.

D) suggest that the need to focus on the specific problems of women is now past.

19

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

A) Lines 57–59 ("But we . . . protected")

B) Lines 68–71 ("It is . . . rights")

C) Lines 75–76 ("Let us . . . heard")

D) Lines 79–83 ("It is . . . part")

20

Based on the information presented in Clinton's speech, it can be inferred that some of those who have important positions of authority in the world

A) are actively working against the prosperity of women.

B) do not consider the labor done by women to be of serious import.

C) are ready to ensure that men and women have equal legal rights.

D) have made it unacceptable to discuss women's rights.

21

Using information in the graph and the passage, it can be reasonably inferred that

A) in America and across the world the greatest gender disparity in poverty rates is among those 65 and older.

B) women 18 to 64 comprise 15.4 percent of the world's poor.

C) while a high percentage of children are poor in America, the opposite is true worldwide.

D) poverty rates in America are in line with a worldwide gender disparity.

CONTINUE

Questions 22–31 are based on the following passages.

Passage 1 is adapted from *Gardner's Art Through the Ages*. © 1991 by Harcourt Brace Jovanovich, Inc. Passage 2 is adapted from John Boardman, "The Parthenon Frieze—Another View. "© 1977 by John Boardman. Both passages discuss the Parthenon Frieze, a band of sculpture that once encircled all four walls of the Parthenon, a temple to the goddess Athena. The naos is the inner sanctuary of the temple.

Passage 1

The inner Ionic frieze of figures was seen from below in reflected light against a colored ground. It enriched the plain wall and directed attention toward the entrance to the temple. Though its subject is still a matter of scholarly dispute ("the riddle of the Parthenon frieze"), it probably represents the Panathenaic procession that took place every four years when the citizens of Athens gathered in the marketplace and carried the *peplos*, or robe, for the statue of Athena to the Parthenon. The robe was not for Phidias' ivory and gold statue, but for an older, archaic one, kept, ultimately, in the Erechtheion of the Acropolis. This is the first known representation of a nonmythological subject in Greek temple reliefs.

The Panathenaic frieze is unique in the ancient world for its careful creation of the impression of the passage of time, albeit a brief fragment of time. The effect is achieved by the use of a sequence of figures posed to present a gradation of motion. In the part of the frieze that decorated the western side of the naos, the viewer can see the procession forming: youths are lacing their sandals and holding or mounting their horses; they are guided by marshals who stand at intervals, and particularly at the corners, to slow movement and guide the horsemen at the turn. In the friezes of the two long sides of the naos, the procession moves in parallel lines, a cavalcade of spirited youths, chariots, elders, jar carriers, and animals for sacrifice. Seen throughout the procession is that balance of the monumentally simple and the actual, of the tactile and the optical, of the "ideal" and the "real," of the permanent and the momentary that is characteristically Greek and the perfect exemplification of the "inner concord of opposites" that Heraclitus, the philosopher, wrote of in the sixth century B.C. The movement of the procession becomes slower and more solemn as it nears the eastern side of the naos, when, after turning the corner, it approaches the seated divinities, who appear to be guests of Athena at her great festival. Standing figures face against the general movement at ever-closer intervals, slowing the forward motion of the procession.

Passage 2

There are many representations of festival or sacrifice in classical Greek art but it is unparalleled to find them attended by a number of guest deities, let alone the complete pantheon. And here we see Athena herself in their number; and they seem to be ignoring the handling of the peplos, which is the nearest we get to the culminating act of the procession. Finally, there is the choice of subject. In Lawrence's words, "Never before has a contemporary subject been treated on a religious building and no subsequent Greek instance is known, with the doubtful exception of the Erechtheum. The flagrant breach with tradition requires explanation."

It is unthinkable that a classical Athenian, looking up at the frieze, could have said to himself "there I go," or even more vaguely "there we go." The subject must be, in some respect, more than mortal and the explanation must lie in the frieze itself and in knowledge of the background to its carving and the building on which it was placed. Moreover the explanation must have been apparent to the classical Athenian who knew this background. We cannot exempt the frieze from the conventions of classical art.

We must rule out, then, the explanation that it is a contemporary or generic statement of the Panathenaic procession conducted by the citizens of Periclean Athens.

In classical Athens of these years there was one group of mortal Athenian citizens who, by their actions, had acquired the right to depiction on public buildings and in the company of the gods: these are the men who fought at Marathon.

Pausanias tells us that the people of Marathon worshipped the Athenian men who died as heroes, and a Hellenic inscription records that young Athenian men lay wreaths at their tomb. The heroising of the dead at Marathon is a fact which cannot be called into dispute, and it was appropriate that they should have been celebrated on the Parthenon, in a position secondary to that of the purely divine and heroic subjects.

CONTINUE

My suggestion is that the frieze shows the fighters of Marathon celebrating the prime festival of the goddess Athena, on the temple dedicated to her as a thanksgiving for her aid at Marathon and afterwards, and in a manner which indicates the heroic status of those who fell there.

22

The author of Passage 1 references a quote from Heraclitus (lines 29–35) primarily to

A) reinforce the sense of the passage of time present in the frieze.

B) suggest that opposing qualities of the carving present a sense of overall balance.

C) prove that the style of the frieze is characteristically Greek.

D) emphasize the contrast between the men in the procession and the goddess Athena at its end.

23

Which of the following best describes the structure of Passage 1?

A) A purpose for the frieze is proposed, and then a description is given.

B) An interpretation of the frieze is questioned and a new solution is offered.

C) The frieze is described in detail, with emphasis on its unique qualities.

D) A historical overview is given that helps explain the layout of the frieze.

24

As used in line 44, "unparalleled" most nearly means

A) crooked.

B) normal.

C) unsurpassed.

D) unprecedented.

25

The first two paragraphs of Passage 2 primarily serve to

A) reject the idea that the frieze depicts the Panathenaic procession.

B) argue against the idea that the frieze represents the passage of time.

C) suggest that the frieze represents the heroes of Marathon.

D) outline problems in the traditional interpretation of the frieze.

26

As used in line 59, "mortal" most nearly means

A) human.

B) deadly.

C) terrible.

D) common.

27

In the context of the passage, the author's use of the phrase "there I go" (lines 57–58) is primarily meant to convey the idea that

A) figures in the frieze were not meant to be portraits of individual citizens.

B) the frieze cannot be a representation of a human event.

C) the citizens of Athens did not participate in the Panathenaic procession.

D) the subject of the frieze should be obvious to modern viewers.

CONTINUE

28

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

A) Lines 46–49 ("And here . . . the procession")

B) Lines 54–55 ("The flagrant . . . explanation")

C) Lines 62–64 ("Moreover . . . background")

D) Lines 66–69 ("We must . . . Athens")

29

The author of Passage 2 would most likely argue that the "youths" (line 21) described in Passage 1 are

A) citizens of Athens from around the time the Parthenon was built.

B) Athenian men who died in battle at Marathon.

C) people of Marathon who were worshipped as heroes in Athens.

D) purely divine participants in the celebration of a festival of Athena.

30

Passage 2 differs from Passage 1 in that Passage 1

A) focuses on determining the subject of the frieze.

B) gives a detailed description of the figures in the frieze.

C) considers how Greek citizens might have viewed the frieze.

D) entirely rejects the traditional interpretation of the frieze.

31

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

A) Lines 4–10 ("Though its subject . . . Parthenon")

B) Lines 13–14 ("This is the . . . reliefs")

C) Lines 15–17 ("The Panathenaic frieze . . . time")

D) Lines 19–25 ("In the part . . . turn")

CONTINUE

Questions 32–42 are based on the following passage.

The following is an excerpt from "A Strange Tale of a New Species of Lizard" by Carl Zimmer in *The New York Times.* Originally published December 18, 2014.

Each year, scientists publish roughly 17,000 detailed descriptions of newly discovered animals. Recently, in the journal Breviora, researchers described yet another, a new species of lizard called *Aspidoscelis neavesi.*

At first glance, this seems to be a run-of-the mill lizard: a small, slender creature with spots along its back and a bluish tail. In fact, *Aspidoscelis neavesi* is quite exceptional. The lizard was produced in the laboratory by mating two other species, and its creation defies conventional ideas about how new species evolve.

The evolution of a new animal species is usually a drawn-out affair. Typically, an existing animal population is somehow divided, and the newly isolated populations reproduce only among themselves. Over thousands of generations, the animals may become genetically distinct and can no longer interbreed.

Of course, scientists have long known that some related species sometimes interbreed. But the hybrid progeny generally were thought to be evolutionary dead-ends—sterile mules, for instance. In recent decades, however, researchers have learned that these hybrids may represent new species.

Some of the most striking examples occur among whiptail lizards, which live in the southwestern United States. In the 1960s, scientists noticed that some whiptail lizard species had a strange genetic makeup. They have two copies of each chromosome, just as we do, but each copy is very different from its counterpart. The genes look as if they come from different species. Perhaps stranger, many species produce no males. The eggs of the females hatch healthy female clones, a process known as parthenogenesis.

Normally, unfertilized animal eggs have only one set of chromosomes. But parthenogenic female whiptail lizards can duplicate the chromosomes in their offspring without males.

These findings led scientists to a hypothesis for how these strange species came about: Sometimes individuals from two different species of whiptail lizards interbreed, and their hybrid offspring carry two different sets of chromosomes.

Somehow, this triggers a switch to parthenogenesis. The female hybrids start to produce clones distinct from either parental species. In other words, they instantly become a new species of their own.

Dr. Neaves didn't follow up on this finding, instead pursuing a career researching fertility and stem cells. But at a dinner in 2002, he mentioned the whiptail lizards to Peter Baumann, a molecular biologist at Stowers Institute for Medical Research, where Dr. Neaves served as president.

Dr. Baumann decided it was high time to use new scientific tools to study whiptail lizards, and he and Dr. Neaves started making road trips to New Mexico to catch them and take them back to Stowers. As they came to understand the biology of the lizards better, they and their colleagues began to bring different species together to see if they could hybridize. Most of the time, their experiments failed.

In 2008, the scientists tried to recreate the hybrid with four sets of chromosomes. They put female *Aspidoscelis exsanguis* (the parthenogenic species with three sets of chromosomes) and male *Aspidoscelis inornata* in the same containers. In short order, the lizards started mating, and the females laid eggs. When the eggs hatched, the scientists examined the genes of the baby lizards and found four sets of chromosomes.

Four of the new hybrids were females. To the delight of the scientists, the females could clone themselves—and the offspring could produce clones of their own. Today, the scientists have a colony of 200 of these lizards.

32

The author mentions "sterile mules" (line 21) primarily in order to

A) delineate one of the only instances of an occurrence.

B) contradict the opinion presented in the passage.

C) provide evidence that supports scientists' beliefs.

D) reiterate that the lizard is an unusual creature.

CONTINUE

33

As used in line 24, "striking" most nearly means

A) beautiful.
B) conspicuous.
C) aggressive.
D) remarkable.

34

The passage suggests that the relationship between Dr. Neaves and Dr. Baumann is best characterized as which of the following?

A) A scientific effort to understand parthenogenesis
B) A competitive rivalry to breed *Aspidoscelis exsanguis* first
C) A joint labor to disprove the theories of Stowers
D) A friendship based on a shared interest in whiptail lizards

35

The third paragraph (lines 12–17) most strongly suggests that evolution

A) can happen only over thousands of generations.
B) depends on the separation of individuals of one species.
C) customarily takes many years to occur.
D) isolates populations so they can't interbreed.

36

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

A) Lines 12–13 ("The evolution . . . affair")
B) Lines 13–15 ("Typically . . . themselves")
C) Lines 15–17 ("Over . . . interbreed")
D) Lines 21–23 ("In recent . . . species")

37

As used in line 53, "high time" most nearly means

A) a festival.
B) an hour late.
C) an opportune moment.
D) a lofty ideal.

38

According to the passage, parthenogenesis in whiptail lizards is characterized by each of the following EXCEPT

A) female individuals that can duplicate chromosomes without males.
B) stem cells from the male *Aspidoscelis inornata.*
C) clones that are different from the parental species.
D) offspring with two sets of chromosomes.

39

The passage suggests that whiptail lizards

A) have two identical sets of chromosomes.
B) were first discovered in the 1960s.
C) require a male and a female to breed.
D) create only female clones.

40

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

A) Lines 32–33 ("The eggs . . . parthenogenesis")
B) Lines 44–45 ("The female . . . species")
C) Lines 61–62 ("In . . . chromosomes")
D) Lines 66–68 ("When . . . chromosomes")

CONTINUE

41

Which of the following, if true, would most weaken the author's argument in lines 8–11?

A) Scientists don't always consider animal breeds created in labs to be new species.

B) Evolution is a complex process that can't be manipulated by humans.

C) The two animals used in the process are not considered different species by some scientists.

D) Researchers have proven that all lizards have the ability to clone themselves, but they only clone in captivity.

42

As used in line 43, the sentence "Somehow, this triggers a switch to parthenogenesis," suggests that

A) scientists are still looking for the switch that causes cloning.

B) hybridization is a complex, but manageable process.

C) scientists are unclear as to how female whiptails can clone themselves.

D) no one knows why female whiptails choose cloning over mating.

CONTINUE

Questions 43–52 are based on the following passage and supplementary material.

This passage is adapted from David P. Hill, Roy A. Bailey, James W. Hendley II, Peter H. Stauffer, Mae Marcaida, "California's Restless Giant: The Long Valley Caldera." © 2014 by U.S. Geological Survey.

About 760,000 years ago a cataclysmic volcanic eruption in the Long Valley area of eastern California blew out 150 cubic miles—600 cubic kilometers (km^3)—of magma (molten rock) from a depth of about 4 miles (6 km) beneath the Earth's surface. Rapid flows of glowing hot ash (pyroclastic flows) covered much of east-central California, and airborne ash fell as far east as Nebraska. The Earth's surface sank more than 1 mile (1.6 km) into the space vacated by the erupted magma, forming a large volcanic depression that geologists call a caldera.

Long Valley Caldera is part of a large volcanic system in eastern California that also includes the Mono-Inyo Craters chain. This chain extends from Mammoth Mountain at the southwest rim of the caldera northward 25 miles (40 km) to Mono Lake. Eruptions along this chain began 400,000 years ago, and Mammoth Mountain was formed by a series of eruptions ending 58,000 years ago. The volcanic system is still active—eruptions occurred in both the Inyo Craters and Mono Craters parts of the volcanic chain as recently as 600 years ago, and small eruptions occurred in Mono Lake sometime between the mid-1700s and mid-1800s.

Although no volcanic eruptions are known to have occurred in eastern California since those in Mono Lake, earthquakes occur frequently. These are caused by movement along faults and by the pressure of magma rising beneath the surface, two closely related geologic processes. In 1872, a magnitude 7.4 earthquake centered 80 miles (125 km) south of Long Valley was felt throughout most of California, and moderate (magnitude 5 to 6) earthquakes have shaken the Long Valley area since 1978.

In 1978, a magnitude 5.4 earthquake struck 6 miles southeast of the caldera, heralding a period of geologic unrest in the Long Valley area that is still ongoing. That temblor ended two decades of low quake activity in eastern California. The area has since experienced numerous swarms of earthquakes, especially in the southern part of the caldera and the adjacent Sierra Nevada.

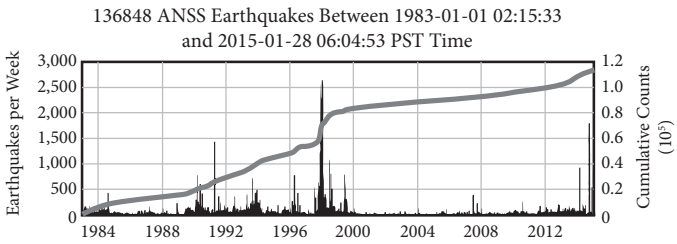
The most intense of these swarms began in May 1980 and included four strong magnitude 6 shocks, three on the same day. Following these shocks, scientists from the U.S. Geological Survey (USGS) began a reexamination of the Long Valley area, and they soon detected other evidence of unrest—a dome-like uplift within the caldera. Measurements showed that the center of the caldera had risen almost a foot (30 centimeters) since the summer of 1979—after decades of stability. This swelling, which by 2014 totaled more than 2.5 feet (75 centimeters) and affected more than 100 square miles (250 km^2), is caused by new magma rising beneath the caldera.

In response to this increased unrest, USGS intensified its monitoring in the Long Valley region. Today, a state-of-the-art network of seismometers and geodetic equipment closely monitors earthquake activity and the swelling in the caldera. Data from these instruments help scientists to assess the volcanic hazard in the Long Valley area and to recognize early signs of possible eruptions.

During the early 1990s, trees began dying at several places on Mammoth Mountain on the southwest edge of Long Valley Caldera. Studies conducted by USGS and U.S. Forest Service scientists showed that the trees are being killed by large amounts of carbon dioxide (CO_2) gas seeping up through the soil from magma deep beneath Mammoth Mountain. Such emissions of volcanic gas, as well as earthquake swarms and ground swelling, commonly precede volcanic eruptions. When they precede an eruption of a "central vent" volcano, such as Mount St. Helens, Washington, they normally last only a few weeks or months. However, symptoms of volcanic unrest may persist for decades or centuries at large calderas, such as Long Valley Caldera. Studies indicate that only about one in six such episodes of unrest at large calderas worldwide actually culminates in an eruption.

Over the past 4,000 years, small to moderate eruptions have occurred somewhere along the Mono-Inyo volcanic chain every few hundred years, and the possibility remains that the geologic unrest in the Long Valley area could take only weeks to escalate to an eruption. Nonetheless, geologists think that the chances of an eruption in the area in any given year are quite small.

CONTINUE



Long Valley Caldera cumulative earthquakes between 1983 and 2015, USGS. The vertical bars on the graphs above correspond with the left-side *y*-axis and represent the number of earthquakes per week. The thicker gray line indicates the cumulative number of earthquakes and corresponds with the right-side *y*-axis.

43

As used in line 10, "depression" most nearly means

A) dejection.

B) decrease.

C) crater.

D) trouble.

44

The authors use the phrase "as recently as 600 years ago" (line 22) primarily to

A) suggest that there will be another eruption this century.

B) convey a sense of the magnitude of geologic time.

C) communicate irony, because 600 years ago is not recent.

D) indicate that the word 'recently' is a relative term.

45

As used in line 38, "temblor" most nearly means

A) drum.

B) earthquake.

C) eruption.

D) caldera.

46

What is the reason geologists have increased their monitoring of the Long Valley Caldera?

A) It has been more than 150 years since the last eruption.

B) Eruptions happen frequently in volcanic chains of such size.

C) The area is experiencing geologic activity indicative of an impending eruption.

D) The swelling of the caldera may damage the sensitive geodetic equipment.

47

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

A) Lines 19–24 ("The volcanic . . . mid-1800s")

B) Lines 38–39 ("That temblor . . . California")

C) Lines 58–60 ("Today, . . . caldera")

D) Lines 70–72 ("Such emissions . . . eruptions")

48

In the context of the passage as a whole, what is the primary purpose of the last paragraph?

A) To suggest that geologists believe danger from an eruption is not imminent

B) To explain how quickly geologic unrest can turn into a catastrophic eruption

C) To warn of the dire impact of another eruption like Mount St. Helens

D) To emphasize the impact of the earthquakes discussed earlier in the passage

CONTINUE

49

It can be inferred from the passage that Mammoth Mountain

A) erupted most recently around 600 years ago.

B) is an active volcano that the USGS is monitoring for early signs of eruption.

C) shows signs that the larger volcanic system to which it belongs is still active.

D) was formed 760,000 years ago by pyroclastic flows from a volcanic eruption.

50

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

A) Lines 1–5 ("About 760,000 . . . surface")

B) Lines 19–24 ("The volcanic system . . . mid-1800s")

C) Lines 25–27 ("Although no . . . frequently")

D) Lines 75–77 ("However, symptoms . . . Caldera")

51

Which of the following situations is most analogous to the recent swelling of the Long Valley Caldera?

A) Many small tremors along a particular fault precede a large, magnitude 8 earthquake.

B) A scientist discovers a new species of insect by chance while observing snakes in the Amazon rainforest.

C) Bad road conditions cause a collision between two cars, and poor visibility contributes to a multi-car pile-up.

D) A doctor is unable to give a definitive diagnosis to a patient after assessing symptoms typical of a particular disease.

52

Which of the following claims is supported by information in the graph?

A) Long Valley Caldera had experienced more than 100,000 cumulative earthquakes by 2015.

B) Long Valley Caldera experienced roughly 30,000 earthquakes per week in 1990.

C) By 2012, Long Valley Caldera had experienced 1.2 million cumulative earthquakes.

D) By 1988, Long Valley Caldera had experienced over 25,000 cumulative earthquakes.

STOP

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

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 and supplementary material.

Park Rangers, Naturally

Of the many parks that are part of the American heritage, the National Park 1 Service (NPS) is easily the most majestic. From the moment of the first European settlements in the fifteenth and sixteenth centuries, visitors and residents alike have marveled at the natural beauty and diversity of 2 the American landscape's attractiveness. As part of a commitment to preserving these national treasures against the forward movement of industrialization, the National Park Service was founded in 1916 during the presidency of Woodrow Wilson.

1

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

A) Service, NPS,
B) Service NPS
C) Service—NPS—
D) Service, abbreviated NPS,

2

A) NO CHANGE
B) the pulchritudinous American landscape.
C) the pretty American landscape.
D) the American landscape.

CONTINUE

Today, there are over 400 parks in the service, and these parks are run and overseen by the Department of the Interior. The day-to-day operations, **3** including maintenance and tours, are the work of park rangers. These park rangers are responsible for the upkeep of the **4** parks, their main responsibility is to maintain the balance between the wildlife and plant species and the human visitors that come to the parks every day.

5 Without park rangers, the parks would be overrun with pollution. Some are scientists who revel in the ecological aspects of maintaining the parts. Some are educators **6** helping visitors to understand the unique aspects and historical significance of the parks. Still others come from law enforcement and firefighting, given that their posts are often very far indeed from the municipal bodies that typically provide **7** them.

3

The writer wants to include a detail that will clarify the phrase "day-to-day operations." Which of the following would best fulfill this goal?

A) NO CHANGE
B) and some that are more long-term,
C) often repetitive tasks,
D) not the political decisionmaking,

4

A) NO CHANGE
B) parks their
C) parks—their
D) parks, their—

5

Which of the following would best introduce the topic of this paragraph?

A) NO CHANGE
B) Park rangers can come from all walks of life.
C) Many millions visit the National Parks every year.
D) The most successful park rangers usually have some background in ecology.

6

A) NO CHANGE
B) that are helping
C) who are helping
D) who help

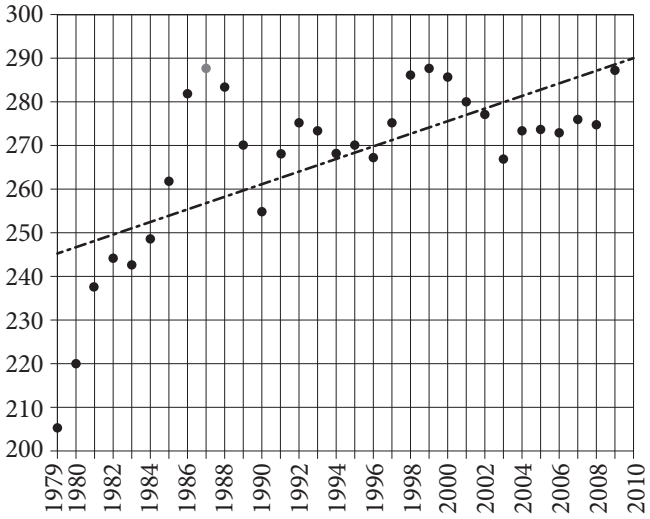
7

A) NO CHANGE
B) these services.
C) those.
D) it.

CONTINUE

There are nearly 4,000 park rangers in service with the NPS today. **8** Visitors are on the rise, poising that number for growth. **9** Although park visitation numbers peaked in 1987, the general trend has been a steady rise. The numbers continue to be high, with over 270 million visitors in 2013. It seems that as economic conditions in the country are uncertain, more and more people turn to parks for economical, educational, and enlightening alternatives to the more costly tourist activities and trips. Now, too, that climate science has **10** foretold difficult times, the NPS is seen to be protecting the last vestiges of our green world before it slips away.

Visitors to America's National Parks, 1979–2009 (in millions)



8

A) NO CHANGE

B) Visitation numbers are poised on the rise for significant growth.

C) That number is poised to grow, as visitation numbers are on the rise.

D) Poised on the rise, visitation numbers are growing.

9

Which of the following gives accurate information based on the graph?

A) NO CHANGE

B) Park visitation peaked in the mid-1980s and has tapered off since then.

C) Park visitation reached record highs in 2009.

D) Park visitation has risen in a linear progression since the late 1970s.

10

Which of the following alternatives to the underlined portion would be LEAST acceptable?

A) predicted

B) stated

C) anticipated

D) forecast

CONTINUE

11 The park-ranger workforce is so diverse, there are actually a few common attributes among park rangers. Park rangers need at least a two-year degree and some experience working in parks. Many seasonal park workers and volunteers go on to become park rangers. Ultimately, attaining work as a park ranger is less about a skill-set than a particular mindset. Park rangers must honor and revere the natural world: they spend their entire careers learning about and living in the places they work. Park rangers have special jobs, so it naturally takes a group of special people to do those jobs.

11

A) NO CHANGE
B) Truly, the park-ranger
C) Because the park-ranger
D) Although the park-ranger

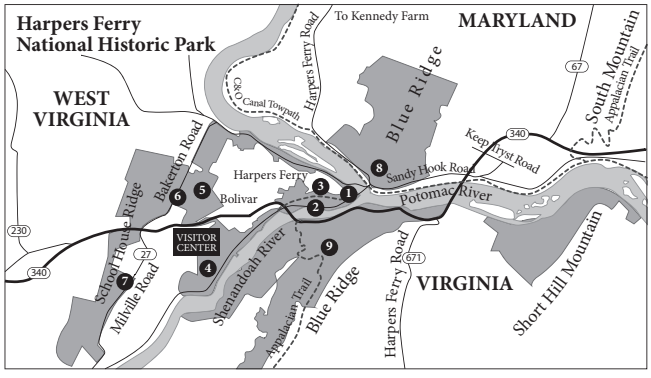
CONTINUE

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

The Ferry Godfather

[1] For much of the early part of American history, Pennsylvania and Virginia, two major early colonies and states, shared a border. [2] This part of Virginia became the modern state of West Virginia on June 20, 1863. [3] Then came the Civil War. [4] Amid the furor of secession and conflict, President Abraham Lincoln granted a special provision for that part of Virginia that was loyal to the Union. **12**

Although this region is not in the news quite so often today, in America's early history one part of it was on the tip of everyone's tongue. The town of Harpers Ferry played a crucial role in the pre–Civil War era. George Washington proposed that the United States station one of **13** their two major armories there, and by 1799, Harpers Ferry became **14** one of the major industrial towns, in the United States. Its position about 60 miles from Washington, D.C., and Baltimore put it close enough to major cities, but its place **15** in the hills at the meeting of the Potomac and Shenandoah Rivers made it difficult to access and easy to defend.



12

For the sake of the logic and coherence of this paragraph, sentence 2 should be placed

A) where it is now.

B) before sentence 1.

C) after sentence 3.

D) after sentence 4.

13

A) NO CHANGE

B) they're

C) its

D) it's

14

A) NO CHANGE

B) one, of the major industrial towns, in the United States.

C) one, of the major industrial towns in the United States.

D) one of the major industrial towns in the United States.

15

Which of the following gives accurate information based on the map?

A) NO CHANGE

B) approximately 20 miles northeast of the town of Bolivar

C) across the Shenandoah River from Maryland

D) at the foot of the Adirondack Mountains

CONTINUE

Because it was situated on the borderline between the Union and the Confederacy, and because its armory was full of the weapons being manufactured to fight the Civil War, **16** the Confederacy took it four times and the Union did also, and both sides saw it as a pivotal strategic base.

In the popular imagination today, Harpers Ferry is still seen as a crucial **17** place of great importance during the Civil War but mainly for events that occurred there before the war had even started. In 1859, radical abolitionist John Brown led a raid on Harpers Ferry, seeking to free slaves and begin a guerilla campaign to free slaves all over the country. While Brown's raid was ultimately a dismal failure and Brown was executed for treason, **18** his raid began a national conversation.

16

A) NO CHANGE
B) the war saw Harpers Ferry change hands eight times,
C) Harpers Ferry changed hands eight times during the war,
D) eight was the number of times Harpers Ferry changed hands,

17

A) NO CHANGE
B) place
C) place that was important
D) place where a great deal happened

18

The writer wants to include an idea here that shows that Brown's raid still had major importance. Which of the following true ideas would best fulfill this goal?

A) NO CHANGE
B) Herman Melville's poem about John Brown is very well-known.
C) the raid was based on some earlier well-known slave revolts.
D) he could not have chosen a more central location.

CONTINUE

Abolitionists in the North saw him as a hero and a freedom fighter while those in the South saw him as a 19 filthy terrorist. 20 The Civil War and the nation's movement towards it used John Brown's name as both sides' rallying cry.

Today, Harpers Ferry is a sleepy town in the mountains of West Virginia. Much of its heritage remains 21 intact. Historical tours run every day. Above all, Harpers Ferry is a living reminder that the crucial events in history are not limited to the big places and the major players. Without the catalyzing effect of this small 22 town: American history as we know it might have been much different.

19

A) NO CHANGE
B) heroic
C) janky
D) vile

20

A) NO CHANGE
B) Brown's name became a rallying cry for both sides as the nation moved toward Civil War.
C) Brown's cry was the rally that both sides named as the Civil War moved in on the nation.
D) Both sides used Brown's name as the nation's Civil War was moving toward it.

21

A) NO CHANGE
B) intact, historical
C) intact historical
D) intact; and historical

22

A) NO CHANGE
B) town; American
C) town. American
D) town, American

CONTINUE

Questions 23–33 are based on the following passage.

Stefan Zweig's Return

Stefan Zweig's name has been showing up a lot lately. In addition to a 23 large amount of recently republished works, Wes Anderson cites Zweig as the major influence on Anderson's recent film *The Grand Budapest Hotel* (2014). It seems that Zweig has suddenly become 24 revelant again after nearly 75 years of obscurity. Why this sudden interest? What can he offer that our culture seems to need?

23

Which of the following alternatives to the underlined portion would be LEAST acceptable?

A) bevy
B) mass
C) multitude
D) volume

24

A) NO CHANGE
B) relevant
C) irrelevant
D) irrevelant

CONTINUE

Stefan Zweig was born in 1881. 25 His parents were part of the Jewish cultural elite in Vienna at the time. Stefan was afforded every possible luxury and privilege. By 1904, Zweig had earned a doctoral degree from the University of Vienna, and he formed the connections that would allow his entry into the 26 city's cultural elite. Zweig went on to publish a near infinitude of works of fiction, drama, journalism, and biography, and enjoyed a period of major celebrity in the 1920s and 1930s. 27

25

The author would like to combine the two sentences reproduced below:

> His parents were part of the Jewish cultural elite in Vienna at the time. Stefan was afforded every possible luxury and privilege.

Which of the following gives the best combination of the two sentences?

A) His parents were part of the Jewish cultural elite in Vienna at the time; Stefan was afforded every possible luxury and privilege.

B) Zweig was afforded every possible luxury and privilege because his parents were part of the Jewish cultural elite in Vienna at the time.

C) Born to parents who were part of Vienna's Jewish cultural elite, Stefan was afforded every possible luxury and privilege.

D) His parents were part of the Jewish cultural elite in Vienna at the time, and so Stefan benefited from their eliteness with luxury.

26

A) NO CHANGE

B) cities

C) citie's

D) cities'

27

The writer is considering deleting the phrase "of fiction, drama, journalism, and biography" and placing a comma after the word *works*. Should the phrase be kept or deleted?

A) Kept, because it shows that Zweig had no problem finding work after he left Vienna.

B) Kept, because it demonstrates the range of Zweig's talents.

C) Deleted, because it is implausible that a single writer could work well in so many forms.

D) Deleted, because it presents information given in numerous places throughout the essay.

CONTINUE

Still, Zweig's relationship with his homeland was always tenuous. While he did support the German side in World War I, Zweig remained a committed pacifist and participated only in the Archives of the Ministry of War. By the second war, **28** however, Zweig's pacifism was no longer looked on with such understanding. Zweig and his wife fled Nazi Germany in 1939 and spent their remaining years in the Americas. Only a few short years after their escape, Zweig and his wife took their own lives out of despair over what had become of Europe. Zweig's ancestral home, **29** which, you'll recall, was in Vienna, insisted on tearing itself apart, and Jewish men like himself were being slaughtered by the millions.

For many years, cultural critics saw Zweig's work as a historical curiosity. His decision to flee Europe was seen as an act of quaint pacifism, and his ultimate decision to end his own life was seen as the act of a privileged man for **30** which everyday realities were simply too much to bear. Much more popular in the post–WWII era were more traditionally "masculine" figures, who not only went to war but treated writing, painting, and filmmaking **31** like competitive sports.

28

A) NO CHANGE
B) indeed,
C) on the one hand,
D) although,

29

Which of the following choices would best emphasize the personal stake that Zweig had in the conflict in Europe?

A) NO CHANGE
B) not the Americas to which he had moved,
C) in which he had such pride,
D) the land of Goethe and Beethoven,

30

A) NO CHANGE
B) who
C) whose
D) whom

31

Which of the following conclusions to this sentence would best support the idea presented at the beginning in the sentence?

A) NO CHANGE
B) with a pacifist bent.
C) like proper gentlemen.
D) as the province of veterans.

CONTINUE

Today, however, Zweig's sensibility makes a good deal more sense. Like Zweig, many of us were alive and aware before the great catastrophes of 32 his own age, and our longing for a "simpler time" is not pure nostalgia. We know that things cannot be as they once were, but we 33 have sensed the injustice in the world being so complicated, and in the power just a few people have to take it all away from us.

32

A) NO CHANGE
B) their
C) her
D) our

33

A) NO CHANGE
B) are sensing
C) sense
D) sensed

CONTINUE

Questions 34–44 are based on the following passage.

For Figs? The Chimps Aren't Chumps

Sometimes as you fall asleep, you're thinking about what to eat for breakfast the next morning. "When I get up, I'll go to the fridge. I'll have an egg, 34 a piece of toast, and a few strips of bacon while I'm making coffee." Even though you may know where your food is coming from, you plan breakfast as a way to plan the day.

Our species may have been doing this kind of breakfast planning long before refrigerators, long before our species was even our species. A team of researchers recently followed groups of chimpanzees through three periods of fruit scarcity in West Africa. 35 For a chimpanzee, every day during a fruit-poor season can be like Black Friday, where all the "shoppers" want the same hot item.

34

A) NO CHANGE

B) a piece of toast, and a few strips of bacon,

C) a piece, of toast, and a few strips, of bacon,

D) a piece of toast and a few strips of bacon

35

At this point, the author wants to add a sentence that accurately summarizes the scientists' research in a way that is consistent with other information in the passage. Which sentence would most effectively achieve that goal?

A) They wanted to see whether the chimps would prefer new, high-yield fruits like figs to their traditional diet of bananas.

B) They wanted to discover where chimps spent the time between waking and sleep.

C) They wanted to know how the chimps acquired highly sought-after fruits, like figs, when the trees that bear these fruits are depleted so quickly.

D) They wanted to uncover the secrets of human evolution and how chimps would operate in a retail environment.

CONTINUE

36 Why does everyone freak out during Black Friday when the deals aren't even that good? If you want to be sure to get the new, say, plasma TV, what do you have to do? Camp out in front of the store! Well, that's exactly what the researchers found the chimpanzees to do with the coveted fruits. In fruit-poor seasons, 37 the nomadic chimpanzees set up their campsites within striking distance of the ripe fruits. When the fruits were 38 "_____," or quick to disappear, the female chimpanzees set up their sleeping nests more pointedly in the direction of the fruit 39 than the fruit was plentiful. Moreover, in order to ensure that the fruit supply would not be 40 gobbled by the time the chimps got there, they woke up early, often before sunrise, when the forests were still dark.

36

Which of the following would provide the best transition from the previous paragraph and introduction to this paragraph?

A) NO CHANGE
B) The similarity to Black Friday shoppers goes even a bit further than this.
C) For a monkey, every day of the year is like Black Friday, but without Thanksgiving.
D) Black Friday is the day after the American Thanksgiving, and it is often characterized by heavy retail traffic.

37

A) NO CHANGE
B) the nomadic chimpanzee sets up their
C) the nomadic chimpanzee sets up its
D) the nomadic chimpanzees set up its

38

Which of the following provides the most precise word given the definition that immediately follows?

A) lively
B) desiccated
C) ephemeral
D) eternal

39

A) NO CHANGE
B) then the
C) than if the
D) than when the

40

A) NO CHANGE
B) depleted
C) chomped
D) ate

CONTINUE

The findings about the chimp 41 has led scientists to reopen a number of heated questions. The first has to do with animals' existence outside the present moment: how much do they remember, and how much do they plan? In other words, is "consciousness" really only 42 the province of humans? The other set of questions has to do with the lines of evolution. It has been firmly established that chimpanzees are our evolutionary ancestors, but now we have to wonder if we've inherited even more 43 than we thought from them initially. Have the lives of chimpanzees conditioned the small, day-to-day patterns of our own lives?

While such questions may seem purely academic and conceptual, they actually have a good deal to do with our lived experience. We learn more and more about what we share with other animals—and with each discovery, we learn a new way to relate to the world around us.

Question 44 asks about the previous passage as a whole.

41

A) NO CHANGE
B) have lead
C) have led
D) has lead

42

A) NO CHANGE
B) the providence of humans?
C) the provenance of humans?
D) providential for humans?

43

A) NO CHANGE
B) from them than we initially thought.
C) then initially thought.
D) than we had been thinking from them initially.

Think about the previous passage as a whole as you answer question 44.

44

Suppose the author's goal had been to present an argument that suggests Black Friday shopping is an animalistic behavior. Would the information in this essay support that argument?

A) Yes, this essay establishes a parallel between humans and chimpanzees and explores it in detail.
B) Yes, this essay suggests that chimps have adapted Black Friday behavior easily.
C) No, this essay suggests that chimpanzees are more advanced than most Black Friday shoppers.
D) No, this essay is more concerned with describing a behavior of chimpanzees than in passing judgment on humans.

STOP

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

Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

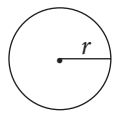
DIRECTIONS

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.

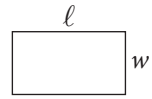
NOTES

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.

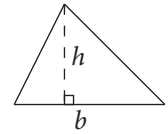
REFERENCE



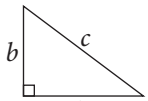
$A = \pi r^2$
$C = 2\pi r$



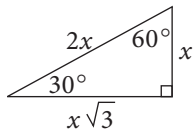
$A = \ell w$

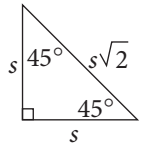


$A = \frac{1}{2}bh$

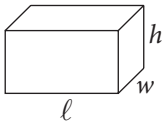


$c^2 = a^2 + b^2$

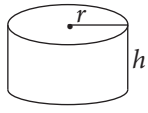




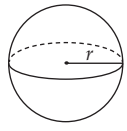
Special Right Triangles



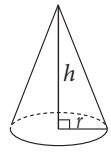
$V = \ell wh$



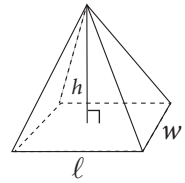
$V = \pi r^2 h$



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



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



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

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

If two times a number is equal to that number minus 4, what is the number?

A) –7

B) –6

C) –4

D) –3

2

The number of soil samples, s, that Sonal needs for an experiment must be greater than 6 but less than or equal to 13. Which of the following represents an acceptable number of soil samples for Sonal's experiment?

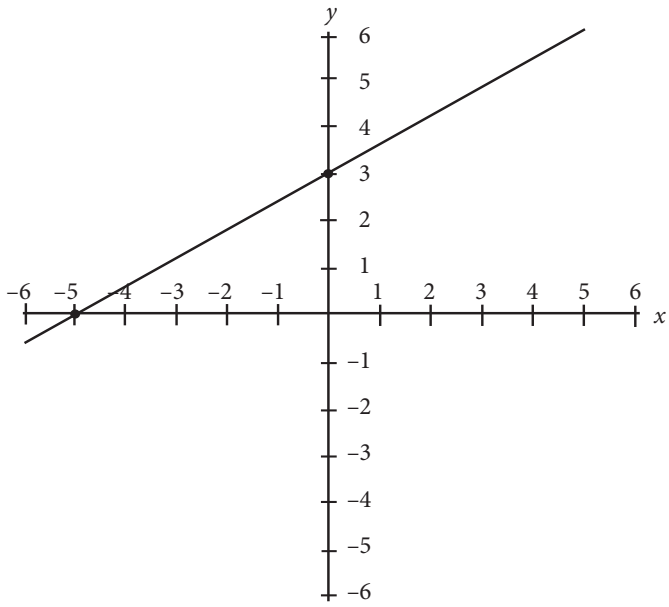
A) $6 < s < 13$

B) $6 \leq s < 13$

C) $6 < s \leq 13$

D) $6 \leq s \leq 13$

3



In the figure above, the graph of $y = f(x)$ is shown. Which of the following could be the equation of $f(x)$?

A) $f(x) = -\frac{3}{5}x + 3$

B) $f(x) = -\frac{3}{5}x - 3$

C) $f(x) = \frac{3}{5}x - 3$

D) $f(x) = \frac{3}{5}x + 3$

CONTINUE

4

If $x + y = 0$, which of the following must be equivalent to $x - y$?

A) $-2y$

B) $\frac{x}{y}$

C) x

D) x^2

5

Which of the following is equivalent to $2x^2 - 6x - 8$?

A) $2(x - 4)(x + 1)$

B) $3(x + 4)(x - 1)$

C) $2(x - 3)(x + 2)$

D) $3(x - 4)(x - 2)$

6

Ryan and Allison build a ramp to help their elderly cat, Simms, walk up to their bed. They need the ramp to make a 35° angle with their bedroom floor. How long must the ramp be to reach the top of their bed that is exactly three feet off the ground?

A) $\frac{\sin 35°}{3}$

B) $\frac{\sin 55°}{3}$

C) $\frac{3}{\sin 55°}$

D) $\frac{3}{\sin 35°}$

7

If $3a + 2b = 24$ and $4a + 5b = 53$, what is the value of $a + b$?

A) 2

B) 7

C) 9

D) 11

CONTINUE

8

Given the equation $y = 3x^2 + 4$, what is the function of the coefficient of 3 ?

A) It moves the graph of $y = 3x^2 + 4$ three units higher than the graph of $y = x^2 + 4$.

B) It moves the graph of $y = 3x^2 + 4$ three units lower than the graph of $y = x^2 + 4$.

C) It makes the graph of $y = 3x^2 + 4$ wider than the graph of $y = x^2 + 4$.

D) It makes the graph of $y = 3x^2 + 4$ narrower than the graph of $y = x^2 + 4$.

9

Steven needs to buy t theme park tickets for himself and his family. Each ticket costs \$80, and the number of tickets he needs to buy can be modeled by the expression $t^2 – 4t – 90 = 6$ when $t > 0$. What is the total cost of the theme park tickets that Steven purchased?

A) \$640

B) \$800

C) \$960

D) \$1,120

10

$$2c + 3d = 17$$
$$6c + 5d = 39$$

In the system of linear equations above, what is the value of $4c – 4d$?

A) –4

B) 1

C) 4

D) 13

11

If $x^2 + 2xy + y^2 = 64$ and $y – x = 12$, which of the following could be the value of x ?

A) –10

B) –4

C) 2

D) 10

CONTINUE

12

Samantha offers two different packages of yoga classes at her yoga studio. She offers two hot yoga sessions and three zero gravity yoga sessions at a total cost of $400. She also offers four hot yoga sessions and two zero gravity sessions at a price of $440. Samantha wants to offer a larger package for long-time clients in which the cost must exceed $800. If Samantha does not wish to include more than 13 sessions for the long-time client package, will she be able to create this package for her clients?

A) No, because the closest package that she can offer consists of three hot yoga and three zero gravity yoga sessions.

B) No, because the closest package that she can offer consists of four hot yoga and four zero gravity yoga sessions.

C) Yes, because she can offer five hot yoga and five zero gravity yoga sessions.

D) Yes, because she can offer six hot yoga and six zero gravity yoga sessions.

13

Cuthbert is conducting a chemistry experiment that calls for a number of chemicals to be mixed in various quantities. The one amount of which he is unsure is grams of potassium, p. If Cuthbert is certain that $(3p^2 + 14p + 24) - 2(p^2 + 7p + 20) = 0$, what is one possible value of $3p + 6$, the exact number of grams of potassium that Cuthbert would like to use for this experiment?

A) 20

B) 18

C) 12

D) 10

14

What is the value of $(2 + 8i)(1 - 4i) - (3 - 2i)(6 + 4i)$? (Note: $i = \sqrt{-1}$)

A) 8

B) 26

C) 34

D) 50

15

If $2\sqrt{x} = x - 3$, which of the following is the solution set for x?

A) $\{-1, 9\}$

B) $\{1, -9\}$

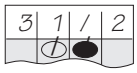
C) $\{9\}$

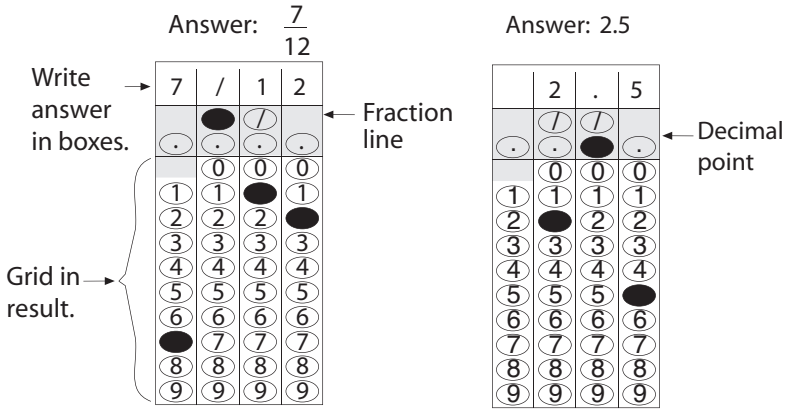
D) $\{1, 9\}$

CONTINUE

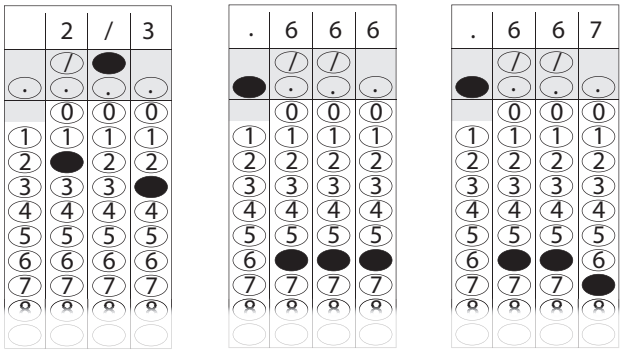
DIRECTIONS

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

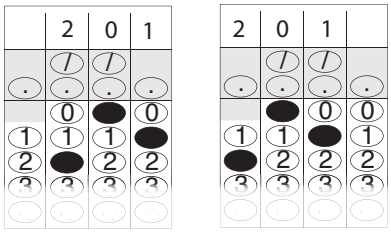
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
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 as $3\frac{1}{2}$.)
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

A group of students at Omega High School is using staples and popsicle sticks to build a scale model of the Great Wall of China as part of a project detailing China's military history. The number of staples the students will need is three times the number of popsicle sticks they will need. If the students determine they need 84 staples for this particular project, how many popsicle sticks will they need?

17

A standard parabola in the x,y-coordinate plane intersects the x-axis at (5, 0) and (–5, 0). What is the value of the x-coordinate of this parabola's line of symmetry?

18

Danielle is a civil engineer for Dastis Dynamic Construction, Inc. She must create blueprints for a wheelchair accessible ramp leading up to the entrance of a mall that she and her group are building. The ramp must be exactly 100 meters in length and make a 20° angle with the level ground. What is the horizontal distance, in meters, from the start of the ramp to the point level with the start of the ramp immediately below the entrance of the mall, rounded to the nearest meter? (Disregard units when inputting your answer.)

(Note: $\sin 20° \approx 0.324$, $\cos 20° \approx 0.939$, $\tan 20° \approx 0.364$)

CONTINUE

19

If twice a number is equal to that number minus five, what is three times that number plus seventeen minus that number?

20

Given that the equation $3x^2 + 2x - 8 = 0$ has two distinct solutions, what is the value of the smaller solution subtracted from the larger solution?

STOP

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

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

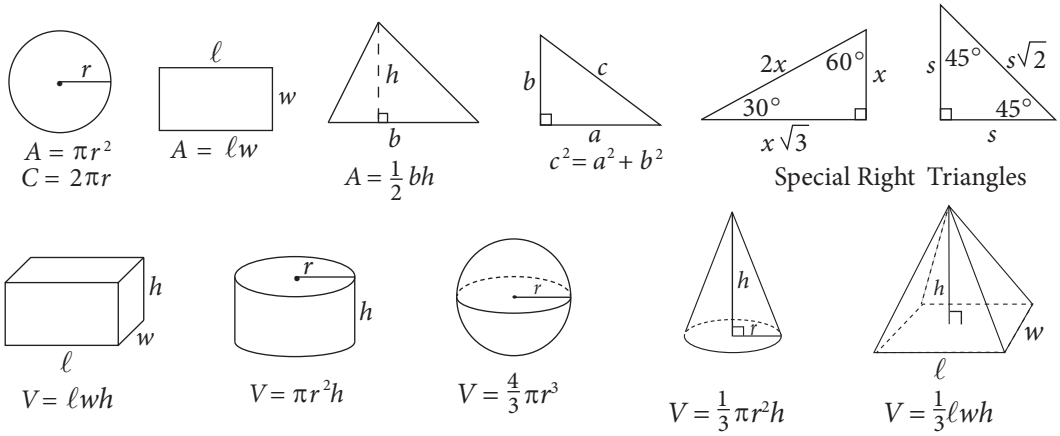
DIRECTIONS

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



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

If $3y = y + 2$, what is the value of $2y$?

A) 1

B) 2

C) 3

D) 4

2

Merry joined an online community that charges a monthly fee of $15. A one-time enrollment fee of $50 was charged when she joined. Which of the following represents the total amount of fees that Merry has paid to the community organizers after m months, in dollars?

A) $15m + 50$

B) $15 + 50m$

C) $15m - 50$

D) $(15 + 50)m$

3

Rob has his favorite guitar tuned up and ready to take to a performance by his cover band at a local venue Saturday. He decides at the last minute to take x additional guitars, just in case his favorite guitar has an issue. If the total number of guitars that Robert takes to the performance can be modeled as $x + 1$, what does the "+ 1" account for in the expression?

A) It accounts for an additional guitar that Rob returns to his house and picks up in the middle of the performance.

B) It accounts for his favorite guitar, which Rob was taking from the beginning.

C) It accounts for the number of additional guitars that Rob decided to take.

D) It accounts for an additional non-guitar musical instrument that Rob decided to take.

4

A group of 24 students was polled as to whether they enjoy biology class, chemistry class, both, or neither. The results are shown in the table below:

	Biology	Chemistry
Enjoy	14	18
Don't Enjoy	10	6

Given the above data, which of the following conclusions is true?

A) The ratio of those who enjoy biology class to those who enjoy chemistry class is 7:8.

B) The ratio of those who enjoy chemistry class to those who don't enjoy chemistry class is 9:4.

C) The ratio of those who enjoy biology class to those who don't enjoy chemistry class is 7:2.

D) The ratio of those who don't enjoy biology class to those who enjoy chemistry class is 5:9.

CONTINUE

5

Dr. Goldberg, a noted dietician, mixes different solutions as part of her research into sugar substitutes. By weight, she mixes 40% of a sample of substitute A and 70% of a sample of substitute B to create substitute C. If Dr. Goldberg initially had 60 grams of substitute A and 110 grams of substitute B, then what would be the weight, in grams, of substitute C ?

A) 24

B) 77

C) 101

D) 170

6

Which of the following is equivalent to the expression $x^4 - x^3 - x^2$?

A) $x(x^2 - x - 1)$

B) $x(x - x^2 - x^3)$

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

D) $x^2(x^2 - x - 1)$

7

Officer Blake drives his squad car 1 mile per minute while patrolling local highways during his shift. If he has driven 480 miles by the end of his shift, how many total hours did he drive his car at the above rate?

A) 8

B) 12

C) 16

D) 20

8

In the inequality $37 \leq -2x + 1$, what is the appropriate order of steps needed to solve the inequality for x ?

A) Add 1 to both sides, divide both sides by 2, and flip the inequality sign to $\geq$.

B) Subtract 1 from both sides, divide both sides by –2, and flip the inequality sign to $\geq$.

C) Add 1 to both sides, divide both sides by –2, and keep the original inequality sign.

D) Subtract 1 from both sides, divide both sides by 2, and keep the original inequality sign.

CONTINUE

9

What is the value of $(2x^2 + 4x + 8) - (2x^2 - 4x + 7)$?

A) $4x^2 + 8x + 15$

B) $2x^2 + x + 1$

C) $8x + 1$

D) $8x + 15$

10

As part of a project for his cartography elective, Adam climbs several hills to create a relief map for the woods surrounding his house. He records the vertical heights of the five hills he climbed at 55 feet, 42 feet, 38 feet, 50 feet, and 48 feet. For his project, Adam must convert his measurements to inches. If 1 foot = 12 inches, what is the measurement, in inches, of the *tallest* hill Adam will have on his map?

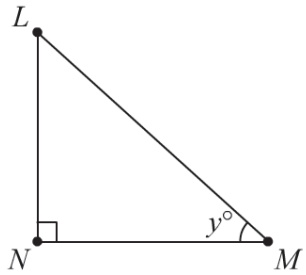
A) 660

B) 600

C) 576

D) 456

11



In the figure above, if $y = 40$ and $\overline{LN} = 8$, which of the following most closely approximates the length of $\overline{MN}$?

A) 0.10

B) 9.53

C) 10.44

D) 12.45

12

McCoy Max Speed, Inc. makes custom skateboards for its customers. Two wooden skateboards and three composite skateboards cost $650. Three wooden skateboards and one composite skateboard cost $450. How much would McCoy Max Speed charge a customer who purchases five wooden skateboards and four composite skateboards?

A) $500

B) $600

C) $1,000

D) $1,100

CONTINUE

13

The chart below shows data about the number of employees at Cuda Cola, a popular beverage company.

	2012	2013	2014
Total Employees	1,670	1,890	2,110
Percent Male	65%	60%	55%
Percent Female	35%	40%	45%

Assuming the employee total grows at the same rate each year, and male and female percentages continue to decrease and increase by 5%, respectively, approximately how many male employees will work at Cuda Cola in 2015 ?

A) 1,515

B) 1,398

C) 1,282

D) 1,165

14

John Croxley, the mayor of Black Rock, NY, is counting the number of restaurants that have opened in his town per month for the last seven months. He compiles the seven numbers into Set F, which contains the elements 4, 5, 11, 13, 16, 18, and x. If both the median and average (arithmetic mean) of Set F equal 11, what must be the value of x, the unknown number of restaurants that opened in Mayor Croxley's town last month?

A) 9

B) 10

C) 11

D) 12

15

$$17s + 20t = 59$$
$$30s + 40t = 110$$

In the system of equations above, what is the value of t in terms of s ?

A) $\frac{2s}{5}$

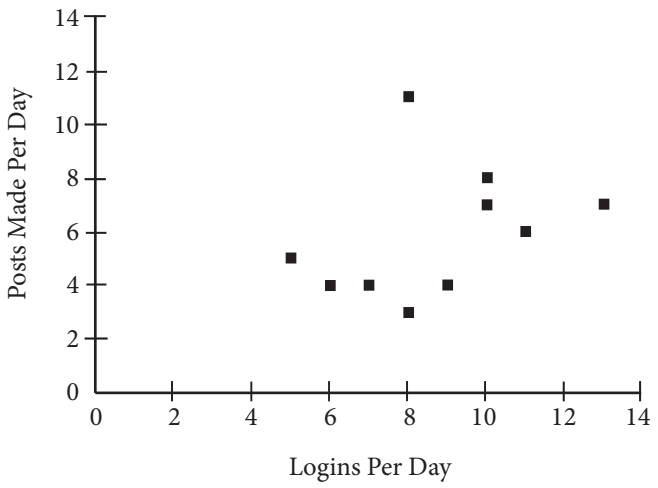
B) $\frac{s}{5}$

C) $\frac{5}{2s}$

D) $\frac{5}{s}$

CONTINUE

16



Given the scatterplot graph above, ten students at Welton Academy were polled at random about their usage of the school's new physics-centered social media app, E = MC Shared. The app was developed to encourage students to discuss physics curricula and concepts in ways that mirrored social media trends in 2013. Students were asked how many times they logged into the app each day as well as how many posts they actually made using the app. With the given data, what conclusions can be drawn about this group of students?

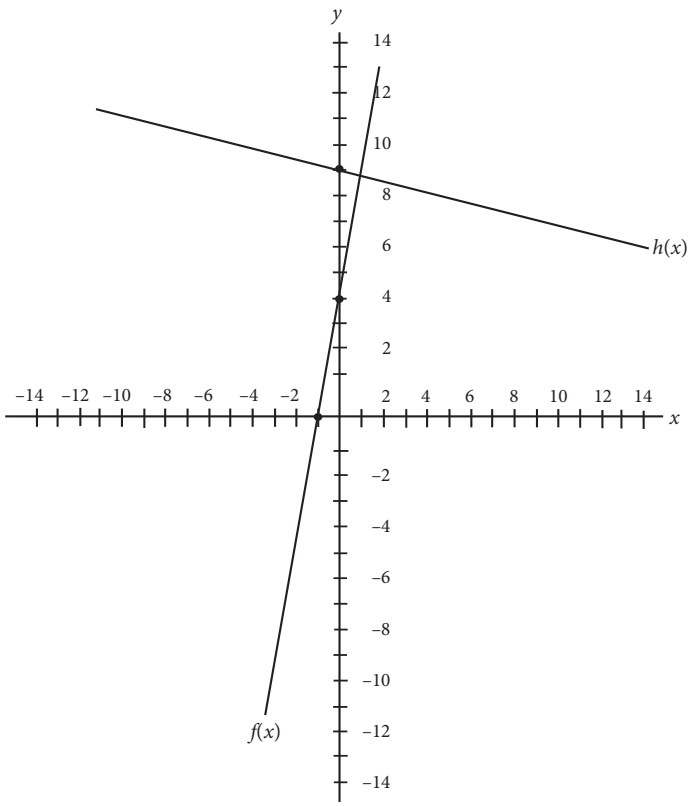
A) The majority of students polled logged in more times per day than they posted.

B) The majority of students polled posted more times per day than they logged in.

C) The majority of students polled logged in and posted an equal number of times.

D) No relationship can be drawn between logins per day and posts per day.

17



Two graphs, $f(x)$ and $h(x)$, are shown above. If $f(x) = 3x + 4$ and $f(x)$ and $h(x)$ are perpendicular, which of the following could be the equation of $h(x)$?

A) $h(x) = \frac{1}{3}x + 9$

B) $h(x) = -\frac{1}{3}x + 9$

C) $h(x) = 3x + 9$

D) $h(x) = -3x + 9$

CONTINUE

18

The number of eggs that Farmer Jones has in his chicken coop will grow exponentially as Farmer Jones buys more chickens to increase production. The number of eggs Farmer Jones has in the coop can be modeled by the equation $y = 3^x$ beginning on Day 1, where x is given by $x = 1$, and y is the number of eggs currently in the coop. If the coop can support only 4,000 eggs, and Farmer Jones empties the coop every day, on which day will the chickens produce too many eggs for the coop to support?

A) Day 6

B) Day 7

C) Day 8

D) Day 9

19

If $a = \frac{4a^2}{16}$ and a is a nonzero integer, which of the following is equivalent to a?

A) $4a$

B) $4\sqrt{a}$

C) $\sqrt{2a}$

D) $2\sqrt{a}$

20

Three different chefs work together to prepare meals for 280 dinner guests. Each works at a different speed, and their combined output throughout the night is modeled by the equation $8x + 4x + 2x = 280$. If x is a positive integer, which of the following could $8x$ represent in the equation?

A) The total meal output by the slowest chef, who made 40 meals.

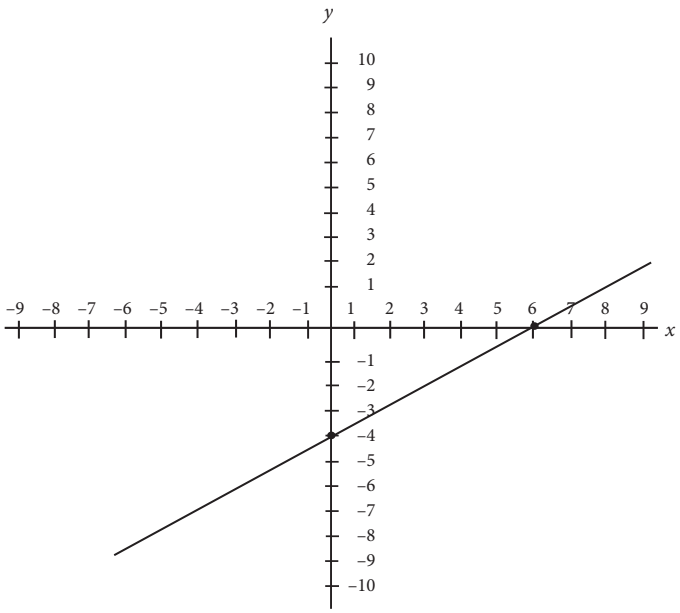
B) The total meal output by the fastest chef, who made 160 meals.

C) The total meal output by the fastest chef, who made 80 meals.

D) The difference between the output between the slowest and fastest chef, which would be 120 meals.

CONTINUE

21



The graph, $y = f(x)$, shown above models the performance of a certain crop, where x is the nutrients subtracted or added to the soil and y is the gain or loss of pieces of fruit added to the total harvest. A more powerful fertilizer that is used causes the graph $y = f(x)$ to be reflected over the line $y = x$. Which of the following best describes the behavior of the crop with the new fertilizer?

A) For every three nutrients added to the soil, the crop loses two additional fruits for the total harvest.

B) For every two nutrients added to the soil, the crop loses two additional fruits for the total harvest.

C) For every three nutrients added to the soil, the crop adds two additional fruits to the total harvest.

D) For every two nutrients added to the soil, the crop adds three additional fruits to the total harvest.

22

George and Joe both interview the same 20 fellow students regarding their interest in their school's new Model UN Club. George asked the students to respond with Interested, Sort of Interested, and Not Interested. Joe asked the students to rate their interest on a scale of 1 to 5. The results of the polls are below.

George's Poll

Response	Number of Students
Interested	8
Sort of Interested	5
Not Interested	7

Joe's Poll

Rating	Number of Students
1	5
2	4
3	3
4	4
5	4

After reviewing the data, the Model UN advisors determine that Joe informed the students of whether a 1 or a 5 was the best rating, but neglected to report to them whether it was a 1 or a 5 that was the best rating in the report. What additional piece of information would most help the advisor determine whether a 1 or 5 was the best rating?

A) Requesting that George redo his poll with the same rating system as Joe's poll

B) Requesting that Joe redo his poll with the same rating system as George's poll

C) Polling all of the students who said "Interested" in George's Poll and asking them to choose between "Extremely Interested" and "Very Interested"

D) Polling all of the students who gave a "1" rating in Joe's poll and ask them if they are interested in Model UN

CONTINUE

23

Each winter, Captain Dan's Ski Lodge rents both pairs of skis and snowboards to its guests for a flat daily rate per pair of skis and a flat daily rate per snowboard. Five pairs of skis and two snowboards will cost a family $370. Three pairs of skis and four snowboards will cost a family $390. During a particularly slow season, Captain Dan announces a 10% discount on all skis and snowboards. What would be the cost of renting two pairs of skis and two snowboards if they were rented during this discount period?

A) $99

B) $110

C) $198

D) $220

24

If $8x + 8y = 18$ and $x^2 - y^2 = -\frac{3}{8}$, what is the value of $2x - 2y$?

A) $-\frac{1}{3}$

B) $-\frac{1}{6}$

C) $\frac{1}{3}$

D) $\frac{1}{6}$

25

Shaun is developing a weight loss regimen, which includes both a workout plan and a calorie-restriction plan. Shaun wants to work out for no less than 30 minutes and no more than 60 minutes a day and consume no less than 2,000 and no more than 2,500 calories. If each minute, m, of his workout time burns 50 calories, which of the following inequalities represents the number of minutes, m, that Shaun can work out each day to burn off as many calories as he consumes?

A) $30 \leq m \leq 60$

B) $30 \leq m \leq 50$

C) $40 \leq m < 50$

D) $40 \leq m \leq 50$

26

A professional baseball team wishes to average 45,500 ticket purchases per game for the entire 162-game season. Through the first 60 games of the season, the team has averaged 43,000 ticket purchases per game. Which of the following most closely approximates how many ticket purchases per game the team must average for the remainder of the season in order to hit its overall goal of an average of 45,500 ticket purchases per game for the season?

A) 46,970

B) 47,880

C) 48,000

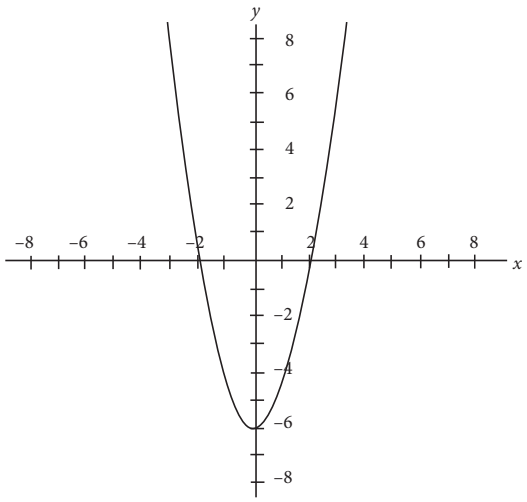
D) 48,220

CONTINUE

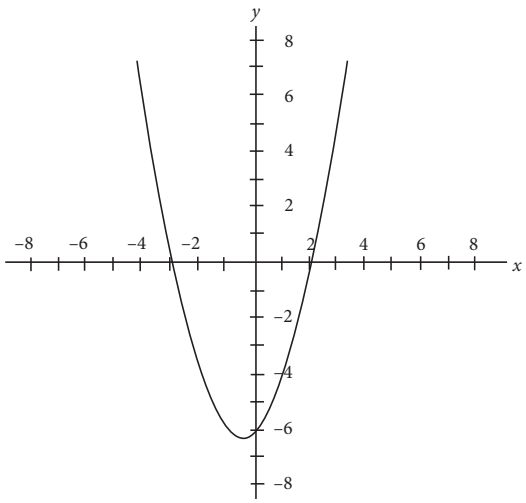
27

A certain polynomial, P, has a degree of 2. Polynomial P has zeros of 2 and –3, and $a > 0$ when the function of polynomial P is written in the form of $y = ax^2 + bx + c$. Given this information, which of the following could be the graph of polynomial P ?

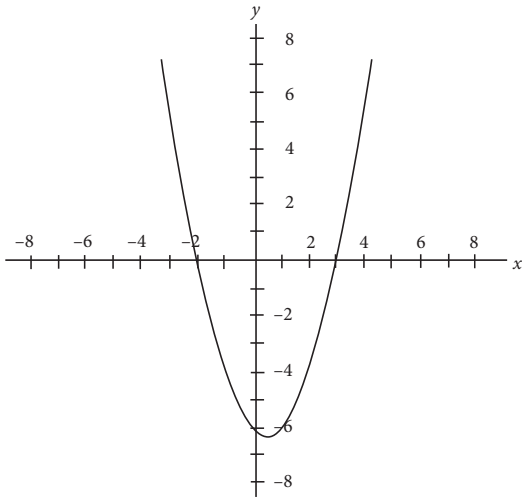
A)



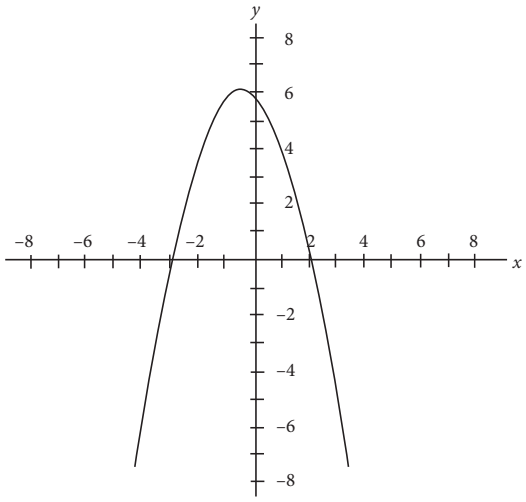
B)



C)



D)



CONTINUE

28

Circle O (not shown) is divided into three sectors. Points P, Q, and R are on the circumference of the circle. Sector POR has an area of 8π, and sector ROQ has an area of 6π. If the radius of circle O is 4, what is the measure of the central angle of sector QOP, in degrees?

A) 45

B) 90

C) 135

D) 180

29

Medical residents at Lakewood Hospital are choosing their individual specialties. Among them, 40% choose cardiology, 16% choose oncology, 34% choose endocrinology, and the remaining x% choose hematology. Once the doctors pick their first specialty, they are then each asked to choose a second specialty from the previous four options in case their original specialty is already filled. They may not pick their original specialty again. 20% of those who originally picked cardiology choose oncology as their second choice. If no other field chooses oncology as their second choice, and the hospital boasts 200 medical residents, then what is the total number of residents who named oncology as either their first or second choice, in terms of x ?

A) $8x - 128$

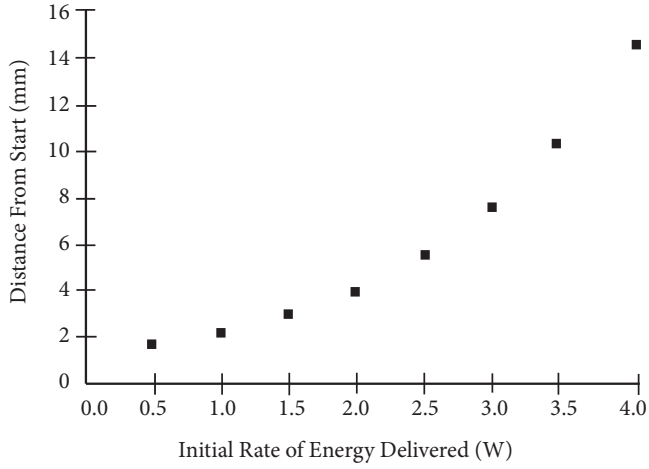
B) $8x - 144$

C) $x^2 + 24x - 188$

D) $x^2 - 24x + 188$

30

Mr. Lastorka's science class is running experiments with an energy-efficient model electric car. As the initial rate of energy delivered to the car, measured in watts, increases, the number of millimeters moved by the car from its starting position increases exponentially. The results of several trial runs are shown on the scatterplot graph below.



Based on the data, the students in Mr. Lastorka's class determine the exact equation involving Watts, x, and total distance from start, y . They call the function $y = f(x)$. Mr. Lastorka then instructs his class to reflect $y = f(x)$ over the x-axis. He challenges each student to determine the new function and what it would mean from a physics perspective. Four student pairs gave their answers below. Who is correct, and for what reasons?

A) Charles and Shannon, who identify the new equation as $y = -2^x$ and explain that the new graph indicates that the car is still moving forward at the same rate as before

B) Michael and Lauren, who identify the new equation as $y = -2^x$ and explain that the new graph indicates the car is now moving in reverse at the same rate as before

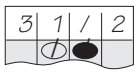
C) Matthew and Karen, who identify the new equation as $y = 2^{-x}$ and explain that the new graph indicates that the car is now moving forward more rapidly than before

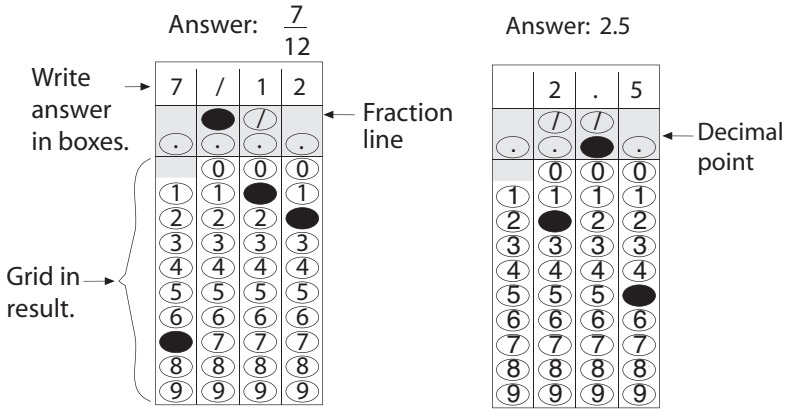
D) Andy and Joanie, who identify the new equation as $y = 2^{-x}$ and explain that the new graph indicates that the car is no longer moving in any direction

CONTINUE

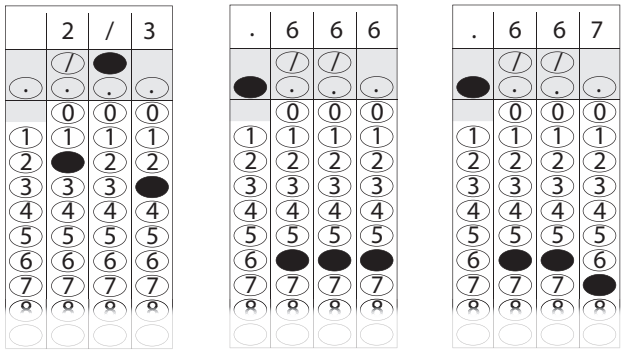
DIRECTIONS

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

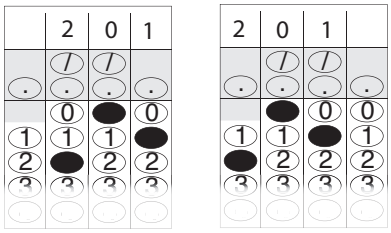
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
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 as $3\frac{1}{2}$.)
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

What number divided by two is equal to that same number minus 15 ?

32

The number of hours Robert spends in his game room is proportional to the number of hours he spends playing *Call of Destiny IV: Modern Battlefield*. If he plays *Call of Destiny IV* for 6 hours, he will spend 8 hours in his game room. How many hours will Robert spend in his game room if he plays *Call of Destiny IV* for only 3 hours?

33

Twelve Smooth-Glide pens and eight Easy-Write pencils cost exactly $16.00 at Office World. Six Smooth-Glide pens and ten Easy-Write pencils cost $11.00 at the same location. How much will nine Smooth-Glide pens and nine Easy-Write pencils cost at Office World? (Disregard the dollar sign when gridding your answer.)

34

In the equation $3x^2 - 16x = -20$, what is one possible value of x ?

CONTINUE

35

Anthropologists determine that new dwellings in an ancient farming community were constructed monthly as modeled by the function $f(x) = 2x + 100$, where x is the current month of the year and $f(x)$ is the number of dwellings constructed by the end of that month. Additionally, they determine that the population grew exponentially each month, thanks to the discovery of more fertile land for farming. This growth is modeled by the equation $g(x) = 3^x$, where $g(x)$ represents the current population at the end of a given month. What is the smallest integer value of x, with 1 representing the end of January and 12 representing the end of December, at which the population surpasses the number of dwellings built?

36

In a school-wide competition held at Saul C. Tigh Memorial High School, Olympiad teams are challenged to come up with different circuits involving both real and imaginary currents. Imaginary currents exist in spots where the electrical energy encounters zero resistance, such as through a coil or wire. Real currents exist only where the electrical energy headed through the circuit encounters resistance, such as when a light bulb "resists" the current and takes up some of the energy carried throughout the circuit.

The members of Team Charlie develop a circuit in which the total current, real and imaginary, can be measured at $50 + 12i$ amps. They then add the current together with the current produced by Team Delta's circuit, $40 - 9i$ amps. Finally, they decide to multiply the resulting current, in amps, by Team Epsilon's total current, $60 - 2i$ amps. What is the final current, in amps, after the entire process is completed?

Questions 37 and 38 refer to the following information.

The chart below shows the population distribution for the 2,400 occupants of the city of Centre Hill.

	Adult Male	Adult Female	Child
% Living in Uptown	9	8	6
% Living in Midtown	22	20	15
% Living in Downtown	21	22	12
% Living in Suburbs	48	50	67

37

If there are an equal number of adults and children, and adult females outnumber adult males by 200, what is the sum of the women living uptown and the children living in the suburbs of Centre Hill?

38

Centre Hill plans to annex the area around a nearby lake. This new part of Centre Hill will be called, appropriately, The Annex. The Annex will add to the current population of Centre Hill. The percent of adult males living in Uptown will decrease to 6% after incorporating The Annex into Centre Hill. If the information from Part 1 holds true for the original four districts of the city of Centre Hill, then how many adult males live in The Annex?

STOP

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

SAT Essay

ESSAY BOOK

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 sheet 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 in print so that what you are writing is legible to those readers.

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

REMINDER

— Do not write your essay in this booklet. Only what you write on the lined pages of your answer booklet will be evaluated.

— An off-topic essay will not be evaluated.

CONTINUE

As you read the passage below, consider how the author 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.

"Robert Redford: Protect Our Wild Horses" by Robert Redford, published in *USA Today,* November 3, 2014.

1 Horses and I have had a shared existence, personal and professional, for as long as I can remember. And while I carry a strong passion for all horses, my tenacious support for the preservation of habitat for wildlife and the American mustangs derives from their symbolic representation of our national heritage and freedom.

2 Any infringement on their legally protected right to live freely is an assault on America's principles. The varied and subjective interpretation of laws intended to protect these animals on our public lands, continues to leave wild horses under attack.

3 Recent "stand-offs" between ranchers and the federal government are reminiscent of old westerns. But this American tragedy does not have a hero riding in to save the day, and wild horses have become the victim in the controversies over our public land resources.

4 In 1971, as a result of concern for America's dwindling wild horse populations, the US Congress passed the Wild Free Roaming Horse and Burro Act. The act mandated that the Bureau of Land Management (BLM), protect free roaming wild horses and burros, under a multiple use management policy, on designated areas of our public lands.

5 The BLM manages 245 million acres of our public lands, with livestock grazing permits on 155 million acres. Wild horses are designated to share a mere 26.9 million acres. That means only 17 percent of BLM-managed public land is made available to wild horses. Wild horse populations vary between 32,000 and 50,000, while livestock grazing allocations accommodate numbers in the millions. Yes, in the millions.

6 Advocates are only asking that the horses be treated fairly. Wild horses are consistently targeted as the primary cause of negative impact to grazing lands resulting from decades of propaganda that ignores math, science and solutions that can be implemented today.

7 Ranchers hold nearly 18,000 grazing lease permits on BLM land alone. Grazing costs on BLM land go for $1.35 per cow and calf pair, well below the market rate of $16. This price disparity derived from BLM's current permit policy establishes an uneven playing field on grazing economies. Understandably, ranchers have a vested interest in maintaining the status quo.

CONTINUE

8 Although less than 3 percent of America's beef is produced on federal land, this subsidized grazing program costs the taxpayer more than $123 million dollars a year, and more than $500 million when indirect costs are accounted for.

9 The long-term economic success of public lands lies in maintaining a bio-diverse ecosystem within its boundaries. However, understanding the need for a preservation balance in thriving agricultural communities often becomes sidelined.

10 The BLM needs to comply with its original "multiple use" principle in managing wild horses and burros. In light of the inequitable share of livestock on BLM land, the ongoing persecution of wild horses and those that value them is unacceptable and threatens the very spirit of the American West. I urge Congress to stand up for much needed reform of the BLM's wild horse and burro program and livestock grazing on federal lands.

11 Now is not the time to repudiate environmental balance, but rather it is the time for all of us to work together—politician, advocate, rancher, scientist, and citizen. Only by doing this will the United States move forward and be a leader in environmental issues and ensure sustainability to our delicate ecosystem.

Write an essay in which you explain how Robert Redford builds an argument to convince Congress to do more to protect wild horses. In your essay, analyze how Redford uses one or more of the features listed 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 aspects of the passage.

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

END OF TEST

DO NOT RETURN TO A PREVIOUS SECTION.

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Completely darken bubbles with a No. 2 pencil. If you make a mistake, be sure to erase mark completely. Erase all stray marks.

1.
YOUR NAME: (Print) _____ (Last) _____ (First) _____ (M.I.)
SIGNATURE: _____ DATE: ___/___/___
HOME ADDRESS: (Print) _____ (Number and Street)
_____ (City) _____ (State) _____ (Zip Code)
PHONE NO.: (Print) _____

IMPORTANT: Please fill in these boxes exactly as shown on the back cover of your test book.

2. TEST FORM

3. TEST CODE

4. REGISTRATION NUMBER

3. TEST CODE					4. REGISTRATION NUMBER					
0	A	J	0	0	0	0	0	0	0	0
1	B	K	1	1	1	1	1	1	1	1
2	C	L	2	2	2	2	2	2	2	2
3	D	M	3	3	3	3	3	3	3	3
4	E	N	4	4	4	4	4	4	4	4
5	F	O	5	5	5	5	5	5	5	5
6	G	P	6	6	6	6	6	6	6	6
7	H	Q	7	7	7	7	7	7	7	7
8	I	R	8	8	8	8	8	8	8	8
9			9	9	9	9	9	9	9	9

6. DATE OF BIRTH

Month	Day		Year	
JAN				
FEB	0	0	0	0
MAR	1	1	1	1
APR	2	2	2	2
MAY	3	3	3	3
JUN		4	4	4
JUL		5	5	5
AUG		6	6	6
SEP		7	7	7
OCT		8	8	8
NOV		9	9	9
DEC				

7. SEX
- MALE
- FEMALE

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5. YOUR NAME

First 4 letters of last name					FIRST INIT	MID INIT
A	A	A	A		A	A
B	B	B	B		B	B
C	C	C	C		C	C
D	D	D	D		D	D
E	E	E	E		E	E
F	F	F	F		F	F
G	G	G	G		G	G
H	H	H	H		H	H
I	I	I	I		I	I
J	J	J	J		J	J
K	K	K	K		K	K
L	L	L	L		L	L
M	M	M	M		M	M
N	N	N	N		N	N
O	O	O	O		O	O
P	P	P	P		P	P
Q	Q	Q	Q		Q	Q
R	R	R	R		R	R
S	S	S	S		S	S
T	T	T	T		T	T
U	U	U	U		U	U
V	V	V	V		V	V
W	W	W	W		W	W
X	X	X	X		X	X
Y	Y	Y	Y		Y	Y
Z	Z	Z	Z		Z	Z

Test 4

Start with number 1 for each new section.
If a section has fewer questions than answer spaces, leave the extra answer spaces blank.

Section 1—Reading

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

Section 2—Writing and Language Skills

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

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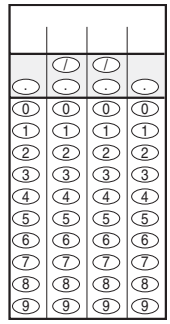
Completely darken bubbles with a No. 2 pencil. If you make a mistake, be sure to erase mark completely. Erase all stray marks.

Test 4 Start with number 1 for each new section.
If a section has fewer questions than answer spaces, leave the extra answer spaces blank.

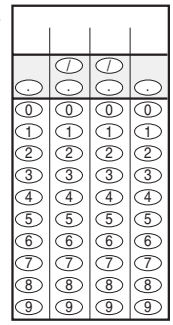
Section 3—Mathematics: No Calculator

1. (A) (B) (C) (D)
2. (A) (B) (C) (D)
3. (A) (B) (C) (D)
4. (A) (B) (C) (D)
5. (A) (B) (C) (D)
6. (A) (B) (C) (D)
7. (A) (B) (C) (D)
8. (A) (B) (C) (D)
9. (A) (B) (C) (D)
10. (A) (B) (C) (D)
11. (A) (B) (C) (D)
12. (A) (B) (C) (D)
13. (A) (B) (C) (D)
14. (A) (B) (C) (D)
15. (A) (B) (C) (D)

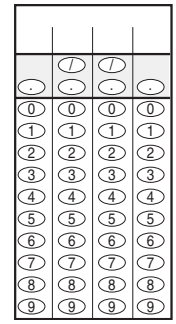
16.



17.



18.



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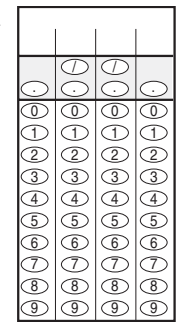
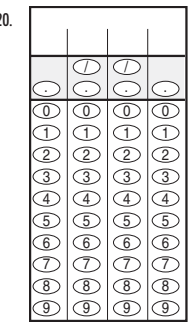


20.



Section 4—Mathematics: Calculator

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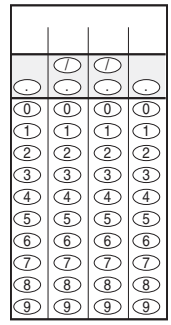
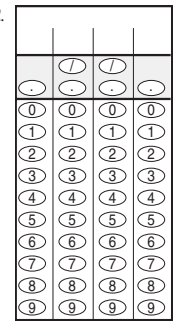
17. (A) (B) (C) (D)
18. (A) (B) (C) (D)
19. (A) (B) (C) (D)
20. (A) (B) (C) (D)
21. (A) (B) (C) (D)
22. (A) (B) (C) (D)
23. (A) (B) (C) (D)
24. (A) (B) (C) (D)
25. (A) (B) (C) (D)
26. (A) (B) (C) (D)
27. (A) (B) (C) (D)
28. (A) (B) (C) (D)
29. (A) (B) (C) (D)
30. (A) (B) (C) (D)

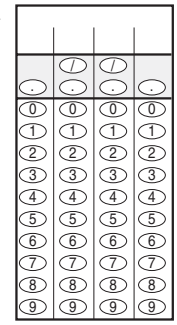
31.



32.



33.



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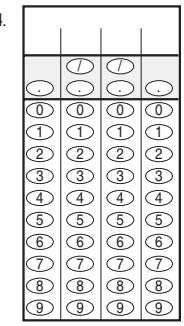

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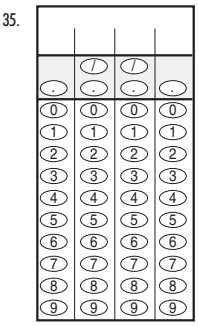

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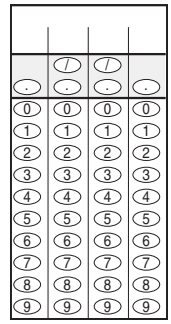

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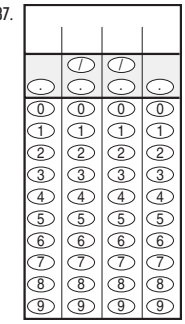

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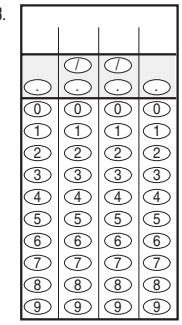

RAW SCORE CONVERSION TABLE SECTION AND TEST SCORES

Raw Score *(# of correct answers)*	Math Section Score	Reading Test Score	Writing and Language Test Score
0	200	10	10
1	200	10	10
2	210	10	10
3	230	11	10
4	240	12	11
5	260	13	12
6	280	14	13
7	290	15	13
8	310	15	14
9	320	16	15
10	330	17	16
11	340	17	16
12	360	18	17
13	370	19	18
14	380	19	19
15	390	20	19
16	410	20	20
17	420	21	21
18	430	21	21
19	440	22	22
20	450	22	23
21	460	23	23
22	470	23	24
23	480	24	25
24	480	24	25
25	490	25	26
26	500	25	26
27	510	26	27
28	520	26	28
29	520	27	28

Raw Score *(# of correct answers)*	Math Section Score	Reading Test Score	Writing and Language Test Score
30	530	28	29
31	540	28	30
32	550	29	30
33	560	29	31
34	560	30	32
35	570	30	32
36	580	31	33
37	590	31	34
38	600	32	34
39	600	32	35
40	610	33	36
41	620	33	37
42	630	34	38
43	640	35	39
44	650	35	40
45	660	36	
46	670	37	
47	670	37	
48	680	38	
49	690	38	
50	700	39	
51	710	40	
52	730	40	
53	740		
54	750		
55	760		
56	780		
57	790		
58	800		

Please note that the numbers in the table may shift slightly depending on the SAT's scale from test to test; however, you can still use this table to get an idea of how your performance on the practice tests will translate to the actual SAT.

CONVERSION EQUATION SECTION AND TEST SCORES