



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 Charlotte Brontë, *Jane Eyre*, originally published in 1847.

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.

5 “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?”

10 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
60 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
65 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?”

70 “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?”

75 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.



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.

Line
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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?

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25
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.

30
35
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.

40
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
45 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
50 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
55 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.

60
65
70
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
70 acceptable to discuss women’s rights as separate from human rights.

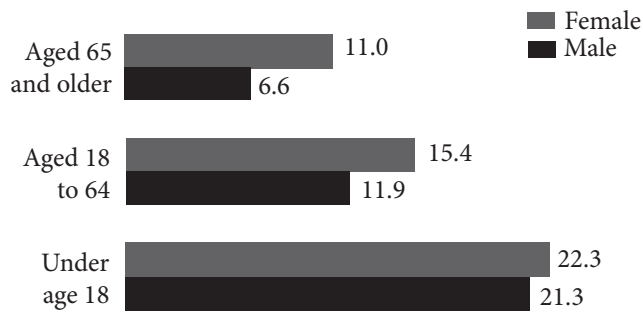
If there is one message that echoes forth from this conference, let it be that human rights are women’s rights and women’s rights are human rights once and
75 for all. Let us not forget that among those rights are the right to speak freely—and the right to be heard.

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
80 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.

85
90
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 . . . 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

The principal rhetorical effect of the phrase in lines 73–75 (“let it . . . 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.

18

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”)

19

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.

20

According to the figure, in the United States in 2012,

- A) people aged 18 to 64 were more likely to live in poverty than were people under 18 years of age.
- B) the greatest poverty rates existed among people over the age of 65.
- C) the smallest gender disparity in poverty rates existed among people under the age of 18.
- D) the gender disparity in poverty rates among those aged 18 to 64 was greater than that among people aged 65 and older.

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 heroizing 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
 85 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.



28

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

- A) Lines 46–49 (“And here . . . 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 . . . Parthenon”)
- B) Lines 13–14 (“This . . . reliefs”)
- C) Lines 15–17 (“The Panathenaic . . . time”)
- D) Lines 19–25 (“In the . . . turn”)

CONTINUE 

Questions 32–42 are based on the following passage.

The passage is adapted from Elsa Youngsteadt, “Free Upgrades, Unfortunately.” ©2006 by *American Scientist*.

Line
5
Contrary to infectious-disease dogma, the mutations that enable bacteria to resist antibiotics do not always result in weaker strains, according to a study published in the June 30 issue of the journal *Science*. This is bad news for public-health efforts, especially because the germ in question is the tuberculosis-causing *Mycobacterium tuberculosis*, once the leading cause of death in the United States.

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Classic laboratory experiments once suggested that bacteria pay a price for antibiotic resistance—that resistant bacteria are weaker than their susceptible counterparts and should not spread through the human population when forced to compete with harder strains.

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But the new study, headed by scientists at Stanford University, has undermined this comforting conventional wisdom. It shows that in real human patients, tuberculosis bacteria can evolve resistance to antibiotics and still be just as aggressive as their susceptible ancestors.

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“It’s generally bad news for the world that some tuberculosis strains can get something for nothing,” said Sebastien Gagneux, one of the lead authors of the study and a research associate at the Institute of Systems Biology. “Even though many drug-resistant strains are less hardy than susceptible strains, others evolve over the course of treatment and remain virulent.”

30
The investigators looked at the evolution of resistance to the drug rifampin, one of the preferred first-line treatments for the disease. Rifampin binds to the molecule that makes, or polymerizes, bacterial RNA. The drug disables the so-called polymerase molecule and prevents the crucial flow of information from DNA to RNA. Without RNA, bacteria can’t make the proteins they need to survive. But simple mutations in the gene that encodes RNA polymerase can change its structure. The different shape decreases the drug’s ability to bind and allows *M. tuberculosis* to persist in the face of antibiotic onslaught. Classic studies suggested that such a change would carry some cost, such as decreased efficiency of the polymerase molecule. Such a penalty would cause the mutants to grow more slowly than unmodified strains, thereby

45
retarding the spread of the antibiotic-resistant mutation in the population.

50
Not so, according to the new study, which found that some resistant bugs are every bit as robust as unmodified strains. The Stanford group collected tuberculosis bacteria from the sputum of patients, first at the beginning of their infections, and a second time after some of those patients developed rifampin-resistant infections. The investigators then pitted the resistant strains against their susceptible counterparts in antibiotic-free competition assays. These tests force the two strains to compete for limited resources in a common culture flask, so the harder bug should take over as the weaker one gets crowded out. Contrary to expectations, five of the ten resistant strains held their own in these tests, and one actually dominated its antibiotic-susceptible ancestor.

60
Just how clinical isolates outperform lab-generated strains with identical mutations remains a mystery. Some changes simply have a low cost to begin with, and, the study also found, the cost depends on the strain in which the mutation occurs. However, the real key is likely to be compensatory mutation—one or more additional changes, in the same RNA polymerase gene or in related genes, that make up for the diminished function caused by the original mutation. Gagneux is planning future studies to find these putative compensatory mutations and learn how they restore the performance of strains that acquire antibiotic-resistance mutations.

75
The authors don’t want their study to fuel an alarmist panic. Indeed, the data don’t call for it, says Bruce Levin, an expert on the evolution of antibiotic resistance at Emory University who was not involved with the study. Levin points out that “the spread of tuberculosis does not depend solely on the efficacy or lack of efficacy of antibiotics.” He cites public-health practices and better nutrition as bulwarks against 19th-century-style epidemics.

85
However, the paper does highlight a sobering trend in human epidemiology. Drug-resistant bacteria are here to stay, even if society stopped abusing antibiotics right now. Furthermore, evolution doesn’t just work on bacteria. Levin explains, “The drug-resistant mutations that aren’t costly are the ones that will take over, not only in the bacteria responsible for tuberculosis but also in [organisms] responsible for other diseases.”

CONTINUE 

32

The primary purpose of the passage is to

- A) support the findings of classic laboratory experimentation.
- B) assert that controversial findings should cause alarm.
- C) present concerns raised by the results of a study.
- D) criticize the methodology of an existing study.

33

What did the scientists in the Stanford University study discover about tuberculosis bacteria that “undermined this comforting conventional wisdom” (lines 16–17)?

- A) Bacteria have shown the ability to resist antibiotics through mutation without losing strength.
- B) *Mycobacterium tuberculosis* has become the leading cause of death in the United States.
- C) RNA and DNA interchangeability in tuberculosis has led to stronger antibiotics.
- D) Rifampin can no longer be used to treat disease due to proliferation of polymerase molecules.

34

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

- A) Lines 35–36 (“Without . . . survive”)
- B) Lines 49–53 (“The Stanford . . . infections”)
- C) Lines 58–61 (“Contrary . . . ancestor”)
- D) Lines 64–66 (“Some . . . occurs”)

35

As used in line 26, “hardy” most nearly means

- A) difficult.
- B) strong.
- C) terrible.
- D) thick.

36

Which statement about rifampin can be most reasonably inferred from the passage?

- A) It stopped tuberculosis from being the leading cause of death in the United States.
- B) It has successfully inhibited protein production in bacteria.
- C) It makes RNA for tuberculosis bacteria compatible with other DNA.
- D) It is the most effective known treatment for tuberculosis.

37

As presented in the passage, the Stanford University study relied on which type of evidence?

- A) Anecdotal opinion
- B) Secondhand observation
- C) Animal studies
- D) Clinical testing

38

The author indicates that prior to the Stanford University study the scientists generally believed that antibiotic-resistant strains of tuberculosis

- A) had a better chance of survival than their antibiotic-susceptible ancestors.
- B) would once again become the most deadly of diseases.
- C) resulted in lowered amounts of sputum in those they infect.
- D) did not have a survival rate equal to that of non-resistant strains.

CONTINUE 

39

According to the passage, Sebastien Gagneux plans to conduct further studies to answer which of the following questions?

- A) Are more virulent strains of tuberculosis likely to cause a panic?
- B) Do drug-resistant bacteria cost more to treat?
- C) How do antibiotic-resistant bacteria compensate for deficiencies caused by mutation?
- D) Why are some strains of bacteria more likely to resist antibiotics than others?

40

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

- A) Lines 71–74 (“Gagneux . . . mutations”)
- B) Lines 79–81 (“the spread . . . antibiotics”)
- C) Lines 85–87 (“Drug-resistant . . . now”)
- D) Lines 88–89 (“The drug-resistant . . . over”)

41

The author mentions an “alarmist panic” (line 76) most likely in order to

- A) bring attention to the threat posed by antibiotic-resistant bacteria.
- B) state that 19th century public-health practices were unable to halt the spread of tuberculosis.
- C) identify the inevitable result of rampant societal antibiotic abuse.
- D) draw a contrast between an undesirable reaction and a reasonable response.

42

The primary function of the final paragraph (lines 84–91) is to

- A) reevaluate the hypothesis of the Stanford University study.
- B) provide a warning supported by results of the Stanford University study.
- C) credit the Stanford University study with changing society.
- D) explain the methodology of the Stanford University study.

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 (km³)—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.

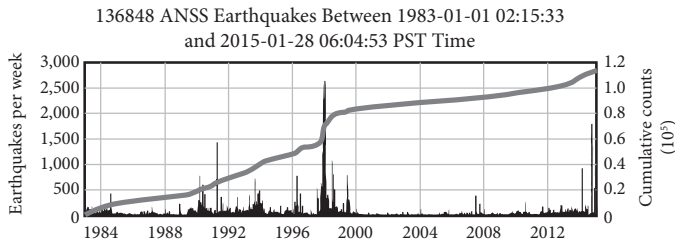
The most intense of these swarms began in May 1980 and included four strong magnitude 6 shocks, three on the same day. Following these shocks, scientists from the U.S. Geological Survey (USGS) began a reexamination of the Long Valley area, and they soon detected other evidence of unrest—a dome-like uplift 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 km²), 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 (CO₂) 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 . . . California”)
- C) Lines 58–60 (“Today, . . . caldera”)
- D) Lines 70–72 (“Such . . . 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 . . . surface”)
- B) Lines 19–24 (“The volcanic . . . mid-1800s”)
- C) Lines 25–27 (“Although . . . frequently”)
- D) Lines 75–77 (“However . . . 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 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 **1** gawked at the natural beauty and diversity of the **2** 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

- A) NO CHANGE
- B) marveled
- C) pondered
- D) stared

2

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

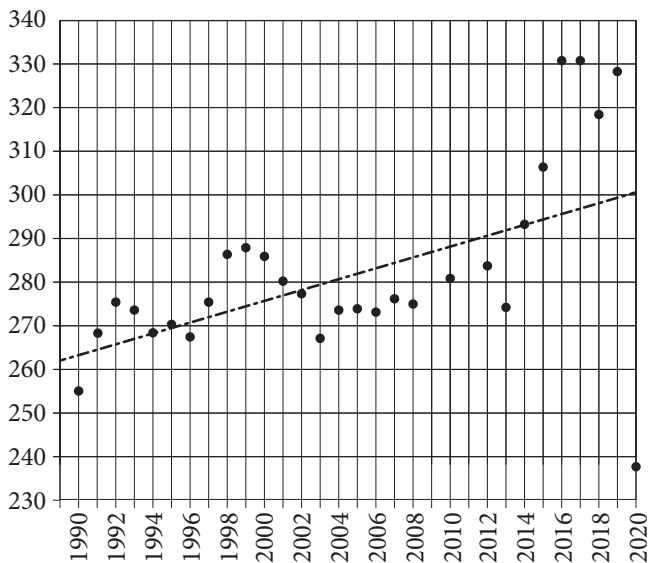
7

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



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 before the 2020 pandemic, the general trend has been a steady rise. The numbers continue to be high, with over 230 million visitors in 2020. It seems that as economic conditions in the country are uncertain, more and more people turn to parks for economical, **10** educational; and enlightening alternatives to the more costly tourist activities and trips. Now, too, that climate science has 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, 1990–2020 (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 late 1990s and has tapered off since then.
- C) Park visitation reached record lows in 2003.
- D) Park visitation has risen in a linear progression since the early 1990s.

10

- A) NO CHANGE
- B) educational, and
- C) educational—and,
- D) educational and,

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
- C) Because the
- D) Although the

CONTINUE 

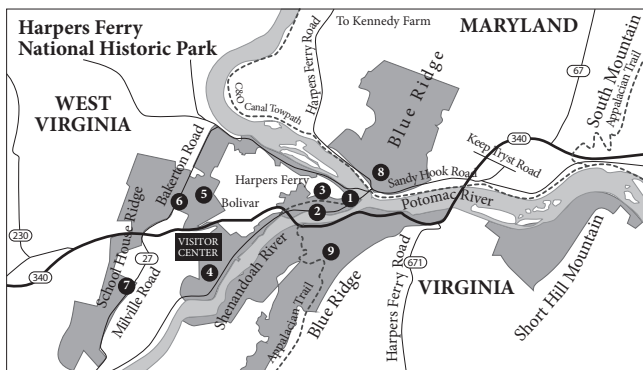
Questions 12–22 are based on the following passage and supplementary material.

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,
- C) one, of the major industrial towns
- D) one of the major industrial towns

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 toward 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;
- C) town.
- D) town,



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 large amount of recently republished works, Wes Anderson cites Zweig as the major influence on Anderson’s recent film **23** (*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

- A) NO CHANGE
- B) *The Grand Budapest Hotel* 2014.
- C) (*The Grand Budapest Hotel*), 2014.
- D) *The Grand Budapest Hotel* (2014).

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.



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.



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, a **34** 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) piece of toast, and a few strips of bacon,
- C) piece, of toast, and a few strips, of bacon,
- D) 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, the nomadic 37 chimpanzees set up their campsites within striking distance of the ripe fruits. When the fruits were 38 "lively," 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) chimpanzee sets up their
- C) chimpanzee sets up its
- D) chimpanzees set up its

38

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

- A) NO CHANGE
- B) "desiccated,"
- C) "ephemeral,"
- D) "eternal,"

39

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

40

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



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 **44** animals and with each discovery, we learn a new way to relate to the world around us.

41

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

42

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

43

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

44

- A) NO CHANGE
- B) animals,
- C) animals and:
- D) animals—and

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.

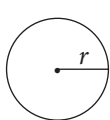
DIRECTIONS

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

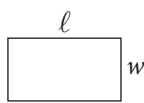
1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated,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

REFERENCE

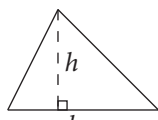


$$A = \pi r^2$$

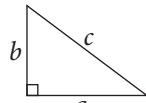
$$C = 2\pi r$$



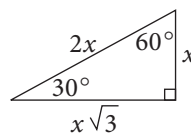
$$A = \ell w$$



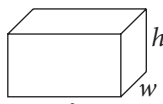
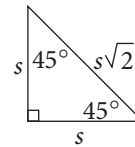
$$A = \frac{1}{2}bh$$



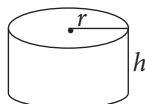
$$c^2 = a^2 + b^2$$



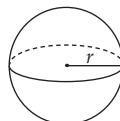
Special Right Triangles



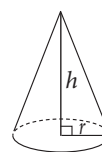
$$V = \ell wh$$



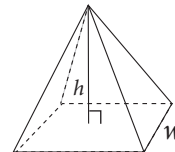
$$V = \pi r^2 h$$



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



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



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

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?

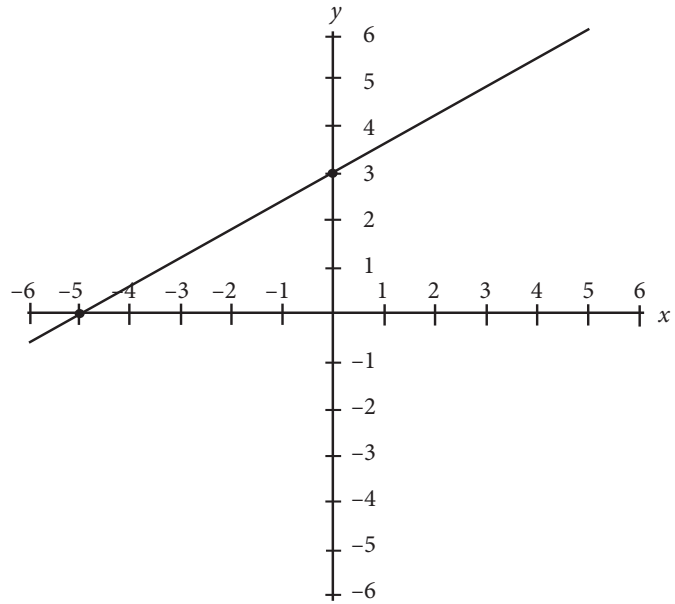
- A) -7
- B) -6
- C) -4
- D) -3

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) $\frac{\sin 35^\circ}{3}$
- B) $\frac{\sin 55^\circ}{3}$
- C) $\frac{3}{\sin 55^\circ}$
- D) $\frac{3}{\sin 35^\circ}$

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

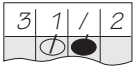
If $2\sqrt{x} = x - 3$, which of the following is the solution set for x ?

- A) $\{-1, 9\}$
- B) $\{1, -9\}$
- C) $\{9\}$
- D) $\{1, 9\}$



DIRECTIONS

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

- 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.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- 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 $3\frac{1}{2}$.)
- 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.

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

Write answer in boxes. →

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

← Fraction line

Grid in result. →

Answer: 2.5

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

← Decimal point

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

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

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

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

Answer: 201 – either position is correct

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

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

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



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 xy -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? (Note: Disregard units when inputting your answer, $\sin 20^\circ \approx 0.324$, $\cos 20^\circ \approx 0.939$, $\tan 20^\circ \approx 0.364$)

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.

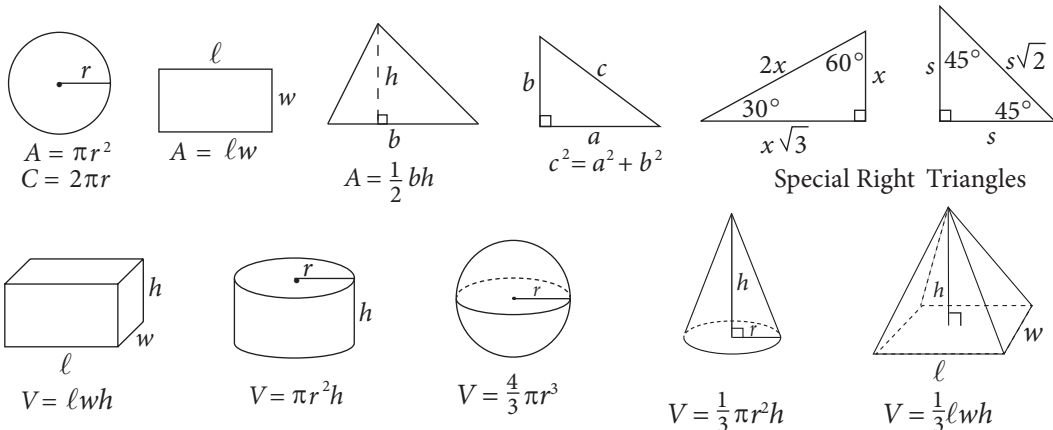
DIRECTIONS

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 .

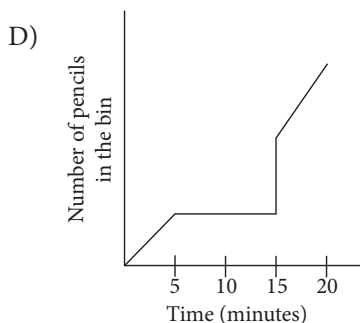
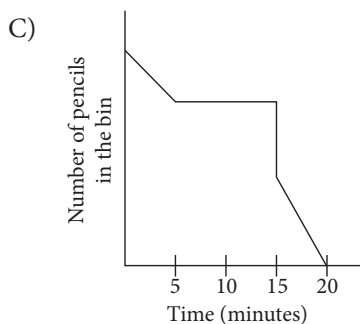
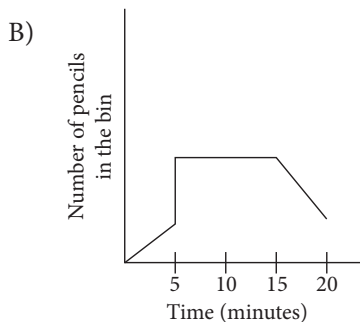
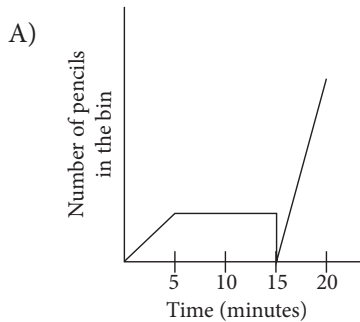
The sum of the measures in degrees of the angles of a triangle is 180.

CONTINUE



1

A pencil-making machine is slowly filling a bin with pencils. After about five minutes, the machine jams, preventing pencils from falling into the bin. A technician notices the problem ten minutes later and clears the jam, causing all of the backed-up pencils to fall into the bin. In order to make up for lost time, the technician then increases the rate at which the machine operates. Which of the following graphs could represent this situation?



2

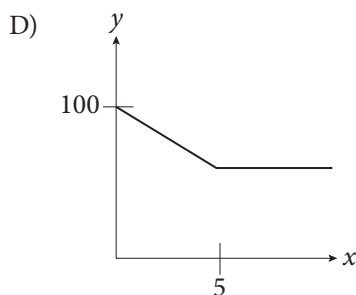
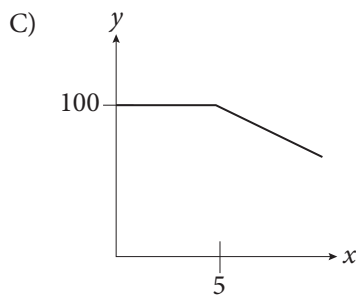
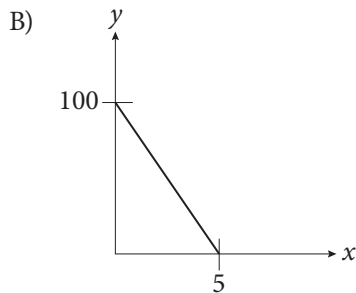
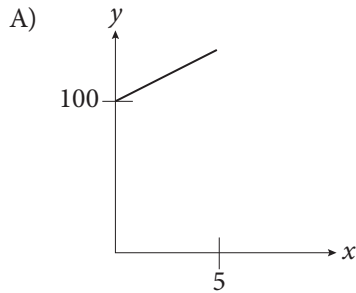
A submarine currently operating at 100 feet below the surface of the ocean begins to dive to increased depths at a rate of 30 feet per minute. Which of the following equations represents the submarine's depth below the surface, d , in feet, m minutes after beginning to dive?

- A) $d = 100 + 30m$
 B) $d = 100 - 30m$
 C) $d = 100 - 30$
 D) $d = 100m - 30$



3

A craft store sells specialty beads for \$1.00 for a single bead but will give a discount if a customer buys more than one bead. For each bead after the first, the price per bead goes down until it reaches 75 cents per bead, the lowest possible price, once 5 or more beads are purchased. Which of the following graphs represents the cost per bead in cents, y , of buying x beads in a single visit?



4

For the function defined as $g(x) = \frac{x-2}{3}$, what is the value of $g(-4)$?

- A) -2
- B) $-\frac{2}{3}$
- C) $\frac{2}{3}$
- D) 2

5

If $18 + d = 12$, what is the value of $5d$?

- A) -30
- B) -18
- C) -6
- D) 6

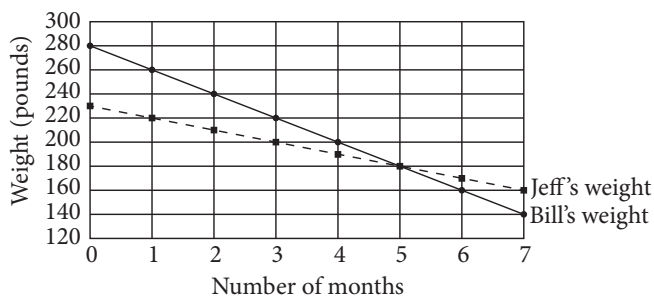


6

The principal at a large high school in a major city believes that the math teachers for each class assign drastically different amounts of homework to their respective students. Which method of sampling would be best to estimate the average number of hours of homework assigned to students by the different math teachers?

- A) Select one math teacher at random and survey the number of assigned homework hours in each of his or her classes.
- B) Post an online poll to the school's social media account that asks students how much math homework they get each night.
- C) Select 5 students from each math class in the high school and then record the number of hours assigned to each student selected.
- D) Select the student with the highest grade in each math class and then survey those students to see how much homework they do each night.

7



Bill and Jeff are participating in two different weight loss programs. The graphs above show how much weight each one has lost over a number of months. On average, how many more pounds did Bill lose per month than did Jeff?

- A) 5
- B) 10
- C) 20
- D) 50

8

Which of the following is equivalent to $9y^4 + 6y^3 + 3$?

- A) $3y^2(3y^2 + 6y + 3)$
- B) $3y^2(3y^2 + 2y) + 3$
- C) $3y^2(6y^2 + 3y + 1)$
- D) $15y^7 + 3$

9

A recent biological study performed on a large random sample of North American birds found that 46% of birds' nests experienced full or partial nest predation, in which some type of predator raided the nest before the hatchlings had flown off. The margin of error for the study was 3%. Which of the following is the best interpretation of the margin of error for this study?

- A) The percentage of North American birds whose nests get raided by predators is likely somewhere between 43% and 49%.
- B) There is a 3% chance that the study's finding about nest predation for North American birds is incorrect.
- C) It is unlikely that fewer than 43% of birds' nests will get raided this coming year.
- D) The research indicates that no more than 49% of birds' nests will likely get raided by predators.

CONTINUE



10

The function $g(x) = 16^x$ is defined for all real values of x . What is $g\left(\frac{1}{2}\right) + g\left(\frac{1}{4}\right)$?

- A) 2
- B) 6
- C) 8
- D) 16

11

A customer bought a clock for \$27.50, which included a 10% sales tax. What was the price of the clock before tax?

- A) \$2.75
- B) \$25.00
- C) \$30.25
- D) \$30.56

12

List X	List Y
5	9
8	10
13	11
13	15
15	19
18	20

Which of the following answers is a true statement about the two lists in the table above?

- A) The means are the same, and the medians are different.
- B) The means are the same, and the standard deviations are the same.
- C) The medians are the same, and the standard deviations are the same.
- D) The medians are different, and the means are different.

13

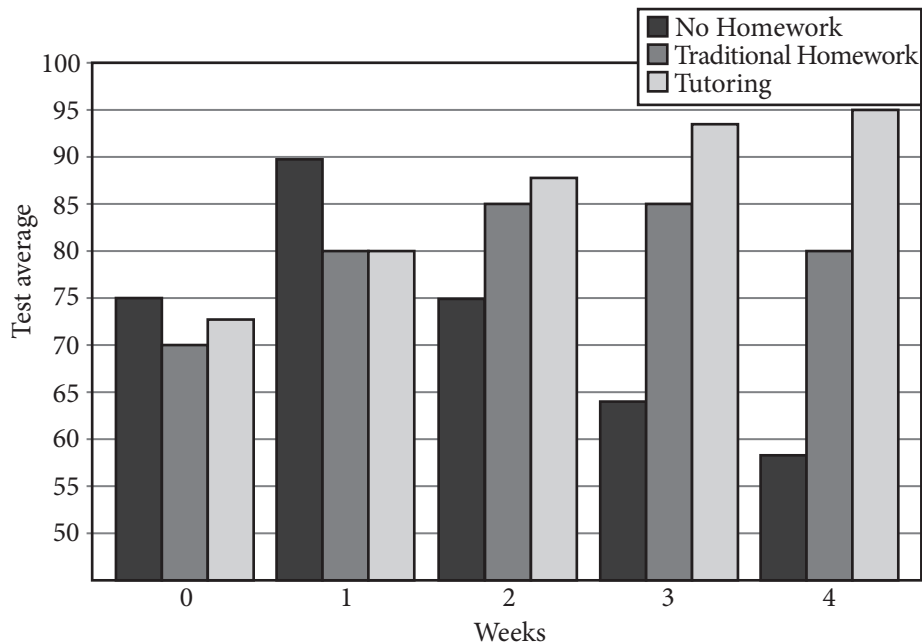
A right square pyramid has a volume of 324 cubic centimeters and a height of 12 centimeters. What is the length of one side of the base, in centimeters?

- A) $18\sqrt{2}$
- B) 18
- C) 9
- D) $3\sqrt{3}$



Questions 14 and 15 refer to the following information.

Student Performance for Three Study Strategies



A researcher is studying the effectiveness of various study strategies on student performance. The researcher has randomly assigned the 30 students equally into one of three groups: a “no homework” group that learns only in class, a “traditional homework” group that receives assignments as they usually do in this class, and a “tutoring” group in which students come to the researcher for a 10-minute tutoring session twice per week. Each week, the researcher administers the same test to all students and tracks their average score. The results are shown in the table above.

14

Which of the following groups showed an increase in test performance in each week of the study?

- I. Tutoring
 - II. Traditional Homework
 - III. No Homework
- A) I only
 B) II only
 C) I and III only
 D) I, II, and III

15

Which of the following best approximates the ratio of the improvement in test average for students in the Traditional Homework group to the students in the Tutoring group from the start of the study to week 4 of the study?

- A) 3 to 4
 B) 1 to 3
 C) 2 to 5
 D) 1 to 2

CONTINUE



16

For a right rectangular pyramid with height h and a square base with side length s , the volume is $V = \frac{1}{3}hs^2$. Which of the following defines the side length of the base of the pyramid in terms of the volume and height of the pyramid?

- A) $\sqrt{\frac{3V}{h}}$
 B) $\sqrt{\frac{h}{3V}}$
 C) $\frac{3V}{h}$
 D) $\frac{h}{3V}$

17

Breakfast Drink of Choice

Hot		Cold		
Tea	Coffee	Water	Milk	Juice
5.3%	26.9%	18.8%	17.2%	31.8%

A national survey determined the breakfast beverage of choice for American high school students. The results are summarized in the table above. Based on this information, which of the following is closest to the probability that a student drinks coffee, given that she does not drink a cold drink at breakfast?

- A) 0.84
 B) 0.66
 C) 0.32
 D) 0.27

18

From the year 2005 to the year 2015, the production of corn in a certain state has increased by 15%. During the same interval, the production of wheat has fallen by 40%. If the state produced identical amounts of each crop in 2005, but it produced 161 million bushels of corn in 2015, how much wheat, in millions of bushels, was produced by the state in 2015?

- A) 84
 B) 111.09
 C) 233.33
 D) 350

19

$$0.27(a + b) = 0.15a + 0.35b$$

An athletic trainer is attempting to produce a carbohydrate-electrolyte solution that is at 27% carbohydrates by mass, which is the maximum amount of saturation allowed by her league. A supply company provides solutions that are at 15% and 35% carbohydrates by mass, respectively. Based on the equation above, if the trainer uses 10 quarts of the 15% solution, how many quarts of the 35% solution will she need?

- A) 180
 B) 90
 C) 30
 D) 15



20

$$f(x) = (x - b)^2 - 4$$

In the function above, b is a constant. When plotted in the xy -plane, the function is a parabola with a vertex at $(b, 4)$. Which of the following is true of the parabola?

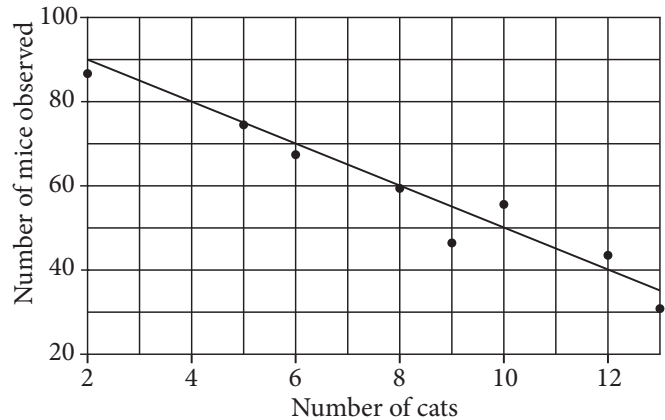
- A) Its y -intercept is at $(-b, 0)$.
- B) Its y -intercept is at $(0, -b)$.
- C) Its y -intercept is at $(0, b^2 - 4)$.
- D) Its y -intercept is at $(b^2 - 4, 0)$.

21

A teacher is looking at the set of recent test scores from her class. After investigating, she realized that she transposed two different test grades. The 19 should be 91, while another student who had an 86 should have had a 68. After correcting these two mistakes, which of the following must increase in the updated data set?

- A) The range
- B) The standard deviation
- C) The median
- D) The mean

22



A researcher is studying the use of cats to control mice populations in granaries. The scatterplot above shows the numbers of cats owned, x , and the number of mice observed, y , for several different farms. A line of best fit is plotted for the data. Which of the following could be the equation of that line?

- A) $y = -0.2x + 100$
- B) $y = 0.2x + 100$
- C) $y = 5x + 100$
- D) $y = -5x + 100$

23

An online survival game begins a marathon session with over 65,000 players active on the server. Every hour, the half of the active players whose scores are the lowest get eliminated from the game. If $g(t)$ is the number of players remaining in the game after t hours, which of the following best describes the function g ?

- A) The function g increases exponentially.
- B) The function g decreases exponentially.
- C) The function g increases linearly.
- D) The function g decreases linearly.



24

x	y
$-3b$	$18b$
$-2b$	$13b$
0	$3b$
$2b$	$-7b$

In the table above, b is a constant. If the xy -table describes some points on a linear function between x and y , which of the following equations could represent that function?

- A) $5x + y = 2b$
- B) $x - 5y = -3b$
- C) $5x + y = 3b$
- D) $x - 5y = -7b$

25

$$8a + 20 = 7 + \frac{3}{4}(8a + 20)$$

Based on the equation above, which of the following is equal to $2a + 5$?

- A) -7
- B) $-\frac{5}{2}$
- C) 7
- D) 10

26

$$1.3x - 0.6y = -0.7$$

$$6.5x - 1.5y = -0.5$$

When two equations above are graphed in the xy -plane, there is a single solution at (x, y) . What is the y -coordinate of that solution?

- A) -1.33
- B) -1.125
- C) 2
- D) 3.25

27

Sally is modeling the change in diets among Native American populations around the Great Lakes by looking at the change over time of goosefoot seed remains in midden heaps. Midden heaps were locations where early peoples would dump the remains of food. She notices that the number of goosefoot seeds deposited in midden heaps has decreased by roughly 7% per century, c , since the earliest time period she studies. She estimates there were roughly 500 goosefoot seed remains deposited initially. Which of the following functions models $S(c)$, the number of seeds found per century?

- A) $S(c) = 500(1.07)^c$
- B) $S(c) = 500(0.93)^c$
- C) $S(c) = 500^{0.93c}$
- D) $S(c) = 500^c$



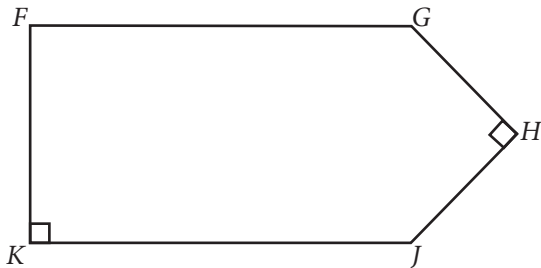
28

$$C = 0.0045P + 5.22$$

A production line manager uses the equation above to predict the production cost per item produced in dollars, C , based on the number of products made, P . In the context of the model, what is the meaning of 5.22?

- A) The initial production cost, in dollars, of each product made
- B) The approximate production cost increase, in dollars per item, for each item made
- C) The approximate production cost, in dollars per item, for every 0.0045 products made
- D) The approximate production cost decrease, in dollars per item, for every 0.0045 products made

29

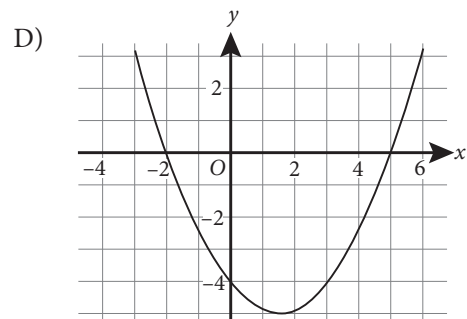
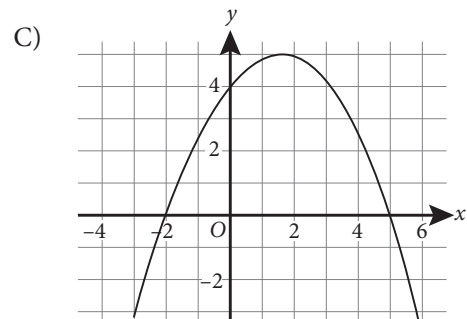
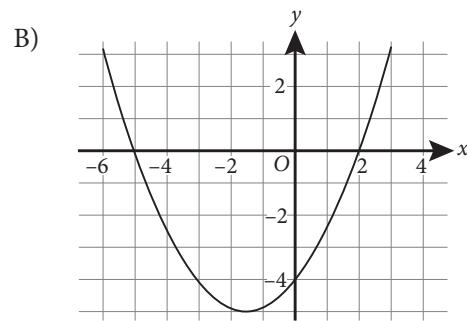
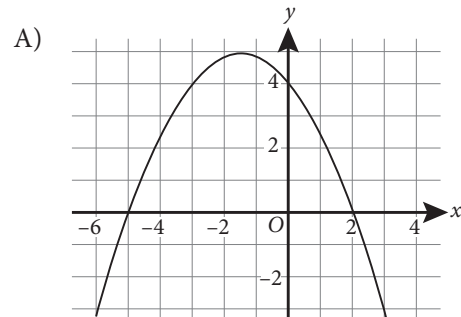


In the figure above, $\overline{FG} \parallel \overline{JK}$, $FG = JK$, and $GH = HJ$. What is the measure of angle J if $FK = HJ(\sqrt{2})$?

- A) 90°
- B) 120°
- C) 135°
- D) 160°

30

The function $h(x)$ is defined as $h(x) = a(x - 2)(x + 5)$ for all real values of x . If a is a negative number, which one of the following could be a graph of $h(x)$?




DIRECTIONS

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

- 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.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If

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

 is entered into the grid, it will be interpreted as $\frac{31}{2}$, not as $3\frac{1}{2}$.)
- Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

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

Write answer in boxes. →

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

← Fraction line

Grid in result. →

Answer: 2.5

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

← Decimal point

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

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

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

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

Answer: 201 – either position is correct

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

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

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

CONTINUE



31

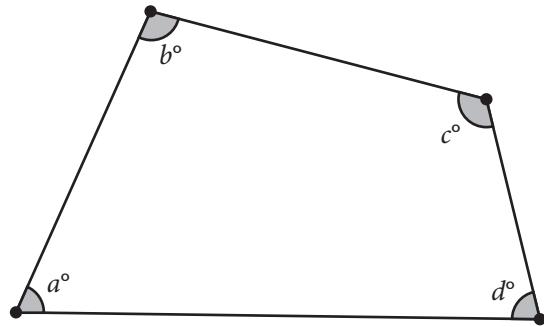
650, a , 1550, 1750, 2300, 2650

If the mean of the list above is 1650, what is the value of a ?

32

John is buying some burgers and fries for his friends. Burgers cost \$4.30 each and fries cost \$3.10 per order. There is no tax on the food. If he has \$50 and buys 6 orders of fries, what is the maximum number of burgers he can buy?

33



Note: Figure not drawn to scale.

If $a = 118$ and $b = 67$ in the quadrilateral above, what is the value of $c + d$?

34

$$-3x + 2 = p(x - q)$$

In the equation above, p and q are constants. If there are infinitely many solutions to the equation, what is the value of q ?

CONTINUE



35

A parabola described by the equation $y = x^2 - 6x + c$ is intersected exactly once in the xy -plane by the equation $y = -1$. What is the value of c ?

36

In a certain function, a is a constant. The value of the function is 5 when $x = b$. If the function can be modeled using the equation $f(x) = ax^2$, what is the value of the function when $x = 3b$?

Questions 37 and 38 refer to the following information.

To leave the Moon's gravity well, a shuttle must reach speeds of 8568 kilometers per hour. This speed is known as escape velocity because, if not reached, the shuttle would not be able to escape the Moon's gravity and return to Earth.

37

If the space shuttle traveling at escape velocity has 150 km left before reaching lunar orbit, in approximately how many seconds will the shuttle reach orbit? (Round your answer to the nearest second).

38

What is the space shuttle's escape velocity in meters per second, rounded to the nearest hundred? (1 kilometer = 1000 meters)?

END OF TEST

DO NOT RETURN TO A PREVIOUS SECTION.