March 2018

The SAT®

Question-and-Answer Service

Use this with your QAS Student Guide and personalized QAS Report.

What's inside:
– Test questions
– The Essay prompt administered on your test day

CollegeBoard

ABOUT THE COLLEGE BOARD

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

SAT CUSTOMER SERVICE

You can reach us from 8 a.m. to 9 p.m. ET (9 a.m. to 7 p.m. after the June test through August 19).

Phone: 866-756-7346

International: +1-212-713-7789

Email: **sat@info.collegeboard.org**

Mail: College Board SAT Program, P.O. Box 025505, Miami, FL 33102

TABLE OF CONTENTS

March QAS 3/10/18

Introduction

Congratulations on taking the SAT®! This booklet contains the SAT you took in March 2018, as well as the Essay prompt you responded to if you took the SAT with Essay. This booklet contains every question that was scored.

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

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

The test begins on the next page.

Reading Test

65 MINUTES, 52 QUESTIONS

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

DIRECTIONS

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

Questions 1-10 are based on the following passage.

This passage is adapted from Dinaw Mengestu, *The Beautiful Things That Heaven Bears*. ©2007 by Dinaw Mengestu. Naomi, an eleven-year-old on a school break, is visiting the narrator, a family friend from Ethiopia, at the store he manages. They have made a plan to read the novel *The Brothers Karamazov* together.

I read forty or fifty pages that first day. Naomi read none. After I read the first page I waited for her to pick up where I had left off, but she insisted, in a Line voice that bordered on pleading, that I continue.

5 "One more," she said at first. And when that page had been completed, she added another "one more" to that, until eventually there were so many "pleases" and "pretty pleases" and "come on, pleases" that I was left utterly defenseless.

10 I looked up every couple of pages to see if Naomi was still paying attention, and of course she was. Her attention, in fact, never seemed to waver. I felt her staring at me sometimes when my eyes were focused on the page, and I realized she was taking it all in, not 15 just the words, but me, and the scene that we had created together. I tried not to notice too much, to simply just live, but that was impossible. Every time I looked at her I became aware of just how seemingly perfect this time was. I thought about how years from 20 now I would remember this with a crushing, heartbreaking nostalgia, because of course I knew even then that I would eventually find myself standing here alone. And just as that knowledge would threaten to destroy the scene, Naomi would 25 do something small, like turn the page too early or shift in her chair, and I would be happy once again.

I had more customers then, and I treated each interruption to our reading as an assault on my privacy. When someone I didn't know entered the 30 store, Naomi would mark where I had left off so that I could keep my eyes on the person wandering around the aisles. She would take the book out of my hand, put her finger on the exact word or sentence I had just concluded, and hold it there until I returned. 35 I kept one man, who came to the counter with a single roll of toilet paper under his arm, waiting for more than a minute while I finished reading a page I had just started. At first he smiled and was charmed by what he saw. The charm wore off when I refused 40 to acknowledge him. He responded by slamming the roll on the counter, inches from my face, and storming out. Naomi and I read on.

I slipped into the characters as I read. I grumbled and bellowed, slammed my fist onto the counter, and 45 threw my arms wide open. I knew this was exactly what my father would have done had he been the one reading. He would have made the story an event, as grand and real as life. He must have told me hundreds, perhaps even thousands, of stories, not 50 just at night, but throughout the course of any given day, over breakfast, during lunch, in the middle of a conversation he might have been carrying on with my mother or friends. There was no wrong time with him, or if there was, he didn't live long enough for 55 me to see it.

CONTINUE

The stories he invented himself he told with particular delight. They all began the same way, with the same lighthearted tone, with a small wave of the hand, as if the world were being brushed to the side, which I suppose for him it actually was.

"Ah, that reminds me. Did I tell you about—
The farmer who was too lazy to plow his fields
The hyena who laughed himself to death
The lion who tried to steal the monkey's dinner
The monkey who tried to steal the lion's dinner?"

If I had heard the story before, I let him tell it to me again. His performance was that good, his love of a story that obvious. When Fyodor Karamazov spoke, I waved my hands wildly in the air. I grumbled in a deep baritone and tried as hard as I could to do my father proud.

"Ah, you fools," I shouted out, and Naomi smiled in delight.

Naomi found each of the characters as real as anyone she met in the street.

"Oooh, I hate him," she would cry out after a particularly cruel antic on the part of the elder Karamazov. When it came to Alyosha, though, the youngest and gentlest of the Karamazov brothers, she was willing to fall completely in love.

1

Over the course of the passage, the main shift in focus is from

A) an anecdote about an amusing event to a recollection of similar events from the narrator's childhood.

B) an account of the early stages of a friendship to a foreshadowing of that friendship's ultimate demise.

C) a description of an emotionally significant activity to a reflection on the narrator's early experiences with that activity.

D) a character sketch of an individual to a consideration of how that individual has changed the life of the narrator.

2

Which choice best supports the conclusion that reading to Naomi interferes with some of the narrator's responsibilities?

A) Line 5 ("One . . . first")

B) Lines 23-26 ("And just . . . again")

C) Lines 29-32 ("When . . . aisles")

D) Lines 35-38 ("I kept . . . started")

3

The narrator's descriptions of Naomi suggest that she is notable for her

A) empathy toward other people.

B) ability to concentrate and observe.

C) talent for dramatizing fiction.

D) optimism despite many hardships.

4

Which choice best reflects the perspective of the narrator regarding his reading to Naomi?

A) He is unequivocally delighted, because reading to Naomi has provided him with a much-needed creative outlet.

B) He is pleasantly surprised, because he did not expect Naomi to be so enthusiastic about reading.

C) He is occasionally regretful, because he is not as skilled a reader as his father was.

D) He is somewhat ambivalent, because he knows that his reading time with Naomi will inevitably end.

CONTINUE

5

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

A) Lines 10-11 ("I looked . . . she was")
B) Lines 17-23 ("Every . . . alone")
C) Lines 38-42 ("At first . . . read on")
D) Lines 68-71 ("When . . . proud")

6

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

A) decided.
B) finished.
C) inferred.
D) dismissed.

7

It can reasonably be inferred from the passage that the narrator's father influenced him by

A) creating an environment that encouraged young people to express themselves.
B) emphasizing what was most important in a life well lived.
C) providing a model for the dramatic recounting of a story.
D) exposing the narrator to a number of classic novels written by renowned authors.

8

The passage indicates that the narrator's father viewed storytelling as something that

A) continued a long-standing family tradition.
B) provided a means of bringing historical events to life.
C) helped children to distinguish good choices from bad ones.
D) was part of the fabric of the family's everyday life.

9

As used in line 53, "wrong" most nearly means

A) inappropriate.
B) unjust.
C) immoral.
D) inaccurate.

10

Which situation is most similar to the one described in lines 66-68 ("If I . . . obvious")?

A) A viewer eagerly anticipates the new episodes of a television series each week.
B) An artist paints a favorite landscape at several different hours of the day.
C) A moviegoer happily sees a particularly memorable film for a second time.
D) An actress repeatedly recites the lines of her script to improve her performance.

CONTINUE

1

Questions 11-20 are based on the following passage and supplementary material.

This passage is adapted from Adam Alter, *Drunk Tank Pink: And Other Unexpected Forces That Shape How We Think, Feel, and Behave.* ©2013 by Adam Alter.

Perhaps the first experiment ever conducted in the field of social psychology suggests that humans are often faster and stronger when they test their speed and strength in the company of other people, rather than alone.

That study, conducted at Indiana University in the late 1890s, was the brainchild of Norman Triplett, a cycling enthusiast and a sports aficionado. In dozens of experiments he pushed cyclists to ride as fast as they could on stationary bikes. Across his observations, Triplett noticed that the cyclists tended to ride faster when other cyclists rode nearby. One cyclist rode a mile in 2 minutes 49 seconds when alone, but managed to ride the same mile in 2 minutes 37 seconds in the company of four pacing cyclists; similarly he rode ten miles in 33 minutes 17 seconds while riding alone, but rode the same distance two minutes faster when riding with several pacers. Triplett acknowledged that his observations were far from rigorous, so he conducted an experiment to show that the effect persisted in a tightly controlled lab study.

Triplett recruited forty children, ages eight to thirteen, to complete his study in 1897. He measured how quickly the students could wind a fishing reel so that a small flag attached to the line traveled a distance of sixteen meters. The task was simple but novel, and none of the children had played with fishing rods before the experiment. They performed the task both alone and in the presence of other children, and Triplett noticed that they wound the reels faster in the presence of others. He concluded that an audience enables people to "liberate latent energy" not normally available when they perform alone.

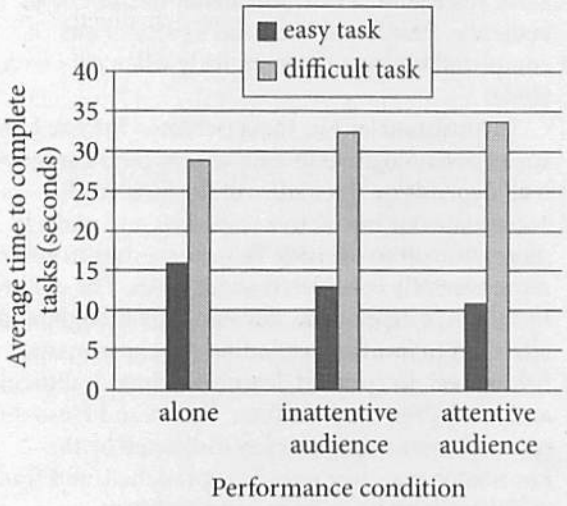
Science doesn't always tell simple stories, and other researchers challenged Triplett's groundbreaking results well into the twentieth century. While some researchers replicated Triplett's effect—now known as the *social facilitation* effect—others found the opposite effect, known as *social inhibition*. Joseph Pessin and Richard Husband asked participants in their study to learn a simple maze either blindfolded alone or blindfolded in the presence of other people. The blindfolded participants traced their fingers along the maze, and reversed each time they encountered one of ten dead ends. Instead of performing better in front of an audience, Pessin and Husband's participants completed the maze more quickly when they were alone.

Inconsistencies like these persisted for years, until social psychologist Bob Zajonc proposed a solution: it all depends on the nature of the task. Audiences accentuate our instinctive responses and make it more difficult to override those responses in favor of more carefully considered alternatives. The children in Triplett's experiment devoted little thought and attention to frantically winding the experimental fishing reel. In contrast, learning a maze is difficult, and it requires concentration. Pessin and Husband's maze learners were probably distracted by the knowledge that they were being watched, and feared making a mistake in front of an audience.

Zajonc avoided experimenting with humans at first, choosing to observe the behavior of seventy-two cockroaches instead. With a small team of researchers, he devised two small athletic tasks that required the cockroaches to scuttle from a brightly lit area in a small box to a more appealing darker compartment. Some of the cockroaches completed a simpler task, in which they ran along a straight runway from the glare of the box to the darkened goal compartment. The remaining cockroaches completed a more difficult task, traversing a more complex maze before they could escape the light. Some of the cockroaches completed these tasks alone, but the researchers also built a small audience box to force some of the athletic cockroaches to compete in front of an audience of roach spectators. Just as the researchers predicted, the cockroaches were much quicker to cover the straight runway when watched by an audience, reaching the darkened goal compartment an average of twenty-three seconds more quickly when they were performing before a crowd. But the cockroach athletes responded very differently to an audience when they were faced with the complex maze, reaching the goal seventy-six seconds more quickly when they were alone. The same audience that pushed the cockroaches to perform the simpler task more quickly also delayed them when the task was more complex.

CONTINUE

Human Performance of Easy and Difficult Tasks in Different Audience Scenarios



Adapted from Hazel Markus, "The Effect of Mere Presence on Social Facilitation: An Unobtrusive Test." ©1978 by Academic Press, Inc.

Participants were observed performing an easy task (such as putting on their shoes) and a difficult task (such as putting on a back-tying lab coat).

11

The main purpose of the passage is to

A) assert that the majority of people learn more effectively in a group than they do alone.

B) present the contradictory results of two studies about learning that have each been considered groundbreaking.

C) show how various experiments helped establish and refine the understanding of an audience's effect on performance.

D) chronicle the historical development of competing theories of social interaction.

12

Which choice best represents the different meanings of "simple" as used in line 27 and line 36?

A) Easy; straightforward

B) Mindless; sincere

C) Effortless; humble

D) Innocent; uncomplicated

13

Based on the passage, the design of Triplett's fishing-reel experiment most likely ruled out which potential objection to his findings?

A) Improvements in the subjects' performance after being asked to perform the task in front of an audience may reflect the subjects' increasing competence at the task.

B) Differences between the subjects' performance with an audience and their performance without an audience may be influenced by the subjects' prior experience with the task.

C) Variations in performance among the subjects under either audience condition may be attributed to variations in the subjects' ages and physical development.

D) Changes in the subjects' performance after being put in front of an audience may result from some subjects observing and imitating the performance of more highly skilled subjects.

14

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

A) Lines 19-22 ("Triplett . . . study")

B) Lines 23-24 ("Triplett . . . 1897")

C) Lines 27-29 ("The task . . . experiment")

D) Lines 29-32 ("They . . . others")

1

15

As presented in the passage, Triplett would most likely agree that human beings

A) are capable of ultimately mastering almost any task with which they are presented.

B) exhibit a general tendency to avoid attempting difficult tasks when they are alone.

C) have a strong desire to cooperate with other members of a group.

D) possess abilities that they are not always able to exploit.

16

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

A) Lines 9-10 ("In dozens . . . bikes")

B) Lines 32-35 ("He concluded . . . alone")

C) Lines 36-39 ("Science . . . century")

D) Lines 39-42 ("While . . . *inhibition*")

17

Based on the passage, which choice best describes what happened when the cockroaches in Zajonc's experiment attempted to complete the complex maze in front of a cockroach audience?

A) The cockroaches became less hesitant in making choices than they had been without an audience.

B) The cockroaches completed the maze more slowly than they had without an audience.

C) The cockroaches in the maze appeared to communicate directly with the audience.

D) The cockroaches sought out the simpler task instead of the complex maze.

18

The author uses the terms "athletic cockroaches," "roach spectators," and "cockroach athletes" in the last paragraph of the passage most likely to

A) call attention to the similarity of the two experiments described.

B) stress the skepticism with which the author views the design of the experiment.

C) create a casual tone that offsets the seriousness of the work being done.

D) reinforce the idea that the observed cockroach behavior is comparable to that of humans.

19

According to the graph, how long did it take participants, on average, to perform an easy task when they were alone?

A) More than 10 seconds but less than 15 seconds

B) More than 15 seconds but less than 20 seconds

C) More than 20 seconds but less than 25 seconds

D) More than 25 seconds but less than 30 seconds

20

Information about which of the following is presented in the graph but NOT discussed in the passage?

A) The time needed to complete tasks

B) Difficult tasks

C) Tasks performed alone

D) An inattentive audience

CONTINUE

1

Questions 21-31 are based on the following passages.

Passage 1 is adapted from Christine Dell'Amore, "Why Do Zebras Have Stripes? New Study Offers Strong Evidence." ©2014 by National Geographic Society. Passage 2 is adapted from Laura Poppick, "Why Do Zebras Have Stripes? It's Not for Camouflage." ©2015 by Purch.

Passage 1

The question of why zebras have stripes has puzzled scientists—including Darwin—for over a century, leading to five main hypotheses: that the stripes repel insects, provide camouflage, confuse predators, reduce body temperature, or help the animals interact socially.

For the first time, scientists played all of these theories against each other in a statistical model—and the result was pretty much, well, black and white.

"We found again and again and again [that] the only factor which is highly associated with striping is to ban biting flies," said study leader Tim Caro, a biologist at the University of California, Davis.

For the study, Caro and colleagues collected data from a vast range of sources, including museum collections and historical maps.

First, the team looked at variations in striping patterns across the seven living species of the equid group—which includes horses, asses, and zebras—and their 20 subspecies. Most have some sort of striping somewhere on their bodies.

They also noted where the stripes occurred on the body—for instance, the face, belly, or rump.

The team then mapped where current and extinct equid species live, where biting flies are found, the ranges of predators like lions and hyenas, distribution of forests, and other environmental factors that could influence the evolution of stripes. The data was then entered into a statistical model to find out which variable best explains striping.

The results showed that the range of striped species overlaps with where biting flies are most active—regardless of species and where the stripes occur on the body, according to the study.

Brenda Larison, a biologist at the University of California, Los Angeles, who studies stripes in plains zebras, said the new study's approach is "broad brush," and that more specific research may be needed.

That's why "the story is likely to be much more complex, and this is unlikely to be the last word on the subject," said Larison.

Passage 2

Researchers based at the University of California, Los Angeles (UCLA) have produced one of the most comprehensive zebra stripe studies yet by examining how 29 different environmental variables influence the stripe styles of plains zebras at 16 different sites from south to central Africa.

The scientists found that the definition of stripes along a zebra's back most closely correlated with temperature and precipitation in a zebra's environment, and did not correlate with the prevalence of lions or tsetse flies in the region. These findings suggest that torso stripes may do more to help zebras regulate their body temperature than to avoid predators and tsetse flies.

"This wall we kept hitting up against was, 'Well, why do zebra have to have stripes for predation? Other animals have predators, and they don't have stripes,'" said study co-author Brenda Larison. "And other animals get bitten by flies, and they don't have stripes, either."

Other animals also need to regulate body temperature, or thermoregulate, Larison pointed out, but zebras may especially benefit from an extra cooling system because they digest food much less efficiently than other grazers in Africa. As such, zebras need to spend longer periods of time out in the heat of the midday sun, eating more food.

The team found that the plains zebras with the most-defined torso stripes generally lived in the Northern, equatorial region of their range, whereas those with less-defined torso stripes were more common in the Southern, cooler regions of the range—a finding that supports the thermoregulation explanation.

Still, the researchers have not experimentally tested the theory that black and white stripes may generate small-scale breezes over a zebra's body, and some researchers don't think stripes can actually create this effect.

"I don't think that you would want to have a lot of black hairs along the top of your back if you wanted to try to keep cool," said Tim Caro, a professor of wildlife biology at the University of California, Davis, who studies zebra stripes but was not involved in the new study. "It's kind of the last color that you would want."

CONTINUE

Caro said regions with warmer, wetter climates are particularly susceptible to several species of disease-carrying flies other than the tsetse flies that the team considered in their study, and that the relationship the researchers found may actually be a function of fly avoidance, not thermoregulation.

21

Which choice best supports the idea that Caro's team's study may be relevant to animals other than zebras?

A) Lines 1-6 ("The question . . . socially")
B) Lines 10-13 ("We found . . . Davis")
C) Lines 14-16 ("For . . . maps")
D) Lines 31-34 ("The results . . . study")

22

In describing the new study's approach as "broad brush" (line 38), Larison suggests that the study

A) produced results that are relevant to an array of scientific disciplines.
B) revealed that further research will require a specialized focus.
C) raised theoretical questions that proved unanswerable.
D) collected far more data than could be analyzed properly.

23

According to Larison in Passage 2, the reason stripes are particularly beneficial to zebras is probably because zebras

A) endure greater exposure to the midday sun than other grazers do.
B) cannot escape predators as easily as other grazers in hot regions can.
C) live in hot, dry climates that lack an adequate food supply for most grazers.
D) defend themselves more poorly against predator attacks than other grazers do.

24

In Passage 2, the fourth paragraph (lines 63-69) mainly serves to

A) note a distinction between zebras and other animals with stripes.
B) suggest that a weakness in zebra physiology might be mitigated by stripes.
C) imply that Caro's research is based on a false premise about zebras' grazing behavior.
D) describe differences between zebras in warm climates and those in cool climates.

25

Passage 2 implies that Larison's team's study falls short of being definitive because Larison

A) disregarded facts that did not support her conclusions.
B) used research methods that have not proved effective.
C) did not build on the achievements of prior research on the subject.
D) has yet to confirm a key assumption made in the study.

26

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

A) Lines 49-53 ("The scientists . . . region")
B) Lines 54-56 ("These . . . flies")
C) Lines 70-76 ("The team . . . explanation")
D) Lines 77-81 ("Still . . . effect")

27

Based on Passage 2, Caro would most likely agree with which of the following statements about coloration patterns containing black stripes?

A) They have an unknown genetic basis.

B) They might hinder thermoregulation in animals.

C) They occur in nature very rarely.

D) They are aesthetically unappealing.

28

In Passage 2, the phrase "particularly susceptible" (line 90) mainly serves to

A) point out a flaw in Larison's conception of zebras' geographic range.

B) emphasize the abundance of pests where some zebras live.

C) highlight the challenges the terrain presents to zebras in avoiding predators.

D) imply that the heat of their environment affects zebras more negatively than it does other grazers.

29

The primary purpose of both passages is to consider studies that

A) describe the process by which stripes became widespread among zebra species.

B) dispute a common misconception regarding zebras' stripes.

C) explore the likely benefit that zebras derive from their stripes.

D) compare zebras' stripes to coloration in other animal species.

30

Based on the description of Caro's study in Passage 1 and that of Larison's study in Passage 2, with which claim regarding zebras would both researchers most likely agree?

A) Stripes in zebras are used primarily for a different purpose than to provide camouflage.

B) The role of stripes in zebras remains as elusive today as in the past.

C) The evolution of stripes in zebras is in direct response to predation.

D) The geographic locations in which zebras live do not influence stripe patterns.

31

In the passages, Caro and Larison defend their conclusions by relying on

A) several experiments that simulate conditions in nature.

B) field observations over the course of several months.

C) data collected from various museums and maps.

D) observed correlations among multiple variables.

CONTINUE

Questions 32-42 are based on the following passage.

This passage is from Charles Dickens, *American Notes for General Circulation*. Originally published in 1842. After spending six months traveling in North America, British novelist Charles Dickens wrote an account of his travels and of the people he encountered.

But I may be pardoned, if on such a theme as the general character of the American people, and the general character of their social system, as presented to a stranger's eyes, I desire to express my own opinions in a few words, before I bring these volumes to a close.

They are, by nature, frank, brave, cordial, hospitable, and affectionate. Cultivation and refinement seem but to enhance their warmth of heart and ardent enthusiasm; and it is the possession of these latter qualities in a most remarkable degree, which renders an educated American one of the most endearing and most generous of friends. I never was so won upon, as by this class; never yielded up my full confidence and esteem so readily and pleasurably, as to them; never can make again, in half a year, so many friends for whom I seem to entertain the regard of half a life.

These qualities are natural, I implicitly believe, to the whole people. That they are, however, sadly sapped and blighted in their growth among the mass; and that there are influences at work which endanger them still more, and give but little present promise of their healthy restoration; is a truth that ought to be told.

It is an essential part of every national character to pique[1] itself mightily upon its faults, and to deduce tokens of its virtue or its wisdom from their very exaggeration. One great blemish in the popular mind of America, and the prolific parent of an innumerable brood of evils, is Universal Distrust. Yet the American citizen plumes[2] himself upon this spirit, even when he is sufficiently dispassionate to perceive the ruin it works; and will often adduce it, in spite of his own reason, as an instance of the great sagacity and acuteness of the people, and their superior shrewdness and independence.

'You carry,' says the stranger, 'this jealousy and distrust into every transaction of public life. By repelling worthy men from your legislative assemblies, it has bred up a class of candidates for the suffrage, who, in their very act, disgrace your Institutions and your people's choice. It has rendered you so fickle, and so given to change, that your inconstancy has passed into a proverb; for you no sooner set up an idol firmly, than you are sure to pull it down and dash it into fragments: and this, because directly you reward a benefactor, or a public servant, you distrust him, merely because he is rewarded; and immediately apply yourselves to find out, either that you have been too bountiful in your acknowledgments, or he remiss in his deserts. Any man who attains a high place among you, from the President downwards, may date his downfall from that moment; for any printed lie that any notorious villain pens, although it militate directly against the character and conduct of a life, appeals at once to your distrust, and is believed. You will strain at a gnat in the way of trustfulness and confidence, however fairly won and well deserved; but you will swallow a whole caravan of camels, if they be laden with unworthy doubts and mean suspicions. Is this well, think you, or likely to elevate the character of the governors or the governed, among you?'

The answer is invariably the same: 'There's freedom of opinion here, you know. Every man thinks for himself, and we are not to be easily overreached. That's how our people come to be suspicious.'

[1] Take pride in

[2] Indulges with self-satisfaction

32

One central idea of the passage is that Americans'

A) wariness of their elected representatives has led to poor judgment on the part of citizens and to inferior candidates for public office.

B) distrust of both their fellow citizens and foreigners means that Americans will remain insular and unrefined.

C) perceptiveness and independence have enabled Americans to be astute judges of their elected officials.

D) suspiciousness of their politicians has undermined the government and contributed to widespread instability.

CONTINUE

33

Over the course of the passage, Dickens's main focus shifts from

A) defending Americans against the charge of being uncultivated to conceding that Americans would benefit from being more refined.

B) describing particular kindnesses shown to him by Americans to questioning why Americans are so suspicious of their own countrymen.

C) discussing the tendency of nations to take pride in their flaws to recommending that Americans view themselves more critically.

D) praising admirable qualities identified with Americans to expressing concern about certain objectionable American traits.

34

As used in line 2 and line 3, "character" most nearly means

A) symbol.

B) rank.

C) nature.

D) portrayal.

35

Which choice provides the best evidence for the idea that Americans too readily accept unfounded criticism of their elected leaders?

A) Lines 7-13 ("They . . . friends")

B) Lines 13-18 ("I never . . . life")

C) Lines 52-57 ("Any . . . believed")

D) Lines 62-64 ("Is this . . . you")

36

As used in line 18, "regard" most nearly means

A) care.

B) motive.

C) appreciation.

D) aspect.

37

Dickens suggests that the tendency toward suspicion exhibited by many Americans is especially problematic because it

A) causes people to be distrustful of their neighbors and acquaintances.

B) emboldens people to challenge each other's judgments.

C) invites people to act with too great a degree of independence.

D) encourages people to act against their best interests.

38

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

A) judgment.

B) explanation.

C) cause.

D) defense.

CONTINUE

39

Dickens most likely adopts the point of view of "the stranger" (line 38) in order to

A) expose harsh criticisms of Americans that he believes to be unfounded.

B) dramatize a strong view of a certain American intellectual tendency in an imaginary conversation.

C) articulate a view of Americans that he previously held and has since abandoned.

D) report on a conversation that he had with a particular American citizen.

40

In the passage, Dickens implies that American political leaders are often

A) unresponsive to their constituents.

B) undeserving of the positions they hold.

C) too changeable in their judgments.

D) well positioned to wield their authority.

41

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

A) Lines 39-43 ("By repelling . . . choice")

B) Lines 43-45 ("It has . . . proverb")

C) Lines 47-49 ("directly . . . rewarded")

D) Lines 58-62 ("You will . . . suspicions")

42

According to the passage, Americans quickly turn against the elected leaders they had recently idolized because Americans

A) are suspicious that anyone who is elected might not be worthy of the honor.

B) have learned from experience that elected representatives are likely to be corrupt.

C) know that elected officials abandon their political platforms soon after being elected.

D) distrust the political institutions that are the foundation of the American government.

CONTINUE

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

This passage is adapted from Kelly Servick, "Gut Bugs May Boost Flu Shot's Effects." ©2014 by American Association for the Advancement of Science.

Every year, some unlucky people get the flu even though they've had their seasonal shot. One reason, according to a new study, might be their gut bacteria. Researchers have shown that, at least in mice, a strong immune response to the flu vaccine relies in part on signals from intestinal microbes. The findings could help explain variation in the response to the vaccine and suggest ways to maximize its effectiveness.

The new evidence came out of a curious observation that researchers revealed in a 2011 paper. Bali Pulendran, an immunologist at Emory University in Atlanta, and colleagues were looking for genetic signatures in the blood of people injected with the trivalent inactivated influenza vaccine—a mixture of three flu strains. They wanted to know whether the expression of specific genes in the immune system's white blood cells correlated with the amount of vaccine-specific antibodies in the blood—which indicates how strongly a person's immune system responds to the shot, and how much protection that person will gain against future infections. In a long list of genes associated with strong vaccine response, the researchers found an unexpected one: the gene that codes for a protein called toll-like receptor 5 (TLR5).

"We thought this must just be a coincidence," Pulendran says. TLR5 is a sensor of flagellin, a protein that makes up the appendages of bacteria. Why would a receptor that interacts with bacteria in the gut have anything to do with the body's response to a virus injected into muscle? Maybe, the group thought, B cells—the white blood cells that produce antibodies—receive a signal from bacteria that boosts their activity.

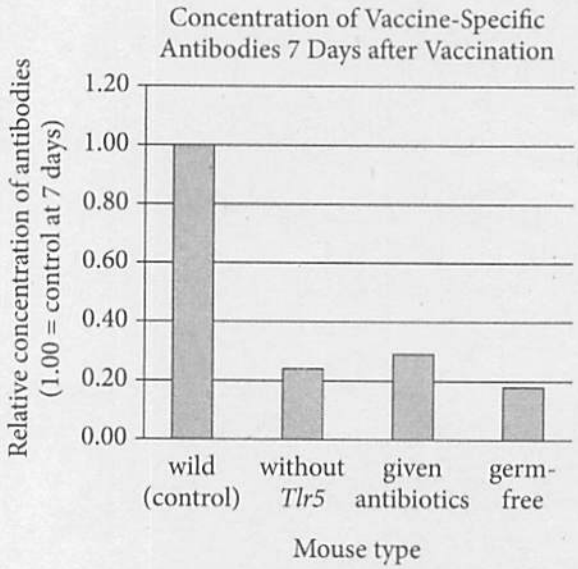
To explore that possibility, the researchers designed a new study using mice. They gave the flu vaccine to three different groups: mice genetically engineered to lack the gene for TLR5, germ-free mice with no microorganisms in their bodies, and mice that had spent 4 weeks drinking water laced with antibiotics to obliterate most of their microbiome.

Seven days after vaccination, all three groups showed significantly reduced concentrations of vaccine-specific antibodies in their blood compared with vaccinated control mice. The reduction was less marked by day 28, as blood antibody levels appeared to rebound. But when the researchers observed the mice lacking *Tlr5* on the 85th day after vaccination, their antibodies seemed to have dipped again, suggesting that without this bacterial signaling, the effects of the flu vaccine wane more quickly.

The researchers saw similar results when they gave mice a polio vaccine, which, like the flu shot, uses an inactivated virus and doesn't contain so-called adjuvants—additives that boost the body's immune response. Pulendran and colleagues suggest that these weaker, adjuvant-lacking vaccines rely more heavily on bacterial signaling. (They didn't see the same results with the live virus in the yellow fever vaccine, for example.)

No specific type of bacteria seemed more important than another in prompting the vaccine response. But further experiments showed a major role for macrophages—immune cells that display pieces of the virus to activate B cells and that can also recognize flagellin. Pulendran's favored explanation is that flagellin manages to break through the lining of the intestines to circulate in the body and activate B cells and macrophages, amping up antibody production. But where and how the interaction happens "is a huge mystery," he says. "We don't have the full answer."

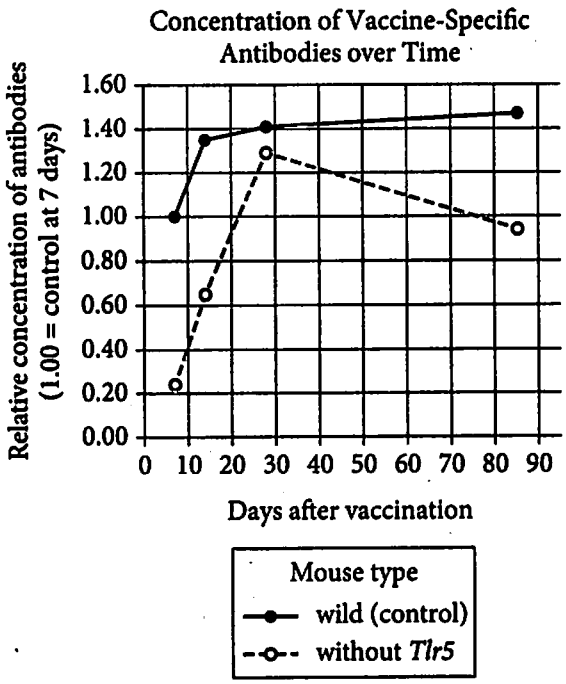
Figure 1



CONTINUE

1

Figure 2



Figures adapted from Jason Z. Oh et al., "TLR5-Mediated Sensing of Gut Microbiota Is Necessary for Antibody Responses to Seasonal Influenza Vaccination." ©2014 by Elsevier Inc.

43

The primary purpose of the passage is to

A) discuss research on a factor that influences vaccine effectiveness.

B) describe how vaccines are tested for safety and efficacy.

C) present a study of the role of bacteria in causing illness.

D) analyze the genetic components of the flu virus.

44

In the second paragraph (lines 10-26), the author uses the words "curious" and "unexpected" primarily to suggest that Pulendran and his colleagues

A) did not anticipate that the gene coding for TLR5 would be so widespread in the people who received the trivalent vaccine.

B) assumed that the gene coding for TLR5 would not be found in any of the people with weak immune responses to the trivalent vaccine.

C) were surprised to find a link between the expression of the gene coding for TLR5 and relatively high counts of trivalent vaccine-specific antibodies.

D) had previously overlooked the connection between the gene coding for TLR5 and changes in white blood cells in response to the trivalent vaccine.

45

Which statement regarding subjects who had strong immune responses to the trivalent vaccine can be most reasonably inferred from the passage?

A) They demonstrated higher white blood cell counts in response to the trivalent vaccine than in response to other vaccines.

B) They had a similar pattern of gene expression that was not found in subjects with weak responses to the vaccine.

C) They showed immunity to flu strains other than those for which the trivalent vaccine was intended.

D) They possessed some types of intestinal bacteria that previously had been observed only in mice.

46

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

A) Lines 4-6 ("Researchers . . . microbes")

B) Lines 12-16 ("Bali . . . strains")

C) Lines 23-26 ("In a . . . TLR5")

D) Lines 28-29 ("TLR5 . . . bacteria")

47

According to the passage, which statement best explains the hypothesis that Pulendran's group tested in their experiment with mice?

A) B cells must receive signals from intestinal bacteria to begin producing vaccine-specific antibodies.

B) Vaccines containing active viruses must be accompanied by adjuvants to generate a strong immune response.

C) The effectiveness of vaccines at stimulating flagellin activity depends on the presence of the gene that codes for TLR5.

D) The strength of the immune response following vaccination is related to the white blood cells' detection of signals from intestinal bacteria.

48

The main purpose of the last paragraph is to

A) question the overall importance of the vaccine response in light of new discoveries.

B) suggest that the researchers who studied the vaccine response were uncertain about their data.

C) emphasize the fact that further research into the nature of the vaccine response is necessary.

D) urge other scientists to consider furthering the existing work regarding the vaccine response.

49

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

A) inciting.

B) suggesting.

C) shortening.

D) refreshing.

CONTINUE

1

50

According to figure 1, the relative concentration of vaccine-specific antibodies in the germ-free mice 7 days after vaccination was closest to which value?

A) 0.20
B) 0.80
C) 1.00
D) 1.20

51

Figure 2 supports which statement about the relative concentrations of vaccine-specific antibodies in control mice and in mice without *Tlr5*?

A) They increased between 7 and 28 days after vaccination.
B) They reached their highest points 85 days after vaccination.
C) They began to decrease 28 days after vaccination.
D) They returned to their lowest levels 85 days after vaccination.

52

Based on the passage and figures 1 and 2, how would the bars in figure 1 most likely change if they focused on the concentration of vaccine-specific antibodies 14 days after vaccination?

A) The bar for the mice without *Tlr5* would be lower.
B) The bar for the mice given antibiotics would be higher than the bar for the control mice.
C) The bar for the control mice only would be higher.
D) The bars for all four groups of mice would be higher.

STOP

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

Writing and Language Test

35 MINUTES, 44 QUESTIONS

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

DIRECTIONS

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

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

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

Questions 1-11 are based on the following passage.

Agriculture Grows Up

[1] Current agricultural practices will not be able to meet the needs of the world's growing population, which is expected to rise to 9.6 billion by the year 2050. [2] The amounts of arable land, water, and fossil fuels necessary to feed so many people using conventional agricultural methods are simply too great. [3] Vertical farms maximize available space by stacking plant racks on top of each other inside skyscrapers and by growing crops year-round, regardless of weather conditions. [4] This method of farming increases crop production per square

CONTINUE

2

meter, yielding much more food than does a traditional farming method employed on an equivalent area of land. [5] One creative alternative is vertical farming: growing crops arranged vertically inside tall buildings rather than spread horizontally on land. 1

Conventional agriculture uses 70 percent of the world's available drinking water for irrigation, while vertical farming techniques are much more efficient in 2 its use of water. Using drip irrigation to water the roots of plants directly rather than irrigating the soil around the plants, vertical farmers use less water than do 3 traditional places like farms. Other water-efficient methods available to vertical farmers are hydroponics (suspending plants in troughs of circulating nutrient-enriched water) and aeroponics (irrigating plants with only water vapor and nutrients). 4

1

To make this paragraph most logical, sentence 5 should be placed

A) where it is now.
B) after sentence 1.
C) after sentence 2.
D) after sentence 3.

2

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

3

A) NO CHANGE
B) farms using traditional methods.
C) traditional farmers.
D) traditional farms.

4

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

> Wheat, corn, and rice are problematic to grow in vertical farms because of the large amount of space these crops require relative to the amount of food they produce.

Should the writer make this addition here?

A) Yes, because it presents a claim that is countered later in the passage.
B) Yes, because it gives an example that supports the main point of the paragraph.
C) No, because it distracts from the focus of the paragraph by adding irrelevant information.
D) No, because it contradicts a point made earlier in the paragraph.

2

Because their indoor facilities can be placed anywhere there is 5 sufficient light and energy, vertical farms can be located where they 6 had been most needed: in cities. Establishing farms in cities not only provides residents with fresh produce 7 but also reduces the fossil fuel consumed during shipping. Salad greens from the Chicago-based company FarmedHere, for example, are sold within a few miles of the vertical farm where they are harvested. By contrast, most lettuce consumed in Chicago must be transported over 1,000 miles by truck before it is eaten.

5

A) NO CHANGE
B) just about enough
C) an unobjectionable amount of
D) a plenitude of essential

6

A) NO CHANGE
B) were
C) are
D) are being

7

A) NO CHANGE
B) and also reduces
C) as it also reduces
D) while also reducing

CONTINUE

2

Despite the advantages of vertical farming, it can be difficult to construct buildings that let in enough sunlight for crops to grow, and 8 the energy needed to supplement or replace sunlight with artificial light can be prohibitively expensive. However, preliminary experiments with low-cost LED lights have been promising, showing that farming with artificial light can be feasible on a 9 large and great scale. More experiments are necessary to demonstrate the viability of vertical farms, which Dickson 10 Despommier professor of, public health and environmental health sciences at Columbia University, believes could make cities nearly self-sufficient food producers. Still, as demand for agricultural produce continues to increase, 11 vertical-farming advocates will likely encourage consumers to patronize local businesses, including vertical farms.

8

Which choice most effectively sets up the next sentence in the paragraph?

A) NO CHANGE
B) the air quality inside the buildings differs according to location.
C) the architect would likely need some knowledge of vertical farming.
D) cities that are already populous may not have room for more buildings.

9

A) NO CHANGE
B) large
C) large, extensive
D) large and also extensive

10

A) NO CHANGE
B) Despommier, professor of
C) Despommier professor, of
D) Despommier professor of

11

The writer wants a conclusion that restates the main idea of the passage. Which choice best accomplishes this goal?

A) NO CHANGE
B) vertical-farming advocates seek additional ways to allow sunlight into city buildings so the plants can grow.
C) researchers are continuing to investigate the feasibility of using low-cost LED lights in vertical farming.
D) vertical farming and similar efforts to meet the world's nutritional needs can only become more important.

2

Questions 12-22 are based on the following passage.

A Singer Finds Her Voice

In the spring of 1963, African Americans across the United States learned that the civil rights leader Martin Luther King Jr. had been arrested at a nonviolent demonstration protesting racial segregation in Alabama. As King worked on his historic "Letter from Birmingham Jail," many African American musicians, 12 writers, and, other artists looked for ways to use their skills to 13 increase the cause of civil rights. One such artist, celebrated singer Nina 14 Simone; became a strong public voice for the movement, 15 having studied classical music at the Juilliard School in New York City.

12

A) NO CHANGE
B) writers; and
C) writers and,
D) writers, and

13

A) NO CHANGE
B) enlarge
C) advance
D) elaborate

14

A) NO CHANGE
B) Simone—
C) Simone,
D) Simone

15

The writer wants to introduce one of the passage's important ideas. Which choice best accomplishes this goal?

A) NO CHANGE
B) even though she hesitated at first to take a prominent role.
C) although her early musical work was in jazz and cabaret.
D) an unsurprising turn of events for such a talented singer.

CONTINUE

2

Simone's friend, the dramatist Lorraine Hansberry, had recently brought national attention to racial inequality through her play *A Raisin in the Sun*. Hansberry was passionate about inspiring her fellow artists to be more outspoken in support of civil rights. 16 However, she pointedly asked Simone 17 what she was doing for the movement while its most visible leader sat in a jail cell. Although Simone was an avid supporter, she said she did not see herself in a leadership role.

Simone's unease about playing a more vocal part in the movement 18 were based largely on her misgivings about mixing politics with popular music. She thought that a three-minute song was too brief to adequately convey a nuanced political message. 19 Moreover, it seemed to her that popular music, typically intended for light entertainment, did not provide the dignity the subject matter deserved. She feared that noble ideals would be cheapened if expressed to the tune of a pop song. Hansberry, however, urged her to reconsider.

16

A) NO CHANGE
B) Regardless,
C) On the contrary,
D) DELETE the underlined portion and capitalize the next word.

17

A) NO CHANGE
B) was she doing anything for the movement while its most visible leader sat in a jail cell.
C) whether she was doing anything for the movement while its most visible leader sat in a jail cell?
D) what she was doing for the movement while its most visible leader sat in a jail cell?

18

A) NO CHANGE
B) are
C) have been
D) was

19

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

A) Kept, because it elaborates on a key term that is used in the paragraph.
B) Kept, because it adds an additional detail that supports the main point of the paragraph.
C) Deleted, because it distracts from the paragraph's discussion by introducing irrelevant information.
D) Deleted, because it merely repeats information that is found earlier in the passage.

Only a few months after King's arrest, the backlash against civil rights activists intensified. News of violent acts carried out against civil rights demonstrators and even bystanders shocked the public. The **20** events dismayed Simone. In 1964 she wrote and performed her first protest song to express her anguish. Other such songs followed. Simone decided that Hansberry had been right—the stage and the airwaves could be used to promote the struggle for civil rights and **21** have denounced discrimination and violence.

In 1965, at the age of 34, Hansberry died. In 1970, Simone composed a political anthem and named it after a play based on Hansberry's work: "To Be Young, Gifted, and Black." The song was a heartfelt tribute to the artist and activist who had inspired Simone's own political development. **22**

20

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

A) events so dismayed Simone that in 1964 she wrote and performed

B) events dismayed Simone; in 1964 Simone wrote and performed

C) events, to her dismay, caused her in 1964 to write and perform

D) events, dismaying her, caused her in 1964 to write and perform

21

A) NO CHANGE

B) denounce

C) denouncing

D) will denounce

22

The writer wants a conclusion that emphasizes how Simone sought to motivate members of her audience to take political action of their own. Which choice best accomplishes this goal?

A) For Simone, the meaning of the song was more important than the melody or the complexity of the lyrics—she just wanted to reach people with her message.

B) In a fitting turn, Simone encouraged listeners to recognize their abilities and dedicate them to the cause of civil rights, just as Hansberry had done for her.

C) Simone eventually left the United States, but she continued to produce music that made her a worldwide phenomenon.

D) Simone was invited to New York City in 1971 to receive a commendation from the Congress of Racial Equality for her musical work.

CONTINUE

2

Questions 23-33 are based on the following passage and supplementary material.

The Inner Workings of Work

23 A specialist within the field of psychology, industrial/organizational (I/O) psychologists are hired by companies to apply psychological principles and research methods to the workplace. With the goal of improving workplace culture and organization, I/O psychologists study many elements of a company, such as hiring processes, training, and employee work habits, and help implement changes to improve them. Though hiring an I/O psychologist is an expense a company 24 maybe wary of taking on, it pays off: an investment in the expert guidance of an I/O psychologist can yield process improvements, increased job satisfaction among employees, and cost savings.

23

A) NO CHANGE
B) Specialists within the field
C) Being a specialist within the field
D) Those that are specialists within the fields

24

A) NO CHANGE
B) maybe weary
C) may be wary
D) may be weary

2

I/O psychologists strive to promote productivity and cooperation among employees. Eduardo Salas, an I/O psychologist at the Institute for Simulation and Training at the University of Central Florida, consults with organizations to study how employees interact with each other and respond to challenges. For example, he has worked with NASA to study team **25** dynamic's among astronauts and the variable's inherent in the isolated and **26** dicey environment of outer space. "It is usually context specific," Salas says of his team-training strategy. So, when working with NASA, his goal was to provide recommendations that would keep astronauts safe and productive.

25

A) NO CHANGE
B) dynamics among astronauts and the variables
C) dynamic's among astronauts and the variables
D) dynamics among astronauts and the variable's

26

A) NO CHANGE
B) dodgy
C) chancy
D) hazardous

CONTINUE

27 Survey results can be an effective means of gauging the effectiveness of I/O psychologists. A company's success depends largely on worker 28 morale; a 2010 Gallup study, found that productivity lost by unhappy, disengaged workers costs companies $28,000 per person annually. 29 To minimize such losses, some I/O psychologists research ways to make employees feel valued and engaged. For example, they may design training courses to help employees learn new skills or advance to leadership positions.

27

Which choice provides the best introduction to the main idea of the paragraph?

A) NO CHANGE
B) Employee productivity can be affected by a variety of factors.
C) I/O psychologists can also improve workplaces by focusing on employee satisfaction.
D) In addition to making recommendations, I/O psychologists can suggest effective ways of implementing them.

28

A) NO CHANGE
B) morale—a 2010 Gallup study,
C) morale, a 2010 Gallup study,
D) morale: a 2010 Gallup study

29

Which choice provides the best transition from the previous sentence?

A) NO CHANGE
B) Despite that study,
C) Although workers are often disengaged,
D) Since productivity can vary,

CONTINUE

2

A 2014 survey of the 500 fastest-growing private companies in the US found that more than half are looking for innovative ways to attract and retain high-performing employees. To meet these needs, companies are increasingly turning to the 30 intuitions provided by I/O psychology. The US Bureau of Labor Statistics reports that I/O psychology is still a relatively small field: 31 the total number of psychologists is expected to increase 12 percent from 2012 to 2022. However, I/O psychology is one of the fastest-growing fields in the country, expected to grow 32 to 178,900 employees between 2012 and 2022.

Employment Projections for Psychologists, 2012–2022

Occupational title	2012 employment	2022 projected employment	Percent increase, 2012–2022 (projected)
Clinical, counseling, and school psychologists	145,100	161,500	11%
Industrial/ organizational psychologists	1,600	2,500	56%
Other psychologists	13,500	14,900	10%
Total psychologists	160,200	178,900	12%

Adapted from US Department of Labor, Bureau of Labor Statistics, Employment Projections, 2014.

30

A) NO CHANGE
B) insights
C) perceptiveness
D) discernment

31

Which choice best illustrates the claim made earlier in the sentence with information from the table?

A) NO CHANGE
B) there will be almost 1,000 more jobs in I/O psychology by 2022.
C) there were only about 1,600 I/O psychologists in 2012.
D) the total number of psychologists in 2022 is projected to be 178,900.

32

Which choice provides accurate information from the table to support the point made in the sentence?

A) NO CHANGE
B) 11 percent
C) 56 percent
D) from 13,500 to 14,900 employees

2

Though companies must spend money to hire I/O 33 psychologists, but doing so is a worthwhile investment. Businesses can hire I/O psychologists full-time or contract with them on a short-term basis to solve specific problems. More than just benefiting a company's bottom line, I/O psychologists can help people feel valued and engaged at work, and that results in jobs well done.

33

A) NO CHANGE
B) psychologists; while
C) psychologists; however,
D) psychologists,

2

Questions 34-44 are based on the following passage and supplementary material.

The Road to Recovery

The Endangered Species Act (ESA) requires the US government to identify and protect plant and animal species that are in danger of extinction. While the ESA helps to preserve species classified as endangered, 34 conservationists have identified hundreds of at-risk species that do not appear on the government's endangered species list. A species that may require protection under the ESA must first be vetted via a complicated and time-consuming process. Since the ESA's implementation in 1973, 10 percent of all species that were candidates for inclusion on the list have disappeared. If the ESA is to fulfill its task of preserving biological diversity, it must reform its procedures to 35 ensure and guarantee that the list accurately reflects the number of at-risk species in existence.

34

A) NO CHANGE
B) conservationists' have identified hundreds
C) conservationist's have identified hundreds'
D) conservationists have identified hundreds'

35

A) NO CHANGE
B) guarantee by ensuring
C) ensure the certainty
D) ensure

2

The ESA considers a species endangered if it is "in danger of extinction throughout all or a significant portion of its range." Many critics of the act argue that this ambiguous terminology hinders species from being classified as endangered. 36 Some critics also worry that the ESA could have negative economic impacts, so scientists and government officials must define it for themselves, and they often 37 reach for different conclusions. A more objective approach would be to define the term "endangered" as the probability of a species becoming extinct within a set number of years. While scientists may debate the methods used to calculate this probability of extinction, 38 therefore, the set number of years would need to be defined, conservationists could identify at-risk species using this standard of measurement.

36

Which choice best introduces the topic of this sentence?

A) NO CHANGE
B) Although there is disagreement about the terms that should be used,
C) Critics do not always have suggestions about how the ESA might be improved;
D) Because the act does not explain the meaning of "a significant portion,"

37

A) NO CHANGE
B) reach
C) reach toward
D) have an outreach of

38

A) NO CHANGE
B) and
C) even so,
D) DELETE the underlined portion.

The ESA's criteria would also benefit from 39 tighter restrictions. The act uses only two categories to classify at-risk 40 species. These two categories are "endangered"—likely to go extinct—and "threatened"—likely to become endangered in the near future. By contrast, the International Union for Conservation of Nature (IUCN), a private environmental 41 group acknowledges a broader range of species vulnerability by using three categories for at-risk species in the wild: critically endangered, endangered, and vulnerable. A

39

Which choice best introduces the discussion in the rest of the paragraph?

A) NO CHANGE
B) clearer definitions of key terms.
C) stronger oversight.
D) being more inclusive.

40

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

A) species:
B) species; respectively, the two are
C) species, these being
D) species: they are

41

A) NO CHANGE
B) group;
C) group—
D) group,

comparison of animals classified by the ESA and the IUCN 42 reveal that the 43 IUCN lists a total of 642 at-risk species.

Noninclusion of IUCN At-Risk Species by the US Endangered Species Act

	Total IUCN-listed species	Total unrecognized by ESA	Percent unrecognized by ESA
Amphibians	55	44	80.0%
Birds	62	25	40.3%
Mammals	36	18	50.0%
Gastropods	195	176	90.3%
Insects	105	100	95.2%
Crustaceans	189	168	88.9%
Total	642	531	82.7%

Adapted from J. Berton C. Harris et al., "Conserving Imperiled Species: A Comparison of the IUCN Red List and US Endangered Species Act." ©2011 by Wiley Periodicals, Inc.

The US government could improve the scope of its conservation efforts by recognizing more degrees of risk and using the IUCN's categories as a model for ESA reform. A new classification system could also 44 be financially advantageous; the US government would be able to begin protection efforts earlier, which might prevent the need for drastic—and costly—interventions when a species is nearly extinct.

42

A) NO CHANGE
B) revealing
C) reveals
D) have revealed

43

Which information from the table provides the strongest evidence in support of the passage's main argument?

A) NO CHANGE
B) ESA fails to recognize 82.7 percent of the species listed as at-risk by the IUCN.
C) ESA fails to recognize 80.0 percent of the amphibian species listed by the IUCN as at-risk.
D) IUCN includes six classes of animals in its classifications of at-risk animal populations.

44

Which choice best introduces the argument made in the final sentence of the paragraph?

A) NO CHANGE
B) please conservationists more than any other strategy;
C) be subject to further revision;
D) constitute a model for other nations grappling with environmental perils;

STOP

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

March QAS 3/10/18

Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

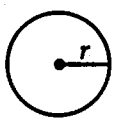
DIRECTIONS

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.

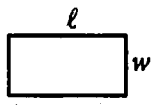
NOTES

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.

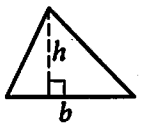
REFERENCE



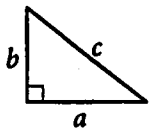
$A = \pi r^2$
$C = 2\pi r$



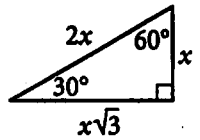
$A = \ell w$

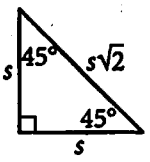


$A = \frac{1}{2}bh$

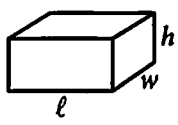


$c^2 = a^2 + b^2$

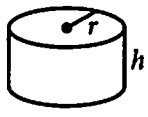




Special Right Triangles



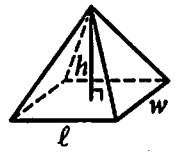
$V = \ell wh$



$V = \pi r^2 h$

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

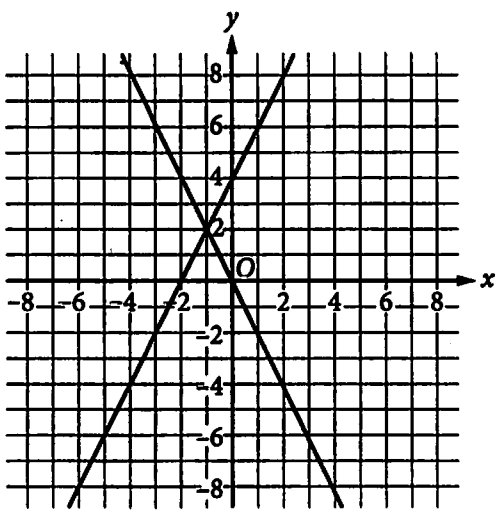
$V = \frac{1}{3}\pi r^2 h$



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

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.

1



The lines in the xy-plane above are the graphs of two linear equations. What is the solution (x, y) to the system formed by the equations?

A) $(-2, 4)$

B) $(-1, 2)$

C) $(0, 0)$

D) $(0, 4)$

2

A checkers enthusiast is customizing a checkers set by painting a design on each of the 24 checkers in the set. It takes the enthusiast 35 minutes to paint the design on each checker. If c of the checkers are already painted, which of the following represents the number of additional minutes needed to finish painting the set of checkers?

A) $24(35 - c)$

B) $24(c - 35)$

C) $35(24 - c)$

D) $35(c - 24)$

3

What is the sum of $(3x^5 + 4x^2 + 8)$ and $(12x^3 - 2x^2 + 6)$?

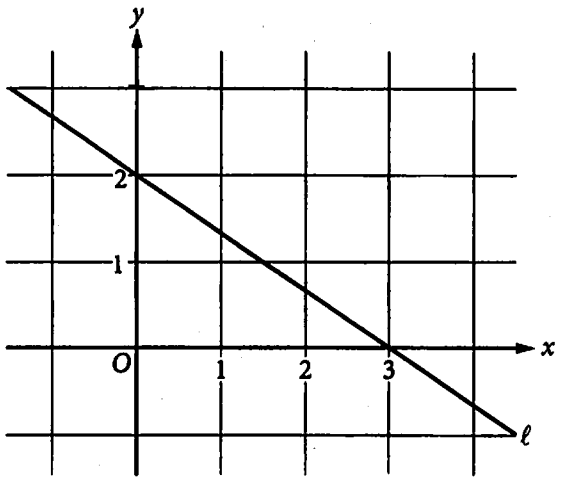
A) $15x^8 + 2x^2 + 14$

B) $3x^5 + 12x^3 + 2x^2 + 14$

C) $3x^5 + 12x^3 + 6x^2 + 14$

D) $3x^5 + 12x^3 + 4x^2 - 2x + 14$

4



Line ℓ is shown in the xy-plane above. Line m (not shown) is parallel to line ℓ and passes through the point $(0, 3)$. Which of the following is an equation of line m ?

A) $y = -\frac{2}{3}x + 3$

B) $y = -\frac{3}{2}x + 3$

C) $y = \frac{2}{3}x + 3$

D) $y = \frac{3}{2}x + 3$

5

What are the slope and the y-intercept of the graph in the xy-plane of the equation $5x + 4y + 3 = 0$?

A) The slope is $-\frac{5}{4}$, and the y-intercept is $(0, -\frac{3}{4})$.

B) The slope is $-\frac{5}{4}$, and the y-intercept is $(0, \frac{3}{4})$.

C) The slope is $\frac{5}{4}$, and the y-intercept is $(0, -\frac{3}{4})$.

D) The slope is $\frac{5}{4}$, and the y-intercept is $(0, \frac{3}{4})$.

6

$$\frac{1}{4}x - 2 = 3 - x$$

What value of x satisfies the equation above?

A) $\frac{4}{3}$

B) 4

C) 5

D) $\frac{20}{3}$

7

$$(2x-1)(x+2)^2 = 0$$

What is the solution set to the equation above?

A) $\left\{\frac{1}{2}, -2\right\}$

B) $\left\{-\frac{1}{2}, 2\right\}$

C) $\left\{\frac{1}{2}, -2, 2\right\}$

D) $\left\{-\frac{1}{2}, -2, 2\right\}$

8

$$(3+4i)-(2+3i)$$

In the complex number system, which of the following is equivalent to the expression above? (Note: $i = \sqrt{-1}$)

A) 0

B) $1+i$

C) $-1-i$

D) $-5-7i$

9

$$\frac{x-1}{3} = \frac{x+1}{2}$$

What is the solution to the equation shown?

A) -5

B) -2

C) 0

D) 1

10

$$P(x) = x^2 - 11x + k$$

In the function above, k is a constant. If 2 is a zero of the function, what is the value of k ?

A) -18

B) -2

C) 3

D) 18

11

$$\frac{2}{3x^2} - \frac{1}{6x^2}$$

Which of the following expressions is equivalent to the expression above for $x > 0$?

A) $-\frac{1}{2x^2}$

B) $-\frac{1}{3x^2}$

C) $\frac{1}{3x^2}$

D) $\frac{1}{2x^2}$

12

$$\frac{x-2}{x-3} = \frac{1}{x} + \frac{1}{x-3}$$

What is the solution set of the equation above?

A) $\{1\}$

B) $\{0, 3\}$

C) $\{1, 2\}$

D) $\{1, 3\}$

13

$$P(t) = 60(3)^{\frac{t}{2}}$$

The number of microscopic organisms in a petri dish grows exponentially with time. The function P above models the number of organisms after growing for t days in the petri dish. Based on the function, which of the following statements is true?

A) The predicted number of organisms in the dish triples every two days.

B) The predicted number of organisms in the dish doubles every three days.

C) The predicted number of organisms in the dish triples every day.

D) The predicted number of organisms in the dish doubles every day.

CONTINUE

14

In the xy-plane, the graph of the equation $y = 9x - 8$ intersects the graph of the equation $y = x^2$ at two points. What is the sum of the x-coordinates of the two points?

A) -9

B) -7

C) 7

D) 9

15

Which of the following expressions is equivalent to $(-4x^3)^{\frac{2}{3}}$?

A) $-2x^3 \cdot \sqrt[3]{2}$

B) $-x^3 \cdot \sqrt[3]{16}$

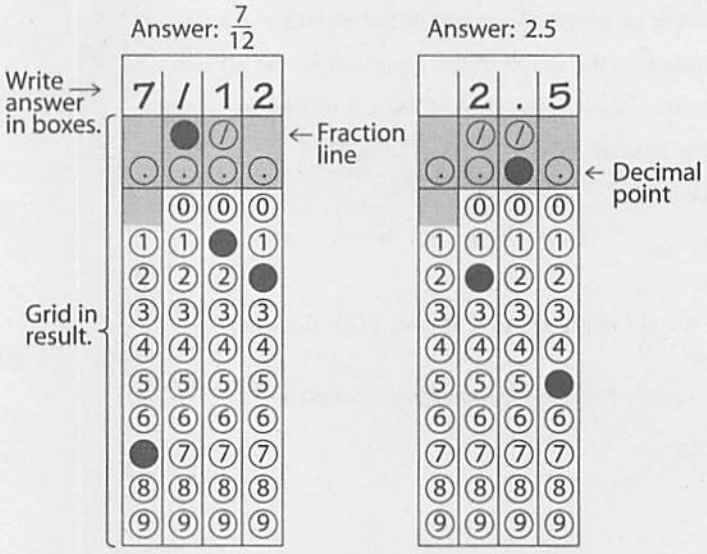
C) $2x^2 \cdot \sqrt[3]{2}$

D) $2x^2 \cdot \sqrt[3]{16}$

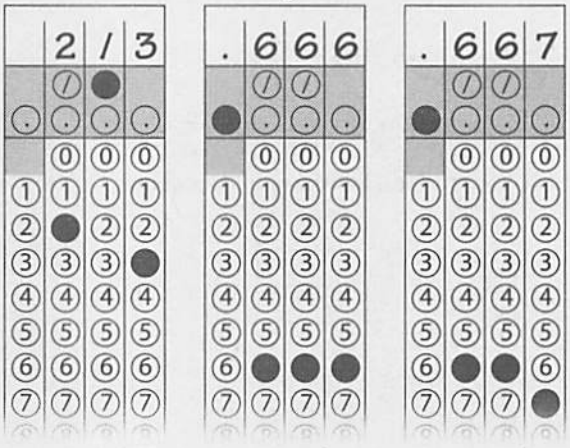
DIRECTIONS

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

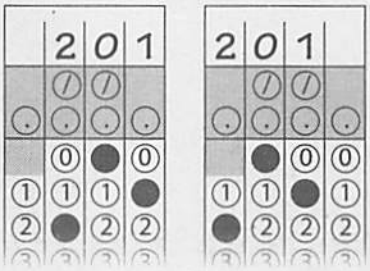
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.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



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



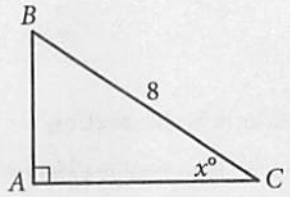
Answer: 201 – either position is correct



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

CONTINUE

16



Note: Figure not drawn to scale.

In right triangle ABC above, $BC = 8$. If the cosine of $x°$ is $\frac{\sqrt{3}}{2}$, what is the length of $\overline{AB}$?

17

$$\frac{1}{x} + \frac{1}{x-1} = 0$$

What value of x satisfies the equation above?

18

For a function f, $f(-1) = 12$ and $f(1) = 16$. If the graph of $y = f(x)$ is a line in the xy-plane, what is the slope of the line?

19

An angle measure of 540 degrees was written in radians as $x\pi$. What is the value of x ?

20

Tamika is ordering desktop computers for her company. The desktop computers cost $375 each, and tax is an additional 6% of the total cost of the computers. If she can spend no more than $40,000 on the desktop computers, including tax, what is the maximum number of computers that Tamika can purchase?

STOP

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

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

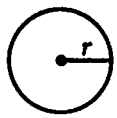
DIRECTIONS

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

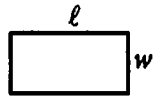
NOTES

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

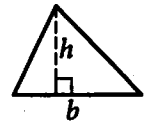
REFERENCE



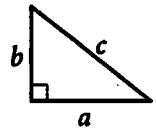
$A = \pi r^2$
$C = 2\pi r$



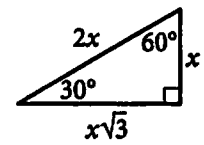
$A = \ell w$

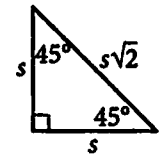


$A = \frac{1}{2}bh$

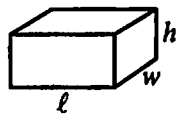


$c^2 = a^2 + b^2$

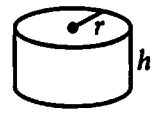




Special Right Triangles



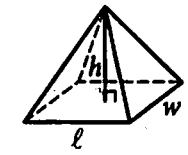
$V = \ell wh$



$V = \pi r^2 h$

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

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



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

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

1

$$(3x+2)(2x+3)$$

Which of the following is equivalent to the expression above?

A) $3x^2+10x+5$

B) $5x^2+13x+5$

C) $6x^2+13x+6$

D) $6x^2+15x+9$

2

$$f(x)=2x-11$$

The function f is defined above. What is the value of $f(-2)$?

A) -15

B) -7

C) 15

D) 30

3

Number of Flight Arrivals at Centerville Airport in a Month

	On time	Delayed	Total
Airline A	2,029	861	2,890
Airline B	1,150	700	1,850
Total	3,179	1,561	4,740

Based on the table above, what fraction of the flights for Airline A were delayed?

A) $\frac{700}{1,850}$

B) $\frac{861}{1,561}$

C) $\frac{861}{2,890}$

D) $\frac{2,029}{2,890}$

4

A political scientist wants to predict how the residents of New Jersey will react to a new bill proposed in the state senate. Which of the following study designs is most likely to provide reliable results for the political scientist?

A) Mailing a questionnaire to each of 200 randomly selected residents of New Jersey

B) Surveying a group of 300 randomly selected New Jersey residents

C) Interviewing a group of students randomly selected from a large public university in New Jersey

D) Surveying a group of 1,500 randomly selected US residents

CONTINUE

5

If the ratio of $0.5 : x$ is equivalent to $1.5 : 2.25$, what is the value of x ?

A) 0.75

B) 1.6875

C) 3

D) 3.25

6

$$8ax - 4 = 24$$

Based on the equation above, what is the value of $2ax - 1$?

A) 3

B) 6

C) 8

D) 12

7

$$P = 2{,}000x$$

$$P = 500(2^x)$$

A website administrator is considering using one of the two models above to predict the total number of purchases, P, made x weeks after the website's advertising campaign begins. How many more purchases are predicted by the exponential model than by the linear model 5 weeks after the advertising campaign begins?

A) 6,000

B) 8,000

C) 10,000

D) 16,000

CONTINUE

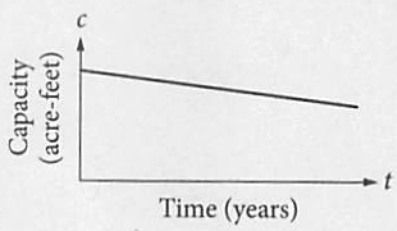
Questions 8-10 refer to the following information.

The Conowingo Reservoir had an original storage capacity of 300,000 acre-feet at the end of 1928, the year in which it was built. Starting in 1929, sediment carried downstream by the Susquehanna River collected in the reservoir and began reducing the reservoir's storage capacity at the approximate rate of 1,700 acre-feet per year.

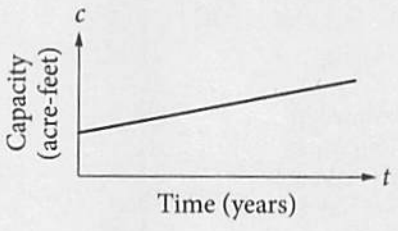
8

Which of the following could be a graph of the reservoir's capacity c, in acre-feet, as a function of time t, in years, after 1928?

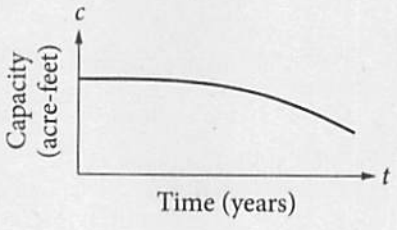
A)



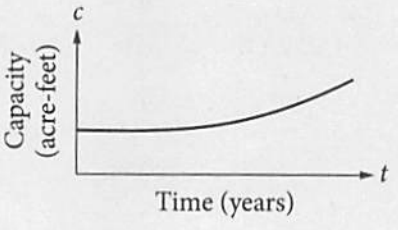
B)



C)



D)



9

What was the approximate storage capacity, in acre-feet, of the reservoir at the end of 1993?

A) 300,000

B) 189,500

C) 175,000

D) 159,500

10

If the reservoir's capacity t years after 1928 was between 290,000 and 292,000 acre-feet, which of the following must be true?

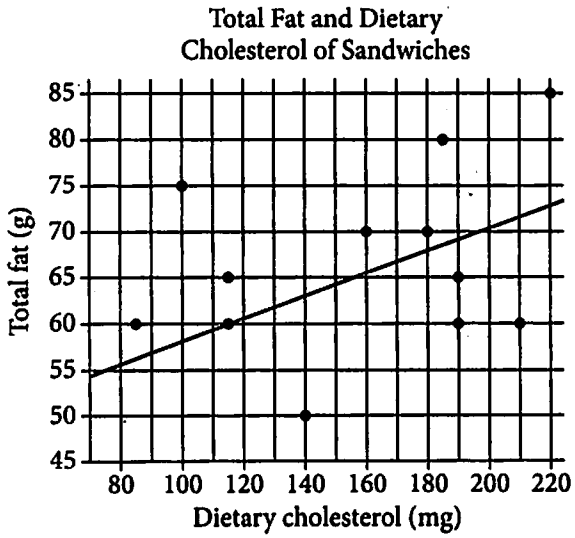
A) $t < 2$

B) $2 < t < 4$

C) $4 < t < 6$

D) $6 < t < 8$

11



The scatterplot above shows the relationship between the amount of dietary cholesterol, in milligrams (mg), and the amount of total fat, in grams (g), in the 12 sandwiches offered by a certain restaurant. The line of best fit predicts the amount of total fat a sandwich has based on the amount of dietary cholesterol in the sandwich. How many grams of total fat are in the sandwich for which this prediction is the most accurate?

A) 140
B) 115
C) 85
D) 60

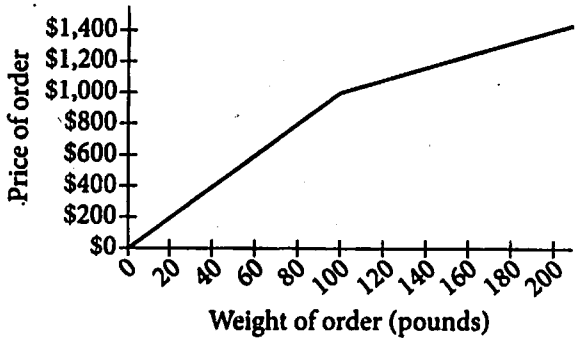
12

Which of the following is a solution to the equation $\sqrt{14-x}+2=x$?

I. -2
II. 1
III. 5

A) I only
B) II only
C) III only
D) I and III

13



The graph above shows the price that a chemical company charges for an order of fragrance oil, depending on the weight of the order. Based on the graph, which of the following statements must be true?

A) The company charges more per pound for orders greater than 100 pounds than for orders less than 100 pounds.

B) The company charges less per pound for orders greater than 100 pounds than for orders less than 100 pounds.

C) The company charges less per pound for orders greater than 1,000 pounds than for orders less than 1,000 pounds.

D) The company charges the same price per pound, regardless of order size.

14

If $2x + 3 = x - 4$, what is the value of $x + 8$?

A) -7

B) -1

C) 1

D) 7

15

A group of 10 students played a certain game. Every player received a score equal to an integer from 1 to 10, inclusive. For the 10 players, the mean score was 4. If more than half of the players received a score greater than 5, which of the following is true about the mean score of the remaining players?

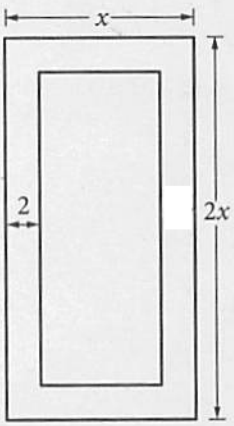
A) It must be less than 4.

B) It must be equal to 4.

C) It must be between 4 and 5.

D) It must be greater than 5.

16



The figure above represents a rectangular painting with a frame that is 2 inches wide. The expression $2x^2 - (x-4)(2x-4)$ represents the area of the frame, in square inches. What does the quantity $(x-4)(2x-4)$ in the expression represent?

A) The width of the painting, in inches
B) The height of the frame, in inches
C) The area, in square inches, of the inner rectangle
D) The combined area, in square inches, of the frame and painting

17

$$f(x) = x(x+5)$$

The function f is defined above. If the function g is defined by $g(x) = f(x) + 5$, what is the value of $g(3)$?

A) 8
B) 15
C) 24
D) 29

18

A sample of 600 ninth graders was selected at random and asked how much time they spend on homework each day. Of the ninth graders selected, 220 spend less than 2 hours on homework each day. If the conclusion was drawn that "approximately 1.35 million ninth graders spend less than 2 hours on homework each day," which of the following is closest to the population, in millions, of ninth graders?

A) 0.495
B) 1.35
C) 3.68
D) 5.84

19

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

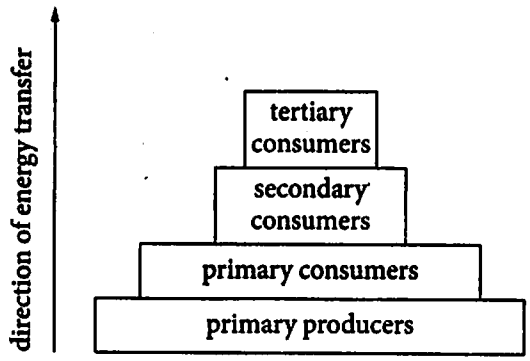
If (x_1, y_1) and (x_2, y_2) are solutions to the system of equations above, what are the values of x_1 and x_2 ?

A) $-\sqrt{13}$ and $\sqrt{13}$
B) $-\sqrt{11}$ and $\sqrt{11}$
C) -2 and 2
D) -3 and 3

CONTINUE

20

The energy pyramid below shows four trophic levels in an ecosystem and the direction of energy transfer between those levels.



On average, 10% of the net energy of one trophic level is transferred to the next trophic level in an ecosystem. Based on the energy pyramid, if primary producers have 5,000 joules (J) of energy, approximately how much of this energy, in calories, is transferred to the secondary consumers in this ecosystem? (1 calorie = 4.18 J)

A) 11.96

B) 20.90

C) 119.6

D) 209.0

21

$$\sqrt[a]{x^b}$$

Which of the following is equivalent to the expression above for all $x > 0$, where a and b are positive integers?

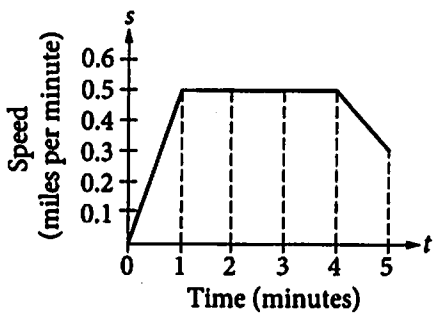
A) x^{ab}

B) $x^{\frac{a}{b}}$

C) $x^{\frac{b}{a}}$

D) x^{a-b}

22



The graph above models the speed, s, of an automobile during the first 5 minutes of travel time, t. What was the total distance traveled from $t = 1$ to $t = 4$?

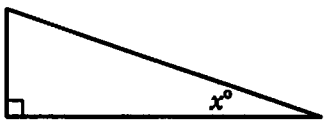
A) 0.5 mile

B) 1.5 miles

C) 2.0 miles

D) 2.5 miles

23



Note: Figure not drawn to scale.

In the figure above, $\sin(90° - x°) = \frac{12}{13}$. What is the value of $\sin x°$?

A) $\frac{12}{13}$

B) $\frac{5}{13}$

C) $\frac{5}{12}$

D) $\frac{13}{12}$

24

$$s = 9.8t$$

The equation above can be used to approximate the speed s, in meters per second (m/s), of an object t seconds after being dropped into a free fall. Which of the following is the best interpretation of the number 9.8 in this context?

A) The speed, in m/s, of the object when it hits the ground

B) The increase in speed, in m/s, of the object for each second after it is dropped

C) The speed, in m/s, of the object t seconds after it is dropped

D) The initial speed, in m/s, of the object when it is dropped

25

A magazine article on video game habits in the United States reported that in 2012 gamers spent an average of 5.6 hours per week playing games. The article also reported the average for 2013 to be 6.3 hours per week. Based on the article, how did the average number of hours that gamers spent playing games per week change from 2012 to 2013?

A) It decreased by 12.5%.

B) It increased by 7.0%.

C) It increased by 11.1%.

D) It increased by 12.5%.

CONTINUE

26

$$5x + y = a$$
$$-3x - 2y = 5$$

In the system of equations above, a is a constant. What is the y-value of the solution to the system in terms of a ?

A) $\frac{-3a - 25}{7}$

B) $\frac{a - 1}{7}$

C) $\frac{2a + 5}{7}$

D) $\frac{10a + 5}{7}$

27

$$y = x^2 - 6x - 16$$

The graph of the equation above in the xy-plane is a parabola. Which of the following equivalent forms of the equation includes the x- and y-coordinates of the vertex as constants?

A) $y = (x - 3)^2 - 25$

B) $y = x(x - 6) - 16$

C) $y = x^2 - 2(3x + 8)$

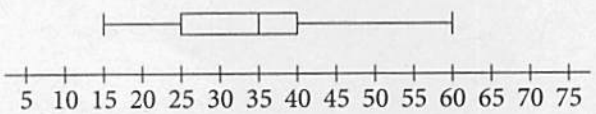
D) $y + 16 = x(x - 6)$

CONTINUE

Questions 28 and 29 refer to the following information.

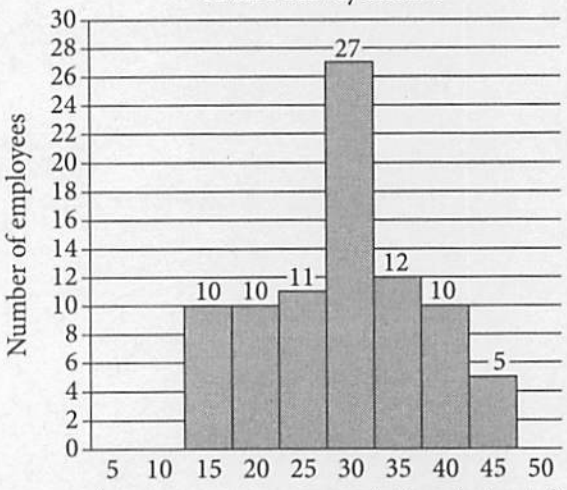
For a particular office building with 1,420 employees, Tia and Amir each conducted a survey about the average one-way commute times, in minutes, between the employees' home and office. Both Tia and Amir selected employees at random, mailed out surveys, and collected data from the returned surveys. For both surveys, respondents were asked to report their average commute times to the nearest 5 minutes. Tia collected data from 150 employees, and Amir collected data from 85 employees. The results from Tia's and Amir's returned surveys are summarized below.

Tia's Survey Results



Average one-way commute time (minutes)

Amir's Survey Results



28

If T is the median commute time of the employees who responded to Tia's survey and A is the median commute time of the employees who responded to Amir's survey, what is the value of $T - A$?

A) 10

B) 8

C) 5

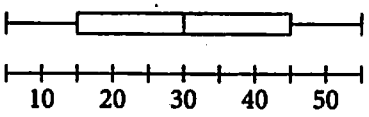
D) 0

CONTINUE

29

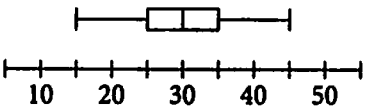
Which of the following box plots could represent Amir's survey data?

A)



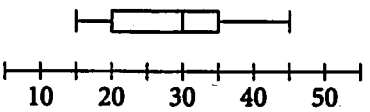
Average one-way commute time (minutes)

B)



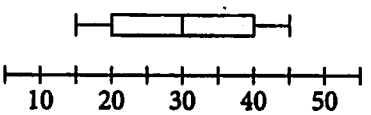
Average one-way commute time (minutes)

C)



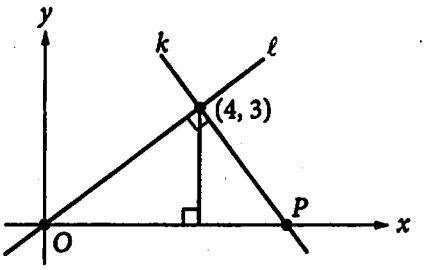
Average one-way commute time (minutes)

D)



Average one-way commute time (minutes)

30



In the xy-plane above, lines k and ℓ are perpendicular. What is the x-coordinate of point P ?

A) 5.25

B) 5.75

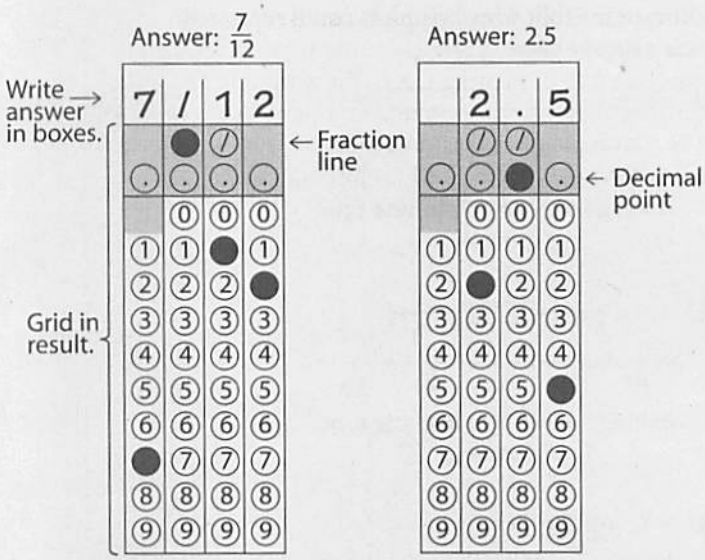
C) 6

D) 6.25

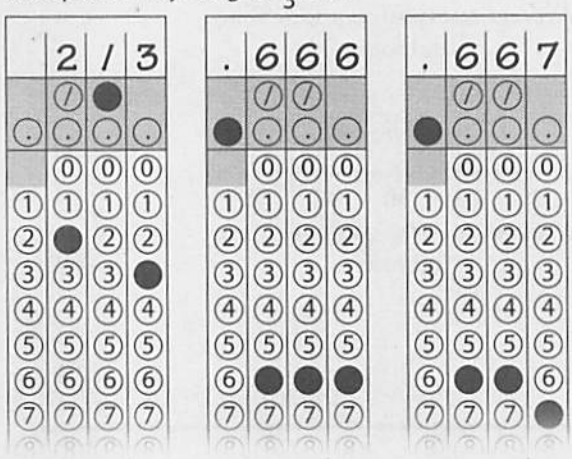
DIRECTIONS

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

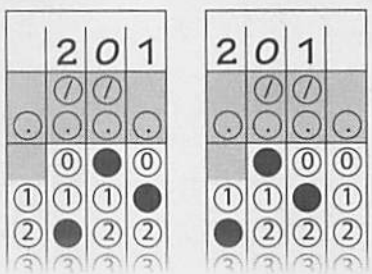
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.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



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



Answer: 201 – either position is correct



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

CONTINUE

4

31

A museum built a scale model of an *Apatosaurus* dinosaur skeleton, where 1 centimeter in the model is equivalent to 16 centimeters of the actual skeleton. If the length of the femur bone of the actual skeleton is 184 centimeters, what is the length, to the nearest tenth of a centimeter, of the femur bone in the model?

32

How many cups, each with a capacity of 8 fluid ounces, can be filled with water from a cooler that contains 10 gallons of water? (1 gallon = 128 fluid ounces)

33

In triangle ABC, angle A measures 48°, angle B measures 88°, and angle C measures 44°.

Triangle ABC is similar to triangle LMN, such that $\frac{LM}{AB} = \frac{MN}{BC} = \frac{LN}{AC} = 3$. What is the measure, in degrees, of angle L ?

34

$$\frac{1}{2}y = \frac{19}{12} - \frac{1}{3}x$$
$$5y = 3x$$

In the xy-plane, the lines that correspond to the system of equations above intersect at the point (a, b). What is the value of $\frac{a}{b}$?

CONTINUE

35

$$z = \frac{5}{2}z - \frac{21}{8}$$

What value of z satisfies the equation above?

36

A circle in the xy-plane has a diameter with endpoints $(-1, -3)$ and $(7, 3)$. If the point $(0, b)$ lies on the circle and $b > 0$, what is the value of b ?

Questions 37 and 38 refer to the following information.

Race Summary

Split number	Race segment (meters)	Split time (seconds)	Total race time at end of split (seconds)
1	0–500	109	109
2	500–1000	112	221
3	1000–1500	111	332
4	1500–2000	108	440

A rowing team entered a 2000-meter race. The team's coach is analyzing the race based on the team's split times, as shown in the table above. A split time is the time it takes to complete a 500-meter segment of the race.

37

During the fourth split of the race, the team rowed at a rate of 28 strokes per minute. To the nearest whole number, how many strokes did it take the team to complete the final 500 meters of the race?

38

By the end of the season, the coach wants the team to reduce its mean split time by 10% as compared to this race. At the end of the season, what should the team's mean split time be, in seconds?

STOP

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