

The SAT[®]

School-Day Test April 13, 2022



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 James Joyce, "A Little Cloud." Originally published in 1914.

Line Eight years before he had seen his friend off at the
North Wall and wished him godspeed. Gallaher had
got on. You could tell that at once by his travelled air,
his well-cut tweed suit, and fearless accent. Few
5 fellows had talents like his and fewer still could
remain unspoiled by such success. Gallaher's heart
was in the right place and he had deserved to win. It
was something to have a friend like that.

Line Little Chandler's thoughts ever since lunch-time
10 had been of his meeting with Gallaher, of Gallaher's
invitation and of the great city of London where
Gallaher lived. He was called Little Chandler because,
though he was but slightly under the average stature,
he gave one the idea of being a little man. His hands
15 were white and small, his frame was fragile, his voice
was quiet and his manners were refined. He took the
greatest care of his fair silken hair and moustache and
used perfume discreetly on his handkerchief. The
half-moons of his nails were perfect and when he
20 smiled you caught a glimpse of a row of childish
white teeth.

Line As he sat at his desk in the King's Inns he thought
what changes those eight years had brought. The
friend whom he had known under a shabby and
25 necessitous guise had become a brilliant figure on the
London Press. He turned often from his tiresome
writing to gaze out of the office window. The glow of

a late autumn sunset covered the grass plots and
walks. It cast a shower of kindly golden dust on the
30 untidy nurses and decrepit old men who drowsed on
the benches; it flickered upon all the moving figures
—on the children who ran screaming along the gravel
paths and on everyone who passed through the
gardens. He watched the scene and thought of life;
35 and (as always happened when he thought of life) he
became sad. A gentle melancholy took possession of
him. He felt how useless it was to struggle against
fortune, this being the burden of wisdom which the
ages had bequeathed to him.

40 He remembered the books of poetry upon his
shelves at home. He had bought them in his bachelor
days and many an evening, as he sat in the little room
off the hall, he had been tempted to take one down
from the bookshelf and read out something to his
45 wife. But shyness had always held him back; and so
the books had remained on their shelves. At times he
repeated lines to himself and this consoled him.

Line When his hour had struck he stood up and took
leave of his desk and of his fellow-clerks
50 punctiliously. He emerged from under the feudal
arch of the King's Inns, a neat modest figure, and
walked swiftly down Henrietta Street. The golden
sunset was waning and the air had grown sharp. A
horde of grimy children populated the street. They
55 stood or ran in the roadway or crawled up the steps
before the gaping doors or squatted like mice upon
the thresholds. Little Chandler gave them no thought.
He picked his way deftly through all that minute life
and under the shadow of the gaunt spectral mansions

60 in which the old nobility of Dublin had roystered.
No memory of the past touched him, for his mind
was full of a present joy.

He had never been in Corless's but he knew the
value of the name. He knew that people went there
65 after the theatre to eat oysters; and he had heard that
the waiters there spoke French and German.
Walking swiftly by at night he had seen cabs drawn
up before the door and richly dressed ladies, escorted
by cavaliers, alight and enter quickly. They wore
70 noisy dresses and many wraps. Their faces were
powdered and they caught up their dresses, when
they touched earth. He had always passed without
turning his head to look. It was his habit to walk
swiftly in the street even by day and whenever he
75 found himself in the city late at night he hurried on
his way apprehensively and excitedly. Sometimes,
however, he courted the causes of his fear. He chose
the darkest and narrowest streets and, as he walked
boldly forward, the silence that was spread about his
80 footsteps troubled him, the wandering, silent figures
troubled him; and at times a sound of low fugitive
laughter made him tremble like a leaf.

He turned to the right towards Capel Street.
Ignatius Gallaher on the London Press! Who would
85 have thought it possible eight years before? Still, now
that he reviewed the past, Little Chandler could
remember many signs of future greatness in his
friend.

✓ 1

Which choice best summarizes the passage?

- A) A character reunites with an old friend and discovers that they cannot resume their friendship.
- B) An invitation from an old friend prompts a character to reflect on both the past and the present.
- C) A chance meeting with an old friend inspires a character to start a new life in another country.
- D) A character's recent professional success prompts him to provide assistance to an old friend.

✗ 2

Which choice best describes the state of mind that Gallaher's return inspires in Little Chandler?

- A) He is impressed by Gallaher's success even though thinking about it calls to mind his own unhappiness.
- B) He is anxious to downplay Gallaher's achievements in an attempt to make his own look better.
- C) He envies Gallaher's remarkable success and is angry about how Gallaher achieved it.
- D) He admires Gallaher's rise to fame but is thankful that he himself lives a relatively inconspicuous life.

✓ 3

Which choice best supports the idea that Little Chandler seeks to rationalize his own passivity?

- A) Lines 6-10 ("Gallaher's . . . that")
- B) Lines 22-27 ("As . . . window")
- C) Lines 37-39 ("He felt . . . to him")
- D) Lines 41-45 ("He had . . . wife")

✗ 4

It can reasonably be inferred from the passage that one of Little Chandler's prominent characteristics is that he is

- A) excessively boastful of his personal achievements.
- B) often unpredictable in his dealings with other people.
- C) highly critical of other people's aspirations.
- D) somewhat vain about his personal appearance.

5

The observations in lines 27-37 (“The glow . . . of him”) mainly serve to

- A) dramatize how the sunset alters the interactions among those in the gardens who witness it.
- B) suggest that the natural beauty of the sunset affects all the people in the gardens equally.
- C) convey the subtle influence that the sunset exerts on Little Chandler’s mood.
- D) suggest that the people in the gardens share Little Chandler’s attitude toward the sunset.

6

As used in line 51, “figure” most nearly refers to the

- A) depiction of a person in artwork.
- B) social position occupied by a person.
- C) image presented by a person’s body.
- D) historical importance of a person.

7

By saying in line 61 that “no memory of the past touched” Little Chandler, the narrator most likely means that Little Chandler

- A) doesn’t fix his attention on the age and decay of his surroundings during his walk.
- B) can analyze his memories while remaining comparatively unaffected by them.
- C) tends to retain few memories of his personal experiences.
- D) is unable to recall key memories of Gallaher.

8

Based on the passage, which choice best identifies a contradictory impulse in Little Chandler’s character?

- A) He fixates on a social world that he ultimately believes to be a hollow spectacle.
- B) He immerses himself in sights and sounds that strike him as ultimately frivolous.
- C) He scorns a historical era that he concedes is preferable in some ways to the present.
- D) He derives excitement from placing himself in settings he finds menacing.

9

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

- A) Lines 58-62 (“He picked . . . joy”)
- B) Lines 67-72 (“Walking . . . earth”)
- C) Lines 72-76 (“He had . . . excitedly”)
- D) Lines 76-82 (“Sometimes . . . leaf”)

10

The main effect of the last paragraph is to

- A) convey Little Chandler’s sense that hindsight has lent a degree of inevitability to Gallaher’s success.
- B) suggest the extent to which the news of Gallaher’s success has altered Little Chandler’s memory of him.
- C) demonstrate that Little Chandler’s confidence in Gallaher has been vindicated by Gallaher’s success.
- D) characterize Little Chandler as regretful that he had failed to foresee Gallaher’s success.

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

This passage is adapted from Neeru Paharia, Anat Keinan, and Jill Avery, “The Upside to Large Competitors.” ©2014 by Massachusetts Institute of Technology.

Large competitors are often viewed as a major threat for startups and small companies; big companies have more financial resources and greater scale, market power and brand awareness than smaller ones. However, our research finds that a smaller brand can actually benefit if consumers can see the competitive threat it faces from a larger organization.

When a U.S.-based ice cream chain with about 1,400 stores moved within 50 steps of a J.P. Licks ice cream store in Newton, Massachusetts, some people expected that J.P. Licks, a small, locally owned company, would be beaten out of the Newton market. But consumers rallied around J.P. Licks, and the national chain later closed its nearby location. When the owner of the Los Angeles-based coffee store chain The Coffee Bean & Tea Leaf could not stop a large coffee shop chain from moving in next door, he was surprised to see his sales shoot up—so much so that he started proactively colocating new stores next to large chain ones.

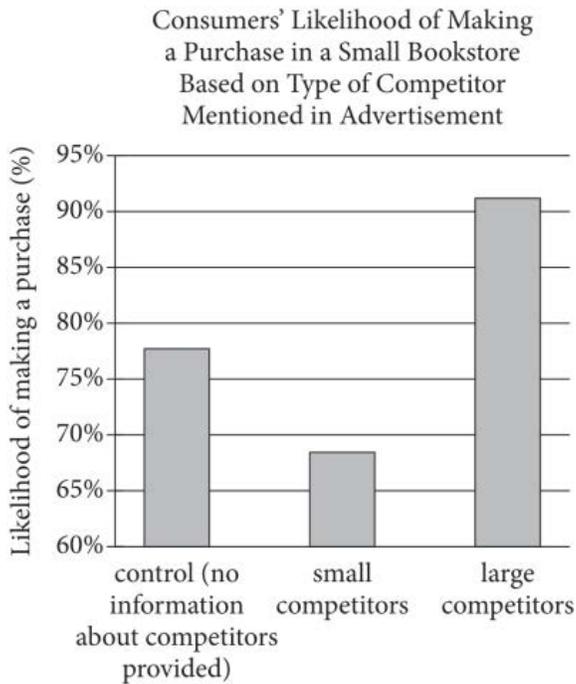
These examples are not anomalies. In six lab and field studies, we explored the effects of having a large, dominant competitor and found that highlighting a large competitor’s size and close proximity can help smaller brands, instead of harming them. Compared to when they are in competition with brands that are similar to them in size or when consumers view them outside of a competitive context, small brands see consumer support go up when they are faced with a competitive threat from large brands. This support translates into higher purchase intention, more purchases and more favorable online reviews.

As part of our research, we conducted a field study at an independent bookstore in Cambridge, Massachusetts. Upon entering the bookstore, 163 prospective shoppers were exposed to one of three versions of an in-store ad, emphasizing either the store’s large competitors, small competitors or no competition. Shoppers who read the “large competitors” version were told that the store’s main competitors are large corporations that have the ability to put small businesses such as this bookstore out of business. The “small competitors” version indicated the store’s main competitors are other

locally owned small bookstores in Cambridge. In the “no competition” version, participants were given no information about the competitive environment. Shoppers were then given a \$5 coupon, coded with the in-store ad version they read. Analyzing shoppers’ sales receipts and the number of redeemed coupons, we found that shoppers were significantly more likely to make a purchase after reading the “large competitors” version of the in-store ad, compared to the “small competitors” version or the “no competition” version. They also purchased more items and spent more money at the store, compared to shoppers reading the “small competitors” or “no competition” versions. These results suggest that framing the competitive game and emphasizing a competitive narrative against a larger company can help a small establishment—and spur consumers to make a purchase that supports the smaller competitor.

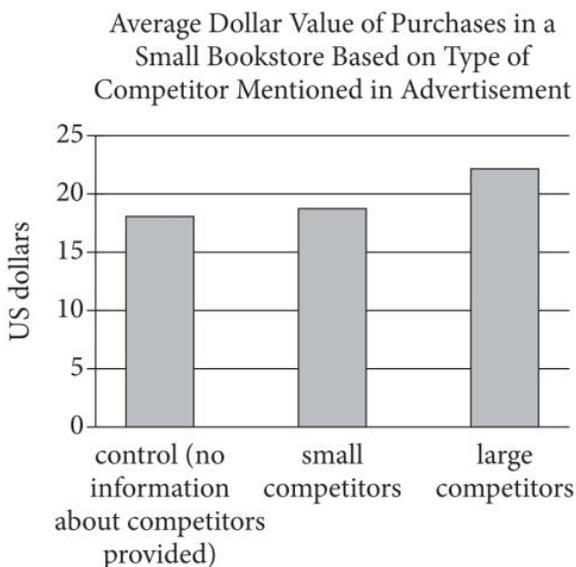
In subsequent studies, we tested this “framing-the-game” effect in various contexts and product categories and further found that support for a large brand decreases when consumers view it as being in competition with a smaller brand. In one study, we asked participants to assess two hypothetical rival tire shops, “Tire World” and “Tire Planet,” under three conditions—small vs. large, small vs. small or large vs. large competitors. While participants indicated no preference for the small or large shop when it was competing against a competitor of similar size, the small vs. large competitive context elicited a strong preference for the small rather than large shop.

Figure 1



Adapted from Neeru Paharia, Jill Avery, and Anat Keinan, "Positioning Brands against Large Competitors to Increase Sales." ©2014 by American Marketing Association.

Figure 2



Source: Data from Neeru Paharia, Jill Avery, and Anat Keinan, "Positioning Brands against Large Competitors to Increase Sales." ©2014 by American Marketing Association.

11

Which choice best describes the overall structure of the passage?

- A) A popular belief about a particular industry is explained, experiments supporting that belief are described, and the implications of the experiments are identified.
- B) An unexpected claim about consumer behavior is introduced, examples supporting the claim are detailed, and experiments confirming the claim are discussed.
- C) A debate about an economic theory is outlined, two opposing views on the debate are explained in more detail, and research supporting one of those views is recounted.
- D) A negative impact of a common business practice is presented, two stories are used as an illustration, and research suggesting improvements is summarized.

12

As used in lines 11-12, "expected" most nearly means

- A) anticipated.
- B) demanded.
- C) hoped.
- D) admitted.

13

The third paragraph (lines 22-33) primarily serves to

- A) outline the steps in a large field study.
- B) offer another researcher's interpretation of the team's data.
- C) introduce a challenge the researchers faced.
- D) summarize the findings of a series of experiments.

14

Which choice provides the best evidence for the idea that consumers' promotion of a small company may extend beyond shopping at its stores?

- A) Lines 31-33 ("This . . . reviews")
- B) Lines 36-40 ("Upon . . . competition")
- C) Lines 40-44 ("Shoppers . . . business")
- D) Lines 43-48 ("The small . . . environment")

15

As used in line 48, "environment" most nearly means

- A) circumstances.
- B) locale.
- C) scenery.
- D) resources.

16

✓ The studies in the passage suggest that if customers of a large chain bookstore were given information focusing on the store's small competitors, a likely result is that the large store would

- A) receive more positive reviews from its customers.
- B) gain customers who perceive it as offering more choices than smaller shops.
- C) benefit from people's perception that its competition is now even greater.
- D) lose customers who would now see it as a competitor of the smaller shops.**

17

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

- A) Lines 14-15 ("But consumers . . . location")
- B) Lines 50-56 ("Analyzing . . . competition version")**
- C) Lines 65-69 ("In subsequent . . . brand")
- D) Lines 69-73 ("In one . . . competitors")

18

✗ Which approach for increasing the likelihood of consumers making a purchase in a small store is best supported by figure 1?

- A) If the small store is currently advertising its small competitors, it should provide no information about its competitors instead.
- B) If the small store is currently providing no information about its competitors, it should provide information about its small competitors instead.
- C) If the small store is currently providing information about its large competitors, it should provide information about its small competitors instead.
- D) If the small store is currently providing information about its large competitors, it should provide no information about its competitors instead.**

✓ 19

According to figure 2, the average dollar value of purchases in a small bookstore that mentioned small competitors in its advertisement was between

- A) 5 and 10 dollars.
- B) 10 and 15 dollars.
- C) 15 and 20 dollars.
- D) 20 and 25 dollars.

✓ 20

Which statement is best supported by information in figures 1 and 2?

- A) While customers were more likely to make a purchase at a small store whose advertisement highlighted a large competitor, they tended to spend less than they would have if the advertisement had provided no information about competitors.
- B) Advertising mentioning competitors of any size tended to result in a small store's customers making more purchases than if the store's advertising had provided no information about competitors, but the dollar value of those purchases was lower on average.
- C) Advertising mentioning a large competitor tended to result in more customers making purchases in a small store and in a higher average dollar value for purchases than if the store's advertising had provided no information about competitors.
- D) While customers were less likely to make a purchase at a small store whose advertisement highlighted a small competitor than if it had highlighted large competitors, the decrease in the number of purchases was offset by the increase in the average dollar amount of purchases.

Questions 21-30 are based on the following passages.

Passage 1 is adapted from Danny Lewis, “After Decades of Decline, Tiger Populations Could Be on the Rise.” ©2016 by Smithsonian Institution. Passage 2 is adapted from K. Ullas Karanth, “The Trouble with Tiger Numbers.” ©2016 by Scientific American, a division of Springer Nature America, Inc.

Passage 1

After years of hard work by conservationists throughout Asia, a new study brings good news for the world’s wild tigers. According to a new report by
 Line the World Wildlife Fund (WWF), the number of
 5 tigers living in the wild may have been slowly rising over the last several years. If continued surveys prove this to be true, this would mark the first time in more than a century that tiger populations have grown.

In a study compiling surveys taken across Asia,
 10 researchers at the WWF found that there are at least 3,890 tigers living in the wild today—a considerable increase from the 3,200 recorded in 2010. The study suggests that the commitment to and success of conservation programs in some countries have
 15 contributed to the overall growth of the global tiger population.

“It’s a positive trend,” Ginette Hemley, the WWF’s senior vice president of wildlife conservation, says. “We’re cautiously hopeful.”

20 Counting wild tigers, however, isn’t easy. While tens of thousands of tigers once roamed Asia from Turkey to Indonesia, their habitats have become tiny and scattered during the last century. Wild tigers are notoriously elusive, preferring to hide out in hard-to-
 25 reach places in jungle undergrowth and high mountains.

Combined with their low numbers, these factors can make them difficult to keep track of, which can leave some uncertainty as to whether the populations
 30 are truly on the rise. The increased numbers may in part reflect better surveying methods.

Additionally, while the global number of wild tigers appears to have gone up, a country-by-country analysis is more sobering. Though several countries
 35 including India, Nepal, Bhutan and Russia may have gone up in recent years, others have seen tigers disappear thanks to poaching and habitat loss.

Passage 2

Photographic capture-recapture and large-scale occupancy modeling are now used to estimate tiger
 40 numbers and range in several countries across Asia. (Scientists who study other elusive carnivores with unique body markings, including African wild dogs and wolverines, are also employing these approaches.) Yet on the whole, although the science of tiger
 45 population assessment has rapidly progressed, its adoption by governmental and nongovernmental conservation agencies has not, whether because of a lack of understanding of or comfort with the new methods or because the old methods cast a more
 50 flattering light on their efforts.

A recent example illustrates just how insidious reliance on outdated tools is. In April the WWF and the Global Tiger Forum announced to great fanfare that the planet’s wild tiger population was at last on
 55 the rise, numbering 3,890 individuals. These groups aim to increase the number of tigers to 6,000 by 2022. But their tally, based on official estimates, relied on flawed methodologies, including the use of statistically weak extrapolations from tiger
 60 photographs and field counts of spoor.¹ And their goal for population growth far exceeds what one would expect to realize on the basis of studies carried out using more rigorous techniques. Furthermore, apart from the increases in tigers in a few reserves in
 65 India and parts of Thailand, there are no convincing data to show that populations are recovering in the rest of Southeast Asia or Russia. Indeed, countries such as Cambodia, Vietnam and China have lost their viable tiger populations in recent years—losses
 70 masked by any single global tiger number.

Speculative tiger numbers for countries and regions undermine efforts to save tigers by distracting conservationists and the public from what should be
 our top priority: guarding and growing the source
 75 populations.² In a way, the overall number of wild tigers, if we could even get an accurate count, may not matter. The source populations are the ones we need to monitor vigilantly, using the best science available to track their numbers. Only with reliable counts can
 80 we set realistic goals for future growth, develop suitable strategies for meeting those goals and measure the impact of our conservation efforts.

¹ Animal droppings

² Animals located in areas with suitable conditions for reproduction to take place

History shows that scientific progress can stall from lack of understanding, institutional inertia and political considerations for decades or even centuries. But as the world enters into the sixth mass extinction of wild species, we simply cannot afford to divorce conservation practices from sound science if we are to have any hope of saving a wildlife icon like the majestic tiger.

21

As used in line 17, “positive” most nearly means

- A) emphatic.
- B) specific.
- C) reliable.
- D) favorable.

22

According to Passage 1, counting wild tigers is difficult because tigers

- A) move extremely quickly from one location to another.
- B) reside in environments that are relatively inaccessible to humans.
- C) bear a superficial resemblance to other related species.
- D) exhibit behavior that is potentially threatening to humans.

23

Based on Passage 1, what is one factor that may have contributed to the rise in the reported global tiger population?

- A) Photographic technology has improved in its ability to detect animals in remote environments.
- B) Recent measurement techniques used to count animals are more accurate than those used in the past.
- C) Scientists’ understanding of the typical growth rate for populations of endangered species has improved.
- D) Wildlife conservation strategies are more uniform from country to country than they once were.

24

Which choice from Passage 1 provides the best evidence for the answer to the previous question?

- A) Lines 9-12 (“In a . . . 2010”)
- B) Lines 17-19 (“It’s . . . hopeful”)
- C) Lines 30-31 (“The increased . . . methods”)
- D) Lines 34-37 (“Though . . . loss”)

25

According to Passage 2, the wild tiger population estimate offered by the WWF and the Global Tiger Forum may be flawed as a result of which factor?

- A) Generalization from a selection of evidence that is likely incomplete
- B) Limitation to data that are more relevant in certain countries than in others
- C) Reliance on a new experimental tool that has not been thoroughly tested in the field
- D) Assumption of stability in population growth over time that is not supported by data

26

As used in line 62, “realize” most nearly means

- A) comprehend.
 B) obtain.
 C) perfect.
 D) create.

27

Which choice best states the relationship between the two passages?

- A) Passage 2 compares and critiques the conservation solutions recommended in Passage 1.
 B) Passage 2 questions the professional credibility of the scientists profiled in Passage 1.
 C) Passage 2 suggests several applications of the conclusions reached in Passage 1.
 D) Passage 2 challenges the reliability of research results discussed in Passage 1.

28

It can reasonably be inferred from the passages that their authors would both agree that wild tiger population sizes are

- A) recovering more fully in certain countries than in others.
 B) beginning to return to the levels recorded in 2010.
 C) responding predictably to aggressive conservation attempts.
 D) declining steadily despite continual human intervention.

29

The author of Passage 2 would most likely respond to the conclusions in the first paragraph of Passage 1 by asserting that such claims

- A) only apply to certain subspecies of tigers and are therefore inconclusive.
 B) will offer incentive for countries and regions to invest further in wildlife preservation programs.
 C) prove that rigorous efforts to protect endangered species result in quick recovery of populations.
 D) may lead people to believe that tigers are recovering when in fact they continue to require vigilant protection.

30

Which choice from Passage 2 provides the best evidence for the answer to the previous question?

- A) Lines 52-55 (“In April . . . individuals”)
 B) Lines 60-63 (“And their . . . techniques”)
 C) Lines 71-75 (“Speculative . . . populations”)
 D) Lines 79-82 (“Only . . . efforts”)

Questions 31-41 are based on the following passage.

This passage is adapted from a speech delivered in 1905 by Lucy Eldine Gonzalez Parsons, "The Principles of Anarchism." Parsons was a political activist.

I think I cannot open my address more appropriately than by stating my experience in my long connection with the reform movement.

Line It was during the great railroad strike of 1877 that
5 I first became interested in what is known as the
"Labor Question."¹ I then thought as many thousands
of earnest, sincere people think, that the aggregate
power operating in human society, known as
10 government, could be made an instrument in the
hands of the oppressed to alleviate their sufferings.
But a closer study of the origin, history and tendency
of governments convinced me that this was a mistake.

I came to understand how organized governments
used their concentrated power to retard progress by
15 their ever-ready means of silencing the voice of
discontent if raised in vigorous protest against the
machinations of the scheming few, who always did,
always will and always must rule in the councils of
nations where majority rule is recognized as the only
20 means of adjusting the affairs of the people.

I came to understand that such concentrated
power can be always wielded in the interest of the few
and at the expense of the many. Government in its
last analysis is this power reduced to a science.
25 Governments never lead; they follow progress. When
the prison, stake or scaffold can no longer silence the
voice of the protesting minority, progress moves on a
step, but not until then.

I will state this contention in another way: I
30 learned by close study that it made no difference what
fair promises a political party, out of power, might
make to the people in order to secure their
confidence, when once securely established in control
of the affairs of society; that they were after all but
35 human with all the human attributes of the politician.
Among these are: First, to remain in power at all
hazards; if not individually, then those holding
essentially the same views as the administration must
be kept in control. Second, in order to keep in power,
40 it is necessary to build up a powerful machine; one
strong enough to crush all opposition and silence all
vigorous murmurs of discontent, or the party
machine might be smashed and the party thereby lose
control.

45 When I came to realize the faults, failings,
shortcomings, aspirations and ambitions of fallible
man, I concluded that it would not be the safest nor
best policy for society, as a whole, to entrust the
management of all its affairs, with all their manifold
50 deviations and ramifications in the hands of finite
man, to be managed by the party which happened to
come into power, and therefore was the majority
party, nor did it then, nor does it now make one
particle of difference to me what a party out of power
55 may promise; it does not tend to allay my fears of
[what] a party, when entrenched and securely seated
in power might do to crush opposition, and silence
the voice of the minority, and thus retard the onward
step of progress.

60 My mind is appalled at the thought of a political
party having control of all the details that go to make
up the sum total of our lives. Think of it for an
instant, that the party in power shall have all
authority to dictate the kind of books that shall be
65 used in our schools and universities; government
officials editing, printing, and circulating our
literature, histories, magazines and press, to say
nothing of the thousand and one activities of life that
a people engage in, in a civilized society.

70 To my mind, the struggle for liberty is too great
and the few steps we have gained have been won at
too great a sacrifice, for the great mass of the people
of this twentieth century to consent to turn over to
any political party the management of our social and
75 industrial affairs. For all who are at all familiar with
history know that men will abuse power when they
possess it. For these and other reasons, I, after careful
study, and not through sentiment, turned from a
sincere, earnest, political Socialist² to the non-
80 political phase of Socialism—Anarchism³—because
in its philosophy I believe I can find the proper
conditions for the fullest development of the
individual units in society, which can never be the
case under government restrictions.

¹ The question of how to preserve the rights of the worker in an industrial society

² One who espouses a belief that the production and distribution of goods should be controlled by the government

³ A belief that opposes any form of authority in society

31

In the passage, Parsons mainly presents herself as someone who is

- A) rational in her analysis of political history.
- B) resentful over a recent turn of political events.**
- C) conflicted about the future role of political parties.
- D) sympathetic to more than one political perspective.

32

A primary purpose of Parsons's speech is to

- A) discuss a political philosophy that is starting to lose favor.
- B) outline a new approach to meeting the needs of oppressed groups.
- C) provide a rationale for adopting a different ideology.**
- D) bring to light inconsistencies within the current political system.

33

In the passage, Parsons indicates that she once believed that

- A) majority rule eliminates the need for individual activism.
- B) mobilization of the few benefits the majority.
- C) progress occurs when everyone works together toward a common goal.
- D) government can be used to make changes that citizens hope for.**

34

It can reasonably be inferred from the passage that Parsons thinks positive social change will take place only when

- A) masses of people are well versed in political history.
- B) political parties become committed to reform.
- C) fewer political parties are competing for people's votes.
- D) vocal individuals compel governments to address their concerns.**

35

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

- A) Lines 21-23 ("I came . . . many")
- B) Lines 25-28 ("When . . . then")**
- C) Lines 29-35 ("I learned . . . politician")
- D) Lines 70-75 ("To my . . . affairs")

36

As used in line 31, "fair" most nearly means

- A) honest.
- B) pure.
- C) appealing.
- D) adequate.**

37

✓ Which argument does Parsons use to support her claim about the extent to which political parties can be trusted by voters?

- A) Political parties are inherently corrupt because human nature is too easily corrupted by power.
- B) Parties often consolidate their power by making deals with opposing parties.
- C) Political parties always sacrifice their own ideals for pragmatic actions.
- D) Parties typically advance positions that are at odds with the beliefs of many of their members.

38

✗ Based on the passage, Parsons would most likely predict that a political system that includes competing parties will consistently

- A) lead to the suppression of views deemed unfavorable.
- B) fracture into an increasing number of warring parties.
- C) impede economic growth and therefore hinder progress.
- D) foster the development of an overly scientific approach to politics.

39

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

- A) Lines 23-24 (“Government . . . science”)
- B) Lines 39-44 (“Second . . . control”)
- C) Lines 44-55 (“When . . . promise”)
- D) Lines 62-69 (“Think . . . society”)

40

✗ According to the passage, Parsons’s support for anarchism is based on the idea that anarchism

- A) distributes wealth and property more equally among the population.
- B) is indifferent to the social status of its adherents.
- C) creates a situation that allows individuals to flourish.
- D) allows people to create an organizational structure whose leaders will champion the rights of the oppressed.

41

✓ As used in line 81, “proper” most nearly means

- A) ordinary.
- B) decent.
- C) conventional.
- D) suitable.

Questions 42-52 are based on the following passage and supplementary material.

This passage is adapted from Sabine Tebbich and Irmgard Teschke, "Why Do Woodpecker Finches Use Tools?" ©2013 by Cambridge University Press. Woodpecker finches use twigs to catch insect prey deep within trees.

In an experimental study we investigated whether twig tool use in woodpecker finches is acquired socially. This seemed plausible since previous studies
 Line have shown that several forms of tool use in primates
 5 develop via social learning. We took whole broods from the Galapagos Islands. We split each brood into two groups: half of the chicks were reared with a tool-using model, and the other half were reared with a non-tool-using model. We found that young
 10 woodpecker finches that never had the opportunity to watch tool use develop this ability with similar aptitude and reached distinct developmental steps that marked the appearance of new tool-oriented behavior at a similar age as their siblings that were
 15 given the chance to observe tool use in adult woodpecker finches. We concluded that, in contrast to chimpanzees, social learning is not necessary for the acquisition of this behavior in woodpecker finches. Instead, the developmental process seems to
 20 be strongly dependent on genetically fixed components. Interestingly, New Caledonian crows also appear to have a specific genetic predisposition for tool use, as demonstrated by the finding that they develop basic use of stick tools without a tool-using
 25 model. However, in contrast to our study, a tool-using demonstrator (a human in the study on New Caledonian crows) stimulated faster development of tool use in juvenile New Caledonian crows. Field observations also show that New Caledonian crow
 30 parents scaffold the development of wide tool manufacture and use in juveniles for up to one year. Juveniles stay close to their parents and are provided with discarded tools. The early exposure to this discarded tool might help juveniles to form a mental
 35 template of functional tool design.

Information about woodpecker finches' social system can shed some light on the reasons for the strong genetic predetermination of tool use in this species. For one thing, in contrast to socially living
 40 primates, woodpecker finches are solitary and thus parents are likely to be the only available tool-using models. In such a system, reliance on social transmission from parents to offspring during an

association would be a highly risky endeavor. Where
 45 the likelihood of encountering important social information is uncertain, selection for a development process based on genetically fixed components could be advantageous, especially given that tool use provides an important part of the woodpecker finch's
 50 diet and seems crucial to survival during the dry season in the islands' Arid Zone.

Although our experiment showed that the development of tool use is based on a very specific genetic predisposition, we were able to demonstrate
 55 that non-social, individual learning does play an important role during the ontogeny [development within an organism's lifetime] of tool use in serving to improve the efficiency of this behavior. Five individuals developed tool-using techniques that
 60 deviated from the tool use performed by birds in the wild, most likely because our artificial crevices differed from natural crevices and tree holes. At some point during the study, each of these birds dropped their tool into the artificial crevice and pulled it out
 65 with an upward motion of their beak, thereby levering the prey to within reach at the front of the crevice. After initial success with this technique, the five birds significantly increased their use of this method. These and other observations on learning in
 70 tool-using woodpecker finches have altered our conception of how this behavior develops. The ontogenetic unfolding of this complex behavior is determined by a very specific genetic component, but is enhanced through individual learning.

Table 1

Tool Use by Woodpecker Finches Raised with and without Tool-Using Models

Tool-use behavior	Mean instances of behavior per observation by experimental condition	
	Raised with tool-using model	Raised without tool-using model
Picking up twig	7.7	10.7
Manipulating twig	7.4	10.7
Using twig as tool	3.6	5.6
Success with tool	0.83	0.94

There is no significant difference in results between the two groups for any of the four tool-use behaviors tested.

Table 2

Effect of Success with Unique Levering Technique on Frequency of Levering Technique Use by Woodpecker Finches		
Before first success at acquiring prey	Median frequency of prey-levering attempts per observation	1
	Range of prey-levering attempts per observation	0–5
After first success at acquiring prey	Median frequency of prey-levering attempts per observation	11
	Range of prey-levering attempts per observation	4–21

Source: Data from Sabine Tebbich et al., “Do Woodpecker Finches Acquire Tool-Use by Social Learning?” ©2001 by The Royal Society.

42

- ✓ The main purpose of the passage is to
- A) contrast the tool-using behavior of wild and captive-raised woodpecker finches.
 - B) describe experiments intended to clarify the benefits of tool use for woodpecker finches.
 - C) discuss a study of the differences between primates and woodpecker finches with respect to tool use.
 - D) present research that explains the development of tool-using behavior in woodpecker finches.

43

It can reasonably be inferred from the passage that the design of the researchers’ experiment helped to minimize the possibility that

- A) there were important differences between the two groups of chicks other than the model with which the groups were reared.
- B) responses of any individual chick to the model were influenced by the responses of other chicks in the same group.
- C) acquisition of tool-using behavior by chicks in both groups was influenced by the particular potential tools available.
- D) identifying when chicks reached different developmental stages of tool-using behavior depended on human evaluations of chicks’ actions.

44

- ✓ Which choice provides the best evidence for the answer to the previous question?
- A) Lines 1-3 (“In an . . . socially”)
 - B) Lines 3-5 (“This . . . learning”)
 - C) Lines 5-9 (“We took . . . model”)
 - D) Lines 16-19 (“We concluded . . . finches”)

45

As used in line 20 and line 47, “fixed” most nearly means

- A) repaired.
- B) determined.
- C) attached.
- D) prepared.

46

The parenthetical statement in lines 26-27 (“a human . . . crows”) mainly serves to

- A) contrast the prevalence of tool use among New Caledonian crows with the prevalence of tool use among woodpecker finches.
- B) explain why the results of the New Caledonian crow study conflicted with those of the woodpecker finch study.
- C) indicate a difference between the design of the New Caledonian crow study and that of the woodpecker finch study.
- D) suggest that the methods of the New Caledonian crow study should be adopted for the study of woodpecker finches.

47

The passage most strongly suggests that the social system of primates allows for young animals to

- A) regularly observe other members of their species using tools.
- B) reach maturity without having learned to use tools to acquire food.
- C) restrict the transmission of tool-related knowledge to close relatives only.
- D) experiment with tool designs at little risk of lost food if the designs are unsuccessful

48

Based on the passage, the researchers' conclusion that the woodpecker finches who used the novel levering technique were displaying individual learning is supported in part by the fact that

- A) no genetic variations were common to all those finches that were not also common to all the finches that did not use that technique.
- B) those finches tended to stop using the technique after the researchers altered the artificial crevices to reduce the effectiveness of the technique.
- C) the portion of that technique that deviates from typical tool-using behavior takes place inside a crevice and is therefore difficult for other finches to observe and acquire socially.
- D) there is probably not a naturally occurring circumstance that would have favored the development of that technique and its prior transmission to those finches.

49

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

- A) Lines 58-62 ("Five . . . holes")
- B) Lines 62-67 ("At some . . . crevice")
- C) Lines 67-69 ("After . . . method")
- D) Lines 71-74 ("The ontogenetic . . . learning")

50

As used in line 71, "conception" most nearly means

- A) beginning.
- B) understanding.
- C) design.
- D) invention.

51

According to table 1, the mean number of instances that woodpecker finches raised without tool-using models used twigs as tools was

- A) 10.7.
- B) 7.4.
- C) 5.6.
- D) 3.6.

52

The data in table 2 best support which statement about the woodpecker finches that used the unique levering technique to acquire prey?

- A) At least one of them attempted the technique five times before successfully acquiring prey.
- B) After the first success at acquiring prey, a few of them ceased using the technique altogether.
- C) After the first success at acquiring the prey, none of them attempted the technique more than five times.
- D) None of them were successful in their first attempt with the technique.

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 and supplementary material.

From Book to Humument

On November 5, 1966, British artist Tom Phillips was rummaging through a warehouse full of bargain

1 books, he found an old, hardbound Victorian novel by W. H. Mallock. The book, which Phillips purchased for mere pennies, **2** was titled *A Human Document*, and he decided to make it the raw material for his next art

1

- X
- A) NO CHANGE
 - B) books when he found
 - C) books; finding
 - D) books. When finding

2

- ✓
- A) NO CHANGE
 - B) were
 - C) have been
 - D) are being

project: a mixed-media book of erasure poetry. **3** This project would later bloom into a decades-long obsession, as he continued to **4** amend the near-forgotten novel into a kaleidoscopic work of art.

Phillips **5** initially worked on the book for over five years; instead, he would “treat” it. In this process,

3

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

Copies of *A Human Document* can still be obtained, though the price is more than a few cents now.

Should the writer make this addition here?

- A) Yes, because it helps explain why the novel was sold so cheaply.
- B) Yes, because it provides context about Phillips’s source material for the project.**
- C) No, because it detracts from the focus of the passage on Phillips’s artistic use of the book.
- D) No, because it fails to explain why Phillips would choose to use this particular book.

4

- A) NO CHANGE
- B) mutate
- C) transform
- D) rehabilitate**

5

Which choice most effectively sets up the information in the rest of the sentence?

- A) NO CHANGE**
- B) noted that the book’s text contained a diverse vocabulary;
- C) was unfamiliar with *A Human Document* before buying it;
- D) never planned to read Mallock’s book;

Phillips **6** would open the book to a random page then erase, cross out, paint over, or otherwise manipulate the text so that the carefully selected remaining words would create a unique, poetic message. In one of his earliest treatments, he folded the title page of Mallock’s novel, truncating “A Human Document” to “A Humument.” This struck Phillips as a particularly evocative title. “Humument” was an “earthy word,” as he put it, “with echoes of humanity and monument.” **7** However, the newly coined word revealed something of his method, how Phillips would “hew” his own meaning out of the larger text of the novel, carving away words like a sculptor carves away stone to reveal a new artwork beneath.

6

X

- A) NO CHANGE
- B) had opened
- C) opens
- D) opened

7

X

- A) NO CHANGE
- B) Therefore,
- C) For example,
- D) Furthermore,

[1] Phillips’s first treatments were done mostly with ink and watercolors, but soon he also incorporated other designs—from abstract shapes and collages to elaborate drawings—to cover or accompany the text. [2] Even after he’d treated each of the novel’s 367 pages and put *A Humument* on display, first as a unique artwork in 1973 **8** and later, as a book published in 1980, Phillips’s work wasn’t done. [3] In his 1973 treatment of page 50, for example, Phillips painted the page with six green petri-dish-like circles, covering all but the playfully absurd lines, “ten hours; / bands play. It is a / political revolution.” [4] For the 1996 version, Phillips covered the page with a richly drawn self-portrait, leaving the egomaniacal message, “At last—welcome! / my own / myself!” [5] Though diverse in artistic style, **9** they reveal Phillips’s sense of humor, his delight in “fish[ing] the odd joke out of a dry text.” **10**

8

- A) NO CHANGE
 B) and later as a book
 C) and later as a book—
 D) and, later as a book

9

- A) NO CHANGE
 B) the years
 C) both versions
 D) those

10

The writer wants to add the following sentence to this paragraph.

He returned to *A Humument* again and again, scouring the text for new opportunities.

The best placement for the sentence is

- A) before sentence 1.
 B) after sentence 2.
 C) after sentence 3.
 D) after sentence 5.

In 2016, Phillips reflected on his lifelong engagement with *A Human Document*. **11** He wrote the introduction to the sixth and final edition. In the introduction, he observed that he'd "yet to find a situation, sentiment or thought which [Mallock's] words cannot be adapted to cover." Across its colorful pages of images and text, *A Humument* shows the infinite, creative possibilities that can be found—even in a dusty, old book.

11

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

- ✓
- A) In the sixth and final edition's introduction, an introduction that he wrote,
 - B) For the final edition, the sixth, writing in the introduction,
 - C) The sixth edition was the final edition; in the introduction, in writing,
 - D) Writing in the sixth and final edition's introduction,

Questions 12-22 are based on the following passage.

Freshwater Salinization Syndrome

12 For a while, researchers have long warned of salinization, the increasing concentration of dissolved salts, in freshwater ecosystems. Less attention, however, has been paid to the role of alkalization, or rising pH, in the salinization process. 13 University of Maryland geology professor Sujay Kaushal led a 2018 study. In this study was the observation that alkalization and salinization are crucially linked occurrences in North American fresh waterways. Given the environmental threat of what Kaushal terms “freshwater salinization syndrome,” it is imperative that scientists 14 take a more holistic approach and account for alkalization processes when studying waterway salinization.

12

- X
- A) NO CHANGE
 - B) Researchers have long warned of and cautioned against
 - C) Researchers have for a while—a long time, in fact—warned of
 - D) Researchers have long warned of

13

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

- ✓
- A) There was an observation in a 2018 study by University of Maryland geology professor Sujay Kaushal, and it was that
 - B) As observed in a 2018 study led by University of Maryland geology professor Sujay Kaushal,
 - C) Sujay Kaushal is a geology professor at the University of Maryland; in a 2018 study that Kaushal led, it was observed that
 - D) Leading a 2018 study was University of Maryland geology professor Sujay Kaushal, and in the study was an observation:

14

Which choice most effectively sets up the main argument of the passage?

- ✓
- A) NO CHANGE
 - B) keep in mind that the syndrome is most prevalent in densely populated areas
 - C) recognize symptoms of the syndrome, such as infrastructure corrosion and contaminant mobilization,
 - D) consider the research methods and technologies used

[1] Traditional salinization tests that solely **15** focus on sodium chloride, a salt often used to deice roads, are inadequate in studying the increased salinity and pH of freshwater systems. [2] Sodium chloride does not make water more alkaline, but other salts—such as those containing positive ions of calcium, potassium, and magnesium—do. [3] Such salts are released by numerous processes, including mining, agriculture, and, counterintuitively, acid rain. [4] Regardless of how they enter waterways, “these ‘cocktails’ of salts can be more toxic than just one salt, as some ions can displace and release other ions from soils and rocks, compounding the problem,” Kaushal explains. [5] As Kaushal’s study shows, these effects are widespread in the United **16** States, of the 232 stream and river monitoring sites examined in the study, 66 percent showed trends of increasing pH. **17**

15

- X
- A) NO CHANGE
 - B) were focusing
 - C) will focus
 - D) had been focused**

16

- ✓
- A) NO CHANGE
 - B) States: of**
 - C) States; of,
 - D) States of

17

✓ The writer wants to add the following sentence to this paragraph.

While acid rain itself lowers pH, it breaks down minerals containing alkaline salts, ultimately raising pH in waterways.

The best placement for the sentence is

- A) after sentence 2.
- B) after sentence 3.**
- C) after sentence 4.
- D) after sentence 5.

Together, alkalization and salinization **18** poses a double threat to the health of freshwater ecosystems and the animals that rely on them. Among **19** its many effects, higher salinity can cause greater levels of phosphates to be leached into rivers and streams, fostering the growth of harmful algae and bacteria. Elevated pH, meanwhile, **20** could have several causes such as changes in weathering, certain fertilizers, or even the process of photosynthesis.

18

- A) NO CHANGE
- B) has posed
- C) pose
- D) is posing

19

- A) NO CHANGE
- B) it's
- C) their
- D) they're

20

Which choice most effectively supports the claim being made in the paragraph?

- A) NO CHANGE
- B) was slightly mitigated in some areas following the Clean Air Act Amendments in 1990.
- C) can cause ammonium, a nutrient already present in water, to convert into toxic ammonia gas, resulting in decreased biodiversity.
- D) is the opposite of acidification and can stimulate the production of nitrate.

Due to the linked ecological and biological costs of high salt concentrations and high pH in freshwater **21** systems. Scientists must consider both when assessing a freshwater ecosystem's overall health. This is not to say that existing salinization studies are invalid; sodium chloride remains an important source of salinization and requires monitoring, but so do pH-increasing salts. **22** In fact, Kaushal points out that adding one type of salt to the environment can actually encourage the mobilization of other kinds of salt, exacerbating the freshwater salinization syndrome.

21

X

- A) NO CHANGE
- B) systems; scientists
- C) systems, and scientists
- D) systems, scientists

22

X

Which choice provides the most effective conclusion to the passage?

- A) NO CHANGE
- B) According to Kaushal, many cities have inefficient salt-spreading equipment that could be updated to ultimately help with efforts to manage the freshwater salinization syndrome.
- C) What Kaushal's freshwater salinization syndrome provides is a critical conceptual framework that can help scientists make more effective use of existing research and design better studies in the future.
- D) Ultimately, Kaushal notes, salinization and alkalization could not only affect freshwater ecosystems but coastal regions as well.

Questions 23-33 are based on the following passage.

Rave Reviews for Professional Reviewers

An individual who wants to purchase a new laptop computer can get reviews of the available models from one of the many websites where customers post their own reviews. However, many consumers are concerned about the trustworthiness of anonymous customer appraisals or are simply overwhelmed by the countless, often conflicting **23** reviews, there is growing demand for the objective, reputable reviews provided by a professional reviewing service. Those who enjoy trying new products and sharing their opinions may even consider becoming professional reviewers who conduct **24** sizeable product research and report on their findings. As the example of David **25** Heim, who worked for more than 25 years at Consumer Reports, a leading reviewing service—shows, the field is ideal for those who want to use their expertise to provide honest information to consumers while learning about the latest technologies.

Professional review services, like Consumer Reports, The Wirecutter, and The Sweethome, offer expert advice. **26** Its technicians run tests on products such as cars, electronics, appliances, and household supplies—a task as exciting as it is difficult, given that professional

23

- A) NO CHANGE
- B) reviews; now that
- X C) reviews, so
- D) reviews, therefore,

24

- ✓ A) NO CHANGE
- B) spacious
- C) pervasive
- D) extensive

25

- ✓ A) NO CHANGE
- B) Heim
- C) Heim—
- D) Heim;

26

- X A) NO CHANGE
- B) Our
- C) These
- D) Their

reviewers often have to anticipate industry trends. Heim recalls, for example, a time in the 1990s when managing editors at his company held a meeting to discuss a product many **27** are not even hearing of: digital cameras. After a live demonstration, Heim and his team decided this was a product they should review for the public. Two years later, digital cameras became the second most popular product the company had reviewed.

Professional reviewers' commitment to fairness and accuracy should be particularly appealing to consumers since, according to market research, **28** product testers try all brands, not just the most popular ones. For example, a 2014 study found that 50 percent of those **29** surveyed believed that, businesses sometimes write negative reviews about competitors, and a further 18 percent believed businesses did so often. The individuals

27

- ✓ A) NO CHANGE
 B) had not even heard
 C) have not even heard
 D) will not even have heard

28

Which choice best introduces the main point of the paragraph?

- ✓ A) NO CHANGE
 B) looking at nonprofessional reviews makes it difficult to spot market trends.
 C) consumers often prefer the cheapest products regardless of quality.
 D) people have many reservations about online customer reviews.

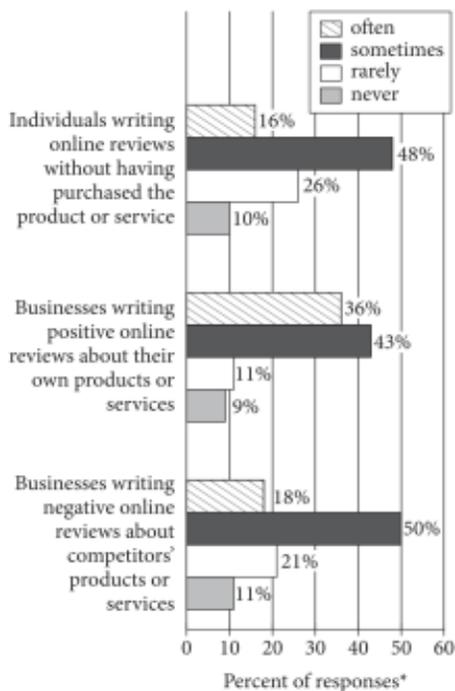
29

- ✓ A) NO CHANGE
 B) surveyed, believed that,
 C) surveyed believed that
 D) surveyed, believed that:

surveyed also thought that businesses write positive reviews of their own products or services, with 43 percent of respondents saying this happens sometimes and **30** 21 percent saying it happens often. And even when they did not suspect direct interference from the businesses, respondents **31** rarely considered whether reviews were honest: 48 percent thought that individuals sometimes write online reviews without purchasing the products or services, and 16 percent thought that this occurs often.

Survey about Online Reviews
of Products and Services

Note: Participants responded to the question "How often, if at all, do you think the following practices occur in online reviews?"



*Because of rounding, percentages may not add up to 100%.

Adapted from Jake Gammon, "Americans Rely On Online Reviews Despite Not Trusting Them." ©2014 by YouGov.

30

The writer wants to use accurate information from the graph to support the point made earlier in the sentence. Which choice best accomplishes this goal?

- A) NO CHANGE
- B) 9 percent saying it happens rarely.
- C) 36 percent saying it happens often.
- D) 11 percent saying it never happens.**

31

Which choice offers an accurate interpretation of the graph?

- A) NO CHANGE
- B) had doubts about the validity of customer reviews:**
- C) did not purchase products or services with fraudulent reviews:
- D) preferred products or services with higher numbers of reviews:

32 As the evidence shows, there is a growing need for product reviews consumers can trust. Though it can be challenging to maintain the expertise needed to make informed evaluations, those excited about 33 getting a cool gig should consider lending their opinion to consumers who need it most.

32

Which choice provides the best transition from the information in the previous paragraph?

- X
- A) NO CHANGE
 - B) Despite these drawbacks,
 - C) Whatever the format,
 - D) On the other hand,

33

✓ Which choice best maintains the style and tone of the passage?

- A) NO CHANGE
- B) working in a cutting-edge career
- C) snagging a job that's all the rage
- D) acquiring employment at the forefront

Questions 34-44 are based on the following passage.

The Myth of *Homo Economicus*

Classical economic theory is predicated on a bedrock assumption about human behavior: people make economic decisions **34** precisely as they did in the nineteenth century. The law of supply and demand, for example, which holds that as the supply of an item increases, its price decreases, assumes that each shopper will strive to pay **35** as small as possible for the item. From the nineteenth century until quite recently, **36** there was this rational “economic man,” *Homo economicus*. He formed the basis of most economic models.

34

Which choice best sets up the information that follows in the paragraph and the passage?

- A) NO CHANGE
- B) based on general principles.
- C) rationally and in their own self-interest.
- D) whenever they choose which goods or services to buy.

35

- A) NO CHANGE
- B) so small
- C) as little
- D) so little

36

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

- A) there was this rational “economic man”; *Homo economicus*
- B) this rational “economic man,” *Homo economicus*,
- C) “economic man,” being the rational *Homo economicus*,
- D) *Homo economicus* was a rational “economic man” and

37 Economic models vary, according to scholars in the emerging field of behavioral economics: humans aren't rational. In the real world, people make irrational economic decisions all the time. 38 However, studies of savings behavior show that many workers choose not to enroll in retirement-savings plans offered by their employers even when these plans are 39 ostentatiously in the workers' interest. Behavioral economists who have studied the issue blame the "default effect," according to which people given a choice tend to favor the option presented as the default or status quo. When the default

37

Which choice provides the most effective transition from the previous paragraph to the information that follows in the sentence?

- X A) NO CHANGE
 B) A comparison is relevant,
 C) Another truth emerged,
 D) There was just one problem,

38

- ✓ A) NO CHANGE
 B) Moreover,
 C) In other words,
 D) For instance,

39

- X A) NO CHANGE
 B) expansively
 C) overwhelmingly
 D) extravagantly

option—that is, the choice that requires no direct action to be taken—is not to enroll in a **40** plan—and many employees don't sign up. However, when the default option is enrollment—that is, when companies automatically sign workers up for a plan and require them to take direct action to **41** unenroll—far more workers make the decision to save for retirement.

As the example above suggests, behavioral economists not only analyze human behavior but also identify mechanisms by which to change it. Sometimes the behaviors studied go beyond the strictly economic. In a 2013 study, Katherine Milkman and two coauthors

40

- A) NO CHANGE
- B) plan, and many
- C) plan. Many
- D) plan, many

41

- A) NO CHANGE
- B) unenroll,
- C) unenroll:
- D) unenroll;

examined what they call “temptation **42** bundling”: tying a so-called “want experience” (in this case, listening to a favorite audiobook) with a so-called “should behavior” **43** (one which they should be doing anyway). Milkman found that participants who limited their audiobook listening to time spent at the gym worked out 51 percent more frequently than the control participants, and 61 percent of those in the experimental group even **44** purchased gym-only access to audiobooks. As Milkman points out, if other kinds of temptation-bundling options were available, such as Netflix subscriptions that can be accessed only at a gym, more people would make the rational decision to exercise more often.

In short, behavioral economics offers a nuanced consideration of the forces that influence human decision-making, fundamentally complicating classical economic theory. In the eyes of behavioral economists, rational, self-interested *Homo economicus* does not exist; on the other hand, with the right interventions, people can—and should—be nudged to act in accordance with the old assumptions.

42

- A) NO CHANGE
- B) bundling” tying:
- C) bundling,” tying;
- D) bundling”; tying

43

Which choice provides an example that is most consistent with the other information in the sentence and the paragraph?

- A) NO CHANGE
- B) (audiobooks were available to them while they exercised).
- C) (a behavior they might not enjoy).
- D) (exercising at a gym).

44

- A) NO CHANGE
- B) had purchased
- C) purchase
- D) would 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.**

No Test Material On This Page



Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

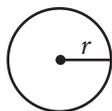
DIRECTIONS

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

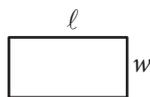
- The use of a calculator **is not permitted**.
- All variables and expressions used represent real numbers unless otherwise indicated.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures lie in a plane unless otherwise indicated.
- Unless otherwise indicated,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

REFERENCE

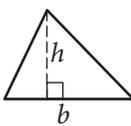


$$A = \pi r^2$$

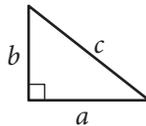
$$C = 2\pi r$$



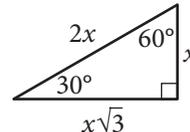
$$A = \ell w$$



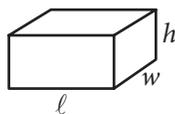
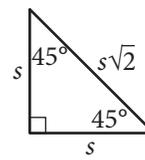
$$A = \frac{1}{2}bh$$



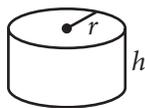
$$c^2 = a^2 + b^2$$



Special Right Triangles



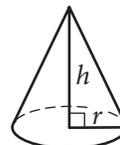
$$V = \ell wh$$



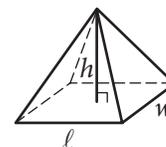
$$V = \pi r^2 h$$



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



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



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

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 function f is defined by $f(x) = \frac{9}{2}x + 1$. What is the slope of the graph of $y = f(x)$ in the xy -plane?

- A) $-\frac{9}{2}$
- B) $-\frac{2}{9}$
- C) $\frac{2}{9}$
- D) $\frac{9}{2}$

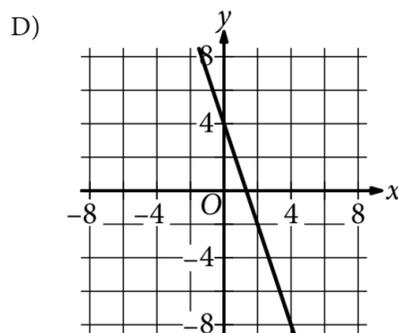
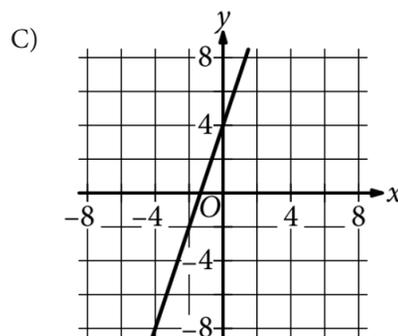
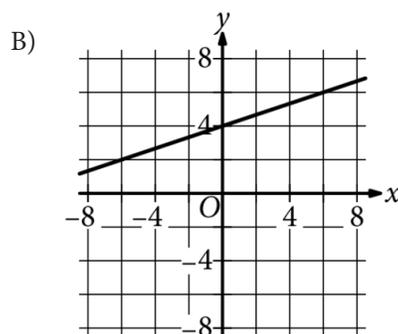
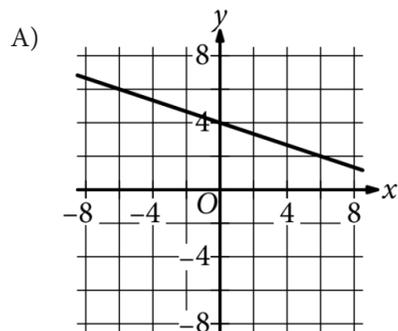
2

If $2(x - 4) = x$, what value of x makes the equation true?

- A) $\frac{4}{3}$
- B) $\frac{8}{3}$
- C) 4
- D) 8

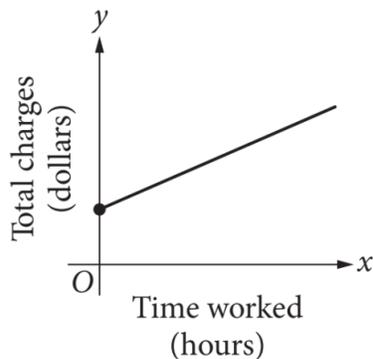
3

What is the graph of $y = 3x + 4$?





4



The graph represents the total charges, in dollars, by a contractor for x hours of work. The contractor charges a onetime fee plus an hourly rate. What is the best interpretation of the slope of the graph?

- A) The contractor's hourly rate
- B) The contractor's onetime fee
- C) The total amount that the contractor charges
- D) The maximum amount that the contractor charges

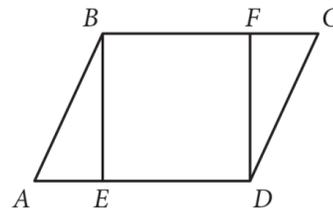
5

$$z = \frac{x + 3}{2y}$$

The given equation relates the distinct positive real numbers x , y , and z . Which equation correctly expresses x in terms of y and z ?

- A) $x = 2yz + 3$
- B) $x = 2yz - 3$
- C) $x = \frac{z}{2y} - 3$
- D) $x = \frac{z - 3}{2y}$

6



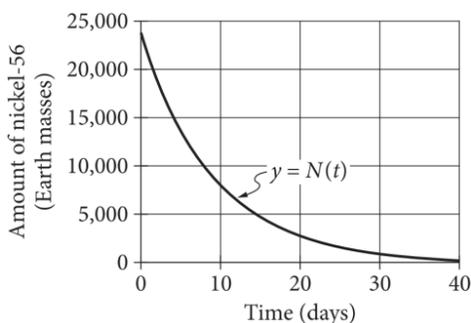
Note: Figure not drawn to scale.

In the figure shown, $ABCD$ is a parallelogram and $EBFD$ is a square. The area of $ABCD$ is 112 square meters (m^2), and the area of $EBFD$ is 64 m^2 . What is the length, in meters, of line segment \overline{AE} ?

- A) 6
- B) 8
- C) 14
- D) 23



7



The function N models the amount of nickel-56, in Earth masses, remaining t days after a massive star explodes. About how many Earth masses of nickel-56 were there when the star exploded?

- A) 3,000
- B) 8,000
- C) 12,000
- D) 24,000

8

Which of the following pieces of information is sufficient to prove that triangle ABC is an isosceles triangle?

- I. \overline{AB} is congruent to \overline{BC}
- II. $\angle A$ is congruent to $\angle C$

- A) I is sufficient, but II is not.
- B) II is sufficient, but I is not.
- C) Either I or II is sufficient.
- D) Neither I nor II is sufficient.

9

Which expression is equivalent to $\frac{2 + 3x}{16 - 81x^4}$, where $x > 1$?

- A) $\frac{1}{8 - 27x^3}$
- B) $8 - 27x^3$
- C) $\frac{1}{(4 + 9x^2)(2 - 3x)}$
- D) $(4 + 9x^2)(2 - 3x)$

10

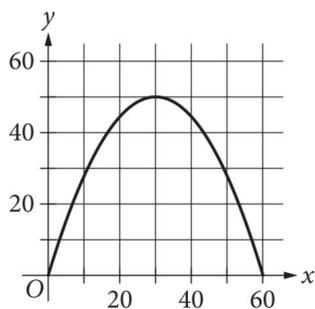
$$3x^2 - 7x - 1 = 0$$

What are the solutions to the given equation?

- A) $x = \frac{7 \pm \sqrt{37}}{6}$
- B) $x = \frac{7 \pm \sqrt{61}}{6}$
- C) $x = \frac{-7 \pm \sqrt{37}}{6}$
- D) $x = \frac{-7 \pm \sqrt{61}}{6}$



11



The graph shown models the profit y , in thousands of dollars, and the number of products sold x , in thousands, for a certain company. Which equation represents this model?

- A) $y = \frac{1}{18}x^2$
 B) $y = -\frac{1}{18}x^2 + 50$
 C) $y = 50 - \frac{1}{18}(x - 30)^2$
 D) $y = 50 + \frac{1}{18}(x - 30)^2$

12

How many solutions does the equation $3x - 8 = x + 2(x - 4)$ have?

- A) Zero
 B) Exactly one
 C) Exactly two
 D) Infinitely many

13

Which expression is equivalent to $k^{\frac{5}{16}}(k^{\frac{3}{2}})^{\frac{5}{8}}$, where $k > 0$?

- A) \sqrt{k}
 B) $\sqrt[4]{k^5}$
 C) $\sqrt[8]{k^5}$
 D) $\sqrt[15]{k^{16}}$

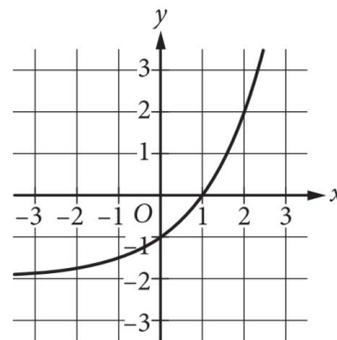


14

A company offers its salespeople two different weekly compensation plans. Salespeople on Plan X earn \$1,000 plus a 10% commission on their sales each week. Salespeople on Plan Y earn \$500 plus a 20% commission on their sales each week. Which inequality models the amount in sales each week, d dollars, for which salespeople on Plan X earn more than salespeople on Plan Y?

- A) $d < 5,000$
- B) $d > 5,000$
- C) $d < 1,500$
- D) $d > 1,500$

15



What is an equation of the graph shown?

- A) $y = 2^x + 2$
- B) $y = 2^x + 1$
- C) $y = 2^x - 1$
- D) $y = 2^x - 2$

**DIRECTIONS**

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

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

3	1	/	2
•	•	•	•

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

Write answer → in boxes.

Grid in result.

← Fraction line

← Decimal point

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

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

Answer: 2.5

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

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

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

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

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

Answer: 201 – either position is correct

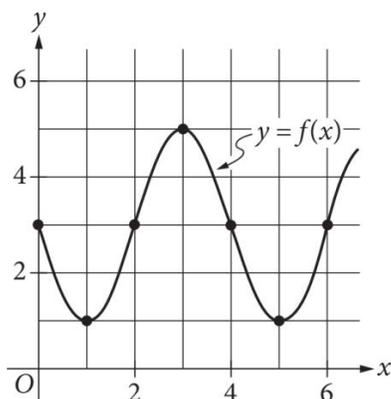
	2	0	1
•	•	•	•
0	0	•	0
1	1	1	•
2	•	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

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

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



16



The graph of the function f is shown. What is the value of $f(0)$?

17

$$x^2 + 2x + 1 = 4$$

What is the positive solution to the given equation?

18

The graph of a line in the xy -plane passes through the point with coordinates $(6,2)$ and crosses the x -axis at the point with coordinates $(10,0)$. The line crosses the y -axis at the point with coordinates $(0,b)$. What is the value of b ?

19

$$\begin{aligned} -3x + 4y &= 4 \\ 4x - 3y &= 0.5 \end{aligned}$$

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

20

$$x^2 + y^2 + 6x + 5y = -\frac{45}{4}$$

The equation of a circle in the xy -plane is shown. What is the radius of the circle?

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.

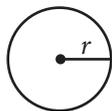
DIRECTIONS

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

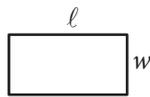
1. The use of a calculator **is permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated,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

REFERENCE

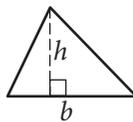


$$A = \pi r^2$$

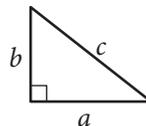
$$C = 2\pi r$$



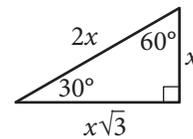
$$A = \ell w$$



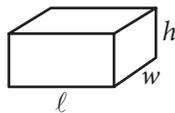
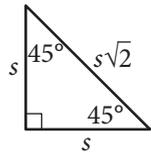
$$A = \frac{1}{2}bh$$



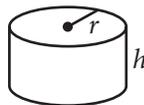
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = \ell wh$$



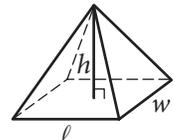
$$V = \pi r^2 h$$



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



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



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

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

Which equation has the same solution as $8x = 2x + 12$?

- A) $10x = -12$
- B) $10x = 12$
- C) $6x = -12$
- D) $6x = 12$

2

The function k is defined by $k(x) = \frac{3x - 5}{2x + 3}$. What is the value of $k(1)$?

- A) $\frac{5}{2}$
- B) $\frac{8}{5}$
- C) $-\frac{2}{5}$
- D) $-\frac{3}{2}$



3

When the temperature of water is 25 degrees Celsius, sound travels through the water at a constant speed of about 1,500 meters per second. At the same temperature, about how far, in meters, would sound travel through the water in 15 seconds?

- A) 37,500
- B) 22,500
- C) 375
- D) 100

4

A digital artist resized a rectangular image. The ratio of the length to the width of the image did not change. The width of the new image is 3 times as long as the original width. If L is the length of the original image, which expression represents the length of the new image in terms of L ?

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

Questions 5 and 6 refer to the following information.

4, 5, 5, 6, 7, 8, 8, 9, 9, 9, 10

Eleven employees at a company were selected at random to participate in a survey. The survey included a question that asked the participants to rate their work satisfaction on a scale from 1 to 10. The list shows the eleven ratings of the participants.

5

Which of the following is closest to the percentage of participants who gave a rating of 5?

- A) 9%
- B) 18%
- C) 27%
- D) 45%

6

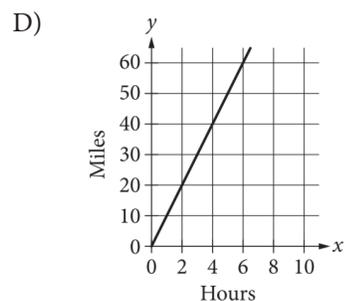
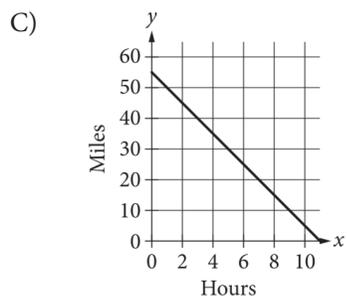
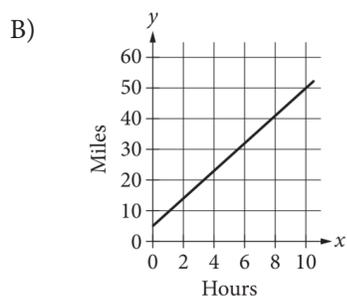
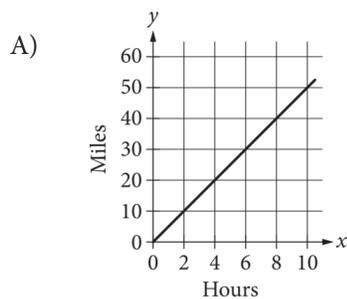
What is the ratio of the number of participants who gave a rating of 6 or higher to the number of participants who gave a rating lower than 6?

- A) 3 to 8
- B) 8 to 3
- C) 8 to 11
- D) 11 to 8



7

In Chicago in 1895, Frank Duryea won America's first automobile race by driving 52.4 miles in 10 hours and 23 minutes. If he drove at a constant rate, the approximate distance he drove y , in miles, during the race could be modeled by $y = 5x$, where x is the time, in hours, after the start of the race. Which graph best represents this relationship?



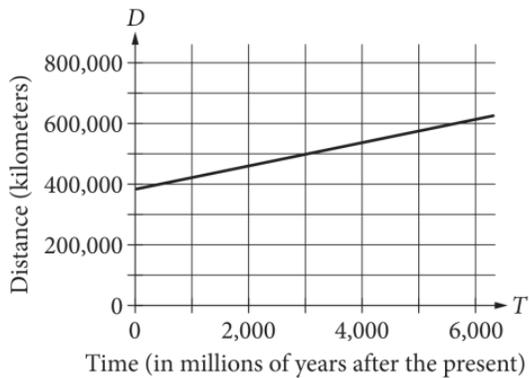
8

A certain soccer field has an area of 7,000 square meters. What is this area in square feet? (Use 1 square meter = 10.76 square feet.)

- A) 60
- B) 651
- C) 75,320
- D) 810,443



9



The graph shown models the relationship between the distance D , in kilometers, from Earth to the Moon and the time T , in millions of years after the present. Which of the following equations models this relationship?

- A) $D = -38T - 385,000$
- B) $D = -38T + 385,000$
- C) $D = 38T - 385,000$
- D) $D = 38T + 385,000$

10

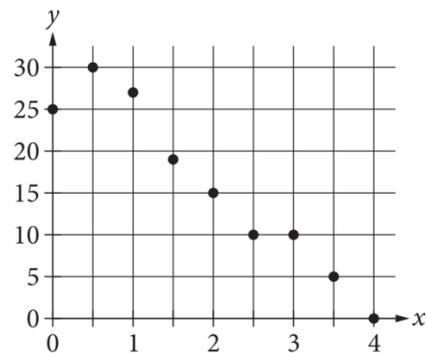
$$(2x + 1)^2 = 81$$

What are all possible solutions to the given equation?

- A) -9 and 9
- B) -5 and 4
- C) 4
- D) 40

11

The scatterplot shows the relationship between two variables, x and y .



Which of the following equations is the most appropriate linear model for the data shown?

- A) $y = -7 + 30x$
- B) $y = 7 - 30x$
- C) $y = 30 + 7x$
- D) $y = 30 - 7x$



12

If $4(x + 1) = 16$, what is the value of $x + 1$?

- A) 3
- B) 4
- C) 11
- D) 12

13

The equation $0.95c + 0.05n = 8.87$ represents the density of a copper-zinc alloy, where c is the density, in grams per cubic centimeter (g/cm^3), of copper, n is the density, in g/cm^3 , of zinc, and $8.87 \text{ g}/\text{cm}^3$ is the density of the alloy. The density of copper is $8.96 \text{ g}/\text{cm}^3$. What is the density of zinc, in g/cm^3 ?

- A) 0.09
- B) 0.47
- C) 7.16
- D) 8.51

14

76, 72, 71, 71, 68, 66, 30

The list shown gives the total number of points scored by 7 teams in a curling tournament. The score 30 was recorded in error. If the score of 30 points is removed from the list, which statement best describes the effect on the mean and median number of points?

- A) The mean increases, and the median decreases.
- B) The mean decreases, and the median increases.
- C) The mean decreases, and the median remains the same.
- D) The mean increases, and the median remains the same.



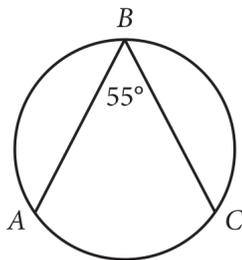
15

$$2x - 3y = 5$$

One of the two equations in a system is given. The system has an infinite number of solutions. Which equation could be the other equation in the system?

- A) $4x - 6y = 10$
- B) $4x + 6y = 10$
- C) $2x - 3y = 10$
- D) $2x + 3y = 10$

16



Points A , B , and C lie on the circle as shown. What is the measure, in degrees, of arc \widehat{AC} ?

- A) 55
- B) 110
- C) 220
- D) 305

17

$$y < \frac{1}{2}x + 4$$

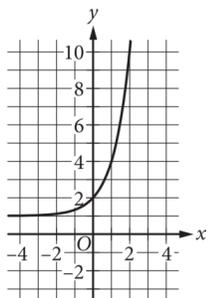
$$y > -2x + 4$$

Which ordered pair (x, y) is a solution to the given system of inequalities in the xy -plane?

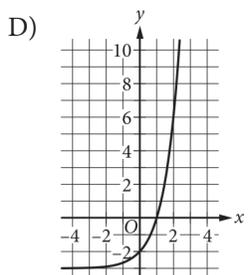
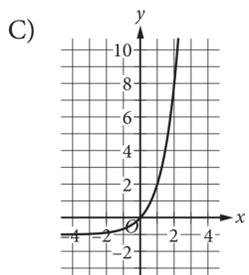
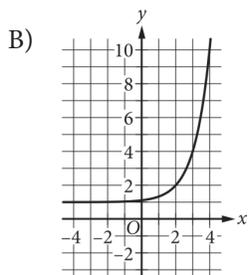
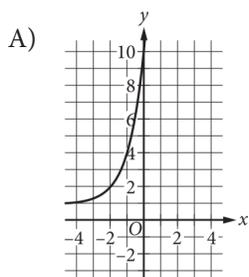
- A) (0,2)
- B) (1,0)
- C) (1,5)
- D) (2,4)



18



The graph of $y = f(x)$ is shown. What is the graph of $y = f(x) - 2$?



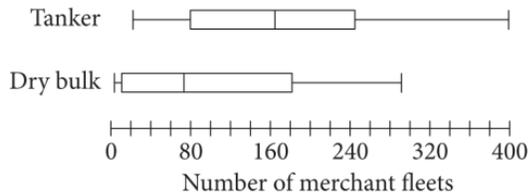
19

The gross domestic product (GDP) of Malta was approximately 250.72 million US dollars in 1970. From 1970 to 1980, a model indicates the GDP increased by 15% per year compared to the previous year's GDP. Which function represents this model, where $f(t)$ is the estimated GDP, in millions of US dollars, and t is the number of years after 1970?

- A) $f(t) = (1.15)^{250.72t}$
- B) $f(t) = (250.72)^{1.15t}$
- C) $f(t) = 1.15(250.72)^t$
- D) $f(t) = 250.72(1.15)^t$



20



The box plots shown summarize the number of tanker and dry-bulk merchant fleets for 18 countries. Which of the following measures must be greater for the number of tanker merchant fleets than for the number of dry-bulk merchant fleets?

- I. The median
 II. The range
- A) I only
 B) II only
 C) I and II
 D) Neither I nor II

21

$$x(x - 12) - 12(x - 12) = 0$$

How many distinct real solutions does the given equation have?

- A) Zero
 B) Exactly one
 C) Exactly two
 D) Infinitely many

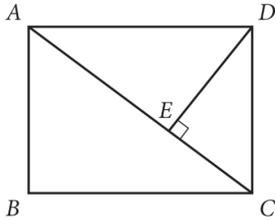
22

The average price per pound of oranges at a certain grocery store started at \$1.15 and increased at a constant rate each month for several months until the average price per pound reached \$1.41. The equation $1.15 + 0.065x = 1.41$ represents this situation, where x is the number of months after the average price per pound was \$1.15. Which is the best interpretation of the number 0.065 in this context?

- A) The average price per pound of oranges
 B) The percentage increase in the average price per pound of oranges
 C) The rate of change, in dollars per month, in the average price per pound of oranges
 D) The total increase, in dollars, in the average price per pound of oranges after x months



23



In rectangle $ABCD$ shown, $\overline{AB} = 6$, $\overline{CD} = 6$, and $\overline{AC} = 10$. What is the length of \overline{CE} ?

- A) 3.6
- B) 4.2
- C) 5
- D) 8

Questions 24 and 25 refer to the following information.

Store	List price	Discount	Installation fee
W	\$ a per tire	Buy 3 tires at list price and get the 4th tire free.	\$50 for all 4 tires
X	\$90 per tire	Each tire is 15% off list price.	\$12 per tire
Y	\$90 per tire	Buy 1 tire at list price and get the 2nd tire 50% off.	\$15 per tire
Z	\$110 per tire	Each tire is \$10 off list price.	\$18 per tire

The table shows the list price, discount, and installation fee for tires from four different car repair stores. Assume there is no sales tax and the information in the table is for tires of the same brand and size.

24

At Store X, a customer buys 4 tires and receives the discount but does not have the tires installed. What is the total cost to the customer?

- A) \$54
- B) \$150
- C) \$300
- D) \$306

25

Store W's total expenses for selling and installing 4 tires is \$100. Which function represents the profit $p(a)$, in dollars, from selling and installing 4 tires to which the store's discount is applied? (profit = total amount of money received – expenses)

- A) $p(a) = 3a + 50$
- B) $p(a) = 3a - 50$
- C) $p(a) = 4a + 50$
- D) $p(a) = 4a - 50$



26

The height of a certain tree in 2016 was 1.35 times the height of the tree in 2011. By what percentage did the height of the tree increase from 2011 to 2016?

- A) 0.35%
- B) 1.35%
- C) 35%
- D) 135%

27

A study conducted by a mobile phone company found that the average battery life of a random sample of its phones is 4.6 hours, with an associated margin of error of 0.5 hours. The study was then repeated with a much larger sample size, with the mean and margin of error of the new sample being calculated in the same way as the original study. Which of the following is most likely true?

- A) The margin of error from the new study is larger than the margin of error from the original study.
- B) The margin of error from the new study is smaller than the margin of error from the original study.
- C) The mean from the new study is larger than the mean from the original study.
- D) The mean from the new study is smaller than the mean from the original study.



28

$$L_1 = 10(0.89)^d$$
$$L_2 = 9.75 - 0.83d$$

An exponential equation and a linear equation are given. Each equation estimates the luminosity, in units of billions of solar luminosities, for a Type Ia supernova d days after its peak luminosity, for $d \leq 6$. The luminosity, in billions of solar luminosities, estimated by the linear equation 3 days after its peak luminosity is how much greater than the luminosity estimated by the exponential equation?

- A) 0.21
- B) 2.1
- C) 21
- D) 210

29

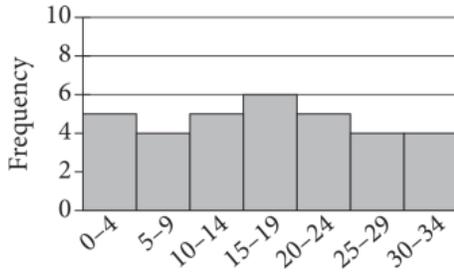
A bag contains x apples, y oranges, and z pears. If one of these fruits is selected at random, what is the probability of selecting a fruit that is not an orange?

- A) $\frac{x+z}{y}$
- B) $\frac{x+z-y}{x+y+z}$
- C) $1 - \frac{y}{x+z}$
- D) $1 - \frac{y}{x+y+z}$

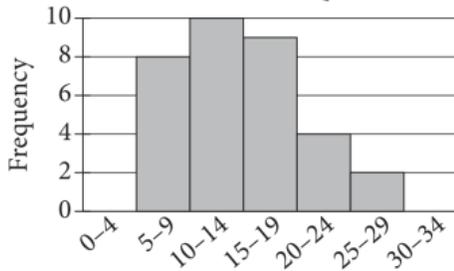


30

Data Set P



Data Set Q



The histograms shown summarize two data sets, P and Q. Which of the following statements best compares the ranges and standard deviations of the two data sets?

- A) Data set P has a greater range and a greater standard deviation than data set Q.
- B) Data set Q has a greater range and a greater standard deviation than data set P.
- C) Data set P has a greater range but a smaller standard deviation than data set Q.
- D) Data set Q has a greater range but a smaller standard deviation than data set P.

**DIRECTIONS**

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

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

Write answer in boxes. →

Grid in result. →

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

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

← Fraction line

Answer: 2.5

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

← Decimal point

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

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

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

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

Answer: 201 – either position is correct

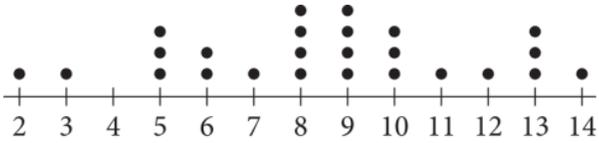
	2	0	1
•	•	•	•
	0	•	0
①	①	①	•
②	•	②	②
③	③	③	③

2	0	1	
•	•	•	•
	•	0	0
①	①	•	①
•	②	②	②
③	③	③	③

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



31



What is the median of the 25 data values represented in the dot plot above?

32

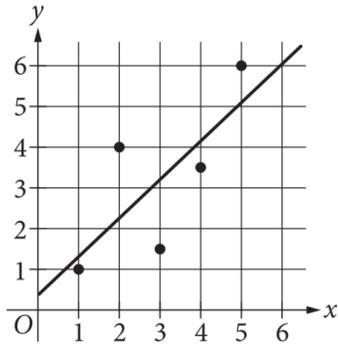
$$0.10x + 0.20y = 0.18(x + y)$$

The given equation represents a volume x , in gallons, of a 10% saltwater solution that will be mixed with a volume y , in gallons, of a 20% saltwater solution to produce an 18% saltwater solution. What volume, in gallons, of the 20% saltwater solution will be needed if 50 gallons of the 10% saltwater solution is used?



33

The scatterplot shows the relationship between two variables, x and y . A line of best fit is also shown.



For how many of the data points does the line of best fit predict a greater y -value than the actual y -value?

34

If $ax - 3$ is a factor of $6x^3 + 27x^2 - 54x$, where a is a positive constant, what is the value of a ?



35

Set K consists of all the positive integers that are less than or equal to 150, where none of the integers are repeated. If a number is selected at random from set K , what is the probability of selecting a number that is even and less than or equal to 30? (Express your answer as a decimal or fraction, not as a percent.)

36

The volume of sphere A is 20 cubic centimeters. Sphere B has a radius that is 2 times the radius of sphere A . What is the volume, in cubic centimeters, of sphere B ?



37

When Karina walks from home to work, she burns 5.3 calories per minute, and when she rides her bike from home to work she burns 6.4 calories per minute. If Karina spends a total of 6 hours walking and bicycling from home to work in a week and burns a total of 1941 calories doing these activities, how many minutes does she spend bicycling?

38

A quadratic function can be used to model the height, in feet, of an object above the ground in terms of the time, in seconds, after the object was launched. According to the model, an object was launched into the air from a height of 0 feet and reached its maximum height of 784 feet 7 seconds after it was launched. Based on the model, what was the height, in feet, of the object 3 seconds after it was launched?

STOP

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

