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 Nina Revoyr, *The Age of Dreaming*. ©2008 by Nina Revoyr. The narrator describes acting in silent films in the early 1900s. Moran owns the production company that employs the narrator.

It is amusing, in retrospect, to think how primitive our efforts were in those early years. For my first two films, all of the interiors were shot on outdoor sets, with canvases draped over them to soften the sun. All copies of *Jamestown Junction* have long been lost, but if the film had survived, and if you could see it, you would notice that during the office scene the papers on my desk are disturbed by a mysterious breeze. And in the very next scene, you would see a shadow moving in the corner, caused by the canvas flapping in the wind. These were the conditions in which we shot at that time, and because we worked without the benefit of artificial light, there was always a rush to complete the day's filming before the shadows grew too deep in the afternoon. In late May, when we endured an unexpected heat wave, Moran had giant ice blocks delivered to the sets, and powerful fans placed behind them to blow the cool air in the direction or the players. If it rained, filming would halt altogether, and we would scramble to move all the furniture and props under the complex's few permanent roofs. But despite these challenges, everyone remained in good spirits. We were working, yes, but it felt like play, and it was hard to comprehend the tremendous good fortune that had suddenly befallen me.

Through the making of both films, Hanako gave me constant guidance, which I eagerly accepted. And I immediately discerned the difference between myself, an untrained amateur, and a seasoned professional who knew everything about the art of acting. Indeed, she was perhaps the largest influence on my development as an actor.

"There is no audience to see you," she said one day in Japanese, as I gestured expansively to convey my anguish at the death of one of my fellow soldiers. "You don't need to project like you would in the theater, as if you're trying to be seen by the person in the last row. Pretend the camera is the one man you're playing to."

On another occasion when I was perhaps *too* understated, Hanako approached me after Moran called "cut." "You're painting a picture with your body," she said. "Think of pantomime. You must express physically what you can't with your voice. And use your face, your eyes. You have such eyes. They alone speak volumes."

Moran nodded in agreement, although he couldn't have understood, and I adjusted my actions accordingly. I was surprised by the extent to which he let Hanako direct things—not only my own performance, but also the placement of props, even the movements of the other actors. Yet all of her suggestions improved the films. And between her advice and Moran's direction, I was slowly learning what to do. The transition from theater, which depends on dialogue, was more difficult than I had imagined—indeed, many stage actors, even those who didn't disdain the new medium or moving

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pictures, did not make the change successfully. Hanako Minatoya was one of the few who was equally accomplished in both realms. I was learning under her tutelage every day.

On certain days, when we weren't in scenes, Hanako and I would leave the sets and walk into the hills. They were vibrant with color, with flowers wherever one looked—blue brodiaea and lupin, Mariposa lilacs, the wispy orange California poppies. The beauty of that landscape, when the air was cool, the sun glinting off the ocean, and the breeze carrying the scent of the flowers, was so dramatic I could hardly believe it real. And I was seeing it, feeling it, in the company of an artist whose work I had admired for years.

One day on our walk we were discussing a well-known actor, and Hanako surprised me by her reaction to his name. "He is nothing but a face for the fan magazines," she said dismissively. "He is not a genuine actor."

"What do you mean?" I asked, although I didn't disagree.

"It is impossible to distinguish one of his roles from another. He is always the same, and it is obvious why. In order to project a believable fiction, the actor himself must have substance. You must possess something *internally* to perform it externally. He has only a fraction of the talent of an artist such as you."

I was, of course, deeply flattered by her compliment, and I did not know how to respond. Hanako continued talking of this actor and that, without noting my reaction.

1

As used in line 2, "primitive" most nearly means

A) basic.
B) ancient.
C) original.
D) natural.

2

The narrator references *Jamestown Junction* (line 5) primarily in order to

A) highlight a film that features acting that the narrator aims to emulate.
B) provide context for the tensions that later surface between the narrator and others on the set.
C) contrast the responsibilities of the director and the actors in film production.
D) showcase the challenges posed by filming in an outdoor setting.

3

The passage is written from the perspective of someone who

A) realizes he cannot meet the challenges of pivoting to a new career.
B) regrets not making more of an effort to achieve his professional goals.
C) is enthusiastic about recent technological developments affecting his profession.
D) is nostalgic about experiences toward the beginning of his career.

4

It can most reasonably be inferred from the passage that, as a young man, the narrator attributed his employment in films to

A) his wide range of acting skills.
B) the fan base he acquired as a stage actor.
C) a lucky happenstance.
D) his friendship with Hanako.

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5

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

A) Lines 11-15 ("These . . . afternoon")
B) Lines 24-26 ("We were . . . befallen me")
C) Lines 27-28 ("Through . . . accepted")
D) Lines 29-32 ("And I . . . acting")

6

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

A) communicate.
B) conduct.
C) guide.
D) experience.

7

Based on the passage, in what way does Hanako most directly influence the narrator's development?

A) She praises his skill as an actor to boost his confidence.
B) She advises him on balancing popularity with artistic integrity.
C) She shares lessons learned from having made the same career shift that he is making.
D) She convinces Moran to allow the narrator to take on more prominent roles in his films.

8

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

A) Lines 53-56 ("Yet . . . to do")
B) Lines 61-63 ("Hanako . . . day")
C) Lines 64-66 ("On certain . . . hills")
D) Lines 89-90 ("I was . . . respond")

9

The passage indicates that when Hanako criticizes a well-known actor, the narrator

A) fears that Hanako will address him with the same criticism but is relieved when she praises him instead.
B) concurs with Hanako's opinion of the actor but is curious about the reasoning behind her criticism.
C) is disappointed that Hanako does not respect the actor but continues to admire the actor himself.
D) understands Hanako's argument but respectfully disagrees with her characterization of the actor.

10

It can most reasonably be inferred from the passage that Hanako believes that an actor's merit depends on the

A) caliber of training that the actor receives from mentors.
B) depth of the actor's own feelings and perceptions.
C) actor's willingness to take on roles that others find unappealing.
D) actor's ability to overlook unfavorable audience reactions.

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

This passage is adapted from Giorgia Guglielmi, "Small News Outlets Influence Us More Than We Think." ©2017 by American Association for the Advancement of Science.

Assessing the influence of news media is tricky. Researchers can't peer into voting booths or people's living rooms, and news organizations aren't typically willing to have outsiders interfere with their content. That's why it took a team of social scientists 5 years to get 48 U.S. news organizations to agree to run an unusual set of experiments. Instead of simply tracking what the outlets were publishing and analyzing their impact on public opinion, the researchers took an approach similar to that used in clinical trials to evaluate the effects of new drugs. They manipulated the type of news stories run, and then assigned a "treatment" week when the stories would run and a "control" week when they wouldn't. This way they could tell whether those particular stories were having any effect on public discussion.

Most participating outlets were small, with fewer than an estimated 200,000 pageviews per month, and a few were midsized, like the Wisconsin-based magazine *The Progressive*, which had more than 250,000 pageviews per month. The nonprofit news organization Truthout, based in Chicago, Illinois, represented a large outlet, with an estimated 2 million pageviews per month.

The researchers, led by Gary King of Harvard University, asked groups of two to five of these news outlets to write stories on broad policy areas, including race, immigration, and climate. For example, if the broad area was technology policy, the specific story might be what Uber drivers think about self-driving cars. The outlets could choose the policy area, the stories to cover, and the type of articles to write, such as investigative reports or opinion pieces. However, the researchers could reject a story if it was outside a specific policy area. (The outlets were free to publish whatever story they wanted outside of the experiment.)

Then, the researchers flipped a coin to decide during which of two consecutive weeks these clusters of stories, all on the same topic, would run. Finally, they measured the number of tweets about both the specific stories and the broader policy issues during the week when the stories ran compared to the week when they didn't.

Twitter posts on these topics increased by nearly 63% over the week in which the stories were posted. On average, Americans wrote more than 13,000 additional social media posts about a specific policy area on the day the stories ran and in the following 5 days. What's more, the cluster of stories swayed people's opinion by 2.3% in the ideological direction of opinion articles, suggesting that news media might in some cases change people's beliefs.

The team repeated the experiment 35 times, and observed that stories boosted posting by men and women alike, as well as by people living in different U.S. regions, with different political orientations and influence on Twitter. Removing larger outlets from the analysis didn't change the effect on public conversation much, suggesting that no single large news organization was responsible for the increase.

However, if the researchers had recruited large mainstream outlets, the spike in discussion might have been much bigger: When they looked at stories published by *The New York Times* on little-discussed topics, such as how fracking affects the quality of drinking water, they found that Twitter posts about the broader issue of water quality increased by 300% in just 1 day.

Though excited by the study, economist Matthew Gentzkow points out that only about 20% of Americans use Twitter, so the results might not be widely applicable outside social media. But to King, Twitter users are a valuable resource to assess the agenda-setting power of media because they represent those people who are willing to speak up to influence policy.

Figure 1

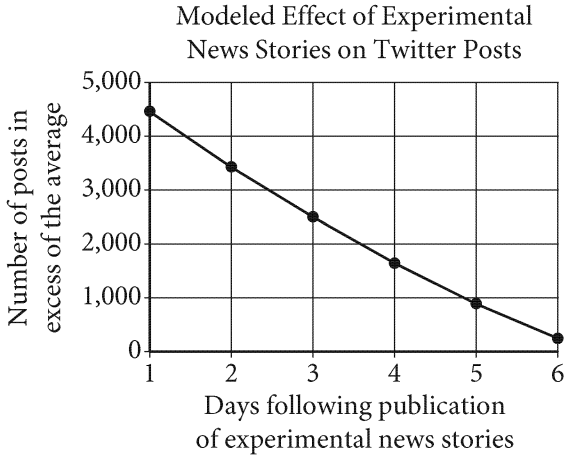

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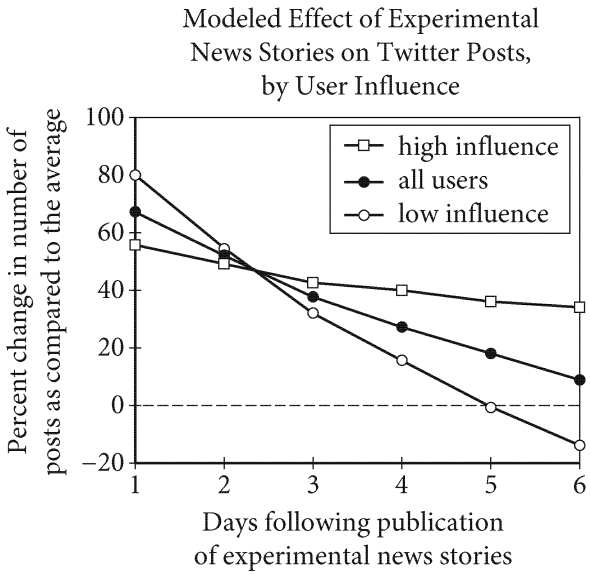
Figure 2



Figures adapted from Gary King, Benjamin Schneer, and Ariel White, "How the News Media Activate Public Expression and Influence National Agendas." ©2017 by Gary King, Benjamin Schneer, and Ariel White.

11

The main purpose of the passage is to

A) summarize an open question with respect to social media and propose a study to examine the question in greater depth.

B) introduce a common misunderstanding about mainstream media outlets and describe a study that challenges that misunderstanding.

C) outline a study that compares trends in social media use among different demographic groups and suggest an explanation for the results of that study.

D) describe a study's novel way of assessing the impact of news media on public opinion and report the findings of that study.

12

As used in line 4, "interfere with" most nearly means

A) oppose.

B) prevent.

C) modify.

D) suspend.

13

Which choice best supports the idea that the researchers needed a mechanism to determine whether changes in public opinion were the result of the experimental stories and not some other factor?

A) Lines 1-4 ("Assessing . . . content")

B) Lines 5-7 ("That's . . . experiments")

C) Lines 7-11 ("Instead . . . drugs")

D) Lines 12-16 ("They . . . discussion")

14

According to the passage, the opinion articles used in the study had what impact on the opinions of Twitter users?

A) Twitter users' opinions changed to be increasingly negative toward a specific policy area over the five-day period following the articles' publication.

B) Twitter users' opinions changed somewhat toward favoring the articles' position on the policy area.

C) Twitter users' opinions showed no measurable change throughout the two-week experiment.

D) Twitter users' opinions changed only in response to stories on policy areas that already interested them.

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15

As used in line 55, "boosted" most nearly means

A) advanced.
B) raised.
C) supported.
D) improved.

16

It can reasonably be inferred from the passage that the design of King's team's experiment made it less likely that

A) Twitter users would read more stories from participating news media outlets than they usually did.
B) news media outlets would be able to choose which stories to publish outside of treatment weeks.
C) Twitter users would realize that there was something unusual about the media outlets' publication output.
D) news media outlets would run stories on any particular topic for more than one week.

17

The passage most strongly suggests that which additional study would best help to determine more precisely the extent to which news media outlets shape public opinion in the United States?

A) A study that examines how influential news media outlets are to people who do not participate in social media
B) A study that determines whether users on different social media platforms get news from different media outlets
C) A study that captures the most common age range of people who use social media to comment on current events
D) A study that assesses whether people who participate in social media are more likely to become involved in changing US policy

18

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

A) Lines 54-58 ("The team . . . Twitter")
B) Lines 62-64 ("However . . . bigger")
C) Lines 70-73 ("Though . . . media")
D) Lines 73-77 ("But to . . . policy")

19

According to the model in figure 1, the number of Twitter posts on the relevant topics in excess of the average

A) increased from day one to day two following the experimental news stories' publication.
B) was approximately zero by day three following the experimental news stories' publication.
C) was greater than zero for two weeks following the experimental news stories' publication.
D) decreased throughout days one through six following the experimental news stories' publication.

20

Which statement best reflects the model in figure 2?

A) On day one following publication of the experimental news stories, Twitter users with high influence showed a lower percent change in their number of posts on the relevant topic than did those with low influence.
B) On day four following publication of the experimental news stories, Twitter users with low influence had about the same percent change in their number of posts on the relevant topic as all Twitter users.
C) On day five following publication of the experimental news stories, Twitter users with high influence posted about as frequently on the relevant topic as they usually did.
D) On day six following publication of the experimental news stories, all Twitter users posted on the relevant topic less frequently than they usually did.

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Questions 21-31 are based on the following passage and supplementary material.

This passage is adapted from Clint Perry and Olli Loukola, "We Taught Bees to Play Football So We Could Learn about Their Brains." ©2017 by The Conversation US, Inc.

Most people don't often think about bees' brainpower. Bees are generally regarded as tiny unthinking machines, flying from flower to flower, genetically pre-programmed to collect pollen and nectar and make honey.

But bees have some impressive cognitive capacities. Bumblebees and honeybees can count, navigate complex environments, learn concepts, use their uncertainty to guide their decisions, and even display emotion-like behaviour.

Recently, bees have also been trained to solve complex cognitive tasks such as string pulling and cap pushing to gain rewards. But as impressive as these tasks might be, they resemble some of the bees' natural foraging behaviour. Our research group wanted to test the behavioural limits of bumblebees by tasking them with something far removed from anything they encounter in nature.

So we've managed to show that bees can play football. Sort of. We showed that they can learn to move a small ball to a goal to gain a sugary reward.

To do this, we used a plastic model bee on the end of a transparent stick to move a tiny ball across a platform as a real bumblebee watched. When the ball reached a specified location at the centre of the platform, it opened access to rewarding sugar water. After several observations, each real bee we tested picked up how to solve the task and no longer needed demonstrations.

While mastering this unnatural task was impressive, we were curious to know how the bees were actually learning to solve it. So we tested three further groups of bees. One group of bees watched another previously trained bee move the ball to the centre. A second group of bees observed the ball moving to the centre "by itself" (we actually used a magnet under the platform to move the ball). And a third group of bees did not receive any demonstration.

The movement of the ball with the magnet was enough for some of the bees to learn the task significantly better than the bees who did not receive any demonstration. But all ten bees observing another bee move the ball to the centre solved the task much quicker and at a higher success rate than either of the other groups. This suggests the observer bees picked up something important from their fellow bees that helped them learn this unnatural task.

The design of this experiment also allowed us to ask a novel question in social learning experiments: when learning from others, will bees simply copy what they see or can they improve upon it? During each of the observation trials, there were three balls positioned at varying distances from the centre of the platform, but it was always the furthest ball that was moved during the demonstration. But during the test trials, on their own, the observer bees almost always moved the closest ball to the centre. This suggests bees weren't simply copying what they saw during the demonstration but actually improved on the task by using the easiest means.

Our current findings suggest with convincing evidence that a miniature brain is not necessarily simple, and can solve an impressively complex task. In fact, we are not yet aware of a cognitive ability that is specific to large brains. What's more, neurobiology and modelling research suggests that a very limited number of neurons (even just a few) can accomplish some rather complex cognitive tasks.

We have shown that bumblebees can solve a task they've unlikely ever seen in their evolutionary history. No flower has likely ever required bees to move an object into its centre to gain access to nectar. The fact that bees learned this unnatural and complex task through observation alone and could improve on what they saw, rather than simply copy what they observed, shows an unprecedented amount of cognitive flexibility in an animal with such a small brain.

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Figure 1

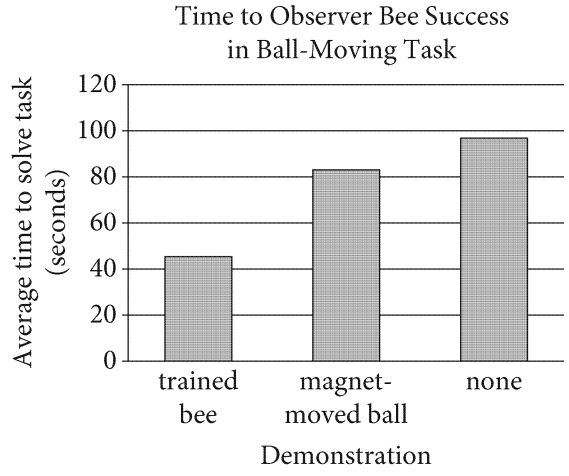
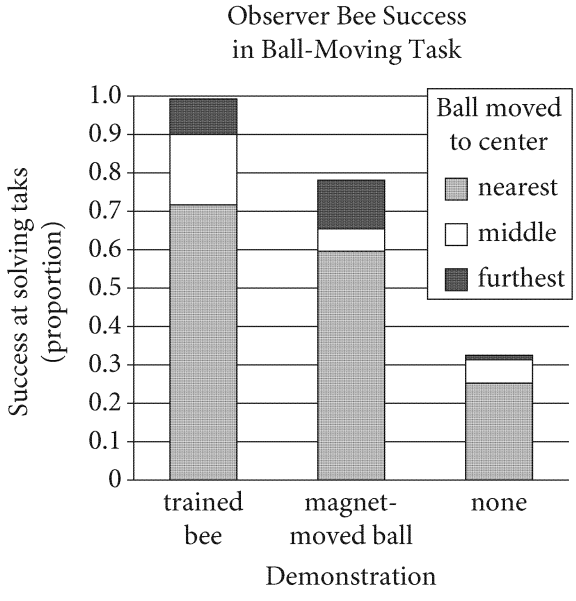


Figure 2



Figures adapted from Olli J. Loukola et al., "Bumblebees Show Cognitive Flexibility by Improving on an Observed Complex Behavior." ©2017 by American Association for the Advancement of Science.

21

The main idea of the passage is that bees

A) learn by mimicking demonstrated behavior.

B) have greater cognitive flexibility than most other insects.

C) can master simple tasks and then demonstrate them for other bees.

D) can learn unfamiliar tasks and then execute them efficiently.

22

Which choice best describes the overall structure of the passage?

A) An experiment to test an existing hypothesis about bees is presented, that hypothesis is revised based on the experiment's results, and a new study is proposed.

B) An experiment that produces unexpected data about bees is introduced, the source of the data is traced to faulty research design, and a redesigned study is described.

C) A generalization about bees is mentioned, information challenging that generalization is noted, and an experiment that deepens understanding of bees is presented.

D) A criticism about the lack of research on bees is voiced, a new experiment is proposed in response to that criticism, and a hypothesis for that new experiment is discussed.

23

According to the passage, one reason that bees may have mastered tasks such as string pulling is that the

A) bees are exceptionally responsive to sugary rewards.

B) bees are quick to copy trained bees in performing such tasks.

C) behaviors stimulate highly developed part of the bees' brains.

D) motions are similar to behaviors the bees perform in natural settings.

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24

It can most reasonably be inferred from the passage that some of the bees participating in the initial training activity

A) were unable to solve the task after a single demonstration.

B) were transfixed by the appearance of the plastic model bee.

C) could access the sugar water without moving the ball.

D) had no prior experience with goal-oriented tasks.

25

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

A) Lines 19-21 ("So we've . . . reward")

B) Lines 22-24 ("To do . . . watched")

C) Lines 24-26 ("When . . . water")

D) Lines 27-29 ("After . . . demonstrations")

26

Based on the results of the ball-moving tasks, the authors would most likely agree with which statement?

A) Bees learn to master new tasks through the process of trial and error.

B) Bees develop complex behaviors by learning them in incremental steps.

C) Bees learn effectively by observing the behaviors of other bees.

D) Bees imitate the actions of other bees and learn by repeating their movements.

27

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

A) Lines 40-43 ("The movement . . . demonstration")

B) Lines 46-49 ("This . . . task")

C) Lines 50-53 ("The design . . . upon it")

D) Lines 59-62 ("This . . . means")

28

As used in line 62, "means" most nearly means

A) instrument.

B) approach.

C) design.

D) results.

29

Which statement about the bees' success in the ball-moving task is best supported by the data in figure 1?

A) Observer bees benefited from seeing a demonstration of the ball-moving task before attempting to solve the same task.

B) Bees that received no demonstration of the ball-moving task required assistance when attempting to solve the task on their own.

C) Observer bees that saw the demonstration of the magnet-moved ball solved the task as quickly as did bees that received no demonstration.

D) Bees that saw the demonstration with the trained bee were the only bees that succeeded at the ball-moving task.

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30

According to figure 2, which combination of demonstration type and the ball's distance from the center of the platform yielded the least success in solving the task?

A) Trained bee demonstration; furthest ball
B) Magnet-moved demonstration; middle ball
C) No demonstration; nearest ball
D) No demonstration; furthest ball

31

As used in line 69, "limited" most nearly means

A) reduced.
B) small.
C) restricted.
D) exclusive.

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CONTINUE

Questions 32-42 are based on the following passage.

This passage is adapted from a speech delivered in 1841 by Thomas Paul to the Massachusetts Anti-Slavery Society, "Let Us Do Justice to an Unfortunate People." Paul, a black abolitionist, worked with white abolitionist leader William Lloyd Garrison, who founded the American Anti-Slavery Society in 1833.

I have often asked myself, what posterity would think of the strange contest in which the abolitionists are engaged. Here we meet, time after time, newspapers are printed and speeches delivered, to prove—what? Why, that a man is a man, and that he is the only human possessor of himself. But these propositions are self-evident propositions, and self-evident propositions we all know, though the most difficult to be proved, are the most easily understood, because they need no proof. The mind sees their truth intuitively, without the aid of reasoning. The attempt to prove them, therefore, would be ridiculous, were it not for the consideration of the amazing state of delusion and vassalage to which prejudice reduces the mind when unenlightened by reason.

The history of every age shows the truth of this assertion. At one time, we see Galileo thrown into prison by the Inquisition, because he had made some discoveries . . . and forced to purchase his liberty by retracting his opinions. . . . When, therefore, we see the control which prejudice, aided by circumstances and encouraged by self, interest, has in times past exercised over the human mind, and the tenacity with which it has held its deluded victims, stopping up the avenues of improvement, clipping the wings of genius, and retarding the progress of truth—when we see the minds whose energies have been crippled, and whose spheres of action have been curtailed by its influence—when we see the tremendous power which reformers have brought to bear against the prevailing sins of the ages in which they lived, the firm opposition they encountered, and the long and arduous struggles which preceded a better state of things—we are led, by analogical reasoning, to believe, that the contest in which we are engaged is not an unnatural one—that it is not so dissimilar in its character and measures to others which have been carried triumphantly through—that the modern champions of freedom do not savor so much of quixotism [impracticality] as their traducers have represented—and that the unfortunate men, whose cause they have espoused, have as just a claim to humanity as their oppressors, and like them have been created a little lower than the angels. . . .

How was it five years ago in regard to the question of slavery! A gloom hung over the moral atmosphere, which nothing seemingly could dissipate, save a miracle from God himself. All saw it, but no one durst expose his own breast to the pitiless peltings of the gathering storm. The pulpit and the press, instead of being faithful to their trust, were the panders to the general lust. But mind, like matter, must have its legitimate scope. . . . There are always some spirits who will resist such unnatural domination. And such a spirit was found in the father of American anti-slavery. In that dark hour, he arose to cheer us on our gloomy pathway. The shafts of criticism, and sarcasm, and denunciation, which rang against his buckler [shield], told only where he stood up unscathed, in his moral and intellectual might, and bearing down all opposition. The result is well known, nor does Mr. Garrison need any eulogy from me.

The task of a reformer is far from being an agreeable one. The hidden springs which are to be touched by him, and set into motion, are not discernible to common eyes; and, if they were, few would know how to approach or dare to meddle with them. He scatters his truths among the body politic, and the effect is electrical. He is greeted at once with smiles and frowns, with blessing and cursing, with eulogy and abuse. Now he is almost stifled with the caresses of devoted friends, and anon he is exposed to the fury of a blood-thirsty mob. But, if it is melancholy to see some run mad, we have the gratification to behold others restored to their reason. Much may depend upon accidental circumstances for the success of the reformer, but more depends upon himself. In him are found the great qualities of the head and heart. For the burden of proof is upon him, and he is to answer cavils [petty objections], refute sophistry [falsehood], and prove his propositions, while slanderers are crucifying his reputation, and assassins are aiming deadly daggers at his heart. All moral reformations have been attended with more or less persecution; but the American abolitionists stand preeminently distinguished in this respect.

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32

According to the passage, the author considers the campaign of the abolitionists to be "strange" (line 2) because it requires them to

A) predict how future generations will judge their efforts to end slavery.

B) persuade others of a truth that should be very obvious.

C) provide evidence that links slavery to the general lack of enlightenment in society.

D) propose a course of action that is counter to the beliefs of the audience.

33

The author suggests that abolitionists' persuasive methods will have to take into account their opponents' inability to comprehend

A) logical arguments.

B) appeals to emotion.

C) challenges to authority.

D) political rhetoric.

34

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

A) Lines 3-6 ("Here . . . himself")

B) Lines 6-10 ("But these . . . proof")

C) Lines 10-12 ("The mind . . . reasoning")

D) Lines 12-16 ("The attempt . . . reason")

35

A central claim in the passage is that

A) public resistance to a cause delays the progress of justice by discouraging reformers.

B) Garrison is unlike most reformers in that he has been willing to endure constant criticism and abuse.

C) reformers face significant challenges in addressing the social injustices of their eras.

D) slavery is harder to eliminate than other forms of oppression because the press has stifled abolitionist voices.

36

Which statement best describes the method the author employs in the second paragraph (lines 17-45) to present his argument?

A) He accounts for the presence of prejudice by citing a general historical principle.

B) He explains the current situation by drawing a parallel to past reformers' experiences.

C) He shows that a traditional criticism of past reformers is not applicable to the present situation.

D) He disproves the charges made against his fellow reformers by illustrating their moral superiority.

37

The description of Galileo's experiences in lines 18-21 primarily serves to

A) encourage the audience to appreciate the contributions of an earlier reformer.

B) introduce an alternative explanation for the pervasive prejudice in society.

C) caution the audience about the dangers of espousing revolutionary ideas.

D) illustrate a preceding generalization about the effects of ignorance.

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38

The passage most strongly suggests that a society dominated by prejudice most likely has which effect on its members?

A) They readily become inspired to fight injustice.
B) They are prevented from reaching their fullest potential.
C) They most commonly feel discouraged and frightened.
D) They inevitably become corrupt in their dealings with others.

39

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

A) Lines 21-30 ("When . . . influence")
B) Lines 30-35 ("when . . . things")
C) Lines 47-51 ("A gloom . . . storm")
D) Lines 53-58 ("But mind . . . pathway")

40

In context, the phrase "as their traducers have represented" in lines 41-42 most strongly suggests that opponents to abolition

A) concealed their motives.
B) became symbols of ideals.
C) distorted the truth.
D) misinterpreted an event.

41

The author's attitude toward Garrison is best described as one of

A) deep admiration.
B) cheerful gratitude.
C) mild impatience.
D) grave disappointment.

42

As used in line 71, "at once" most nearly means

A) simultaneously.
B) initially.
C) correspondingly.
D) decisively.

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CONTINUE

Questions 43-52 are based on the following passages.

Passage 1 is adapted from "Free-Floating Planets May Be More Common Than Stars." Published in 2011 by National Aeronautics and Space Administration. Passage 2 is adapted from Ashley Yeager, "Fewer Big Rogue Planets Roam the Galaxy, Recount Shows." ©2017 by Society for Science & the Public.

Passage 1

A survey scanned toward the center of the Milky Way galaxy during 2006 and 2007, revealing evidence for up to 10 free-floating planets roughly the mass of Jupiter. The isolated orbs, also known as orphan planets, are difficult to spot, and had gone undetected until now. The planets are located at an average approximate distance of 10,000 to 20,000 light years from Earth.

This could be just the tip of the iceberg. The team estimates there are about twice as many free-floating Jupiter-mass planets as stars. In addition, these worlds are thought to be at least as common as planets that orbit stars. This adds up to hundreds of billions of lone planets in our Milky Way galaxy alone.

"Our survey is like a population census," said David Bennett, a coauthor of the 2011 study. "We sampled a portion of the galaxy, and based on these data, can estimate overall numbers in the galaxy."

The survey is not sensitive to planets smaller than [with lower mass than] Jupiter and Saturn, but theories suggest lower-mass planets like Earth should be ejected from their stars more often. As a result, they are thought to be more common than free-floating Jupiters.

Previous observations spotted a handful of free-floating planet-like objects within star-forming clusters, with masses three times that of Jupiter. But scientists suspect the gaseous bodies form more like stars than planets. These small, dim orbs, called brown dwarfs, grow from collapsing balls of gas and dust, but lack the mass to ignite their nuclear fuel and shine with starlight. It is thought the smallest brown dwarfs are approximately the size of large planets.

On the other hand, it is likely that some planets are ejected from their early, turbulent solar systems, due to close gravitational encounters with other planets or stars. Without a star to circle, these planets would move through the galaxy as our sun and others stars do, in stable orbits around the galaxy's center. The discovery of 10 free-floating Jupiters supports the ejection scenario, though it's possible both mechanisms are at play.

"If free-floating planets formed like stars, then we would have expected to see only one or two of them in our survey instead of 10," Bennett said. "Our results suggest that planetary systems often become unstable, with planets being kicked out from their places of birth."

Passage 2

In a new study, Przemek Mróz of the Astronomical Observatory of the University of Warsaw and colleagues estimated the number of large, rogue planets in our galaxy using a technique called microlensing. When an object with a mass of a planet passes in front of a distant, background star, the gravity of the planet acts as a gravitational magnifying glass. It distorts and focuses the light, giving up the planet's existence.

Mróz and colleagues looked at 2,617 microlensing events recorded between 2010 and 2015 and determined which were caused by a rogue planet. For every typical star, called main sequence stars, there are 0.25 free-floating Jupiter-mass planets, the analysis suggests.

The new result sharply contrasts an estimate published in 2011, which suggested that rogue Jupiters are almost twice as common as main sequence stars. About 90 percent of stars in the universe are main sequence stars, so if that estimate were accurate, there should be a lot of free-floating Jupiters.

"That result changed our conceptual framework of the universe just a little bit," says astronomer Michael Liu of the University of Hawaii. It challenged long-held ideas about how planets go rogue because the known methods wouldn't generate enough planets to account for all the wanderers.

The 2011 result was based on a relatively small sample of microlensing events, only 474. Since then, infrared telescope images haven't detected as many free-floating planets as expected. "Over the years, serious doubts were cast over the claims of a large population of Jupiter-mass free-floaters," Mróz says.

David Bennett, coauthor of the 2011 study, agrees that the new census failed to find evidence for a large population of Jupiter-mass rogue planets. He notes,

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CONTINUE

however, that the new data do reveal four times as many Jupiter-mass failed stars called brown dwarfs than predicted in the original census. So some of the rogues that were originally classified as planets may, in fact, be failed stars.

Liu says the latest census is much more in line with theories of how planets form. Most rogues should be Earth-mass or a little heavier. Those lighter planets get tossed out of their planetary systems much easier than behemoths like Jupiter.

43

Do the results of the survey described in Passage 1 support the conclusion that there are twice as many Jupiter-mass free-floating planets as Earth-mass ones?

A) Yes, because the survey demonstrates that there are more Jupiter-mass free-floating planets than were previously assumed.

B) Yes, because the survey accurately estimates the number of free-floating planets in the galaxy.

C) No, because the survey shows that there are more Earth-mass free-floating planets than Jupiter-mass ones.

D) No, because the survey does not include direct information about Earth-mass free-floating planets.

44

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

A) Lines 1-4 ("A survey . . . Jupiter")

B) Lines 9-11 ("This . . . stars")

C) Lines 20-23 ("The survey . . . often")

D) Lines 26-30 ("Previous . . . planets")

45

According to Passage 2, Mróz and colleagues analyzed microlensing events to

A) confirm the results of Bennett and his colleagues' 2011 survey of free-floating planets.

B) discover the minimum required mass for a planet to be detected in front of a distant, background star.

C) compare the relative sizes of main sequence stars and large, free-floating planets.

D) determine how many big, free-floating planets exist in the Milky Way galaxy.

46

As used in line 78, "account for" most nearly means

A) explained.

B) comprise.

C) locate.

D) identify.

47

The sixth paragraph of Passage 2 (lines 85-92) serves as both

A) a corroboration of recent results and a suggestion of a potential flaw in the method used to arrive at them.

B) a criticism of the method used in a recent experiment and a recognition of the method's technical sophistication.

C) an acknowledgment of recent findings and an explanation for how they might reflect on previous findings.

D) a revision of a previous claim and a rebuttal of a criticism of a previous research study.

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CONTINUE

48

As used in line 59, "giving up" most nearly means

A) transferring.
B) abandoning.
C) interrupting.
D) revealing.

49

Which choice best describes the relationship between the two passages?

A) The results of a study outlined in Passage 2 challenge the results of a study outlined in Passage 1.
B) The scientists discussed in Passage 2 extended the research presented in Passage 1 into a new field of study.
C) The data shown in Passage 2 support the hypothesis put forth by the research team in Passage 1.
D) The researchers of Passage 2 identified variables that the researchers of Passage 1 failed to consider.

50

On which point about free-floating Jupiter-mass planets do the passages most clearly disagree?

A) Whether there are free-floating Jupiter-mass planets
B) How many free-floating Jupiter-mass planets there are
C) Whether Jupiter-mass planets can distort and focus light
D) How similar brown dwarfs are to Jupiter-mass planets

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CONTINUE

51

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

A) Lines 51-55 ("In a . . . microlensing")

B) Lines 60-62 ("Mróz . . . planet")

C) Lines 66-69 ("The new . . . sequence stars")

D) Lines 95-97 ("Those . . . Jupiter")

52

Which scientific idea is suggested in both passages?

A) Lower-mass planets are more likely to be ejected from their stars than Jupiter-mass planets are.

B) Brown dwarfs do not possess enough mass to produce their own sources of light.

C) Free-floating Jupiter-mass planets are nearly as common as planets that orbit stars.

D) Rogue planets are easily confused with Jupiter-mass failed stars by astronomers.

STOP

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

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No Test Material On This Page

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.

Shedding Light on the Problem

Plant-pollinating insects are essential to the reproductive process of many flowering plants, but the numbers of these insects are declining around the world. Interestingly, a 2017 ecological study led by Dr. Eva Knop suggests that artificial lighting, the modern convenience that 1 illuminates many streets, storefronts, and athletic fields, may be contributing to the decline of these organisms.

1

A) NO CHANGE
B) illuminate
C) are illuminating
D) have illuminated

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CONTINUE

[1] Daytime pollinators, such as bees and butterflies, have many well-documented threats, so Dr. Knop's team sought to investigate a potential threat to nocturnal 2 pollinators; artificial light. [2] To do so, the team located samples of the thistle plant *Cirsium oleraceum*, which is pollinated by insects, in mountain meadows that are ordinarily dark at night. [3] Before the plants' flowering began, some of the plants were covered with mesh bags to 3 outlaw visits from 4 pollinators, however, others were left unbagged. [4] The scientists measured how much fruit each plant produced over the course of its life cycle. 5

2

A) NO CHANGE
B) pollinators:
C) pollinators
D) pollinators,

3

A) NO CHANGE
B) oppose
C) prevent
D) revoke

4

A) NO CHANGE
B) pollinators, while
C) pollinators, meanwhile,
D) pollinators so that

5

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

> Half of the plants in each category were then illuminated during the nighttime hours.

The best placement for the sentence is

A) after sentence 1.
B) after sentence 2.
C) after sentence 3.
D) after sentence 4.

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CONTINUE

Whereas the unbagged plants' fruit production changed significantly with light exposure, the bagged plants saw no such effect. 6 The bagged plants couldn't be visited by pollinators. Because of that fact, the bagged plants self-fertilized and thus averaged only about 7 15 fruits per plant in dark sites but 85 fruits per plant in illuminated sites. On the other hand, unbagged plants from the dark sites produced an average of 90 fruits per plant, whereas 8 bagged plants that were exposed to artificial light produced an average of 78 fruits per plant—a 13 percent decline in fruit production for plants that were illuminated at night. From these results, the researchers concluded that

6

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

A) The bagged plants couldn't be visited by pollinators, so the lack of pollinators meant they
B) Being that they were unable to be visited by pollinators, the bagged plants therefore
C) The pollinators couldn't visit the bagged plants, and those plants
D) Because they couldn't be visited by pollinators, the bagged plants

7

Which choice provides accurate information from the graph?

A) NO CHANGE
B) 15 fruits per plant whether they were in dark sites or
C) 20 fruits per plant in dark sites but 80 fruits per plant in
D) 100 fruits per plant whether they were in dark sites or

8

Which choice most accurately represents the information in the graph?

A) NO CHANGE
B) bagged plants from the dark sites
C) unbagged plants from the illuminated sites
D) unbagged plants that were not exposed to artificial light

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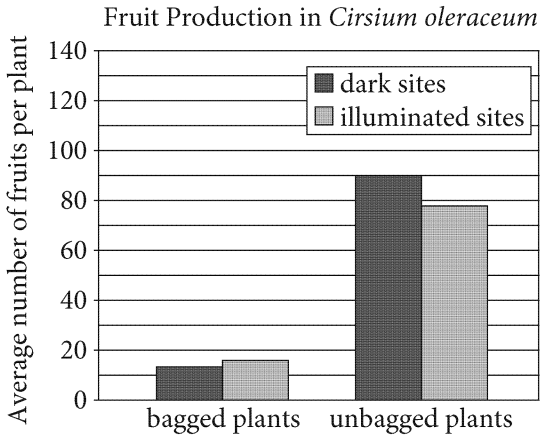
CONTINUE

nocturnal pollinators were avoiding the unbagged plants in the illuminated sites, 9 which affected the overall yield of the plants.



Adapted from Eva Knop et al., "Artificial Light at Night as a New Threat to Pollination." ©2017 by Eva Knop et al.

The scientists also found that the decline in nighttime pollination visits 10 coincided with a decline in visits from daytime pollinators. The precise cause for this dual decline was unclear; one possibility is that the plants were less nourishing to daytime pollinators when no longer visited by nighttime pollinators. Whatever the reason, artificial illumination clearly has adverse effects on plant pollination, and the increasing 11 presents of artificial lighting may pose a major problem for biodiversity. "Urgent measures must be taken, to reduce the negative consequences of the annually increasing light emissions on the environment," says Dr. Knop. She is hopeful that further research will focus on ways to reduce excessive light and revive populations of nighttime pollinators.

9

Which choice provides the best transition to the paragraph that follows?

A) NO CHANGE
B) but these pollinators were regularly visiting the unbagged plants in the dark sites.
C) although the researchers hope to investigate this result further.
D) and daytime pollinators were not making up for the loss.

10

A) NO CHANGE
B) coexisted to
C) corresponded for
D) correlated in

11

A) NO CHANGE
B) presents in
C) presence of
D) presence in

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CONTINUE

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

Benefits of Dress Code Flexibility

In July 2016 the coffee shop chain Starbucks instituted a new policy to relax its dress code. The decision—allowing employees to customize their previously uniform looks with such accessories as hats and colorful socks— 12 reflects workplaces across the United States. From retail services to large corporate offices, employers are finding that flexible dress codes can make a company more attractive to potential 13 workers; boosting morale among current employees. Given these benefits, more employers ought to embrace the trend of relaxed dress codes.

There are a number of reasons why job applicants might favor companies that allow for some degree of flexibility in workplace attire. Having the option to dress casually can mean greater physical comfort. Also, being able to personalize otherwise identical uniforms with unique flourishes can enhance happiness by allowing 14 them to retain a greater sense of personal identity in the workplace.

12

A) NO CHANGE
B) reflects a new trend in
C) reflects a new trend, or tendency, in
D) is reflective of a new, national trend in

13

A) NO CHANGE
B) workers, additionally, they can boost
C) workers. And boosting
D) workers and boost

14

A) NO CHANGE
B) him or her
C) employees
D) the flourishes

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CONTINUE

15 Individuals' motives may vary, but job recruiters are finding that many potential employees do indeed share a preference for flexible dress codes, and embracing this preference could help companies attract a wider range of talent. According to a 2016 study, 16 essentially none of those surveyed wanted to be employed by a company with a relaxed dress code: 31 percent of respondents reported that they would prefer a company with a business casual dress code, and a further 27 percent reported that they would prefer a casual dress code or no dress code at all. 17

Employee Survey on Office Dress Codes

Statement*	Percent agreeing
I would prefer to work at a company that has a formal dress code.	18%
I would prefer to work at a company that has a business casual dress code.	31%
I would prefer to work at a company that has a casual dress code or no dress code.	27%
A company's dress code doesn't impact my decision to work there.	23%
Total	99%

*Workers responded to the question "Which of the following statements most closely describes how a company's dress code impacts your decision to work there?"

Note: Responses do not total 100 percent due to rounding.

Adapted from OfficeTeam, "Casual Dress Code in Fashion at Work." ©2016 by Robert Half International Inc.

15

A) NO CHANGE
B) Individuals motives
C) Individual's motives
D) Individuals motives'

16

The writer wants to set up the information that follows in the sentence with an accurate interpretation of data from the table. Which choice best accomplishes this goal?

A) NO CHANGE
B) all
C) fewer than a quarter
D) more than half

17

At this point, the writer is considering adding the following sentence based on information from the table.

> Only 18 percent preferred a more formal dress code at work.

Should the writer make this addition here?

A) Yes, because it provides additional evidence that supports the writer's argument.
B) Yes, because it refutes an opposing point of view referred to elsewhere in the paragraph.
C) No, because it misinterprets the information in the table.
D) No, because it provides loosely related information that interrupts the discussion in the paragraph.

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CONTINUE

In addition to making companies more appealing to potential employees, 18 dressing casually can also be a fun way to express one's individuality. When the accounting firm Crowe Horwath LLP asked workers what changes they would like to see in the 19 workplace, and workers said that dressing casually would help them most 20 with, "being comfortable, being engaged, and being productive," said chief people officer Julie Wood. The firm started allowing workers to wear jeans and other relatively casual attire, and the response from employees was overwhelmingly positive. "With our change in dress, the level of excitement and feedback from our people has been really phenomenal," Wood said.

Of course, formal workplace attire is 21 appropriate and even required in some contexts. For example, job interviews and client meetings often require professional clothing. 22 However, in certain occupations, such as law enforcement, uniforms without personal embellishments are still necessary. When possible, though, companies should consider relaxing dress codes and allow flexibility, a move that is likely to benefit both employees and companies.

18

Which choice most effectively introduces the main idea of the paragraph?

A) NO CHANGE
B) relaxing dress codes can also help businesses broaden their customer bases.
C) forgoing formal work attire can also result in fewer conflicts between coworkers.
D) instituting a flexible dress code can also improve current employees' morale.

19

A) NO CHANGE
B) workplace,
C) workplace;
D) workplace, while

20

A) NO CHANGE
B) with
C) with:
D) with;

21

A) NO CHANGE
B) admissible
C) unexceptional
D) genuine

22

A) NO CHANGE
B) Furthermore,
C) Incidentally,
D) Conversely,

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CONTINUE

Questions 23-33 are based on the following passage.

The Filtered Net

Search engines make it easy for us to keep up with current issues, but the information we find may not be as objective as it appears. Many search engines collect data from users, such as their locations and search 23 histories, they use what they gather to filter search results. This invisible customization may create what media CEO Eli Pariser has termed a "filter bubble," a biased worldview that is 24 reinforced when it is consistently confirmed rather than challenged. It is important, especially with regard to political issues, that search engines make their filtering practices 25 explicit. When search engines make them explicit, users can be aware of potential biases when making important decisions, especially when those decisions 26 are shared with friends and family members on social media.

23

A) NO CHANGE
B) histories; and using
C) histories they use
D) histories, and use

24

A) NO CHANGE
B) enlarged
C) defended
D) emphasized

25

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

A) explicit, whereas
B) explicit, which has the result that
C) explicit so that
D) explicit: this is an outcome that helps ensure

26

Which choice best sets up the main argument of the passage?

A) NO CHANGE
B) are made based on misleading statistics found online.
C) impact civic duties such as candidate selection and voter opinion.
D) have long-term effects that may not be easy to measure.

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CONTINUE

Psychologist Robert Epstein has shown how filtered 27 results, can lead to political biases. In an experiment conducted before the 2014 general election in India, Epstein created a fake search engine and asked 2,000 undecided voters to use it to research candidates running for the office of prime minister. Voters were divided into three groups, and each group was presented with results favoring a different major-party candidate. Participants whose searches favored a given candidate 28 was 12 percent more likely to report a positive view of that candidate than were participants in other groups. While there is no evidence that commercial search engines intentionally skew their results in favor of certain candidates or 29 positions, filters based on 30 user's browsing history's could produce similarly slanted results.

27

A) NO CHANGE
B) results can lead to:
C) results, can lead to,
D) results can lead to

28

A) NO CHANGE
B) has been
C) were
D) are

29

A) NO CHANGE
B) positions, however,
C) positions
D) positions, however

30

A) NO CHANGE
B) users' browsing history's
C) users browsing histories
D) users' browsing histories

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CONTINUE

31 This possibility is especially troubling because most users think their searches display the full spectrum of perspectives on an issue. The vast majority of participants in Epstein's experiment—99.3 percent—did not recognize the bias in their results. 32 Politicians hope to counteract this: a 2012 survey from the Pew Research Center indicated that 66 percent of respondents believed that results obtained through a search engine represent all available information rather than a personalized selection.

Filtering is essential to search engines because the sheer volume of information on the Internet makes it impossible to display more than a small portion of all relevant results. But in the case of political information, it is important for users to be aware of the existence of filters and of the factors that might bias results. If search engines published this information 33 —by displaying a warning that results are selected based on user preferences, for example—users would be better able to read political coverage online with an appropriately critical eye and thus base their political beliefs on a fuller range of information.

31

Which choice provides the best transition from the previous paragraph to the information that follows?

A) NO CHANGE
B) The study therefore appears to contradict the idea that
C) Election outcomes are nevertheless unaffected, since
D) Search engine designers assume that

32

A) NO CHANGE
B) But there are mitigating factors:
C) And this finding was by no means atypical:
D) This was subsequently reversed:

33

The writer is considering deleting the underlined phrase, adjusting the punctuation as needed. Should the phrase be kept or deleted?

A) Kept, because it introduces an additional point about filter bubbles that is developed in the paragraph.
B) Kept, because it supports the passage's argument about search engines by offering a potential solution.
C) Deleted, because it blurs the focus of the passage by introducing information unrelated to politics.
D) Deleted, because it repeats information about search engine filters that appears earlier in the passage.

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CONTINUE

Questions 34-44 are based on the following passage.

Oglala Lakota Art Gets Rolling

A 2015 study led by First Peoples Fund, an organization dedicated to supporting indigenous 34 artists revealed that roughly four out of ten households on the Pine Ridge Indian Reservation in South Dakota had home businesses centered on arts or handicrafts. This finding reflects the deeply rooted importance of art within the reservation's Oglala Lakota culture. However, the study also concluded that the vastness of the reservation limited local artists' ability to collaborate with one another, find mentors, and sell their art. 35 Regardless of these discoveries, First Peoples Fund worked with a group of organizations and supporters to implement a plan for strengthening the creative economy of the reservation. The outcome of the organization's combined efforts 36 have been Rolling Rez Arts, a bus that would serve as a mobile space to support artistic collaboration and 37 forge critical partnerships with local financial institutions.

34

A) NO CHANGE
B) artists:
C) artists—
D) artists,

35

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

A) NO CHANGE
B) With its headquarters in Rapid City, South Dakota,
C) In light of the study's results,
D) Founded in 1995,

36

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

37

Which choice best states one of the main points of the passage?

A) NO CHANGE
B) create new commercial opportunities for artists in the area.
C) provide access to computers for people who need them.
D) offer entrepreneurship classes for people living on the reservation.

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CONTINUE

Rolling Rez Arts itself was a collaborative work of art by Oglala Lakota artists. Donald Montileaux, 38 a 2014 inductee into the South Dakota Hall of Fame, was selected to give the bus a distinctive appearance. He created a lavish design for the 39 bus. This design, intended for the sides of the bus, had vivid pictograms of running Buffalo inspired by the narrative scenes of ledger art. After Montileaux produced drawings of the design, an Oglala Lakota graphic artist adapted them to fit the bus, helping transform 40 its exterior into a brilliant, traveling canvas.

38

Which choice gives information about Montileaux that best supports the paragraph's discussion?

A) NO CHANGE
B) a practitioner of the traditional Plains Indian art form known as ledger art,
C) an artist whose work has been featured in galleries in New Mexico, Minnesota, and Arizona,
D) a cover illustrator for several books by Joseph M. Marshall III,

39

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

A) bus, the sides of which would include vivid running-buffalo-inspired pictograms, suggested
B) sides of the bus, with vivid pictograms of running buffalo inspired
C) bus's sides, and this design featured running buffalo, in vivid pictogrammatic form, suggested
D) sides of the bus—in these places would be vivid pictograms of running buffalo inspired

40

A) NO CHANGE
B) their
C) one's
D) his

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CONTINUE

With the eye-catching collaboration complete, the bus was ready to begin journeying across the far-flung communities of the reservation. The bus's versatile interior allows artists to work together on projects, study with mentors, and even set up bank accounts to help grow their art as a business. The bus also hosts a gift shop whose manager buys works on-site to sell elsewhere along the bus's travels, **41** enhancing artists' ability to benefit financially from their art. Local artist and **42** rancher, Tony Richards used to have to drive more than an hour to reach a local cultural center, where he sold his jewelry at the gift shop. "A lot of times I didn't have time to go over there," Richards said. Now, with Rolling Rez Arts, the shop travels to him.

41

A) NO CHANGE
B) exalting
C) embellishing
D) exaggerating

42

A) NO CHANGE
B) rancher Tony Richards
C) rancher Tony Richards,
D) rancher, Tony Richards—

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CONTINUE

While the organizations behind the project ultimately aim to open a permanent art space and gallery on the reservation to serve as a fixed cultural 43 hub; the art in motion of Rolling Rez Arts will continue. As 44 Warren "Guss" Yellow Hair, an artist trainer for First Peoples Fund, said, "What I do is contact some of the established artists and utilize some of their skills."

43

A) NO CHANGE
B) hub, and while
C) hub, and
D) hub,

44

The writer wants to incorporate a direct quotation into a conclusion that summarizes and reflects upon the main idea of the passage. Which choice best accomplishes this goal?

A) NO CHANGE
B) Jeremy Staab, the program manager of First Peoples Fund, said, part of the success of Rolling Rez Arts depends on "thinking about asset building"—that is, determining how to get residents "comfortable with banking."
C) Brandie Macdonald, the former program manager of First Peoples Fund, said, Rolling Rez Arts "provides access to capital" and addresses other needs in the community as it passes through the space where the community resides, which "is beautiful to think about."
D) Lori Pourier, the president of First Peoples Fund, said of the founding of Rolling Rez Arts, "We had a conversation about doing something on wheels."

STOP

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

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Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

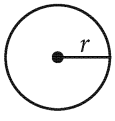
DIRECTIONS

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

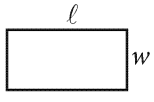
NOTES

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

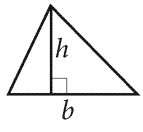
REFERENCE



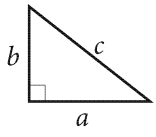
$A = \pi r^2$
$C = 2\pi r$



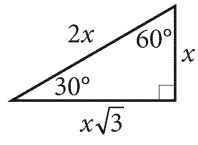
$A = \ell w$

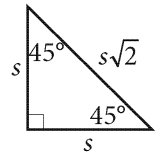


$A = \frac{1}{2}bh$

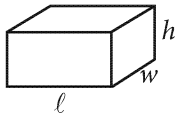


$c^2 = a^2 + b^2$

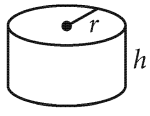




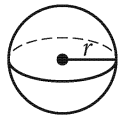
Special Right Triangles



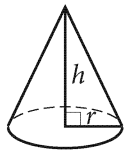
$V = \ell wh$



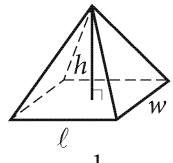
$V = \pi r^2 h$



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



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



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

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

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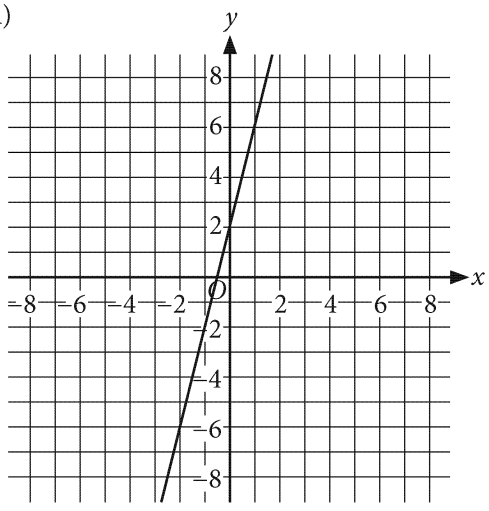
CONTINUE

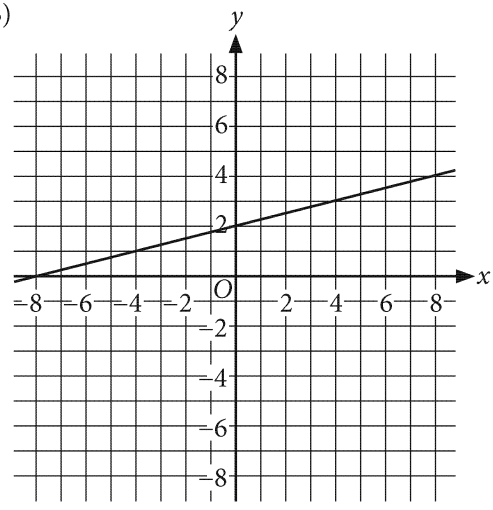
1

The function h is defined by $h(x) = -\frac{1}{4}x - 2$. Which is the graph of $y = h(x)$?

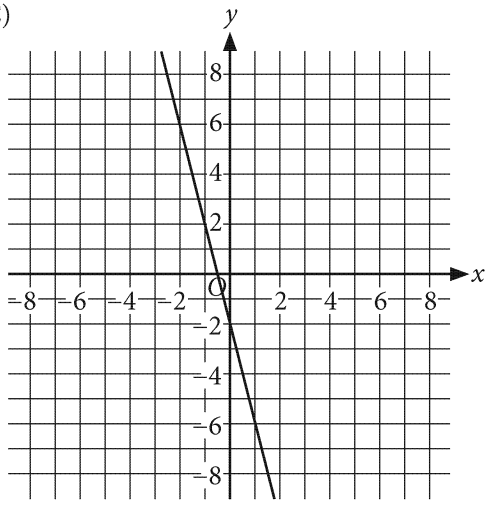
A)



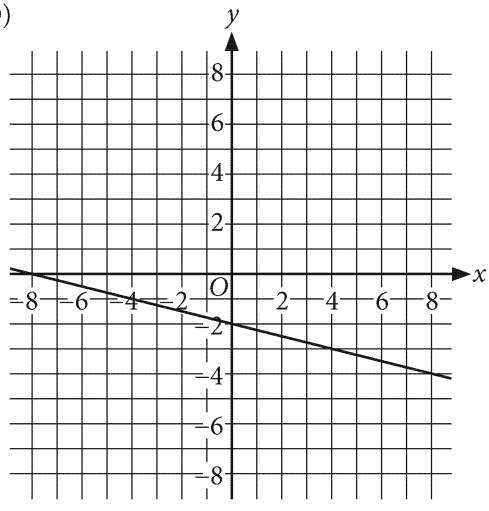
B)



C)



D)



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CONTINUE

2

$$x^2 + 10 = 91$$

What is the positive solution to the given equation?

A) 9

B) 10

C) 41

D) 51

3

$$x + 7 = 3(x - 3)$$

What value of x satisfies the given equation?

A) 4

B) 8

C) 9

D) 16

4

A line in the xy-plane has a slope of 1 and passes through the point (0, 2). Which is an equation of the line?

A) $y = \frac{x}{2}$

B) $y = 2x$

C) $y = x + 2$

D) $y = x - 2$

5

From 1990 to 2001, German currency included coins called *pfennigs*, worth 1 pfennig each, and *groschen*, worth 10 pfennigs each. Which equation represents the number of pfennig coins, p, and groschen coins, g, that have a combined value of 85 pfennigs?

A) $p + g = 85$

B) $p + 10g = 85$

C) $10p + g = 85$

D) $10(p + g) = 85$

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CONTINUE

6

If $x > 0$, which of the following is equivalent to $\frac{1}{x} + \frac{1}{2x}$?

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

B) $\frac{1}{2x}$

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

D) $\frac{2}{3x}$

7

$$x^2 - 10x + y^2 + 6y = 2$$

The graph in the xy-plane of the equation above is a circle. What are the coordinates of the center of the circle?

A) $(-5, -3)$

B) $(-5, 3)$

C) $(5, -3)$

D) $(5, 3)$

8

$$y > 4x$$
$$y < -x$$

When graphed in the xy-plane, what point (x, y) is a solution to the given system of inequalities?

A) $(1, 1)$

B) $(-2, -2)$

C) $(3, -3)$

D) $(-4, 4)$

9

The equation $h = 150 + 10t$ gives the total number of housing units, h, in a community t months after a new zoning law was passed. How many housing units are added to the community each month after the zoning law was passed?

A) 10

B) 150

C) 160

D) 1,500

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CONTINUE

10

Which expression is equivalent to $(2x^2 + 3x - 2) - (5x^2 - x - 7)$?

A) $7x^2 + 4x + 9$

B) $3x^2 + 4x + 5$

C) $-3x^2 + 2x - 9$

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

11

$$y = (x - 1)(x + 1)(x + 2)$$

The graph in the xy-plane of the equation above contains the point (a, b). If $-1 \leq a \leq 1$, which of the following is NOT a possible value of b ?

A) -2

B) -1

C) 0

D) 1

12

Two beach balls are each in the shape of a sphere. The larger beach ball has a diameter of $3x$, and the smaller beach ball has a diameter of x. What is the ratio of the volume of the larger beach ball to the volume of the smaller beach ball?

A) 3 to 1

B) 6 to 1

C) 9 to 1

D) 27 to 1

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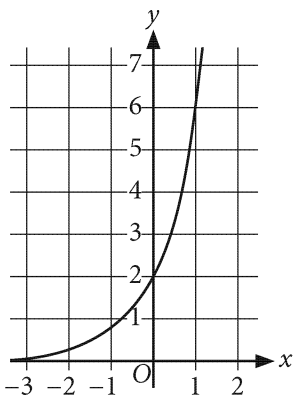
CONTINUE

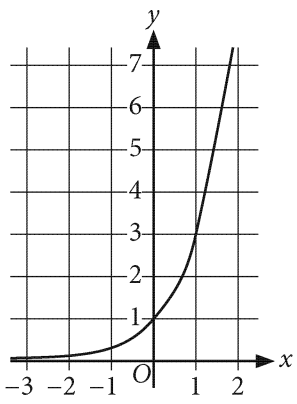
13

What is the graph of the equation $y = 2(3)^x$?

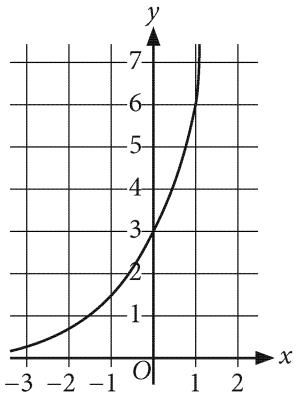
A)



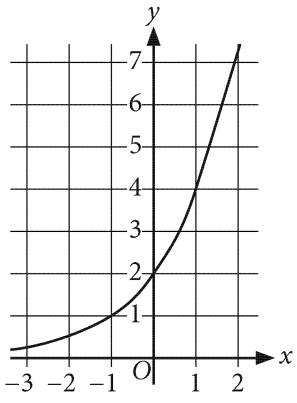
B)



C)



D)



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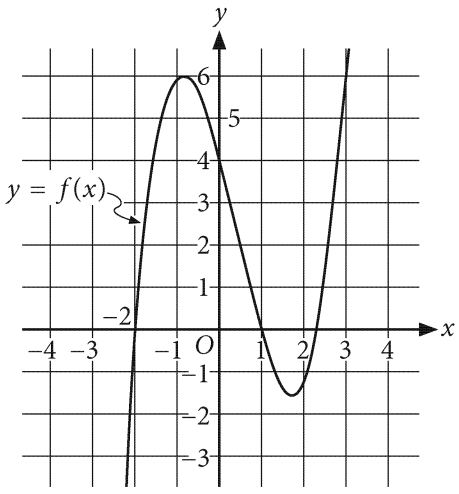
CONTINUE

14



The graph of the function f is shown. Which of the following is a value of x for which $f(x) = 0$?

A) -1

B) 0

C) 1

D) 4

15

The function $A(t) = 12(2)^{\frac{t}{6}}$ models the number of water hyacinths in a population over time, where $A(t)$ is the number of water hyacinths and t is the time, in days, since the population was first measured. Which is the best interpretation of $(2)^{\frac{t}{6}}$ in this context?

A) The number of water hyacinths doubled t times.

B) The number of water hyacinths doubled every 6 days.

C) The number of water hyacinths increased by 2 every $\frac{t}{6}$ days.

D) The number of water hyacinths increased by 2 every t days.

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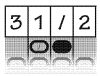
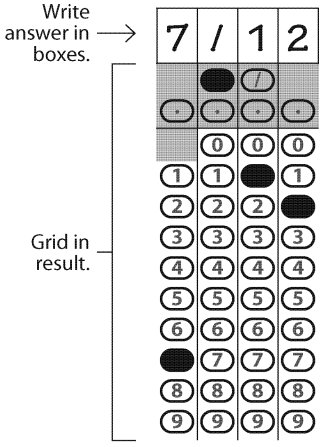
CONTINUE

DIRECTIONS

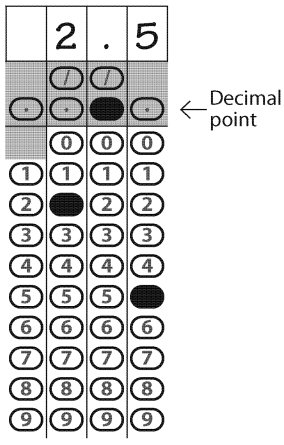
For questions 16-20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

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

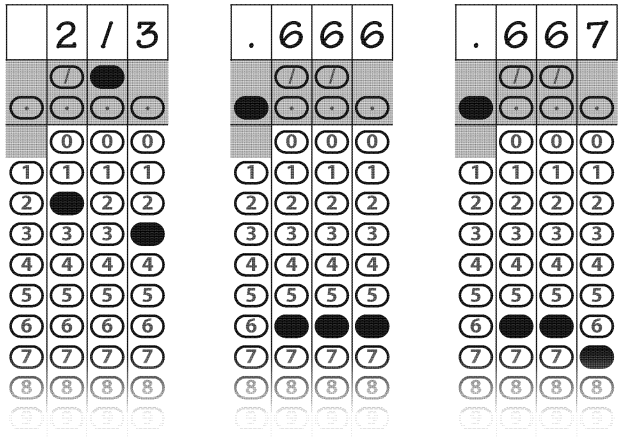
Answer: $\frac{7}{12}$ are:



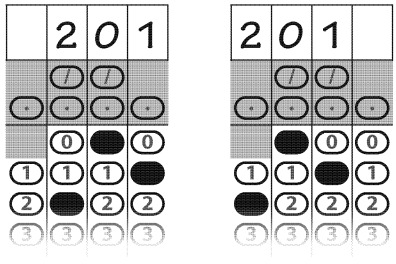
Answer: 2.5



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



Answer: 201 – either position is correct



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

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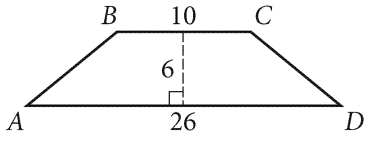
CONTINUE

16

$$4T - 8D = 12H$$

The given equation can be rewritten as $T = aD + bH$, where a and b are constants. What is the value of a ?

17



In the figure shown, $\overline{BC}$ is parallel to $\overline{AD}$ and $AB = CD$. What is the perimeter of quadrilateral $ABCD$?

18

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

The equation above has solutions $x = n + \sqrt{k}$ and $x = n - \sqrt{k}$, where n and k are positive integers. What is the value of $n + k$?

19

$$4x + y = 7$$
$$2x - 7y = 1$$

If (x, y) is the solution to the given system of equations, what is the value of x ?

20

$$\frac{1}{2}x + 5 = kx + 7$$

In the given equation, k is a constant. The equation has no solution. What is the value of k ?

STOP

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

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No Test Material On This Page

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

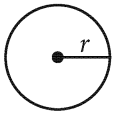
DIRECTIONS

For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding bubble 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 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

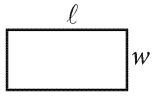
NOTES

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

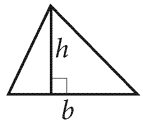
REFERENCE



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



$A = \ell w$



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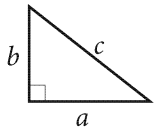
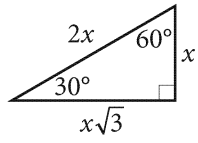
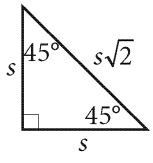
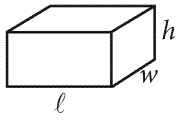


$c^2 = a^2 + b^2$

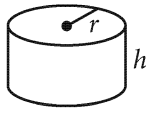




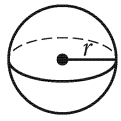
Special Right Triangles



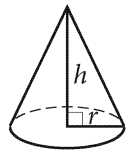
$V = \ell wh$



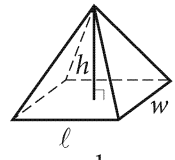
$V = \pi r^2 h$



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



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



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

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.

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CONTINUE

1

A sample of water was taken from each of ten different locations in a pond. The pH of each sample was measured. The measurements are summarized in the frequency table shown.

pH	Frequency
6.8 to 7.0	1
7.1 to 7.3	2
7.4 to 7.6	4
7.7 to 7.9	3

How many samples have a pH of 7.4 or greater?

A) 3

B) 4

C) 6

D) 7

2

In 2015, the city of Miami had a population of 441,000 people and an area of 36 square miles. What was the population density of Miami, in people per square mile, in 2015?

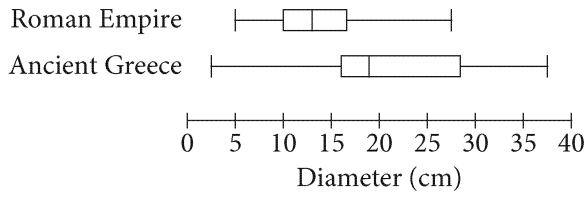
A) 10,750

B) 12,250

C) 14,250

D) 16,750

3



The Metropolitan Museum of Art has plates on display from the Roman Empire and ancient Greece. The box plots shown summarize the distributions of the diameters, in centimeters, of all the museum's plates from each region. How does the median diameter of the plates from the Roman Empire, r, compare to the median diameter of the plates from ancient Greece, g ?

A) $r < g$

B) $r > g$

C) $r = g$

D) There is not enough information to compare the medians.

4

The combustion of glucose releases energy. The ratio of grams of glucose combusted to kilocalories of energy released is 12.0 to 45.0. How many grams of glucose must be combusted to provide 85.5 kilocalories of energy?

A) 5.7

B) 9.9

C) 22.8

D) 320.6

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CONTINUE

5

The function f is defined by $f(x) = x^2 - 7$. What is the value of $f(3)$?

A) -16

B) -2

C) 2

D) 16

6

The probability of an unfair coin landing heads side up is 0.6. A student tossed this coin into the air 9 times. It landed tails side up 5 times and heads side up 4 times. What is the probability that the coin will land heads side up on the 10th toss?

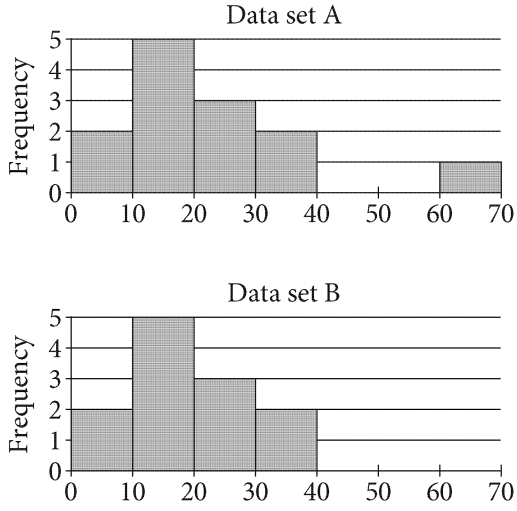
A) 0.4

B) 0.5

C) 0.6

D) 1

7



The two histograms show the distribution of data set A and data set B, respectively. Data set B is the result of removing the outlier from data set A. Which of the following statements about the means of data set A and data set B is true?

A) The means of data set A and B are the same.

B) The mean of data set A is greater than the mean of data set B.

C) The mean of data set A is less than the mean of data set B.

D) No comparison about the means of the data sets can be made.

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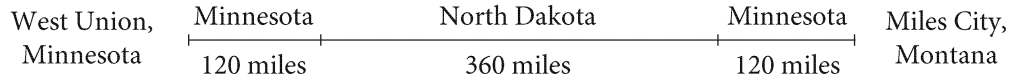
Questions 8 and 9 refer to the following information.

Haimi drove a car from West Union, Minnesota, through North Dakota, to Miles City, Montana. The total distance she traveled through each state is shown in the figure.



The distance d, in miles, Haimi drove as a function of the time t, in hours, since she started driving is modeled by the equation $d = 60t$.

8

According to the model, what distance, in miles, had Haimi driven 3 hours after she started driving?

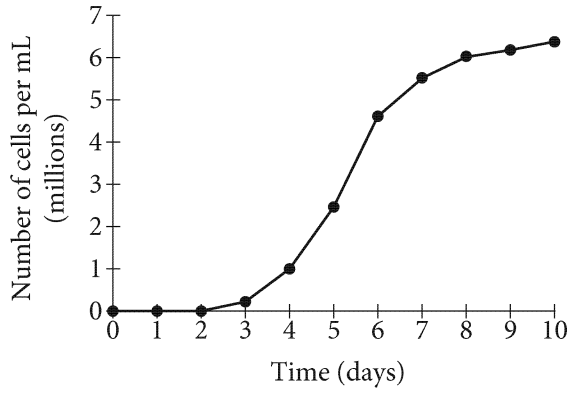
A) 20
B) 60
C) 120
D) 180

9

What interval represents all values of t during which Haimi drove in North Dakota?

A) $2 \leq t \leq 10$
B) $2 \leq t \leq 8$
C) $0 \leq t \leq 8$
D) $0 \leq t \leq 2$

10



The graph shows the number of algae cells grown during an experiment, in millions of cells per milliliter (mL) of water, d days after the start of an experiment. Between which two days was the growth rate, in millions of cells per mL of water per day, of the algae the greatest?

A) Day 4 and day 5
B) Day 5 and day 6
C) Day 7 and day 8
D) Day 9 and day 10

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CONTINUE

11

A local restaurant gives teachers a 20% discount on all their meals. If a teacher pays $14.00 for a meal after the discount was applied, what was the price of the meal before the discount?

A) $16.80

B) $17.50

C) $20.00

D) $25.20

12

Amount of Water in 80 Bottles

Fluid ounces	Frequency
19.6	1
19.7	0
19.8	12
19.9	10
20.0	31
20.1	14
20.2	11
20.3	1
20.4	0

The frequency table above shows the distribution of the actual number of fluid ounces of water in a random sample of 80 20-ounce bottles of the water at a bottling plant. Bottles are only sold if they contain at least 19.8 but no more than 20.2 fluid ounces of water. If the proportion of bottles that can be sold is the same for the sample and the 16,000 20-ounce bottles produced at the plant each day, how many of the 16,000 bottles cannot be sold?

A) 800

B) 600

C) 400

D) 200

13

x	$f(x)$
−4	14
−2	8
3	−7
5	−13

For the linear function, f, the table shows several values of x and their corresponding values of $f(x)$. What is the y-intercept of the graph of $y = f(x)$ in the xy-plane?

A) $(0, -3)$

B) $(0, -1)$

C) $(0, 2)$

D) $(0, 4)$

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CONTINUE

14

When a buffet restaurant charges \$12.00 per meal, the number of meals it sells per day is 400. For each \$0.50 increase to the price per meal, the number of meals sold per day decreases by 10. What is the price per meal that results in the greatest sales, in dollars, from meals each day?

A) \$16.00

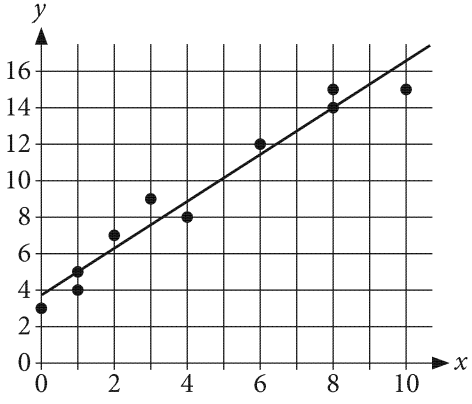
B) \$20.00

C) \$24.00

D) \$28.00

15

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



What is an equation of the line of best fit?

A) $y = 3.7 + 1.3x$

B) $y = 1.3 + 3.7x$

C) $y = 3.7 - 1.3x$

D) $y = 1.3 - 3.7x$

16

For the linear function f, $f(2) = 10$ and the graph of $y = f(x)$ in the xy-plane has a slope of 3. Which equation defines f?

A) $f(x) = 2x + 12$

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

C) $f(x) = 3x + 10$

D) $f(x) = 3x + 4$

17

If $7x + 21 = -2$, what is the value of $x + 3$?

A) -5

B) -2

C) $-\frac{5}{7}$

D) $-\frac{2}{7}$

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CONTINUE

18

$$x + 2y = 10$$
$$2x - y = 5$$

The solution to the given system of equations is (x, y). What is the value of $3x + y$?

A) 5

B) 7

C) 13

D) 15

19

An advertising agency guarantees that its services will increase website traffic by 3.5% compared to each previous week. Which type of function best models the weekly guaranteed website traffic as the number of weeks increases?

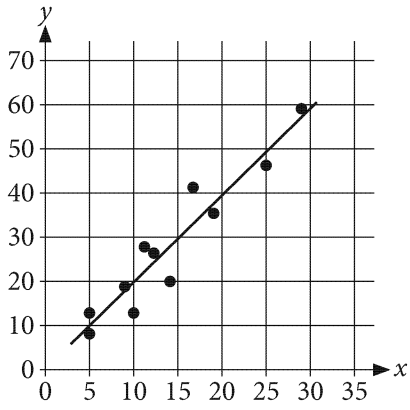
A) Increasing exponential

B) Decreasing exponential

C) Increasing linear

D) Decreasing linear

20



The scatterplot shows a data set of 11 points and a line of best fit for the data. For how many data points is the y-value predicted by the line of best fit greater than the actual y-value?

A) Five

B) Six

C) Seven

D) Eight

21

Dana is riding in a 100-mile-long bicycle race. The function f defined by $f(x) = 100 - 18x$ models the number of miles that Dana has remaining x hours after she starts the race. What is the best interpretation of $f(2) = 64$?

A) Dana rides about 64 miles in the first 2 hours of the race.

B) Dana will ride the last 64 miles of the race in about 2 hours.

C) When Dana has ridden 64 miles, she has about 2 hours remaining.

D) Two hours after Dana starts the race, she has about 64 miles remaining.

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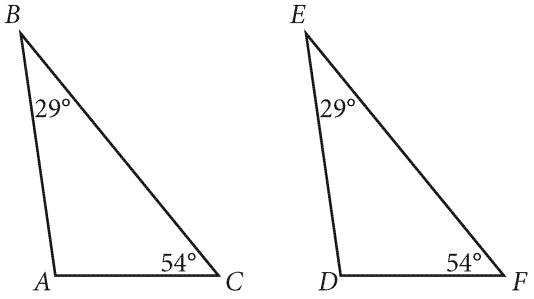
CONTINUE

22



Triangle ABC and Triangle DEF each have an angle measuring 29° and an angle measuring 54°, as shown above. Which of the following statements is sufficient to prove triangle ABC is congruent to triangle DEF ?

A) The length of $\overline{EF}$ is 10.

B) The measure of angle EDF is 97°.

C) The length of $\overline{BC}$ is equal to the length of $\overline{EF}$.

D) The measure of angle BAC is equal to the measure of angle EDF.

23

How many solutions does the equation $|x + 7| = -4$ have?

A) Zero

B) Exactly one

C) Exactly two

D) More than two

24

$$3x^2 + x - 2 = 0$$

The solutions to the quadratic equation above are a and b. What is the value of $a + b$?

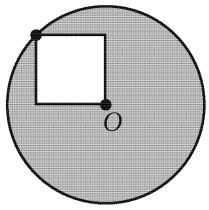
A) $-\frac{5}{3}$

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

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

D) $\frac{5}{3}$

25



In the figure shown, point O is the center of the circle. One vertex of the square lies on the circle, and the opposite vertex is point O. If the area of the shaded region is $36\pi - 18$, what is the perimeter of the square?

A) 24

B) 72

C) $12\sqrt{2}$

D) $36\sqrt{2}$

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CONTINUE

26

Which of the following is equivalent to the expression $x^4 - 8x^2 + 16$?

I. $(x + 2)^2(x - 2)^2$

II. $(x^2 - 4)^2$

A) I only

B) II only

C) I and II

D) Neither I nor II

27

Each year the value of an investment increases by 2.5% of the previous year's value. The initial value of the investment was \$500. Which equation gives the value of the investment y, in dollars, x years after the initial investment was made?

A) $y = 500(0.25)^x$

B) $y = 500(1.025)^x$

C) $y = 500(1.25)^x$

D) $y = 500(2.5)^x$

28

$$5x - y = 9$$
$$-60x + 12y = -108$$

How many solutions does the given system of equations have?

A) Zero

B) Exactly one

C) Exactly two

D) Infinitely many

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CONTINUE

29

Bridges have spaces between their sections to allow for expansion and contraction caused by temperature variation. This space is known as the gap width. The size of the gap width $w(T)$, in inches, is a linear function of temperature T, in degrees Fahrenheit (°F). For a certain bridge, the gap width is 2.875 inches at 40°F and is 1.875 inches at 100°F. Which of the following defines the relationship between temperature and gap width?

A) $w(T) = -\frac{1}{60}(T - 40) + 2.875$

B) $w(T) = -\frac{1}{60}(T + 40) - 2.875$

C) $w(T) = 60(T - 40) + 2.875$

D) $w(T) = 60(T + 40) - 2.875$

30

The number of books in a library increased by 30% from 2002 to 2014. There were x books in the library in 2002. Which expression represents the number of books in the library in 2014 in terms of x ?

A) $130x$

B) $30x$

C) $1.3x$

D) $0.3x$

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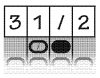
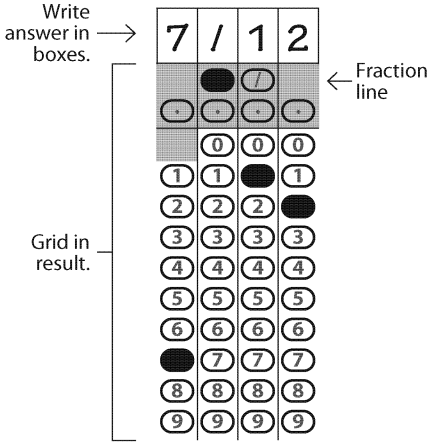
CONTINUE

DIRECTIONS

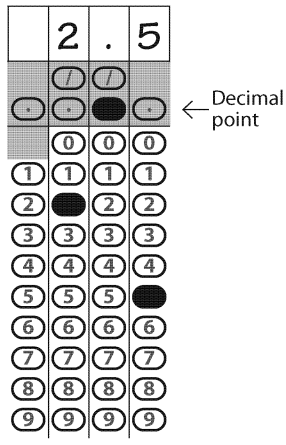
For questions 31-38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

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

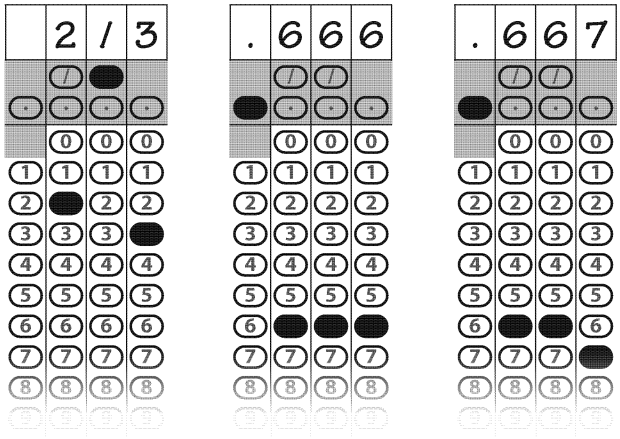
Answer: $\frac{7}{12}$ are:



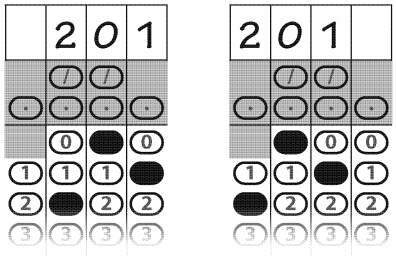
Answer: 2.5



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



Answer: 201 – either position is correct



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

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CONTINUE

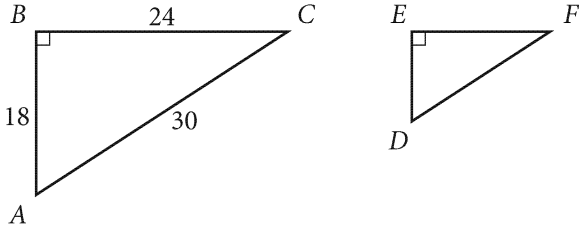
31

In a survey of 240 television viewers, $\frac{3}{5}$ indicated that they like comedies, some indicated that they do not like comedies, and the rest did not respond. If one of the 240 viewers is selected at random, the probability is $\frac{1}{15}$ that the viewer selected did not respond. How many of the 240 viewers indicated that they do not like comedies?

32

What is the y-coordinate of the y-intercept of the graph of $y = 3^x + 9$?

33



Triangle ABC is similar to triangle DEF, where angle A corresponds to angle D. What is the value of $\cos F$?

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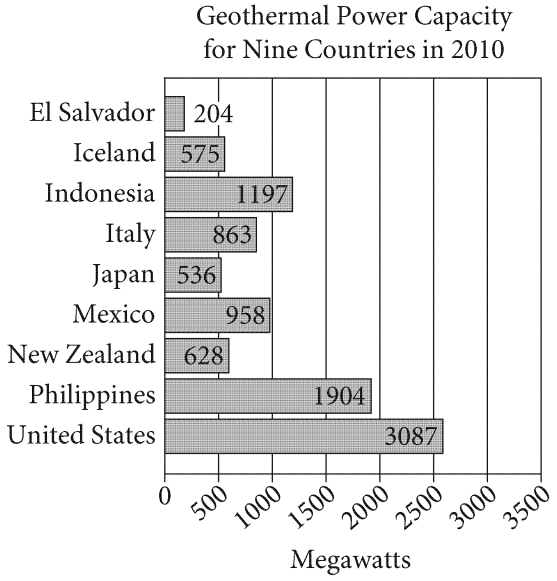
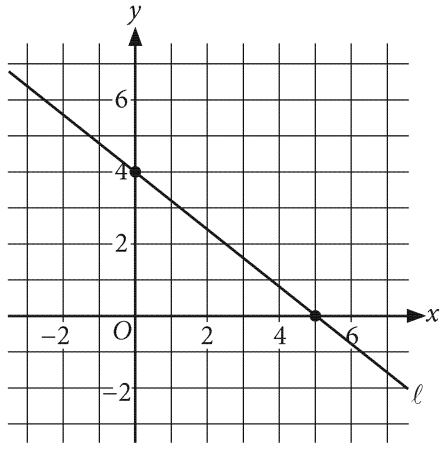
CONTINUE

34



The graph shows the power capacity for the nine countries that had the greatest geothermal power capacity in 2010. What was the capacity, in megawatts, of the country that had the median capacity of the nine countries?

35



Line ℓ is shown in the xy-plane, and the point with coordinates $(2, c)$ is on line ℓ. What is the value of c ?

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CONTINUE

Questions 36 and 37 refer to the following information.

The table gives the typical adult weight ranges and life spans for African and Asian elephants in the wild.

	African elephant	Asian elephant
Typical minimum weight (tons)	2.50	2.25
Typical maximum weight (tons)	7.00	5.50
Typical life span (years)	70	60

36

Based on the table, what is the typical minimum weight of an adult African elephant in the wild, in pounds? (1 ton = 2000 pounds)

37

Based on the table, the typical life span of the African elephant in the wild is p% greater than the typical life span of the Asian elephant in the wild. What is the value of p ? (Disregard the % sign when entering your answer. For example, if your answer is 39%, enter 39)

38

x	$f(x)$
2	106
3	151
4	196

The table shows several values of x and their corresponding values of $f(x)$. The function f is defined by $f(x) = mx + b$, where m and b are constants. What is the value of b ?

STOP

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

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