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K-5MSA04

Test begins on the next page.

Reading Test

65 MINUTES, 52 QUESTIONS

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

DIRECTIONS

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

Questions 1-10 are based on the following passage.

This passage is adapted from William Maxwell, *The Folded Leaf*. ©1959 by William Maxwell. Originally published in 1945.

The Alcazar Restaurant was on Sheridan Road near Devon Avenue. It was long and narrow, with tables for two along the walls and tables for four down the middle. The decoration was *art moderne*, except for the series of murals depicting the four seasons, and the sick ferns in the front window. Lymie sat down at the second table from the cash register, and ordered his dinner. The history book, which he propped against the catsup and the glass sugar bowl, had been used by others before him. Blank pages front and back were filled in with maps, drawings, dates, comic cartoons, and organs of the body; also with names and messages no longer clear and never absolutely legible. On nearly every other page there was some marginal notation, either in ink or in very hard pencil. And unless someone had upset a glass of water, the marks on page 177 were from tears.

While Lymie read about the Peace of Paris, signed on the thirtieth of May, 1814, between France and the Allied powers, his right hand managed again and again to bring food up to his mouth. Sometimes he chewed, sometimes he swallowed whole the food that he had no idea he was eating. The Congress of Vienna met, with some allowance for delays, early in November of the same year, and all the powers engaged in the war on either side sent plenipotentiaries. It was by far the most splendid and important assembly ever convoked to discuss and determine the affairs of Europe. The Emperor of Russia, the King of Prussia, the Kings of Bavaria, Denmark, and Wurttemberg, all were present in person at the court of the Emperor Francis I in the Austrian capital. When Lymie put down his fork and began to count them off, one by one, on the fingers of his left hand, the waitress, whose name was Irma, thought he was through eating and tried to take his plate away. He stopped her. Prince Metternich (his right thumb) presided over the Congress, and Prince Talleyrand (the index finger) represented France.

A party of four, two men and two women, came into the restaurant, all talking at once, and took possession of the center table nearest Lymie. The women had shingled hair and short tight skirts which exposed the underside of their knees when they sat down. One of the women had the face of a young boy but disguised by one trick or another (rouge, lipstick, powder, wet bangs plastered against the high forehead, and a pair of long pendent earrings) to look like a woman of thirty-five, which as a matter of fact she was. The men were older. They laughed more than there seemed any occasion for, while they were deciding between soup and shrimp cocktail, and their laughter was too loud. But it was the women's voices, the terrible not quite sober pitch of the women's voices which caused Lymie to skim over two whole pages without knowing what was on them. Fortunately he realized this and went back. Otherwise he might never have known about the

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CONTINUE

secret treaty concluded between England, France, and Austria, when the pretensions of Prussia and Russia, acting in concert, seemed to threaten a renewal of the attack. The results of the Congress were stated clearly at the bottom of page 67 and at the top of page 68, but before Lymie got halfway through them, a coat that he recognized as his father's was hung on the hook next to his chair. Lymie closed the book and said, "I didn't think you were coming."

Time is probably no more unkind to sporting characters than it is to other people, but physical decay unsustained by respectability is somehow more noticeable. Mr. Peters' hair was turning gray and his scalp showed through on top. He had lost weight also; he no longer filled out his clothes the way he used to. His color was poor, and the flower had disappeared from his buttonhole. In its place was an American Legion button.

Apparently he himself was not aware that there had been any change. He straightened his tie self-consciously and when Irma handed him a menu, he gestured with it so that the two women at the next table would notice the diamond ring on the fourth finger of his right hand. Both of these things, and also the fact that his hands showed signs of the manicurist, one can blame on the young man who had his picture taken with a derby hat on the back of his head, and also sitting with a girl in the curve of the moon. The young man had never for one second deserted Mr. Peters. He was always there, tugging at Mr. Peters' elbow, making him do things that were not becoming in a man of forty-five.

1

Over the course of the passage, the primary focus shifts from

A) Lymie's inner thoughts to observations made by the other characters.

B) an exchange between strangers to a satisfying personal relationship.

C) the physical setting of the scene to the different characters' personality traits.

D) Lymie's experience reading a book to descriptions of people in the restaurant.

2

The main purpose of the first paragraph is to

A) introduce the passage's main character by showing his nightly habits.

B) indicate the date the passage takes place by presenting period details.

C) convey the passage's setting by describing a place and an object.

D) foreshadow an event that is described in detail later in the passage.

3

It can reasonably be inferred that Irma, the waitress, thinks Lymie is "through eating" (line 37) because

A) he has begun reading his book.

B) his plate is empty.

C) he is no longer holding his fork.

D) he has asked her to clear the table.

4

Lymie's primary impression of the "party of four" (line 42) is that they

A) are noisy and distracting.

B) are a refreshing change from the other customers.

C) resemble characters from his history book.

D) represent glamour and youth.

5

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

A) Lines 45-47 ("The women . . . down")

B) Lines 47-52 ("One . . . was")

C) Lines 55-59 ("But . . . them")

D) Line 69 ("Lymie . . . book")

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CONTINUE

6

The narrator indicates that Lymie finally closes the history book because

A) his father has joined him at the table.

B) the people at the other table are too disruptive.

C) he has finished the chapter about the Congress.

D) he is preparing to leave the restaurant.

7

The primary impression created by the narrator's description of Mr. Peters in lines 74-79 is that he is

A) healthy and fit.

B) angry and menacing.

C) nervous and hesitant.

D) aging and shriveled.

8

The main idea of the last paragraph is that Mr. Peters

A) neglects to spend any time with his family members.

B) behaves as if he is a younger version of himself.

C) is very conscious of symbols of wealth and power.

D) is preoccupied with the knowledge that he is growing old.

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CONTINUE

9

Which choice best supports the conclusion that Mr. Peters wants to attract attention?

A) Lines 80-81 ("Apparently . . . change")
B) Lines 81-85 ("He straightened . . . hand")
C) Lines 90-91 ("The young . . . Mr. Peters")
D) Lines 91-93 ("He was . . . forty-five")

10

As used in line 93, "becoming" most nearly means

A) emerging.
B) fitting.
C) developing.
D) happening.

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CONTINUE

Questions 11-21 are based on the following passages.

Passage 1 is adapted from Catharine Beecher, *Essay on Slavery and Abolitionism*. Originally published in 1837. Passage 2 is adapted from Angelina E. Grimké, *Letters to Catharine Beecher*. Originally published in 1838. Grimké encouraged Southern women to oppose slavery publicly. Passage 1 is Beecher's response to Grimké's views. Passage 2 is Grimké's response to Beecher.

Passage 1

Heaven has appointed to one sex the superior, and to the other the subordinate station, and this without any reference to the character or conduct of either. It is therefore as much for the dignity as it is for the interest of females, in all respects to conform to the duties of this relation. . . . But while woman holds a subordinate relation in society to the other sex, it is not because it was designed that her duties or her influence should be any the less important, or all-pervading. But it was designed that the mode of gaining influence and of exercising power should be altogether different and peculiar. . . .

A man may act on society by the collision of intellect, in public debate; he may urge his measures by a sense of shame, by fear and by personal interest; he may coerce by the combination of public sentiment; he may drive by physical force, and he does not outstep the boundaries of his sphere. But all the power, and all the conquests that are lawful to woman, are those only which appeal to the kindly, generous, peaceful and benevolent principles.

Woman is to win every thing by peace and love; by making herself so much respected, esteemed and loved, that to yield to her opinions and to gratify her wishes, will be the free-will offering of the heart. But this is to be all accomplished in the domestic and social circle. There let every woman become so cultivated and refined in intellect, that her taste and judgment will be respected; so benevolent in feeling and action; that her motives will be reverenced;—so unassuming and unambitious, that collision and competition will be banished;—so "gentle and easy to be entreated," as that every heart will repose in her presence; then, the fathers, the husbands, and the sons, will find an influence thrown around them, to which they will yield not only willingly but proudly. . . .

A woman may seek the aid of co-operation and combination among her own sex, to assist her in her appropriate offices of piety, charity, maternal and domestic duty; but whatever, in any measure, throws a woman into the attitude of a combatant, either for herself or others—whatever binds her in a party conflict—whatever obliges her in any way to exert coercive influences, throws her out of her appropriate sphere. If these general principles are correct, they are entirely opposed to the plan of arraying females in any Abolition movement.

Passage 2

The investigation of the rights of the slave has led me to a better understanding of my own. I have found the Anti-Slavery cause to be the high school of morals in our land—the school in which *human rights* are more fully investigated, and better understood and taught, than in any other. Here a great fundamental principle is uplifted and illuminated, and from this central light, rays innumerable stream all around.

Human beings have *rights*, because they are *moral* beings: the rights of *all* men grow out of their moral nature; and as all men have the same moral nature, they have essentially the same rights. These rights may be wrested from the slave, but they cannot be alienated: his title to himself is as perfect now, as is that of Lyman Beecher:[1] it is stamped on his moral being, and is, like it, imperishable. Now if rights are founded in the nature of our moral being, then the *mere circumstance of sex* does not give to man higher rights and responsibilities, than to woman. To suppose that it does, would be to deny the self-evident truth, that the "physical constitution is the mere instrument of the moral nature." To suppose that it does, would be to break up utterly the relations, of the two natures, and to reverse their functions, exalting the animal nature into a monarch, and humbling the moral into a slave; making the former a proprietor, and the latter its property.

When human beings are regarded as *moral* beings, *sex*, instead of being enthroned upon the summit, administering upon rights and responsibilities, sinks into insignificance and nothingness. My doctrine then is, that whatever it is morally right for man to do, it is morally right for woman to do. Our duties originate, not from difference of sex, but from the diversity of our relations in life, the various gifts and talents committed to our care, and the different eras in which we live.

[1] Lyman Beecher was a famous minister and the father of Catharine Beecher.

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CONTINUE

11

In Passage 1, Beecher makes which point about the status of women relative to that of men?

A) Women depend on men for their safety and security, but men are largely independent of women.

B) Women are inferior to men, but women play a role as significant as that played by men.

C) Women have fewer rights than men do, but women also have fewer responsibilities.

D) Women are superior to men, but tradition requires women to obey men.

12

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

A) Lines 6-10 ("But . . . all-pervading")

B) Lines 13-14 ("A man . . . debate")

C) Lines 16-18 ("he may coerce . . . sphere")

D) Lines 41-46 ("but whatever . . . sphere")

13

In Passage 1, Beecher implies that women's effect on public life is largely

A) overlooked, because few men are interested in women's thoughts about politics.

B) indirect, because women exert their influence within the home and family life.

C) unnecessary, because men are able to govern society themselves.

D) symbolic, because women tend to be more idealistic about politics than men are.

14

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

A) region.

B) studio.

C) district.

D) rank.

15

As used in line 12, "peculiar" most nearly means

A) eccentric.

B) surprising.

C) distinctive.

D) infrequent.

16

What is Grimké's central claim in Passage 2?

A) The rights of individuals are not determined by race or gender.

B) Men and women must learn to work together to improve society.

C) Moral rights are the most important distinction between human beings and animals.

D) Men and women should have equal opportunities to flourish.

17

In Passage 2, Grimké makes which point about human rights?

A) They are viewed differently in various cultures around the world.

B) They retain their moral authority regardless of whether they are recognized by law.

C) They are sometimes at odds with moral responsibilities.

D) They have become more advanced and refined throughout history.

18

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

A) Lines 58-61 ("Human . . . same rights")

B) Lines 61-65 ("These . . . imperishable")

C) Lines 71-76 ("To suppose . . . property")

D) Lines 77-81 ("When . . . nothingness")

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19

Which choice best states the relationship between the two passages?

A) Passage 2 illustrates the practical difficulties of a proposal made in Passage 1.

B) Passage 2 takes issue with the primary argument of Passage 1.

C) Passage 2 provides a historical context for the perspective offered in Passage 1.

D) Passage 2 elaborates upon several ideas implied in Passage 1.

20

Based on the passages, both authors would agree with which of the following claims?

A) Women have moral duties and responsibilities.

B) Men often work selflessly for political change.

C) The ethical obligations of women are often undervalued.

D) Political activism is as important for women as it is for men.

21

Beecher would most likely have reacted to lines 65-68 ("Now . . . woman") of Passage 2 with

A) sympathy, because she feels that human beings owe each other a debt to work together in the world.

B) agreement, because she feels that human responsibilities are a natural product of human rights.

C) dismay, because she feels that women actually have a more difficult role to play in society than men do.

D) disagreement, because she feels that the natures of men and women are fundamentally different.

Questions 22-31 are based on the following passage and supplementary material.

This passage is adapted from Bryan Walsh, "Whole Food Blues: Why Organic Agriculture May Not Be So Sustainable." ©2012 by Time Inc.

When it comes to energy, everyone loves efficiency. Cutting energy waste is one of those goals that both sides of the political divide can agree on, even if they sometimes diverge on how best to get there. Energy efficiency allows us to get more out of our given resources, which is good for the economy and (mostly) good for the environment as well. In an increasingly hot and crowded world, the only sustainable way to live is to get more out of less. Every environmentalist would agree.

But change the conversation to food, and suddenly efficiency doesn't look so good. Conventional industrial agriculture has become incredibly efficient on a simple land to food basis. Thanks to fertilizers, mechanization and irrigation, each American farmer feeds over 155 people worldwide. Conventional farming gets more and more crop per square foot of cultivated land—over 170 bushels of corn per acre in Iowa, for example—which can mean less territory needs to be converted from wilderness to farmland. And since a third of the planet is already used for agriculture—destroying forests and other wild habitats along the way—anything that could help us produce more food on less land would seem to be good for the environment.

Of course, that's not how most environmentalists regard their arugula [a leafy green]. They have embraced organic food as better for the planet—and healthier and tastier, too—than the stuff produced by agricultural corporations. Environmentalists disdain the enormous amounts of energy needed and waste created by conventional farming, while organic practices—forgoing artificial fertilizers and chemical pesticides—are considered far more sustainable. Sales of organic food rose 7.7% in 2010, up to $26.7 billion—and people are making those purchases for their consciences as much as their taste buds.

Yet a new meta-analysis in *Nature* does the math and comes to a hard conclusion: organic farming yields 25% fewer crops on average than conventional agriculture. More land is therefore needed to produce fewer crops—and that means organic farming may not be as good for the planet as we think.

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In the *Nature* analysis, scientists from McGill University in Montreal and the University of Minnesota performed an analysis of 66 studies comparing conventional and organic methods across 34 different crop species, from fruits to grains to legumes. They found that organic farming delivered a lower yield for every crop type, though the disparity varied widely. For rain-watered legume crops like beans or perennial crops like fruit trees, organic trailed conventional agriculture by just 5%. Yet for major cereal crops like corn or wheat, as well as most vegetables—all of which provide the bulk of the world's calories—conventional agriculture outperformed organics by more than 25%.

The main difference is nitrogen, the chemical key to plant growth. Conventional agriculture makes use of 171 million metric tons of synthetic fertilizer each year, and all that nitrogen enables much faster plant growth than the slower release of nitrogen from the compost or cover crops used in organic farming. When we talk about a Green Revolution, we really mean a nitrogen revolution—along with a lot of water.

But not all the nitrogen used in conventional fertilizer ends up in crops—much of it ends up running off the soil and into the oceans, creating vast polluted dead zones. We're already putting more nitrogen into the soil than the planet can stand over the long term. And conventional agriculture also depends heavily on chemical pesticides, which can have unintended side effects.

What that means is that while conventional agriculture is more efficient—sometimes much more efficient—than organic farming, there are trade-offs with each. So an ideal global agriculture system, in the views of the study's authors, may borrow the best from both systems, as Jonathan Foley of the University of Minnesota explained:

> The bottom line? Today's organic farming practices are probably best deployed in fruit and vegetable farms, where growing nutrition (not just bulk calories) is the primary goal. But for delivering sheer calories, especially in our staple crops of wheat, rice, maize, soybeans and so on, conventional farms have the advantage right now.
>
> Looking forward, I think we will need to deploy different kinds of practices (especially new, mixed approaches that take the best of organic and conventional farming systems) where they are best suited—geographically, economically, socially, etc.

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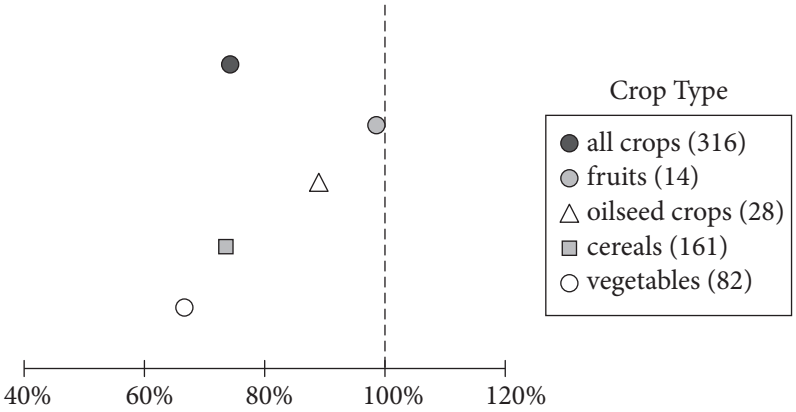
Figure 1

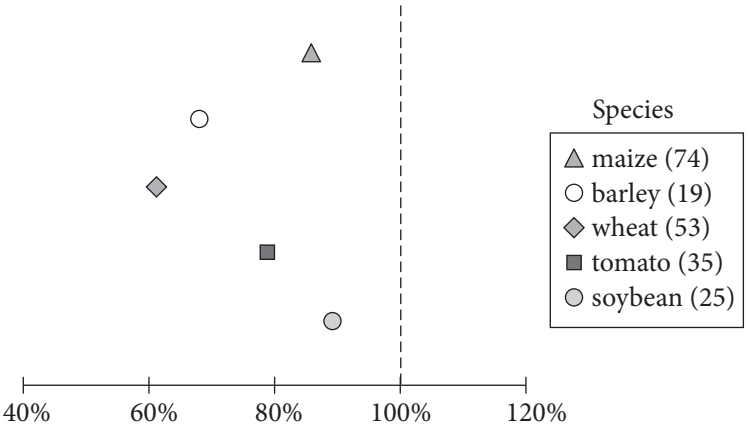
Organic Yield as a Percentage of Conventional Yield, by Crop Type



At 100%, the organic yield is the same as the conventional yield. The number of observations for each crop type is shown in parentheses.

Figure 2

Organic Yield as a Percentage of Conventional Yield, by Species



At 100%, the organic yield is the same as the conventional yield. The number of observations for each species is shown in parentheses.

Figures adapted from Verena Seufert, Navin Ramankutty, and Jonathan A. Foley, "Comparing the Yields of Organic and Conventional Agriculture." ©2012 by Nature Publishing Group.

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CONTINUE

22

As used in line 14, "simple" most nearly means

A) straightforward.

B) modest.

C) unadorned.

D) easy.

23

According to the passage, a significant attribute of conventional agriculture is its ability to

A) produce a wide variety of fruits and vegetables.

B) maximize the output of cultivated land.

C) satisfy the dietary needs of the world's population.

D) lessen the necessity of nitrogen in plant growth.

24

Which choice best reflects the perspective of the "environmentalists" (line 27) on conventional agriculture?

A) It produces inferior fruits and vegetables and is detrimental to the environment.

B) It is energy efficient and reduces the need to convert wilderness to farmland.

C) It is good for the environment only in the short run.

D) It depletes critical resources but protects wildlife habitats.

25

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

A) Lines 27-28 ("Of course . . . green")

B) Lines 28-31 ("They . . . corporations")

C) Lines 31-35 ("Environmentalists . . . sustainable")

D) Lines 42-45 ("More . . . think")

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26

Which statement best expresses a relationship between organic farming and conventional farming that is presented in the passage?

A) Both are equally sustainable, but they differ dramatically in the amount of land they require to produce equivalent yields.

B) Both rely on artificial chemicals for pest control, but organic farmers use the chemicals sparingly in conjunction with natural remedies.

C) Both use nitrogen to encourage plant growth, but the nitrogen used in conventional farming comes from synthetic sources.

D) Both create a substantial amount of nitrogen runoff, but only the type of nitrogen found in fertilizers used in conventional farming can be dangerous.

27

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

A) Lines 13-14 ("Conventional . . . basis")

B) Lines 22-26 ("And since . . . environment")

C) Lines 51-53 ("They . . . widely")

D) Lines 61-65 ("Conventional . . . farming")

28

According to Foley, an "ideal global agriculture system" (line 80)

A) focuses primarily on yield percentages and global markets.

B) considers multiple factors in the selection of farming techniques.

C) weighs the economic interests of farmers against the needs of consumers.

D) puts the nutritional value of produce first and foremost.

29

In line 88, "sheer" most nearly means

A) transparent.

B) abrupt.

C) steep.

D) pure.

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30

Which statement is best supported by the information provided in figure 1?

A) The organic yield as a percentage of conventional yield is greater for vegetables than for fruits.

B) The organic yield as a percentage of conventional yield is similar for cereals and all crops.

C) The reported number of observations for each crop type exceeds 82.

D) The organic yield as a percentage of conventional yield is greater for vegetable crops than it is for oilseed crops.

31

Which of the following claims is supported by figure 2?

A) Of the organically grown species represented, soybeans have the lowest yield.

B) The organically grown maize and barley represented are comparable in their yields to conventionally grown maize and barley.

C) Of the organically grown species represented, tomatoes have the highest yield.

D) The organically grown species represented have lower yields than their conventionally grown counterparts do.

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Questions 32-41 are based on the following passage and supplementary material.

This passage is adapted from John Bohannon, "Why You Shouldn't Trust Internet Comments." ©2013 by American Association for the Advancement of Science.

The "wisdom of crowds" has become a mantra of the Internet age. Need to choose a new vacuum cleaner? Check out the reviews on online merchant Amazon. But a new study suggests that such online scores don't always reveal the best choice. A massive controlled experiment of Web users finds that such ratings are highly susceptible to irrational "herd behavior"—and that the herd can be manipulated.

Sometimes the crowd really is wiser than you. The classic examples are guessing the weight of a bull or the number of gumballs in a jar. Your guess is probably going to be far from the mark, whereas the average of many people's choices is remarkably close to the true number.

But what happens when the goal is to judge something less tangible, such as the quality or worth of a product? According to one theory, the wisdom of the crowd still holds—measuring the aggregate of people's opinions produces a stable, reliable value. Skeptics, however, argue that people's opinions are easily swayed by those of others. So nudging a crowd early on by presenting contrary opinions—for example, exposing them to some very good or very bad attitudes—will steer the crowd in a different direction. To test which hypothesis is true, you would need to manipulate huge numbers of people, exposing them to false information and determining how it affects their opinions.

A team led by Sinan Aral, a network scientist at the Massachusetts Institute of Technology in Cambridge, did exactly that. Aral has been secretly working with a popular website that aggregates news stories. The website allows users to make comments about news stories and vote each other's comments up or down. The vote tallies are visible as a number next to each comment, and the position of the comments is chronological. (Stories on the site get an average of about ten comments and about three votes per comment.) It's a follow-up to his experiment using people's ratings of movies to measure how much individual people influence each other online (answer: a lot). This time, he wanted to know how much the crowd influences the individual, and whether it can be controlled from outside.

For five months, every comment submitted by a user randomly received an "up" vote (positive); a "down" vote (negative); or as a control, no vote at all. The team then observed how users rated those comments. The users generated more than 100,000 comments that were viewed more than 10 million times and rated more than 300,000 times by other users.

At least when it comes to comments on news sites, the crowd is more herdlike than wise. Comments that received fake positive votes from the researchers were 32% more likely to receive more positive votes compared with a control, the team reports. And those comments were no more likely than the control to be down-voted by the next viewer to see them. By the end of the study, positively manipulated comments got an overall boost of about 25%. However, the same did not hold true for negative manipulation. The ratings of comments that got a fake down vote were usually negated by an up vote by the next user to see them.

"Our experiment does not reveal the psychology behind people's decisions," Aral says, "but an intuitive explanation is that people are more skeptical of negative social influence. They're more willing to go along with positive opinions from other people."

Duncan Watts, a network scientist at Microsoft Research in New York City, agrees with that conclusion. "[But] one question is whether the positive [herding] bias is specific to this site" or true in general, Watts says. He points out that the category of the news items in the experiment had a strong effect on how much people could be manipulated. "I would have thought that 'business' is pretty similar to 'economics,' yet they find a much stronger effect (almost 50% stronger) for the former than the latter. What explains this difference? If we're going to apply these findings in the real world, we'll need to know the answers."

Will companies be able to boost their products by manipulating online ratings on a massive scale? "That is easier said than done," Watts says. If people detect—or learn—that comments on a website are being manipulated, the herd may spook and leave entirely.

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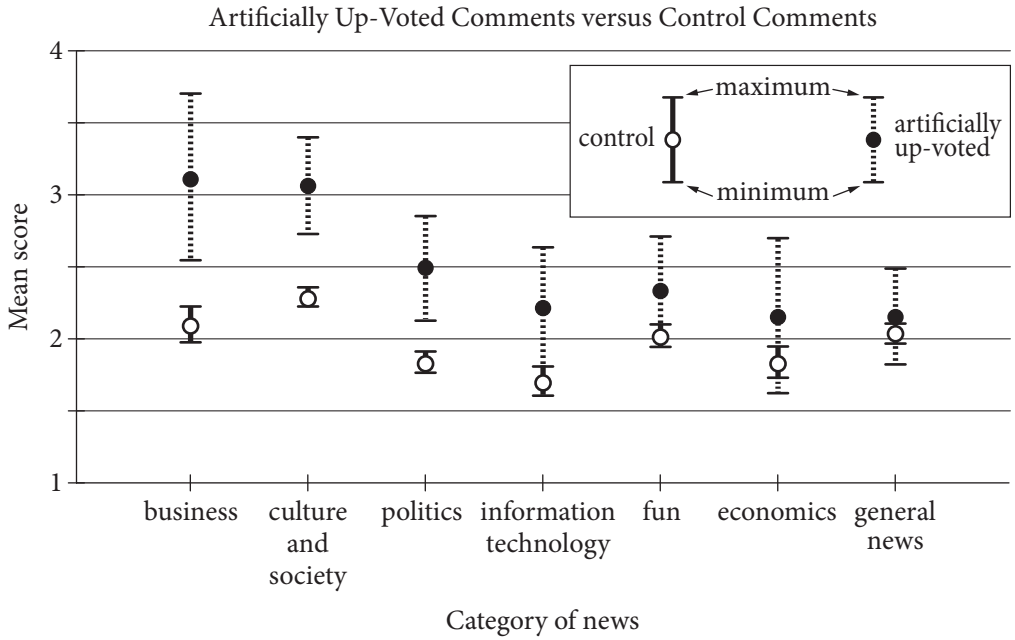

Mean score: mean of scores for the comments in each category, with the score for each comment being determined by the number of positive votes from website users minus the number of negative votes

Adapted from Lev Muchnik, Sinan Aral, and Sean J. Taylor, "Social Influence Bias: A Randomized Experiment." ©2013 by American Association for the Advancement of Science.

32

Over the course of the passage, the main focus shifts from a discussion of an experiment and its results to

A) an explanation of the practical applications of the results.

B) a consideration of the questions prompted by the results.

C) an analysis of the defects undermining the results.

D) a conversation with a scientist who disputes the results.

33

The author of the passage suggests that crowds may be more effective at

A) creating controversy than examining an issue in depth.

B) reinforcing members' ideas than challenging those ideas.

C) arriving at accurate quantitative answers than producing valid qualitative judgments.

D) ranking others' opinions than developing genuinely original positions.

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CONTINUE

34

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

A) Line 9 ("Sometimes . . . you")
B) Lines 11-14 ("Your . . . number")
C) Lines 17-20 ("According . . . value")
D) Lines 25-28 ("To test . . . opinions")

35

Which choice best supports the view of the "skeptics" (line 20)?

A) Lines 55-58 ("Comments . . . reports")
B) Lines 58-60 ("And . . . them")
C) Lines 63-65 ("The ratings . . . them")
D) Lines 76-79 ("He . . . manipulated")

36

Which action would best address a question Watts raises about the study?

A) Providing fewer fake positive comments
B) Using multiple websites to collect ratings
C) Requiring users to register on the website before voting
D) Informing users that voting data are being analyzed

37

As used in line 85, "boost" most nearly means

A) increase.
B) accelerate.
C) promote.
D) protect.

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CONTINUE

38

As used in line 86, "scale" most nearly means

A) level.

B) wage.

C) interval.

D) scheme.

39

In the figure, which category of news has an artificially up-voted mean score of 2.5?

A) Business

B) Politics

C) Fun

D) General news

40

According to the figure, which category of news showed the smallest difference in mean score between artificially up-voted comments and control comments?

A) Culture and society

B) Information technology

C) Fun

D) General news

41

Data presented in the figure most directly support which idea from the passage?

A) The mean score of artificially down-voted comments is similar to that of the control.

B) The patterns observed in the experiment suggest that people are suspicious of negative social influence.

C) The positive bias observed in users of the news site may not apply to human behavior in other contexts.

D) The type of story being commented on has an impact on the degree to which people can be influenced.

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CONTINUE

Questions 42-52 are based on the following passage.

This passage is adapted from Joshua Foer, *Moonwalking with Einstein: The Art and Science of Remembering Everything*. ©2011 by Joshua Foer.

In 2000, a neuroscientist at University College London named Eleanor Maguire wanted to find out what effect, if any, all that driving around the labyrinthine streets of London might have on cabbies' brains. When she brought sixteen taxi drivers into her lab and examined their brains in an MRI scanner, she found one surprising and important difference. The right posterior hippocampus, a part of the brain known to be involved in spatial navigation, was 7 percent larger than normal in the cabbies—a small but very significant difference. Maguire concluded that all of that way-finding around London had physically altered the gross structure of their brains. The more years a cabbie had been on the road, the more pronounced the effect.

The brain is a mutable organ, capable—within limits—of reorganizing itself and readapting to new kinds of sensory input, a phenomenon known as neuroplasticity. It had long been thought that the adult brain was incapable of spawning new neurons—that while learning caused synapses to rearrange themselves and new links between brain cells to form, the brain's basic anatomical structure was more or less static. Maguire's study suggested the old inherited wisdom was simply not true.

After her groundbreaking study of London cabbies, Maguire decided to turn her attention to mental athletes. She teamed up with Elizabeth Valentine and John Wilding, authors of the academic monograph *Superior Memory*, to study ten individuals who had finished near the top of the World Memory Championship. They wanted to find out if the memorizers' brains were—like the London cabbies'—structurally different from the rest of ours, or if they were somehow just making better use of memory abilities that we all possess.

The researchers put both the mental athletes and a group of matched control subjects into MRI scanners and asked them to memorize three-digit numbers, black-and-white photographs of people's faces, and magnified images of snowflakes, while their brains were being scanned. Maguire and her team thought it was possible that they might discover anatomical differences in the brains of the memory champs, evidence that their brains had somehow reorganized themselves in the process of doing all that intensive remembering. But when the researchers reviewed the imaging data, not a single significant structural difference turned up. The brains of the mental athletes appeared to be indistinguishable from those of the control subjects. What's more, on every single test of general cognitive ability, the mental athletes' scores came back well within the normal range. The memory champs weren't smarter, and they didn't have special brains.

But there was one telling difference between the brains of the mental athletes and the control subjects: When the researchers looked at which parts of the brain were lighting up when the mental athletes were memorizing, they found that they were activating entirely different circuitry. According to the functional MRIs [fMRIs], regions of the brain that were less active in the control subjects seemed to be working in overdrive for the mental athletes.

Surprisingly, when the mental athletes were learning new information, they were engaging several regions of the brain known to be involved in two specific tasks: visual memory and spatial navigation, including the same right posterior hippocampal region that the London cabbies had enlarged with all their daily way-finding. At first glance, this wouldn't seem to make any sense. Why would mental athletes be conjuring images in their mind's eye when they were trying to learn three-digit numbers? Why should they be navigating like London cabbies when they're supposed to be remembering the shapes of snowflakes?

Maguire and her team asked the mental athletes to describe exactly what was going through their minds as they memorized. The mental athletes said they were consciously converting the information they were being asked to memorize into images, and distributing those images along familiar spatial journeys. They weren't doing this automatically, or because it was an inborn talent they'd nurtured since childhood. Rather, the unexpected patterns of neural activity that Maguire's fMRIs turned up were the result of training and practice.

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CONTINUE

42

According to the passage, Maguire's findings regarding taxi drivers are significant because they

A) demonstrate the validity of a new method.
B) provide evidence for a popular viewpoint.
C) call into question an earlier consensus.
D) challenge the authenticity of previous data.

43

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

A) Lines 8-12 ("The right . . . difference")
B) Lines 12-16 ("Maguire . . . effect")
C) Lines 17-20 ("The brain . . . neuroplasticity")
D) Lines 20-26 ("It had . . . true")

44

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

A) initial.
B) simple.
C) necessary.
D) fundamental.

45

Which question was Maguire's study of mental athletes primarily intended to answer?

A) Does the act of memorization make use of different brain structures than does the act of navigation?
B) Do mental athletes inherit their unusual brain structures, or do the structures develop as a result of specific activities?
C) Does heightened memorization ability reflect abnormal brain structure or an unusual use of normal brain structure?
D) What is the relationship between general cognitive ability and the unusual brain structures of mental athletes?

46

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

A) Lines 27-29 ("After . . . athletes")
B) Lines 33-37 ("They . . . possess")
C) Lines 38-43 ("The researchers . . . scanned")
D) Lines 52-54 ("What's . . . range")

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CONTINUE

47

As used in line 39, "matched" most nearly means

A) comparable.
B) identical.
C) distinguishable.
D) competing.

48

The main purpose of the fifth paragraph (lines 57-65) is to

A) relate Maguire's study of mental athletes to her study of taxi drivers.
B) speculate on the reason for Maguire's unexpected results.
C) identify an important finding of Maguire's study of mental athletes.
D) transition from a summary of Maguire's findings to a description of her methods.

49

According to the passage, when compared to mental athletes, the individuals in the control group in Maguire's second study

A) showed less brain activity overall.
B) demonstrated a wider range of cognitive ability.
C) exhibited different patterns of brain activity.
D) displayed noticeably smaller hippocampal regions.

50

The passage most strongly suggests that mental athletes are successful at memorization because they

A) exploit parts of the brain not normally used in routine memorization.
B) convert information they are trying to memorize into abstract symbols.
C) organize information into numerical lists prior to memorization.
D) exercise their brains regularly through puzzles and other mental challenges.

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CONTINUE

51

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

A) Lines 66-72 ("Surprisingly . . . way-finding")

B) Lines 72-73 ("At first . . . sense")

C) Lines 79-81 ("Maguire . . . memorized")

D) Lines 85-87 ("They . . . childhood")

52

The questions in lines 74-78 primarily serve to

A) raise doubts about the reliability of the conclusions reached by Maguire.

B) emphasize and elaborate on an initially puzzling result of Maguire's study of mental athletes.

C) imply that Maguire's findings undermine earlier studies of the same phenomenon.

D) introduce and explain a connection between Maguire's two studies and her earlier work.

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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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.

Prehistoric Printing

Paleontologists are using modern technology to gain a greater understanding of the distant past. With the aid of computed tomography (CT) scanning and 3-D printing, researchers are able to create accurate models of prehistoric fossils. **1** These models have expanded

1

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

> Fossils provide paleontologists with a convenient way of estimating the age of the rock in which the fossils are found.

Should the writer make this addition here?

A) Yes, because it supports the paragraph's argument with an important detail.

B) Yes, because it provides a logical transition from the preceding sentence.

C) No, because it is not directly related to the main point of the paragraph.

D) No, because it undermines the main claim of the paragraph.

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researchers' knowledge of ancient species and 2 swear to advance the field of paleontology in the years to come.

CT scanners use X-rays to map the surface of a fossil in minute detail, recording as many as one million data points to create a digital blueprint. A 3-D printer then builds a polymer model based on this blueprint, much as a regular computer printer reproduces digital documents on paper. 3 Whereas the head of an ordinary computer printer moves back and forth while printing ink onto paper, the corresponding part of a 3-D printer moves in multiple dimensions while squirting out thin layers of melted polymer plastic. The plastic hardens quickly, 4 it allows the printer to build the layers of the final model. Compared with older ways of modeling fossils, scanning and printing in this way is extremely versatile.

2

A) NO CHANGE
B) subscribe
C) vow
D) promise

3

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

A) Kept, because it helps explain why X-rays are used in CT scanners.
B) Kept, because it provides details to illustrate how a 3-D printer works.
C) Deleted, because it contradicts the passage's information about digital blueprints.
D) Deleted, because it creates confusion about how researchers gather data.

4

A) NO CHANGE
B) this
C) which
D) that

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CONTINUE

[1] One significant benefit of 3-D printing technology is its ability to create scale reproductions of fossils. [2] But now 3-D scale models can be rearranged with ease, which is a huge boon to scientists. [3] A team led by Drexel University professor Kenneth Lacovara is making models of dinosaur bones one-tenth the bones' original sizes **5** in order to learn how they fit together when the animals were alive. [4] In the past, such research was limited by the weight and bulk of the fossils as well as **6** its preciousness and fragility. [5] In many cases, scientists had to rearrange bones virtually, using artists' renderings. **7**

Because CT scanners can map objects that are impossible to excavate, CT scanning and 3-D printing can also be used to reproduce fossils that scientists cannot observe firsthand. **8** By contrast, researchers

5

A) NO CHANGE
B) in order for learning
C) so that one is learning
D) so to learn

6

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

7

To make this paragraph most logical, sentence 2 should be placed

A) where it is now.
B) before sentence 1.
C) after sentence 4.
D) after sentence 5.

8

A) NO CHANGE
B) Nonetheless,
C) Besides,
D) For example,

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CONTINUE

from the National Museum of Brazil **9** has relied on this technique to study a fossilized skeleton that was discovered protruding from a rock at an old São Paulo railroad site. **10** The fossil was too delicate to be removed from the rock. Because of the fossil's delicate nature, the team dug up a block of stone around the fossil and brought it to their lab. With the aid of a CT scanner and a 3-D printer, they were able to produce a resin model of the fossil. Examining the model, the researchers determined that **11** one had found a new species, a 75-million-year-old crocodile. While not every discovery will be as dramatic as this one, paleontologists anticipate further expanding their knowledge of ancient life-forms as CT scanning and 3-D printing continue to make fossils more accessible.

9

A) NO CHANGE
B) relied
C) will rely
D) is relying

10

Which choice most effectively combines the underlined sentences?

A) The fossil could not be removed from the rock on account of it being too delicate; moreover, the team dug up a block of stone around it and brought it to their lab.
B) The team thought the fossil was too delicate to remove from the rock, and their next decision was to dig up a block of stone around the fossil and bring it to their lab.
C) The fossil was too delicate to be removed from the rock, so the team dug up a block of stone around the fossil and brought it to their lab.
D) In removing the fossil from the rock, the team found it was too delicate; then they dug up a block of stone around the fossil and brought it to their lab.

11

A) NO CHANGE
B) he or she
C) they
D) it

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CONTINUE

Questions 12-22 are based on the following passage.

Thomas Nast, the Crusading Cartoonist

"Stop them pictures!" Legend has it that the corrupt politician William "Boss" Tweed once used those words when ordering someone to offer a bribe to Thomas Nast, an artist who had become famous for cartoons that called for reforms to end corruption. **12** As a result, Tweed's attempt to silence the artist failed, and Nast's cartoons, published in magazines like *Harper's Weekly*, actually played a key role in bringing Boss Tweed and his cronies to justice.

13 There were powerful political organizations in the 1860s and the 1870s. The organizations were known as "political machines" and started taking control of city governments. These political machines were able to pack legislatures and courts with hand-picked supporters by purchasing **14** votes, a form of election fraud involving the exchange of money or favors for votes. Once a political machine had control of enough important positions, its members were able to use public funds to enrich themselves and their friends. Boss Tweed's Tammany Hall group, which controlled New York **15** City in the 1860s—stole more than $30 million,

12

A) NO CHANGE
B) Therefore,
C) Furthermore,
D) DELETE the underlined portion.

13

Which choice most effectively combines the underlined sentences?

A) Powerful political organizations in the 1860s and the 1870s started taking control of city governments, and they were known as "political machines."
B) Known as "political machines," in the 1860s and the 1870s, political organizations that were powerful started taking control of city governments.
C) City governments were taken control of in the 1860s and the 1870s, and powerful political organizations known as "political machines" did so.
D) In the 1860s and the 1870s, powerful political organizations known as "political machines" started taking control of city governments.

14

A) NO CHANGE
B) votes, being
C) votes, that is
D) votes, which it is

15

A) NO CHANGE
B) City in the 1860s,
C) City, in the 1860s,
D) City in the 1860s

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CONTINUE

the equivalent of more than $365 million today.

16 Tweed had been elected to a single two-year term in Congress in 1852. Tammany Hall was so powerful and 17 corrupt that, the *New York Times*, commented "There is absolutely nothing . . . in the city which is beyond the reach of the insatiable gang."

Given the extent of Tweed's power, it is remarkable that a single cartoonist could have played such a significant role in bringing about his downfall. Nast's cartoons depicted Tweed as a great big bloated thief. One of the artist's most 18 famous images showed Tweed with a bag of money in place of his 19 head. Another featured Tweed leaning against a ballot box with the caption "As long as I count the votes, what are you going to do about it?" These cartoons were so effective in part because many of the citizens who supported Tweed were illiterate and thus could not read the newspaper accounts of his criminal activities. Nast's cartoons, though, widely exposed the public to the injustice of Tweed's political machine.

16

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

A) Kept, because it introduces the quote from the *New York Times* in the next sentence.
B) Kept, because it adds a vital detail about Tweed that is necessary to understand his power.
C) Deleted, because it blurs the focus of the paragraph by introducing loosely related information.
D) Deleted, because it contains information that undermines the main claim of the passage.

17

A) NO CHANGE
B) corrupt, that the *New York Times* commented,
C) corrupt that the *New York Times* commented,
D) corrupt that the *New York Times*, commented

18

A) NO CHANGE
B) famous and well-known
C) famous and commonly known
D) famous, commonly known

19

Which choice adds the most relevant supporting information to the paragraph?

A) head; like many other Nast cartoons, that one was published in *Harper's Weekly*.
B) head; Nast would later illustrate Tweed's escape from prison.
C) head, one depiction that omits Tweed's signature hat.
D) head, an image that perfectly captured Tweed's greedy nature.

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CONTINUE

Nast's campaign to bring down Tweed and the Tammany Hall gang was ultimately successful. In the elections of 1871, the public voted against most of the Tammany Hall candidates, greatly weakening Tweed's power. Eventually, Tweed and his gang were **20** persecuted for a number of charges, including fraud and larceny, and many of them were sent to jail. In 1875 Tweed escaped from jail and fled to Spain and unwittingly **21** brought about one final **22** pinnacle for the power of political cartoons: A Spanish police officer recognized Tweed from one of Nast's cartoons. Consequently, Tweed was sent back to jail, and Nast was hailed as the man who toppled the great Tammany Hall machine.

20

A) NO CHANGE
B) persecuted on
C) persecuted with
D) prosecuted on

21

A) NO CHANGE
B) bringing
C) brings
D) has brought

22

A) NO CHANGE
B) triumph
C) culmination
D) apex

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CONTINUE

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

Rethinking Crowdfunding in the Arts

Crowdfunding is a popular way to raise money using the Internet. The process sounds simple: an artist, entrepreneur, or other innovator takes his or her ideas straight to the public via a crowdfunding website. The innovator creates a video about the project and offers, in exchange for donations, a series of "perks," from acknowledgment on a social media site to a small piece of art. Many crowdfunding programs are all-or-nothing; in other words, the innovator must garner 100 percent funding for the project or the money is refunded to the donors. At **23** it's best, the system can give creators direct access to millions of potential backers.

The home page of one leading crowdfunding site features a project to manufacture pinhole cameras on a 3 D printer. **24** The idea is obviously very attractive. An obscure method of photography may be made available to many with little expense. Within weeks, the project was 621 percent funded. In contrast, on the same page, a small Brooklyn performance venue is attempting to raise money for its current season. The venue features works of performance art showcased in a storefront window. Those who have seen the space consider it vital. **25** However, that group may not be large enough; with just fourteen days to go in the fund-raising period, the campaign is only 46 percent funded.

23

A) NO CHANGE
B) its
C) its'
D) their

24

Which choice most effectively combines the underlined sentences?

A) With the idea being obviously very attractive, an obscure method of photography may be made available to many at little expense.
B) The idea is obviously very attractive: an obscure method of photography may be made available to many at little expense.
C) An obscure method of photography may be made available to many at little expense, and the idea is obviously very attractive.
D) An obscure method of photography, an idea that is obviously very attractive, may be made available to many at little expense.

25

A) NO CHANGE
B) Therefore,
C) In effect,
D) As a rule,

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CONTINUE

Artists such as these Brooklyn performers find that crowdfunding exacerbates problems that already exist. **26** Work, that is easily understood and appreciated, is supported, while more complex work goes unnoticed. **27** Time that could be used creating art is spent devising clever perks to draw the attention of potential contributors. **28** In addition, audiences may contain many "free **29** riders," they did not make contributions.

26

A) NO CHANGE
B) Work that is easily understood and appreciated is supported,
C) Work that is easily understood, and appreciated is supported
D) Work—that is easily understood and appreciated—is supported,

27

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

> Crowdfunding tends to attract contributors from a wide variety of professional fields.

Should the writer make this addition here?

A) Yes, because it gives more information about the people who donate to crowdfunding campaigns.
B) Yes, because it reinforces the writer's point about the funding of artistic projects.
C) No, because it fails to take into account project funding received from public institutions.
D) No, because it blurs the focus of the paragraph by introducing a poorly integrated piece of information.

28

A) NO CHANGE
B) Conversely,
C) However,
D) Thus,

29

A) NO CHANGE
B) riders," not making
C) riders," who did not make
D) riders" to not make

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CONTINUE

Ironically, the success of crowdfunding may weaken overall funding for the arts if people begin to feel that paying for the art **30** loved by them is someone else's responsibility.

[1] One innovative playwright has woven the deficiencies of the system into her crowdfunding model. [2] Though the price for her tickets was higher than that of tickets for comparable shows, it was still affordable to most theatergoers—and reflected the real cost of the performance. [3] She presented the total cost for producing her play on a crowdfunding site. [4] Then she divided the total cost by the number of people she expected to attend the performance. [5] The result of the calculation was the minimum donor price, and only donors who paid at least the minimum ticket price were allowed to attend the performance. [6] By subverting the presumption that money used for her project is an altruistic donation, the playwright showed that **31** our work has monetary value to those who enjoy it. **32**

30

A) NO CHANGE
B) they love
C) loved by him or her
D) he or she loves

31

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

32

To make this paragraph most logical, sentence 2 should be placed

A) where it is now.
B) after sentence 3.
C) after sentence 4.
D) after sentence 5.

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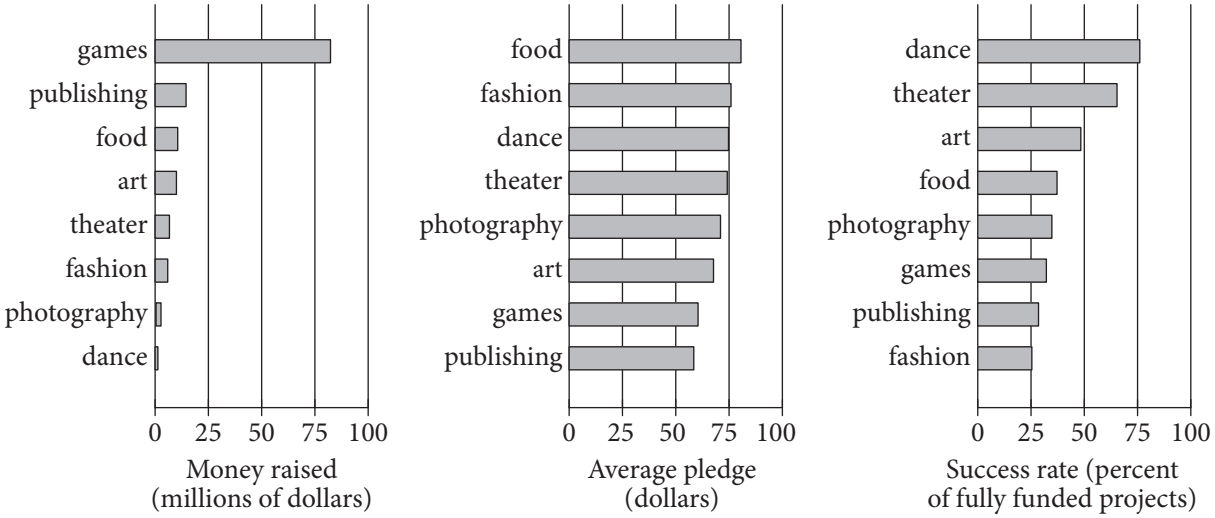
CONTINUE

Crowdfunded Projects on Kickstarter in 2012



Adapted from "These Were the Most Successful Projects on Kickstarter Last Year." ©2013 by The Economist Newspaper Limited.

Question 33 asks about the graphic.

33

Which choice offers an accurate interpretation of the data in the graphs?

A) The project category with the lowest amount of money raised was also the most successfully funded project category.

B) The project category with the highest average pledge amount was also the most successfully funded project category.

C) The project category with the lowest average pledge amount was also the project category that raised the most money.

D) The project category with the highest average pledge amount was also the project category with the most money raised.

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CONTINUE

Questions 34-44 are based on the following passage.

Investigative Journalism: An Evolving American Tradition

[1] The recent precipitous decline of print journalism as a viable profession has exacerbated long-held concerns about the state of investigative reporting in the United States. [2] Facing lower print circulation and diminished advertising revenue, many major newspapers have reduced or eliminated investigative resources. [3] Newspapers, the traditional nurturing ground for investigative journalism, have been hit especially hard by the widespread availability of free news online. [4] To survive, investigative journalism must continue to adapt to the digital age. **34**

It is not difficult to understand why a cash-strapped, understaffed publication might feel pressure to cut teams of investigative **35** reporter's—their work is expensive and time-consuming. **36** Taking on the public interest, investigative journalism involves original, often long-form reporting on such topics as **37** illegal activities, street crime, corporate wrongdoing, and political corruption. An investigative story involves one or more experienced journalists dedicating their full energy and the resources of the publisher to a piece for a prolonged period of time. Expensive legal battles may ensue. The results of this work, though costly, have

34

For the sake of the logic and cohesion of the paragraph, sentence 3 should be

A) placed where it is now.
B) placed before sentence 1.
C) placed after sentence 1.
D) DELETED from the paragraph.

35

A) NO CHANGE
B) reporters:
C) reporters,
D) reporter's;

36

A) NO CHANGE
B) Undertaken in
C) Overtaking
D) Taking off from

37

A) NO CHANGE
B) business scandals,
C) abuse of government power,
D) DELETE the underlined portion.

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CONTINUE

helped keep those in power accountable. The exposure by *Washington Post* reporters Bob Woodward and Carl Bernstein of government misconduct in the Watergate scandal resulted in the resignation of President Richard Nixon in 1974. More recently, Seymour Hersh, reporting for the *New Yorker* in 2004, helped publicize the mistreatment of Iraqi prisoners by US personnel at Abu Ghraib during the Iraq War. **38** In these and other cases, exposure from reporters has served as an important **39** blockade to or scolding of malfeasance.

38

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

> In 1954, Edward R. Murrow and Fred Friendly produced episodes of the CBS television show *See It Now* that contributed to the end of US senator Joseph McCarthy's anticommunist "witch hunts."

Should the writer make this addition here?

A) Yes, because it helps clarify that the passage's main focus is on investigations of political corruption.

B) Yes, because it offers an important counterpoint to the other cases previously described in the paragraph.

C) No, because it gives an example that is both chronologically and substantively out of place in the paragraph.

D) No, because it provides an example that is inconsistent with the passage's definition of investigative journalism.

39

A) NO CHANGE

B) interference to or condemnation of

C) drag on or reproof of

D) deterrent or rebuke to

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CONTINUE

While worrisome, the decline of traditional print media **40** could not entail the end of investigative journalism. **41** Although many newsrooms have reduced their staff, some still employ investigative reporters. Nonprofit **42** enterprises such as the Organized Crime and Corruption Reporting Project have begun to fill the void created by staff losses at newspapers and magazines. Enterprising freelance reporters, newly funded by nonprofits, make extensive use of social media,

40

Which choice most effectively suggests that the "end of investigative journalism" is a real possibility but one that can be prevented?

A) NO CHANGE
B) need
C) will
D) must

41

Which choice most effectively sets up the examples in the following sentences?

A) NO CHANGE
B) Investigative journalism also declined between the 1930s and 1950s, only to be revived in the 1960s.
C) According to the Pew Research Center, more people get their national and international news from the Internet than from newspapers.
D) Indeed, recent years have witnessed innovative adjustments to changing times.

42

A) NO CHANGE
B) enterprises: such as
C) enterprises such as:
D) enterprises, such as

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CONTINUE

including blogs and Twitter, to foster a public conversation about key issues. The Help Me Investigate project, **43** for example, solicited readers to submit tips and information related to ongoing stories to its website. Far from marking the end of investigative journalism, **44** cooperation among journalists and ordinary citizens has been facilitated by the advent of the digital age through an increase in the number of potential investigators.

43

A) NO CHANGE
B) therefore,
C) however,
D) in any case,

44

A) NO CHANGE
B) the number of potential investigators has increased since the advent of the digital age owing to the facilitation of cooperation among journalists and ordinary citizens.
C) the advent of the digital age has increased the number of potential investigators by facilitating cooperation among journalists and ordinary citizens.
D) by facilitating cooperation among journalists and ordinary citizens the advent of the digital age has increased the number of potential investigators.

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 – No Calculator

25 MINUTES, 20 QUESTIONS

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

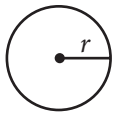
DIRECTIONS

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

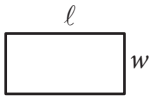
NOTES

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

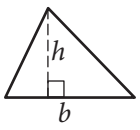
REFERENCE



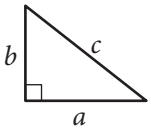
$A = \pi r^2$
$C = 2\pi r$



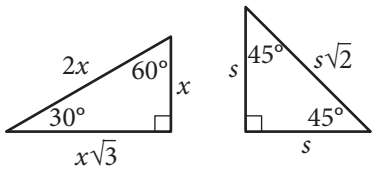
$A = \ell w$



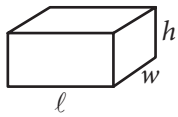
$A = \frac{1}{2}bh$



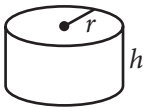
$c^2 = a^2 + b^2$



Special Right Triangles

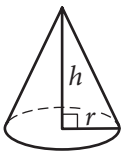


$V = \ell wh$

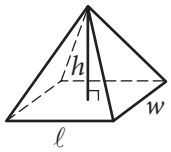


$V = \pi r^2 h$

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



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



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

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

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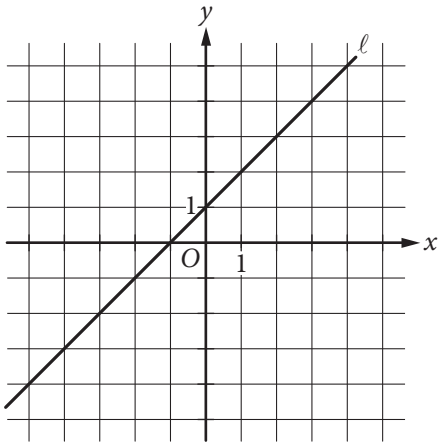
CONTINUE

1



Which of the following is an equation of line ℓ in the xy-plane above?

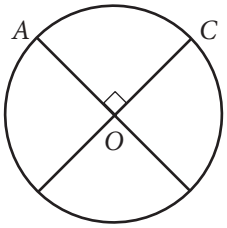
A) $x = 1$

B) $y = 1$

C) $y = x$

D) $y = x + 1$

2



The circle above with center O has a circumference of 36. What is the length of minor arc $\widehat{AC}$?

A) 9

B) 12

C) 18

D) 36

3

What are the solutions of the quadratic equation $4x^2 - 8x - 12 = 0$?

A) $x = -1$ and $x = -3$

B) $x = -1$ and $x = 3$

C) $x = 1$ and $x = -3$

D) $x = 1$ and $x = 3$

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CONTINUE

4

Which of the following is an example of a function whose graph in the xy-plane has no x-intercepts?

A) A linear function whose rate of change is not zero

B) A quadratic function with real zeros

C) A quadratic function with no real zeros

D) A cubic polynomial with at least one real zero

5

$$\sqrt{k+2} - x = 0$$

In the equation above, k is a constant. If $x = 9$, what is the value of k ?

A) 1

B) 7

C) 16

D) 79

6

Which of the following is equivalent to the sum of the expressions $a^2 - 1$ and $a + 1$?

A) $a^2 + a$

B) $a^3 - 1$

C) $2a^2$

D) a^3

7

Jackie has two summer jobs. She works as a tutor, which pays \$12 per hour, and she works as a lifeguard, which pays \$9.50 per hour. She can work no more than 20 hours per week, but she wants to earn at least \$220 per week. Which of the following systems of inequalities represents this situation in terms of x and y, where x is the number of hours she tutors and y is the number of hours she works as a lifeguard?

A) $12x + 9.5y \leq 220$
$x + y \geq 20$

B) $12x + 9.5y \leq 220$
$x + y \leq 20$

C) $12x + 9.5y \geq 220$
$x + y \leq 20$

D) $12x + 9.5y \geq 220$
$x + y \geq 20$

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CONTINUE

8

In air, the speed of sound S, in meters per second, is a linear function of the air temperature T, in degrees Celsius, and is given by $S(T) = 0.6T + 331.4$. Which of the following statements is the best interpretation of the number 331.4 in this context?

A) The speed of sound, in meters per second, at 0°C

B) The speed of sound, in meters per second, at 0.6°C

C) The increase in the speed of sound, in meters per second, that corresponds to an increase of 1°C

D) The increase in the speed of sound, in meters per second, that corresponds to an increase of 0.6°C

9

$$y = x^2$$
$$2y + 6 = 2(x + 3)$$

If (x, y) is a solution of the system of equations above and $x > 0$, what is the value of xy ?

A) 1

B) 2

C) 3

D) 9

10

If $a^2 + b^2 = z$ and $ab = y$, which of the following is equivalent to $4z + 8y$?

A) $(a + 2b)^2$

B) $(2a + 2b)^2$

C) $(4a + 4b)^2$

D) $(4a + 8b)^2$

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CONTINUE

11

The volume of right circular cylinder A is 22 cubic centimeters. What is the volume, in cubic centimeters, of a right circular cylinder with twice the radius and half the height of cylinder A?

A) 11

B) 22

C) 44

D) 66

12

Which of the following is equivalent to $9^{\frac{3}{4}}$?

A) $\sqrt[3]{9}$

B) $\sqrt[4]{9}$

C) $\sqrt{3}$

D) $3\sqrt{3}$

13

At a restaurant, n cups of tea are made by adding t tea bags to hot water. If $t = n + 2$, how many additional tea bags are needed to make each additional cup of tea?

A) None

B) One

C) Two

D) Three

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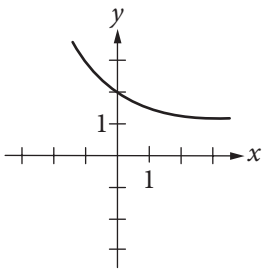
CONTINUE

14

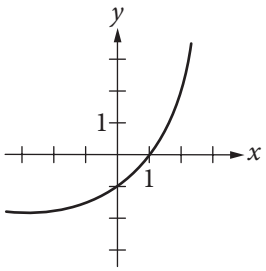
$$f(x) = 2^x + 1$$

The function f is defined by the equation above. Which of the following is the graph of $y = -f(x)$ in the xy-plane?

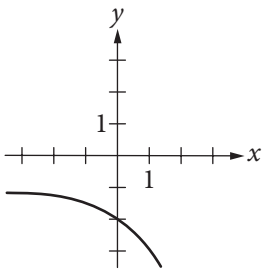
A)



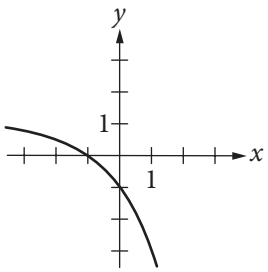
B)



C)



D)



15

Alan drives an average of 100 miles each week. His car can travel an average of 25 miles per gallon of gasoline. Alan would like to reduce his weekly expenditure on gasoline by \$5. Assuming gasoline costs \$4 per gallon, which equation can Alan use to determine how many fewer average miles, m, he should drive each week?

A) $\frac{25}{4}m = 95$

B) $\frac{25}{4}m = 5$

C) $\frac{4}{25}m = 95$

D) $\frac{4}{25}m = 5$

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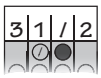
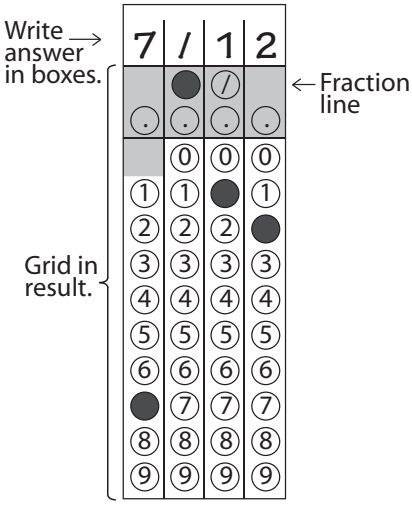
CONTINUE

DIRECTIONS

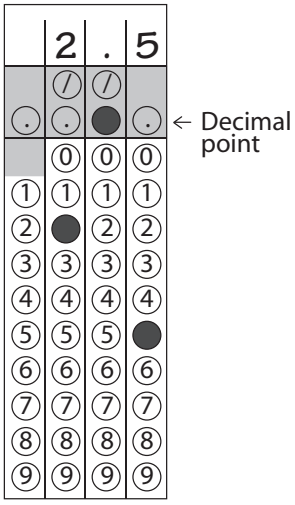
For questions 16-20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

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

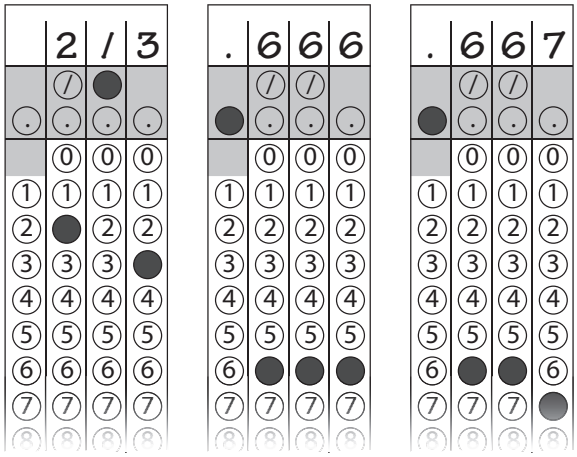
Answer: $\frac{7}{12}$



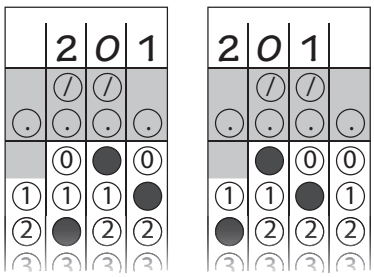
Answer: 2.5



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

Maria plans to rent a boat. The boat rental costs \$60 per hour, and she will also have to pay for a water safety course that costs \$10. Maria wants to spend no more than \$280 for the rental and the course. If the boat rental is available only for a whole number of hours, what is the maximum number of hours for which Maria can rent the boat?

17

$$2(p+1)+8(p-1)=5p$$

What value of p is the solution of the equation above?

18

$$\frac{1}{2}(2x+y)=\frac{21}{2}$$
$$y=2x$$

The system of equations above has solution (x, y). What is the value of x ?

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CONTINUE

19

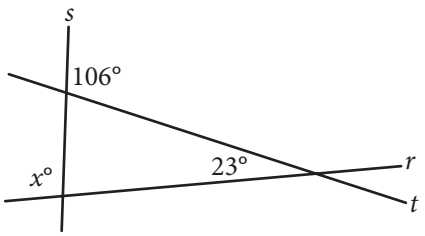
$$\frac{2x+6}{(x+2)^2} - \frac{2}{x+2}$$

The expression above is equivalent to $\frac{a}{(x+2)^2}$, where a is a positive constant and $x \neq -2$.

What is the value of a ?

20

Intersecting lines r, s, and t are shown below.



What is the value of x ?

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.

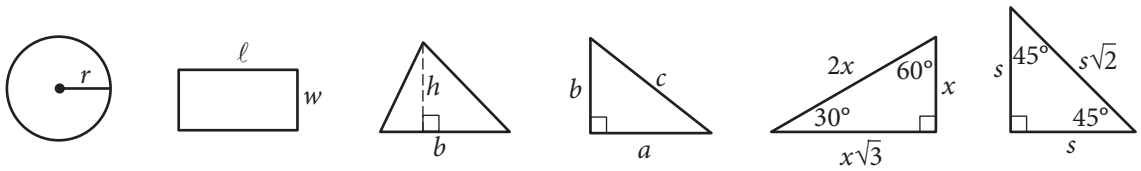
DIRECTIONS

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

NOTES

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

REFERENCE



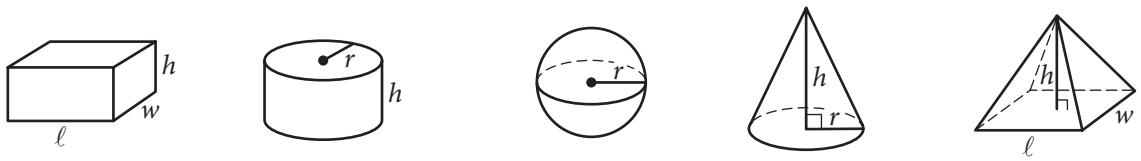
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

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

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

Special Right Triangles



$V = \ell wh$

$V = \pi r^2 h$

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

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

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

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

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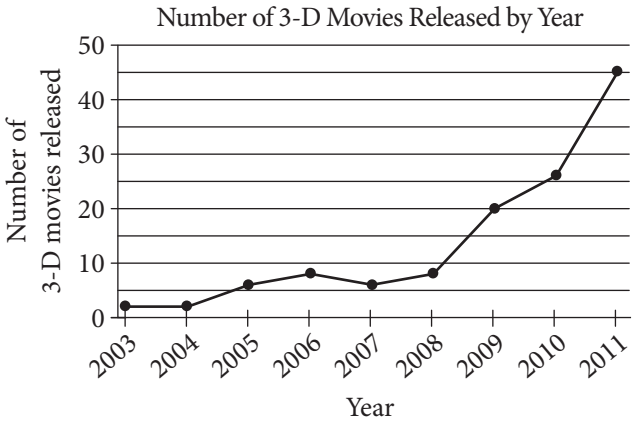
CONTINUE

1



According to the line graph above, between which two consecutive years was there the greatest change in the number of 3-D movies released?

A) 2003–2004

B) 2008–2009

C) 2009–2010

D) 2010–2011

2

x	$f(x)$
1	5
3	13
5	21

Some values of the linear function f are shown in the table above. Which of the following defines f ?

A) $f(x) = 2x + 3$

B) $f(x) = 3x + 2$

C) $f(x) = 4x + 1$

D) $f(x) = 5x$

3

To make a bakery's signature chocolate muffins, a baker needs 2.5 ounces of chocolate for each muffin. How many pounds of chocolate are needed to make 48 signature chocolate muffins?
(1 pound = 16 ounces)

A) 7.5

B) 10

C) 50.5

D) 120

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CONTINUE

4

If $3(c+d)=5$, what is the value of $c+d$?

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

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

C) 3

D) 5

5

The weight of an object on Venus is approximately $\frac{9}{10}$ of its weight on Earth. The weight of an object on Jupiter is approximately $\frac{23}{10}$ of its weight on Earth. If an object weighs 100 pounds on Earth, approximately how many more pounds does it weigh on Jupiter than it weighs on Venus?

A) 90
B) 111
C) 140
D) 230

6

An online bookstore sells novels and magazines. Each novel sells for \$4, and each magazine sells for \$1. If Sadie purchased a total of 11 novels and magazines that have a combined selling price of \$20, how many novels did she purchase?

A) 2
B) 3
C) 4
D) 5

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CONTINUE

7

The Downtown Business Association (DBA) in a certain city plans to increase its membership by a total of n businesses per year. There were b businesses in the DBA at the beginning of this year. Which function best models the total number of businesses, y, the DBA plans to have as members x years from now?

A) $y = nx + b$

B) $y = nx - b$

C) $y = b(n)^x$

D) $y = n(b)^x$

8

Which of the following is an equivalent form of $(1.5x - 2.4)^2 - (5.2x^2 - 6.4)$?

A) $-2.2x^2 + 1.6$

B) $-2.2x^2 + 11.2$

C) $-2.95x^2 - 7.2x + 12.16$

D) $-2.95x^2 - 7.2x + 0.64$

9

In the 1908 Olympic Games, the Olympic marathon was lengthened from 40 kilometers to approximately 42 kilometers. Of the following, which is closest to the increase in the distance of the Olympic marathon, in miles? (1 mile is approximately 1.6 kilometers.)

A) 1.00

B) 1.25

C) 1.50

D) 1.75

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CONTINUE

10

The density d of an object is found by dividing the mass m of the object by its volume V. Which of the following equations gives the mass m in terms of d and V ?

A) $m = dV$

B) $m = \frac{d}{V}$

C) $m = \frac{V}{d}$

D) $m = V + d$

11

$$-2x + 3y = 6$$

In the xy-plane, the graph of which of the following equations is perpendicular to the graph of the equation above?

A) $3x + 2y = 6$

B) $3x + 4y = 6$

C) $2x + 4y = 6$

D) $2x + 6y = 3$

12

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

The system of equations above has solution (x, y). What is the value of x ?

A) 3

B) $\frac{7}{2}$

C) 4

D) 6

13

$$y \le 3x + 1$$
$$x - y > 1$$

Which of the following ordered pairs (x, y) satisfies the system of inequalities above?

A) $(-2, -1)$

B) $(-1, 3)$

C) $(1, 5)$

D) $(2, -1)$

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14

Type of surgeon	Major professional activity		Total
	Teaching	Research	
General	258	156	414
Orthopedic	119	74	193
Total	377	230	607

In a survey, 607 general surgeons and orthopedic surgeons indicated their major professional activity. The results are summarized in the table above. If one of the surgeons is selected at random, which of the following is closest to the probability that the selected surgeon is an orthopedic surgeon whose indicated professional activity is research?

A) 0.122

B) 0.196

C) 0.318

D) 0.379

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CONTINUE

15

A polling agency recently surveyed 1,000 adults who were selected at random from a large city and asked each of the adults, "Are you satisfied with the quality of air in the city?" Of those surveyed, 78 percent responded that they were satisfied with the quality of air in the city. Based on the results of the survey, which of the following statements must be true?

I. Of all adults in the city, 78 percent are satisfied with the quality of air in the city.

II. If another 1,000 adults selected at random from the city were surveyed, 78 percent of them would report they are satisfied with the quality of air in the city.

III. If 1,000 adults selected at random from a different city were surveyed, 78 percent of them would report they are satisfied with the quality of air in the city.

A) None

B) II only

C) I and II only

D) I and III only

Questions 16-18 refer to the following information.

Species of tree	Growth factor
Red maple	4.5
River birch	3.5
Cottonwood	2.0
Black walnut	4.5
White birch	5.0
American elm	4.0
Pin oak	3.0
Shagbark hickory	7.5

One method of calculating the approximate age, in years, of a tree of a particular species is to multiply the diameter of the tree, in inches, by a constant called the growth factor for that species. The table above gives the growth factors for eight species of trees.

16

According to the information in the table, what is the approximate age of an American elm tree with a diameter of 12 inches?

A) 24 years

B) 36 years

C) 40 years

D) 48 years

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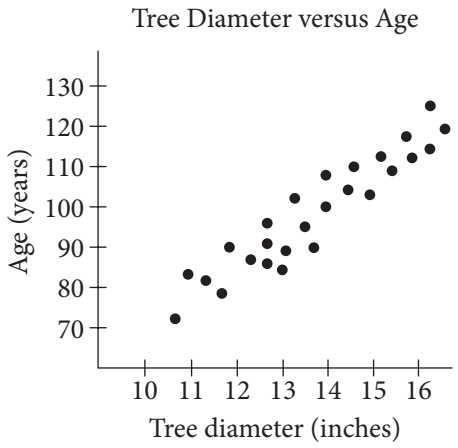
CONTINUE

17



The scatterplot above gives the tree diameter plotted against age for 26 trees of a single species. The growth factor of this species is closest to that of which of the following species of tree?

A) Red maple

B) Cottonwood

C) White birch

D) Shagbark hickory

18

If a white birch tree and a pin oak tree each now have a diameter of 1 foot, which of the following will be closest to the difference, in inches, of their diameters 10 years from now? (1 foot = 12 inches)

A) 1.0

B) 1.2

C) 1.3

D) 1.4

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CONTINUE

21

$$\frac{a-b}{a} = c$$

In the equation above, if a is negative and b is positive, which of the following must be true?

A) $c > 1$

B) $c = 1$

C) $c = -1$

D) $c < -1$

22

In State X, Mr. Camp's eighth-grade class consisting of 26 students was surveyed and 34.6 percent of the students reported that they had at least two siblings. The average eighth-grade class size in the state is 26. If the students in Mr. Camp's class are representative of students in the state's eighth-grade classes and there are 1,800 eighth-grade classes in the state, which of the following best estimates the number of eighth-grade students in the state who have fewer than two siblings?

A) 16,200

B) 23,400

C) 30,600

D) 46,800

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CONTINUE

Questions 23 and 24 refer to the following information.

Townsend Realty Group Investments		
Property address	Purchase price (dollars)	Monthly rental price (dollars)
Clearwater Lane	128,000	950
Driftwood Drive	176,000	1,310
Edgemont Street	70,000	515
Glenview Street	140,000	1,040
Hamilton Circle	450,000	3,365

The Townsend Realty Group invested in the five different properties listed in the table above. The table shows the amount, in dollars, the company paid for each property and the corresponding monthly rental price, in dollars, the company charges for the property at each of the five locations.

23

The relationship between the monthly rental price r, in dollars, and the property's purchase price p, in thousands of dollars, can be represented by a linear function. Which of the following functions represents the relationship?

A) $r(p) = 2.5p - 870$

B) $r(p) = 5p + 165$

C) $r(p) = 6.5p + 440$

D) $r(p) = 7.5p - 10$

24

Townsend Realty purchased the Glenview Street property and received a 40% discount off the original price along with an additional 20% off the discounted price for purchasing the property in cash. Which of the following best approximates the original price, in dollars, of the Glenview Street property?

A) \$350,000

B) \$291,700

C) \$233,300

D) \$175,000

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25

A psychologist set up an experiment to study the tendency of a person to select the first item when presented with a series of items. In the experiment, 300 people were presented with a set of five pictures arranged in random order. Each person was asked to choose the most appealing picture. Of the first 150 participants, 36 chose the first picture in the set. Among the remaining 150 participants, p people chose the first picture in the set. If more than 20% of all participants chose the first picture in the set, which of the following inequalities best describes the possible values of p ?

A) $p > 0.20(300 - 36)$, where $p \leq 150$

B) $p > 0.20(300 + 36)$, where $p \leq 150$

C) $p - 36 > 0.20(300)$, where $p \leq 150$

D) $p + 36 > 0.20(300)$, where $p \leq 150$

26

The surface area of a cube is $6\left(\frac{a}{4}\right)^2$, where a is a positive constant. Which of the following gives the perimeter of one face of the cube?

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

B) a

C) $4a$

D) $6a$

27

The mean score of 8 players in a basketball game was 14.5 points. If the highest individual score is removed, the mean score of the remaining 7 players becomes 12 points. What was the highest score?

A) 20

B) 24

C) 32

D) 36

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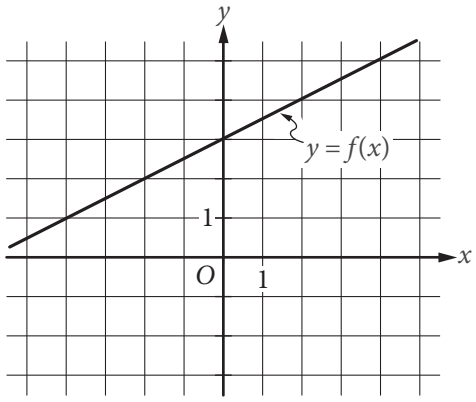
28



The graph of the linear function f is shown in the xy-plane above. The slope of the graph of the linear function g is 4 times the slope of the graph of f. If the graph of g passes through the point $(0, -4)$, what is the value of $g(9)$?

A) 5

B) 9

C) 14

D) 18

29

$$x^2 + 20x + y^2 + 16y = -20$$

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

A) $(-20, -16)$

B) $(-10, -8)$

C) $(10, 8)$

D) $(20, 16)$

30

$$y = x^2 - a$$

In the equation above, a is a positive constant and the graph of the equation in the xy-plane is a parabola. Which of the following is an equivalent form of the equation?

A) $y = (x + a)(x - a)$

B) $y = (x + \sqrt{a})(x - \sqrt{a})$

C) $y = \left(x + \frac{a}{2}\right)\left(x - \frac{a}{2}\right)$

D) $y = (x + a)^2$

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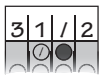
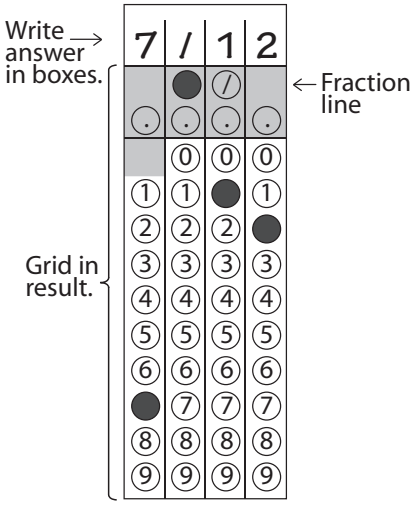
CONTINUE

DIRECTIONS

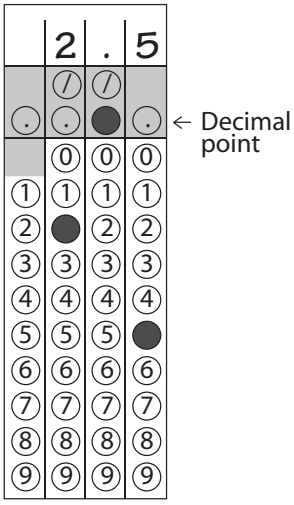
For questions 31-38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

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

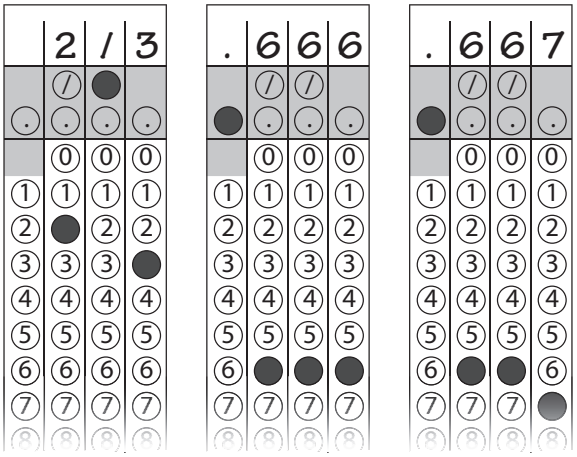
Answer: $\frac{7}{12}$



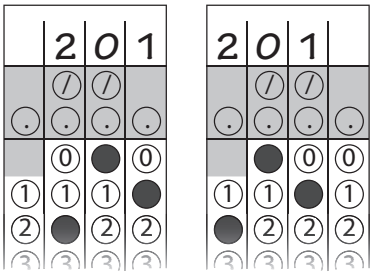
Answer: 2.5



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

Horsepower and watts are units of measure of power. They are directly proportional such that 5 horsepower is equal to 3730 watts. How much power, in watts, is equal to 2 horsepower?

32

The painting *The Starry Night* by Vincent van Gogh is rectangular in shape with height 29 inches and width 36.25 inches. If a reproduction was made where each dimension is $\frac{1}{3}$ the corresponding original dimension, what is the height of the reproduction, in inches?

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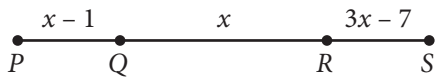
33



Note: Figure not drawn to scale.

On $\overline{PS}$ above, $PQ = RS$. What is the length of $\overline{PS}$?

34

In the xy-plane, the point $(2, 5)$ lies on the graph of the function f. If $f(x) = k - x^2$, where k is a constant, what is the value of k ?

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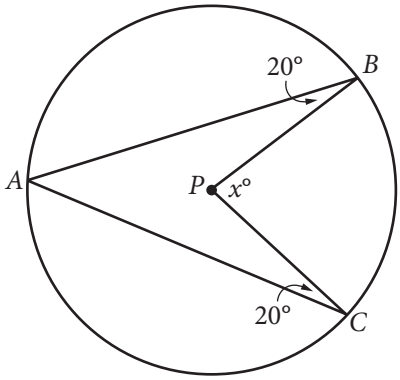
CONTINUE

35

A landscaper is designing a rectangular garden. The length of the garden is to be 5 feet longer than the width. If the area of the garden will be 104 square feet, what will be the length, in feet, of the garden?

36



Point P is the center of the circle in the figure above. What is the value of x ?

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CONTINUE

Questions 37 and 38 refer to the following information.

Ms. Simon's Workday Morning Drive

Segment of drive	Distance (miles)	Average driving speed with no traffic delay (mph)
From home to freeway entrance	0.6	25
From freeway entrance to freeway exit	15.4	50
From freeway exit to workplace	1.4	35

Ms. Simon drives her car from her home to her workplace every workday morning. The table above shows the distance, in miles, and her average driving speed, in miles per hour (mph), when there is no traffic delay, for each segment of her drive.

37

One morning, Ms. Simon drove directly from her home to her workplace in 24 minutes. What was her average speed, in miles per hour, during her drive that morning?

38

If Ms. Simon starts her drive at 6:30 a.m., she can drive at her average driving speed with no traffic delay for each segment of the drive. If she starts her drive at 7:00 a.m., the travel time from the freeway entrance to the freeway exit increases by 33% due to slower traffic, but the travel time for each of the other two segments of her drive does not change. Based on the table, how many more minutes does Ms. Simon take to arrive at her workplace if she starts her drive at 7:00 a.m. than if she starts her drive at 6:30 a.m.? (Round your answer to the nearest minute.)

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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