CollegeBoard

Answer Explanations

SAT® Practice Test #5

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Section 1: Reading Test

QUESTION 1

Choice D is the best answer. The passage begins with the main character, Lymie, sitting in a restaurant and reading a history book. The first paragraph describes the book in front of him ("Blank pages front and back were filled in with maps, drawings, dates, comic cartoons, and organs of the body," lines 11-13). The second paragraph reveals what Lymie is reading about (the Peace of Paris and the Congress of Vienna) and suggests his intense concentration on the book ("sometimes he swallowed whole the food that he had no idea he was eating," lines 23-24). In the third paragraph, the focus of the passage shifts to a description and discussion of others in the restaurant, namely "A party of four, two men and two women . . . " (lines 42-43).

Choice A is incorrect because the passage does not provide observations made by other characters, only offering Lymie's and the narrator's observations. Choice B is incorrect because the beginning of the passage focuses on Lymie as he reads by himself and the end of the passage focuses on the arrival of Lymie's father, with whom Lymie's relationship seems somewhat strained. Choice C is incorrect because the setting is described in the beginning of the first paragraph but is never the main focus of the passage.

QUESTION 2

Choice C is the best answer. The main purpose of the first paragraph is to establish the passage's setting by describing a place and an object. The place is the Alcazar Restaurant, which is described as being "long and narrow" and decorated with "*art moderne*," murals, and plants (lines 2-6), and the object is the history book Lymie is reading.

Choice A is incorrect because rather than establishing what Lymie does every night, the first paragraph describes what Lymie is doing on *one* night. Choice B is incorrect because nothing in the first paragraph indicates when the passage takes place, as the details provided (such as the restaurant and the book) are not specific to one era. Choice D is incorrect because nothing in the first paragraph clearly foreshadows a later event.

QUESTION 3

Choice C is the best answer. The passage states that "when Lymie put down his fork and began to count . . . the waitress, whose name was Irma, thought he was through eating and tried to take his plate away" (lines 34-38). It is reasonable to assume that Irma thinks Lymie is finished eating because he is no longer holding his fork.

Choice A is incorrect because Lymie has already been reading his book while eating for some time before Irma thinks he is finished eating. Choice B is incorrect because the passage doesn't state that Lymie's plate is empty, and the fact that Lymie stops Irma from taking his plate suggests that it is not empty. Choice D is incorrect because the passage gives no indication that Lymie asks Irma to clear the table.

QUESTION 4

Choice A is the best answer. The passage makes it clear that Lymie finds the party of four who enter the restaurant to be loud and bothersome, as their entrance means he is no longer able to concentrate on his book: "They laughed more than there seemed any occasion for . . . and their laughter was too loud. But it was the women's voices . . . which caused Lymie to skim over two whole pages without knowing what was on them" (lines 52-59).

Choices B, C, and D are incorrect because lines 55-59 make clear that Lymie is annoyed by the party of four, not that he finds their presence refreshing (choice B), thinks they resemble the people he is reading about (choice C), or thinks they represent glamour and youth (choice D).

QUESTION 5

Choice C is the best answer. The previous question asks about Lymie's impression of the party of four who enter the restaurant, with the correct answer being that he finds them noisy and distracting. This is supported in lines 55-59: "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."

Choices A, B, and D are incorrect because the lines cited do not support the answer to the previous question about Lymie's impression of the party of four who enter the restaurant. Rather than showing that Lymie finds the group of strangers noisy and distracting, the lines simply describe how two of the four people look (choices A and B) and indicate what Lymie does when his father joins him in the restaurant (choice D).

QUESTION 6

Choice A is the best answer. In the passage, Lymie closes his book only after "a coat that he recognized as his father's was hung on the hook next to his chair" (lines 67-68). It is Lymie's father's arrival that causes him to close the book.

Choices B, C, and D are incorrect because lines 67-70 of the passage clearly establish that Lymie closes his book because his father has arrived, not that he does so because the party of four is too loud (choice B), because he has finished reading a section of the book (choice C), or because he is getting ready to leave (choice D).

QUESTION 7

Choice D is the best answer. In lines 74-79, the narrator describes Mr. Peters as "gray" and balding, noting that he has "lost weight" and his color is "poor." This description suggests Mr. Peters is aging and losing strength and vigor.

Choices A, B, and C are incorrect because the description of Mr. Peters in lines 74-79 suggests he is a person who is wan and losing vitality, not someone who is healthy and in good shape (choice A), angry and intimidating (choice B), or emotionally anxious (choice C).

QUESTION 8

Choice B is the best answer. In the last paragraph of the passage, Mr. Peters is described as being unaware "that there had been any change" in his appearance since he was younger (lines 80-81). Later in the paragraph, the passage states that "the young man" Mr. Peters once was "had never for one second deserted" him (lines 90-91). The main idea of the last paragraph is that Mr. Peters still thinks of himself as young, or at least acts as if he is a younger version of himself.

Choice A is incorrect because Mr. Peters is spending time with Lymie, his son, and there is no indication that he generally does not spend time with his family. Choice C is incorrect because although there are brief mentions of a diamond ring and manicured fingers, the paragraph focuses on Mr. Peters's overall appearance, not on his awareness of status symbols. Choice D is incorrect because the last paragraph clearly states that Mr. Peters is "not aware that there had been any change" and thinks of himself as young.

QUESTION 9

Choice B is the best answer. In lines 81-85, Mr. Peters is described as having "straightened his tie self-consciously" and gestured with a menu "so that the two women at the next table would notice the diamond ring on the fourth finger of his right hand." Mr. Peters's actions are those of someone who wants to attract attention and be noticed.

Choices A, C, and D are incorrect because the lines cited do not support the idea Mr. Peters wants to attract attention to himself. Choices A and C address Mr. Peters's view of himself. Choice D indicates that Mr. Peters's view of himself affects his behavior but does not reveal that he acts in a way meant to draw attention.

QUESTION 10

Choice B is the best answer. The last sentence of the passage states that Mr. Peters's mischaracterization of himself makes him act in ways that are not "becoming" for a man of his age. In this context, "becoming" suggests behavior that is appropriate or fitting.

Choices A, C, and D are incorrect because in the context of describing one's behavior, "becoming" means appropriate or fitting, not becoming known (choice A), becoming more advanced (choice C), or simply occurring (choice D).

QUESTION 11

Choice B is the best answer. In Passage 1, Beecher makes the point that even if women in her society are perceived as being inferior to men, they are still able to effect considerable influence on that society: "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" (lines 6-10).

Choice A is incorrect because Beecher describes the dynamic between men and women in terms of the way they can change society, not in terms of security and physical safety. Choice C is incorrect because even though Beecher implies that women have fewer rights in society than men do, she doesn't say that women have fewer responsibilities. Choice D is incorrect because Beecher does not assert that women are superior to men.

QUESTION 12

Choice A is the best answer. The previous question asks what point Beecher makes regarding the relationship between men and women in her society, with the answer being that women are considered inferior but can still have influence. This is supported in lines 6-10: "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."

Choices B, C, and D are incorrect because the lines cited do not support the answer to the previous question about the point Beecher makes regarding the relationship between men and women in her society. Instead, they describe ways men can affect society (choices B and C) and explain how certain actions undertaken by a woman can be viewed negatively (choice D).

QUESTION 13

Choice B is the best answer. In the third paragraph (lines 22-37), Beecher suggests that women can be "so much respected, esteemed and loved" by those around them that men will accede to their wishes: "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 . . . ." These lines show that Beecher believes women can influence society by influencing the men around them; in other words, women have an indirect influence on public life.

Choices A, C, and D are incorrect because lines 34-37 make it clear that Beecher believes women do have an effect on society, even if it is an indirect effect. Beecher does not indicate that women's effect on public life is ignored because most men are not interested (choice A), unnecessary because men do not need help governing society (choice C), or merely symbolic because women tend to be idealistic (choice D).

QUESTION 14

Choice D is the best answer. Regarding the dynamic of men and women in society, Beecher says that one sex is given "the subordinate station" while the other is given the "superior" station (lines 1-2). In the context of how one gender exists in comparison to the other, the word "station" suggests a standing or rank.

Choices A, B, and C are incorrect because in the context of the relative standing of men and women in Beecher's society, the word "station" suggests a standing or rank, not a physical location or area (choices A, B, and C).

QUESTION 15

Choice C is the best answer. When describing how men and women can influence society, Beecher says the ways they can do so "should be altogether different and peculiar" (lines 11-12). In the context of the "altogether different" ways men and women can influence society, the word "peculiar" implies being unique or distinctive.

Choices A, B, and D are incorrect because in the context of the "altogether different" ways men and women can influence society, the word "peculiar" suggests something unique or distinctive, not something unusual and odd (choice A), unexpected (choice B), or rare (choice D).

QUESTION 16

Choice A is the best answer. In Passage 2, Grimké makes the main point that people have rights because they are human, not because of their gender or race. This is clear in lines 58-60, when Grimké states that "human beings have *rights*, because they are *moral* beings: the rights of *all* men grow out of their moral nature" and lines 65-68, when Grimké writes, "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."

Choices B, C, and D are incorrect because Grimké primarily emphasizes that all men and women inherently have the same rights ("rights are founded in the nature of our moral being," lines 65-66). Her central claim is not that men and women need to work together to change society (choice B), that moral rights are the distinguishing characteristic separating humans from animals (choice C), or that there should be equal opportunities for men and women to advance and succeed.

QUESTION 17

Choice B is the best answer. In Passage 2, Grimké makes the point that human rights are not fleeting or changeable but things that remain, regardless of the circumstances, because they are tied to humans' moral nature. She emphasizes that human rights exist even if societal laws attempt to contradict or override them, citing slavery as an example: "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: it is stamped on his moral being, and is, like it, imperishable" (lines 61-65).

Choices A and D are incorrect because in Passage 2, Grimké makes the point that human rights are inherent and unchanging, not that they are viewed differently in different societies (choice A) or that they have changed and developed over time (choice D). Choice C is incorrect because Grimké doesn't describe a clash between human rights and moral responsibilities; instead, she says that humans have rights "because they are *moral* beings" (lines 58-59).

QUESTION 18

Choice B is the best answer. The previous question asks what point Grimké makes about human rights in Passage 2, with the answer being that they exist and have moral authority whether or not they are established by societal law. This is supported in lines 61-65: "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: it is stamped on his moral being, and is, like it, imperishable."

Choices A, C, and D are incorrect because the lines cited do not support the answer to the previous question about the point Grimké makes about human rights in Passage 2. Instead, they explain the source of all people's human rights (choice A), indicate what would happen if rights were determined by gender (choice C), and discuss why gender is irrelevant to rights (choice D).

QUESTION 19

Choice B is the best answer. In Passage 1, Beecher asserts that men and women naturally have different positions in society: "Heaven has appointed to one sex the superior, and to the other the subordinate station" (lines 1-2). She goes on to argue that a woman should act within her subordinate role to influence men but should not "exert coercive influences" that would put her "out of her appropriate sphere" (lines 44-46). In Passage 2, Grimké takes issue with the idea that men and women have different rights and roles. She asserts that as moral beings all people have the same inherent rights and states that "the *mere circumstance of sex* does not give to man higher rights and responsibilities, than to woman" (lines 66-68).

Choice A is incorrect because Passage 2 does not discuss the practical difficulties of something that is proposed in Passage 1 but rather argues against the main point of Passage 1. Choice C is incorrect because Passage 2 does not provide historical context for the view expressed in Passage 1; the passages were published at around the same time and both discuss contemporary society. Choice D is incorrect because Passage 2 does not elaborate on implications found in Passage 1 as much as it disputes the ideas explicitly expressed in Passage 1.

QUESTION 20

Choice A is the best answer. While Beecher and Grimké clearly disagree regarding a woman's role in society, the passages suggest that both authors share the belief that women do have moral duties and responsibilities in society. In Passage 1, Beecher writes that "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" (lines 6-10). She suggests that women do have an obligation to use their influence to bring about beneficial changes in society. In Passage 2, Grimké asserts that all people "are *moral* beings" (lines 58-59) and that both men and women have "rights and responsibilities" (line 68). She concludes that "whatever it is morally right for man to do, it is morally right for woman to do" (lines 81-83).

Choice B is incorrect because neither author suggests that when men work to bring about political changes, they often do so out of consideration for others rather than considerations for themselves. Choice C is incorrect because neither passage discusses the value given to women's ethical obligations, although both authors suggest that women do have ethical and moral obligations. Choice D is incorrect because in Passage 1 Beecher argues that women should avoid direct political activism, cautioning against actions that would put them outside their "appropriate sphere" (line 46).

QUESTION 21

Choice D is the best answer. In lines 65-68 of Passage 2, Grimké writes, "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." In other words, gender does not make men's rights and duties superior to women's. Beecher, on the other hand, begins Passage 1 by stating that "heaven has appointed to one sex the superior, and to the other the subordinate station," suggesting that men and women have fundamentally different natures. Therefore, Beecher most likely would have disagreed with Grimké's assertion.

Choices A and B are incorrect because Beecher fundamentally disagrees with Grimké regarding the basic nature and societal roles of men and women, making it very unlikely that she would have viewed Grimké's statement in lines 65-68 with either sympathy or agreement. Choice C is incorrect because Beecher wouldn't necessarily have been dismayed by Grimké's belief as much as she would have simply disagreed with it, and she does not indicate that the role of women in society is more difficult to play than is that of men.

QUESTION 22

Choice A is the best answer. In line 14, the passage states that industrial agriculture has become "incredibly efficient on a simple land to food basis." In this context, "simple" suggests something basic or straightforward.

Choices B, C, and D are incorrect because in the context of a land to food dynamic, the word "simple" suggests something basic or straightforward, not something humble (choice B), something without any decoration or ornamentation (choice C), or something that requires little effort (choice D).

QUESTION 23

Choice B is the best answer. The passage clearly states that conventional agriculture is very efficient, especially when compared to organic farming: "organic farming yields 25% fewer crops on average than conventional agriculture" (lines 40-42) and in a study "organic farming delivered a lower yield for every crop type" (lines 51-52). It can therefore be understood from the passage that conventional agriculture does a good job maximizing the output of the land that is farmed.

Choice A is incorrect because the passage states how efficient conventional agriculture is in regard to the amount of food it can produce but does not indicate that it produces a significantly wide variety of fruits and vegetables. Choice C is incorrect because even if the passage does say that each American farmer can produce crops to feed "over 155 people worldwide" (lines 16-17), it never claims that conventional agriculture can satisfactorily feed everyone in the world. Choice D is incorrect because the passage states that conventional agriculture uses a great deal of nitrogen, not that it changes the need for nitrogen in plant growth one way or the other.

QUESTION 24

Choice A is the best answer. The passage makes it clear that "most environmentalists" (line 27) believe conventional agriculture produces food that is not as healthy as food produced through organic farming and that it is more harmful to the environment than organic farming is: many environmentalists "have embraced organic food as better for the planet—and healthier and tastier, too—than the stuff produced by agricultural corporations" (lines 28-31).

Choices B, C, and D are incorrect because they are not supported by the passage. The passage never states that many environmentalists believe that conventional farming reduces the need to convert wilderness to farmland (choice B), is in any way good for the environment (choice C), or protects wildlife habitats (choice D).

QUESTION 25

Choice B is the best answer. The previous question asks how environmentalists perceive conventional agriculture, with the answer being that they believe it produces a product that is less healthy and more environmentally destructive than that produced by organic farming. This is supported in lines 28-31: "They have embraced organic food as better for the planet—and healthier and tastier, too—than the stuff produced by agricultural corporations."

Choices A, C, and D are incorrect because the lines cited do not support the answer to the previous question about how environmentalists perceive the efforts of conventional agriculture. Although the lines in choice A do touch on environmentalists' views, they indicate only that most environmentalists

don't view conventional agriculture's ability to "produce more food on less land" (line 25) as beneficial to the environment. Choice C is incorrect because these lines address environmentalists' view of the environmental effects of conventional and organic farming but not the taste or nutritional value of the food produced. Choice D is incorrect because these lines focus on a drawback to organic farming.

QUESTION 26

Choice C is the best answer. The passage makes it clear that while both conventional and organic farming need nitrogen for plant growth, conventional farming uses synthetic fertilizers and organic does not: "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" (lines 61-65).

Choice A is incorrect because the passage does not state that conventional and organic farming are equally sustainable and does state that organic farming needs "more land" to produce "fewer crops" (lines 42-43) but does not indicate that it always requires dramatically more land. Choice B is incorrect because the passage does not state that organic farming uses artificial chemicals. Choice D is incorrect because the passage mentions nitrogen runoff only as a product of conventional farming, not organic farming, and does not indicate that only the nitrogen in conventional fertilizers is dangerous.

QUESTION 27

Choice D is the best answer. The previous question asks about the relationship between conventional agriculture and organic farming, with the answer being that unlike organic farms, conventional farms use synthetic fertilizers. This is supported in lines 61-65: "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."

Choices A, B, and C are incorrect because the lines cited do not support the answer to the previous question about the relationship between conventional and organic farming, instead describing the efficiency only of conventional agriculture (choice A), discussing one perceived positive aspect of conventional agriculture (choice B), and highlighting a drawback of organic farming (choice C).

QUESTION 28

Choice B is the best answer. The passage states that the authors of the study comparing conventional and organic farming have come to the conclusion that an "ideal global agriculture system" would "borrow the best from both systems" (lines 80-82). The quote from Jonathan Foley in lines 84-97 indicates that this ideal system would take into consideration many different factors, including the nutrition and calories offered by specific types of foods as well as different geographic, economic, and social needs.

Choices A and D are incorrect because the passage makes it clear that the "ideal global agriculture system" would give consideration to multiple factors, not that it would focus mainly on productivity

(choice A) or nutritional value (choice D). Choice C is incorrect because Foley states that the ideal system would take economics into consideration but does not indicate that farmers' economic interests would be weighed against consumers' needs.

QUESTION 29

Choice D is the best answer. The passage states that conventional agriculture can be superior to organic farming in terms of producing "sheer calories" (line 88). In this context, "sheer" most nearly means pure; the passage is referring to the pure number of calories delivered by foods.

Choices A, B, and C are incorrect because in the context of discussing the calories foods can provide, "sheer" suggests the pure number of calories. Also, it does not make sense to say that calories can be seen through (choice A), are somehow sudden or happen unexpectedly (choice B), or are at a very sharp angle (choice C).

QUESTION 30

Choice B is the best answer. Figure 1 shows that the organic yield as a percentage of conventional yield is similar for cereals and all crops, with both yielding roughly 75%.

Choice A is incorrect because figure 1 shows that the organic yield as a percentage of conventional yield is higher for fruits (just under 100%) than for vegetables (just under 70%). Choice C is incorrect because figure 1 shows there were only 28 observations for oilseed crops. Choice D is incorrect because figure 1 shows that the organic yield as a percentage of conventional yield is higher for oilseed crops (approximately 90%) than for vegetables (just under 70%).

QUESTION 31

Choice D is the best answer. Every organically grown species represented in figure 2 produces a smaller yield than do their conventional counterparts. All of the organically grown species are within a range of approximately 60–90% of the conventional yield.

Choice A is incorrect because figure 2 shows that soybeans have the highest yield (approximately 90%), not the lowest. Choice B is incorrect because figure 2 shows that organically grown barley and maize are produced at a lower yield than the conventionally grown species (just below 70% and just below 90%, respectively), not a comparable one. Choice C is incorrect because figure 2 shows that soybeans, not tomatoes, have the highest yield of the organically grown species.

QUESTION 32

Choice B is the best answer. The majority of the passage focuses on the experiment concerning "how much the crowd influences the individual, and whether it can be controlled from outside" (lines 42-44). After explaining the experiment and the results it produced, the passage moves on to consider questions raised by the results, such as whether the findings are site specific or "true in general" (lines

75-76), why different findings are observed, and whether companies can "boost their products by manipulating online ratings on a massive scale" (lines 85-86).

Choice A is incorrect because the passage does not conclude by explaining the practical ways the experiment's findings have been applied but rather by considering questions the findings raise. Choices C and D are incorrect because the passage does not indicate that there were any flaws in the experiment's findings and does not include statements from anyone who disputes the findings.

QUESTION 33

Choice C is the best answer. The author of the passage suggests that a group of people can be "wiser" and more effective than a single person at assessing a quantitative answer, or a measurement, versus producing a valid qualitative judgment, or a judgment of the quality of something. This is most clear in lines 11-14, which state that when guessing a bull's weight or how many gumballs are 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."

Choices A, B, and D are incorrect because lines 11-14 indicate that the author believes that crowds may be more effective than individuals when arriving at quantitative answers rather than qualitative results. Nothing in the passage suggests that the author believes that crowds are better at starting disagreements than studying an issue in depth (choice A), supporting ideas rather than challenging them (choice B), or ranking opinions rather than coming up with new ideas (choice D).

QUESTION 34

Choice B is the best answer. The previous question asks what the author of the passage suggests about the wisdom of crowds, with the answer being that crowds can be more effective at producing quantitative answers than qualitative results. This is supported in lines 11-14: when it comes to guessing a bull's weight or how many gumballs are 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."

Choices A, C, and D are incorrect because the lines cited do not support the answer to the previous question about the author's belief about when the wisdom of a crowd is effective. Instead, they simply state that crowds are sometimes wiser than individuals, without explaining when (choice A), put forth a theory held by someone other than the author (choice C), and explain how hypotheses about the wisdom of crowds could be tested (choice D).

QUESTION 35

Choice A is the best answer. In the passage, the author explains that those who are skeptical of the theory that "measuring the aggregate of people's opinions produces a stable, reliable value" (lines 18-20) believe that "people's opinions are easily swayed by those of others" (lines 20-21). This idea is best supported in lines 55-58, which describe a finding from a study of opinions in crowds: "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." In other words, people were more likely to give a positive vote when they thought other people had given positive votes.

Choices B, C, and D are incorrect because the lines cited do not provide support for the skeptics' idea that people's opinions are easily influenced by the thoughts of others. Instead, they cite findings concerning people giving ratings *different* from those already given (choices B and C) and share an observation that the degree to which others can be influenced depends in part on the context of the situation (choice D).

QUESTION 36

Choice B is the best answer. One question Watts asks in regard to the experiment is whether the results would hold true on a larger scale. The passage quotes him in lines 74-76: "'[But] one question is whether the positive [herding] bias is specific to this site' or true in general." Doing the experiment again but collecting ratings on multiple websites would address Watts's question, as it would show whether or not the same results occur on other sites.

Choices A, C, and D are incorrect. Providing fewer fake positive comments during the experiment (choice A), requiring users to be registered on the website (choice C), or telling users that their answers will be studied (choice D) are actions that likely would affect the results of the experiment involving users voting on comments about stories on one news website, but they would not address Watts's questions about whether the study would produce the same results on *other* websites or why different categories of news items had different effects on the news website.

QUESTION 37

Choice C is the best answer. In lines 85-86 the author asks, "Will companies be able to boost their products by manipulating online ratings on a massive scale?" In the context of selling products by manipulating user reviews, "boost" most nearly means promote.

Choices A, B, and D are incorrect because in the context of selling products by manipulating user reviews, the word "boost" refers to promoting the products, not making them larger or bigger (choice A), faster (choice B), or safe (choice D).

QUESTION 38

Choice A is the best answer. In lines 85-86 the author asks, "Will companies be able to boost their products by manipulating online ratings on a massive scale?" In the context of selling products by manipulating user reviews on a massive scale, the word "scale" most nearly means level or size.

Choices B, C, and D are incorrect because in the context of selling products by manipulating user reviews, a massive "scale" refers to a great level or size, not to a payment (choice B), an interval or space between things (choice C), or a plan (choice D).

QUESTION 39

Choice B is the best answer. The figure shows that while the mean score of the control comments in the politics category is below 2.0, the artificially up-voted mean score for that category is exactly 2.5.

Choice A is incorrect because the artificially up-voted mean score of comments in the business category is higher than 3.0. Choice C is incorrect because the artificially up-voted mean score of comments in the fun category is less than 2.5. Choice D is incorrect because the artificially up-voted mean score of the comments in the general news category is just over 2.0.

QUESTION 40

Choice D is the best answer. The figure shows that the mean score for both control comments and artificially up-voted comments in the general news category is just above 2.0.

Choice A is incorrect because the mean score for the control comments in the culture and society category is a little below 2.5 while the mean score for the artificially up-voted comments is over 3.0. Choice B is incorrect because the mean score for the control comments in the information technology category is a little above 1.5 while the mean score for the artificially up-voted comments is above 2.0. Choice C is incorrect because the mean score for the control comments in the fun category is exactly 2.0 while the mean score for the artificially up-voted comments is nearly 2.5.

QUESTION 41

Choice D is the best answer. In the passage Watts notes that "the category of the news items . . . had a strong effect on how much people could be manipulated" (lines 76-79). That idea is directly supported by the data in the figure, which show that the difference in mean score between the control comments and the artificially up-voted comments varies by subject (for example, in the general news category there is virtually no difference between the mean scores of the two types of comments, while for the business category there is almost a 1.0-point difference between the mean scores).

Choices A and B are incorrect because the passage provides no data for artificially down-voted comments or negative social influence. Choice C is incorrect because the figure applies only to one context (mean score of control comments versus mean score of artificially up-voted comments on the news site); there is no way to tell what patterns would be observed in other contexts.

QUESTION 42

Choice C is the best answer. According to the passage, Maguire found that taxi drivers' hippocampi are "7 percent larger than normal," which is evidence that "way-finding around London had physically altered the gross structure of their brains" (lines 10-14). In lines 20-26, the passage indicates that this finding challenges an earlier consensus: "It had long been thought that the adult brain was incapable of spawning new neurons—that . . . the brain's basic anatomical structure was more or less static. Maguire's study suggested the old inherited wisdom was simply not true."

Choice A is incorrect because the passage does not indicate that Maguire used a new method in her study or that her findings demonstrate the validity of a method. Choice B is incorrect because lines 20-26 show that Maguire's findings disprove a popular viewpoint, not that they support one. Choice D is incorrect because although Maguire's findings call into question a previous idea, there is no indication that they challenge the authenticity of any previous data.

QUESTION 43

Choice D is the best answer. The previous question asks about the significance of Maguire's findings, with the answer being that her findings call into question a previous belief. This is supported in lines 20-26: "It had long been thought that the adult brain was incapable of spawning new neurons—that . . . the brain's basic anatomical structure was more or less static. Maguire's study suggested the old inherited wisdom was simply not true."

Choices A, B, and C are incorrect because the lines cited do not support the answer to the previous question about the significance of Maguire's findings. Choices A and B are incorrect because these lines present Maguire's observation and her conclusion but do not indicate that her findings call into question a previous belief. Choice C is incorrect because these lines simply explain one capability of the human brain.

QUESTION 44

Choice D is the best answer. In line 24, the passage discusses the "brain's basic anatomical structure." In this context, the word "basic" most nearly means fundamental.

Choices A, B, and C are incorrect because in the context of discussing the brain's structure, the word "basic" most nearly means fundamental, not first (choice A), uncomplicated (choice B), or required (choice C).

QUESTION 45

Choice C is the best answer. The purpose of Maguire's study of the mental athletes was to try to determine what it is that makes them so good at memorization, and in particular if they have structurally different brains than people without such extraordinary memorization skills or if they have normal brain structures but use them in unusual ways. This is supported in lines 33-37, which state that Maguire and her team "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."

Choice A is incorrect because the study was an attempt to compare the brains of mental athletes to the brains of the general population, not to compare the use of different brain structures in memorization and navigation. Choices B and D are incorrect because the passage makes it clear that it was not known

if mental athletes have unusual brain structures; finding out if they do was actually one of the goals of the study.

QUESTION 46

Choice B is the best answer. The previous question asks what Maguire's study of mental athletes attempted to answer, with the answer being the question of whether it is brain structure or an unusual use of the brain that gives certain people extraordinary memorization skills. This is supported in lines 33-37: "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."

Choices A, C, and D are incorrect because the lines cited do not support the answer to the previous question about what Maguire's study of mental athletes was investigating. Instead they simply identify the subject of the study (choice A), explain what the study involved (choice C), and state a finding concerning the cognitive ability of the mental athletes (choice D).

QUESTION 47

Choice A is the best answer. In lines 38-39, the passage describes part of Maguire's study by stating that "the researchers put both the mental athletes and a group of matched control subjects into MRI scanners." In the context of a study that has two groups of subjects, the word "matched" suggests subjects that are similar or comparable.

Choices B, C, and D are incorrect because in the context of a study with two groups of subjects, the word "matched" suggests subjects that are similar or comparable, not ones that are exactly the same (choice B), ones that are recognizably different (choice C), or ones that are rivals (choice D).

QUESTION 48

Choice C is the best answer. The main purpose of the fifth paragraph (lines 57-65) is to relate what Maguire discovered about the mental athletes, namely that their brain structures are not different from those of the control group but that the mental athletes use their brains differently: "there was one telling difference . . . regions of the brain that were less active in the control subjects seemed to be working in overdrive for the mental athletes."

Choice A is incorrect because the fifth paragraph does not mention the taxi drivers or the study involving them. Choice B is incorrect because the fifth paragraph describes some of the unexpected results of Maguire's study but does not address the possible reasons for those results. Choice D is incorrect because the fifth paragraph describes only Maguire's findings, not her methods.

QUESTION 49

Choice C is the best answer. The passage indicates that Maguire's second study revealed that people in the control group don't have different brain structures than the mental athletes but that they use their brains differently. In particular, the two groups use different pathways in the brain: "regions of the brain that were less active in the control subjects seemed to be working in overdrive for the mental athletes" (lines 63-65).

Choices A and D are incorrect because the passage states that there was only "one telling difference between the brains of the mental athletes and the control subjects" (lines 57-58); there is no indication that the control group showed less total brain activity or had smaller hippocampal regions. Choice B is incorrect because the passage mentions only the general cognitive ability of the mental athletes, noting that their scores were "within the normal range" (line 54).

QUESTION 50

Choice A is the best answer. After establishing in lines 50-51 that the brains of the control group and the mental athletes seemed to be "indistinguishable," the passage suggests that the reason mental athletes are so good at memorization is that they use parts of their brains that most other people don't use when memorizing: "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" (lines 66-72).

Choices B and C are incorrect because the passage explains that the mental athletes were converting information into images, not abstract symbols or numerical lists. Choice D is incorrect because it is not supported by the passage, as the author discusses the mental athletes' actions while memorizing but not any brain exercises the mental athletes regularly do.

QUESTION 51

Choice A is the best answer. The previous question asks what the passage suggests about the mental athletes' success with memorization, with the answer being that they use parts of the brain that most other people don't use when memorizing. This is supported in lines 66-72: "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."

Choices B, C, and D are incorrect because the lines cited do not support the answer to the previous question about what the passage suggests about the mental athletes' success with memorization. Instead, they acknowledge that Maguire's findings seem odd (choice B), describe how Maguire first responded to the results (choice C), and explain things that *don't* account for the mental athletes' ability (choice D).

QUESTION 52

Choice B is the best answer. According to the passage, Maguire's study revealed that the mental athletes were using the same parts of the brain for memorization as were the London cabbies from the first study, a result that was initially puzzling. The questions in lines 74-78 highlight and expand on that result, making it clear that it is surprising to find that the mental athletes use images to remember numbers or use a part of the brain associated with navigation when trying to remember shapes. Although it became clear *how* the mental athletes were memorizing things, it was not clear why they were doing it that way.

Choice A is incorrect because the questions in lines 74-78 seem to reflect additional questions Maguire and others had based on their result and do not suggest that Maguire's conclusions may not be reliable. Choice C is incorrect because the passage makes no mention of any earlier studies of the phenomenon of using images to remember numbers or to use a part of the brain associated with navigation when trying to remember shapes. Choice D is incorrect because the questions in lines 74-78 specifically address Maguire's two studies but not her earlier work.

Section 2: Writing Test

QUESTION 1

Choice C is the best answer because the sentence is not directly related to the main point of the paragraph and should not be added. The main idea of the paragraph is that new high-tech fossil models help expand scientists' knowledge of ancient species. There is no indication in the paragraph that these scientists are concerned about the age of the rocks in which fossils are found.

Choices A and B are incorrect because the sentence should not be added. It neither adds support to an argument nor provides a transition from one sentence to another. Choice D is incorrect because the sentence does not undermine any claim made in the paragraph.

QUESTION 2

Choice D is the best answer because "promise" suggests the hope of good things to come. The models offer the possibility of advancing the field of paleontology in the future.

Choices A, B, and C are incorrect because they do not make sense in the context of the passage.

QUESTION 3

Choice B is the best answer because the sentence should be kept: it provides a brief but useful explanation of how a 3-D printer works.

Choice A is incorrect. The sentence should be kept because it provides important information about 3-D printers, not because it explains why X-rays are used in CT scanners. Choices C and D are incorrect because the sentence is neither contradictory nor confusing and should not be deleted.

QUESTION 4

Choice C is the best answer because the relative pronoun "which" appropriately follows the independent clause "The plastic hardens quickly." It introduces the relative clause explaining what the fact that the plastic hardens quickly allows the printer to do.

Choices A, B, and D are incorrect because each results in a comma splice (the joining of two independent clauses with only a comma).

QUESTION 5

Choice A is the best answer because no change is needed. The prepositional phrase "in order" and the infinitive "to learn" are appropriately used in conjunction to create an idiomatic phrase.

Choices B and D are incorrect because the phrases "in order for learning" and "so to learn" are not idiomatic. Choice C is incorrect because the pronoun "one" is inconsistent with the noun "team," which identifies a specific team.

QUESTION 6

Choice C is the best answer because the personal plural pronoun "their" agrees in number with its antecedent, the plural noun "fossils."

Choice A is incorrect because the pronoun "its" is singular and doesn't agree with the plural antecedent "fossils." Choices B and D are incorrect because a personal pronoun is needed in the sentence. Neither "it's" (the contraction of "it is") nor "there" is a personal pronoun.

QUESTION 7

Choice D is the best answer because sentence 2 should be placed after sentence 5 to make the paragraph most logical. Sentence 2 begins "But now," signaling a contrast with the past. Sentences 4 and 5 tell what scientists did in the past, so it makes sense for sentence 2 to follow sentence 5.

Choices A, B, and C are incorrect because they result in a paragraph that does not proceed logically. Keeping sentence 2, which begins “But now,” where it is now (choice A) or placing it at the beginning of the paragraph (choice B) signals a contrast with the past that doesn’t make sense in context. Placing sentence 2 after sentence 4 (choice C) appropriately signals a contrast with the past but creates problems for sentence 5, which needs to be placed directly after sentence 4 to continue the discussion of past research limitations.

QUESTION 8

Choice D is the best answer because the phrase “for example” indicates that an example will follow. In this paragraph, the sentence that follows the phrase provides a relevant example of the use of technology to “reproduce fossils that scientists cannot observe firsthand.”

Choices A, B, and C are incorrect because they set up expectations that are not carried out in the paragraph. “By contrast” in choice A and “nonetheless” in choice B suggest that contrary information will follow. “Besides” in choice C suggests that additional information will follow. None of these choices indicates what should be indicated: that an example will follow.

QUESTION 9

Choice B is the best answer because the simple past tense verb “relied” is consistent with the other past tense verbs in the National Museum of Brazil example, such as “dug” and “determined.”

Choices A and D are incorrect because they provide singular verbs that don’t agree in number with the plural subject “researchers.” Choice C is incorrect because the future tense helping verb “will” is inconsistent with the other past tense verbs in the National Museum of Brazil example.

QUESTION 10

Choice C is the best answer because it clearly and concisely combines the sentences in a way that shows the cause-effect relationship between the condition of the fossil and the decision by the research team.

Choices A, B, and D are incorrect because they do not effectively combine the sentences. In each of these choices, the sentence mischaracterizes the relationship between the condition of the fossil and the decision by the research team.

QUESTION 11

Choice C is the best answer because the plural pronoun “they” correctly refers to its plural antecedent “researchers.”

Choices A, B, and D are incorrect because “one,” “he or she,” and “it” are singular pronouns. A plural pronoun is needed to agree in number with the plural antecedent “researchers.”

QUESTION 12

Choice D is the best answer because no transitional phrase is needed between the two sentences. The first sentence indicates that Tweed wanted to silence Nast, and the second sentence simply states what happened next: that his attempt to do so failed.

Choices A, B, and C are incorrect because no transitional phrase or conjunctive adverb such as “therefore” or “furthermore” is needed between the sentences. The information in the second sentence neither results from information in the first nor is in addition to it. Rather, it tells what happened next: the first sentence indicates that Tweed wanted to silence Nast, and the second states that his attempt to do so failed.

QUESTION 13

Choice D is the best answer because it is the only choice that clearly and concisely conveys the key information that “in the 1860s and the 1870s, . . . organizations known as ‘political machines’ started taking control of city governments.”

Choices A, B, and C are incorrect because they all contain unnecessary words or invert the logical order of words in ways that lead to vagueness and redundancy. In choice A, it is unclear if the pronoun “they” refers to “organizations” or “governments.” In choices B and C, word order is inverted, creating a lack of concision (“political organizations that were powerful” is used instead of “powerful political organizations”; “governments were taken control of” and “organizations . . . did so” are used instead of “organizations . . . started taking control of governments”).

QUESTION 14

Choice A is the best answer because no words are needed between the noun phrase “purchasing votes” and the explanatory appositive phrase that follows it (“a form of . . .”).

Choices B, C, and D are incorrect because the participle “being” and the pronouns “that” and “which” are not needed to introduce the appositive phrase “a form of . . .,” which explains the concept of “purchasing votes.”

QUESTION 15

Choice B is the best answer because the comma after “1860s” is used correctly with the comma after “group” to set off the inessential (nonrestrictive) clause “which controlled New York City in the 1860s.”

Choice A is incorrect because a dash cannot be used in conjunction with a comma to set off a nonessential clause. Either two commas or two dashes may be used, but not one of each. Choice C is incorrect because a comma is not needed after “City.” Choice D is incorrect because a comma is necessary to separate the nonessential clause from the rest of the sentence.

QUESTION 16

Choice C is the best answer because the sentence should be deleted. Although the information is true, it is not essential to the paragraph, which is focused on political machines in general and the Tammany Hall group in particular, not on Tweed himself.

Choices A and B are incorrect because the sentence should not be kept. Choice D is incorrect because, while the sentence should be deleted, it does not undermine or challenge the main claim of the passage.

QUESTION 17

Choice C is the best answer because no comma is needed before “commented,” and the comma after “commented” correctly separates the first part of the sentence from the quotation it introduces.

Choices A, B, and D are incorrect because each includes one or more unnecessary commas.

QUESTION 18

Choice A is the best answer because the adjective “famous,” which means widely known, clearly and concisely describes “images.”

Choices B, C, and D are incorrect because “well-known” and “commonly known” are repetitive when used with the adjective “famous,” which means widely known.

QUESTION 19

Choice D is the best answer because it adds the most relevant supporting information. The paragraph is focused on the cartoons’ depictions of Tweed as a thief, so making an explicit connection between one cartoon and “Tweed’s greedy nature” is extremely relevant to the paragraph.

Choices A, B, and C are incorrect because they all contain irrelevant information. Information about Nast's other cartoons, Tweed's prison escape, and Tweed's hat is not important to add to the paragraph, which is focused on the cartoons' depictions of Tweed as a thief.

QUESTION 20

Choice D is the best answer because the word "prosecuted" correctly indicates that Tweed was charged and tried for his crimes. The preposition "on" is idiomatic when used with the verb "prosecuted."

Choices A, B, and C are incorrect because the word "persecuted" means that someone is harassed or oppressed, not that he or she is charged with a crime. "Persecuted" doesn't fit into the context of this sentence, which is about the legal troubles of Tweed and his gang.

QUESTION 21

Choice A is the best answer because the past tense verb "brought" is consistent with the other past tense verbs in the sentence, such as "escaped" and "fled."

Choices B, C, and D are incorrect because the participle "bringing," the present tense verb "brings," and the present perfect tense verb "has brought" are not consistent with the other verbs in the sentence.

QUESTION 22

Choice B is the best answer because "triumph" indicates victory. It could be considered a victory for political cartoons that Tweed was recaptured because he was recognized from a Nast cartoon.

Choices A, C, and D are incorrect because "pinnacle," "culmination," and "apex" all suggest the highest point or end of something. None of these words indicates the appropriate relationship between the recapture of Tweed and the impact of Nast's cartoons.

QUESTION 23

Choice B is the best answer because the singular possessive pronoun "its" is used correctly to refer to the singular noun "system."

Choice A is incorrect because the contraction "it's" cannot be used to show possession. Choice C is incorrect because "its" is already possessive; an apostrophe is unnecessary. Choice D is incorrect because "their" is a plural possessive pronoun that does not agree in number with the singular noun "system."

QUESTION 24

Choice B is the best answer because it clearly and concisely combines the sentences to show the relationship between the claim ("the idea is obviously very attractive") and the supporting information about the cameras' cost.

Choices A, C, and D are incorrect because they mischaracterize the relationship between the claim ("the idea is obviously very attractive") and the supporting information about the cameras' cost. The claim about the idea's attractiveness is not *in addition to* the information about the cost; rather, the information about the cameras' cost supports the claim that the idea is very attractive.

QUESTION 25

Choice A is the best answer because "however" is used correctly to indicate contrast. Some people consider the art space vital, but that group of people may be too small to generate necessary funding for the project.

Choices B, C, and D are incorrect because neither "therefore," "in effect," nor "as a rule" indicates the appropriate relationship between the two sentences being connected. The two sentences form a contrast: some people consider the art space vital, but that group of people may be too small to generate necessary funding for the project.

QUESTION 26

Choice B is the best answer because no commas are needed to set off the restrictive clause ("that is easily understood and appreciated") that follows the subject.

Choices A and D are incorrect because the clause that describes "work" is essential and should not be set off with punctuation. Setting off a clause with two commas or dashes indicates that it is nonessential to the sentence (nonrestrictive). Choice C is incorrect because no comma is needed between the two verbs.

QUESTION 27

Choice D is the best answer because the sentence should not be added. The general information it contains is not relevant to this paragraph's discussion of crowdfunding for the arts.

Choices A and B are incorrect because the sentence should not be added. Information about crowdfunding in general is not relevant to the discussion of the arts in this paragraph. Additionally, the sentence doesn't support the writer's point about funding of artistic projects.

Choice C is incorrect because, while the sentence should not be added, “funding received from public institutions” is not an idea that is developed in the passage.

QUESTION 28

Choice A is the best answer because “in addition” appropriately introduces an additional problem with crowdfunding in the arts.

Choices B, C, and D are incorrect because “conversely,” “however,” and “thus” do not indicate the appropriate relationship between what is said earlier in the paragraph about problems with crowdfunding in the arts and the additional problem that follows.

QUESTION 29

Choice C is the best answer because the pronoun “who” appropriately introduces a dependent clause defining “free riders.”

Choice A is incorrect because it results in a comma splice (two independent clauses cannot be joined by only a comma). Choice B is incorrect because it is not clear which people don’t contribute: “audiences” or “free riders.” Choice D is incorrect because the infinitive phrase “to not make” doesn’t make sense in the sentence.

QUESTION 30

Choice B is the best answer because the plural pronoun “they” agrees in number with the plural noun “people” and results in a clear, straightforward clause: “if people begin to feel that paying for the art they love is someone else’s responsibility.”

Choice A is incorrect because the passive voice is unnecessary and adds some confusion about which antecedent the pronoun “them” is referring to: “arts” or “people.” Choices C and D are incorrect because the pronouns “him” and “her” and “he” and “she” are singular and do not agree in number with the plural antecedent “people.”

QUESTION 31

Choice C is the best answer because the singular pronoun “her” is consistent with the pronoun “her” that is used earlier in the sentence to refer to the playwright.

Choices A and B are incorrect because they are plural pronouns that are not consistent with the singular pronoun “her” used earlier in the sentence to refer to the singular noun “playwright.” Choice D is incorrect because the singular pronoun “its” is not consistent with “her” and is not used to refer to a person.

QUESTION 32

Choice D is the best answer because sentence 2, which mentions the high price of the playwright's tickets, logically follows sentence 5, which addresses how the price of tickets was determined.

Choices A, B, and C are incorrect because sentence 2 does not logically follow sentences 1, 3, or 4. Sentences 3, 4, and 5 present a logical sequence of activities that establish the ticket price: first the playwright presents the total cost of her production, then she projects the attendance, and then she sets a per-person cost and prices tickets accordingly. Sentence 2, which addresses the ticket price, must come after the completion of this sequence; it can't come before the sequence (choice A) or interrupt the sequence (choices B and C).

QUESTION 33

Choice A is the best answer because it accurately interprets data in the graph. The category "dance" had the lowest amount of money raised but also had the highest percentage of projects fully funded.

Choices B, C, and D are incorrect because they do not accurately interpret the information provided in the graph.

QUESTION 34

Choice C is the best answer because sentence 3 needs to be placed before sentence 2 for the paragraph to be cohesive. Sentence 3 presents a cause ("newspapers . . . have been hit especially hard by the widespread availability of free news online") and sentence 2 presents an effect of that cause ("newspapers have reduced or eliminated investigative resources").

Choice A is incorrect because sentence 3 needs to precede sentence 2, not follow it: sentence 3 presents a cause ("newspapers . . . have been hit especially hard"), and sentence 2 presents an effect ("newspapers have reduced or eliminated investigative resources"). Choice B is incorrect because sentence 1 needs to precede sentence 3, not follow it: sentence 1 offers a general assessment of "print journalism as a viable profession," and sentence 3 offers information about one form of print journalism (newspapers). Choice D is incorrect because sentence 3 is needed to provide an explanation for the "lower print circulation and diminished advertising revenue" noted in sentence 2.

QUESTION 35

Choice B is the best answer because the plural noun “reporters” is used correctly as the object of the preposition “of” and because the colon appropriately joins two independent clauses, indicating that the second clause (“their work is expensive and time-consuming”) follows logically from the first (“It is not difficult . . . reporters”).

Choices A and D are incorrect because the singular possessive “reporter’s” does not provide an object for the preposition “of.” Choice C is incorrect because the comma after “reporters” creates a comma splice (the comma is used without a conjunction to join two independent clauses).

QUESTION 36

Choice B is the best answer because the phrase “undertaken in” appropriately identifies why and for whom investigative journalism is conducted (“in the public interest”—that is, to serve the interests of all of the people instead of only a few).

Choice A is incorrect because “taking on the public interest” implies that investigative journalism is the adversary of the public interest (that is, it “takes on,” or confronts, the interests of ordinary people). Choice C is incorrect because it implies that investigative journalism overpowers or takes control of the public interest. Choice D is incorrect because it is unclear what “taking off from the public interest” might mean in this context.

QUESTION 37

Choice D is the best answer because the general term “illegal activities” creates redundancy with the specific examples provided in the sentence and should be deleted. “Street crime,” “corporate wrongdoing,” and “political corruption” are all specific examples of “illegal activities,” so it is unnecessary to mention “illegal activities” as a separate item in the list.

Choice A is incorrect because the general term “illegal activities” creates redundancy with the specific examples of illegal activities provided in the sentence. Choices B and C are incorrect because they repeat ideas that are already in the sentence: “corporate wrongdoing” is a type of “business scandal,” and “political corruption” is a type of “abuse of government power.”

QUESTION 38

Choice C is the best answer because the sentence is out of place in the paragraph: the year 1954 breaks the chronology of the other examples (1974, 2004), and the example is about television news instead of print journalism.

Choices A and B are incorrect because the sentence is out of place in the paragraph and should not be added. Choice D is incorrect because, while the passage should not be added, the reason

is not the one specified. The example of journalists reporting a story that exposes a person in power is consistent with the passage's definition of investigative journalism.

QUESTION 39

Choice D is the best answer because "deterrent" and "rebuke to" appropriately indicate the effect that exposure by reporters has had on "malfeasance" (misconduct).

Choices A, B, and C are incorrect because they do not appropriately indicate the effect that exposure by reporters has had on "malfeasance" (misconduct). It is unclear how journalism would act as a "blockade" to misconduct, and it is not idiomatic to say that these reports have acted as an important "interference to" or "drag on" misconduct.

QUESTION 40

Choice B is the best answer because the verb phrase "need not entail"—an inverted form of "does not need to entail"—appropriately conveys the writer's point that the decline in traditional print media does not *necessarily* mean "the end of investigative journalism." In other words, this possibility is real but can be prevented.

Choices A and C are incorrect because "could not" and "will not" indicate certainty—in other words, that there is no possibility of an end to investigative journalism. Choice D is incorrect because "must not" suggests a call to action by the writer ("this *must* be prevented") that is inconsistent with the approach taken in the paragraph.

QUESTION 41

Choice D is the best answer because the noun phrase "innovative adjustments" sets up the examples that follow. The examples of the Organized Crime and Corruption Reporting Project, blogs and Twitter, and Help Me Investigate all refer to innovative projects and media that enable investigative journalism to thrive outside of traditional newspapers and magazines.

Choices A, B, and C are incorrect because they do not set up the specific examples of innovative projects and media that are helping fill the void left by the decline of investigative journalism in traditional newspapers and magazines.

QUESTION 42

Choice A is the best answer because no punctuation is needed to separate the subject of the sentence, "enterprises," from the adjective phrase beginning "such as."

Choices B and C are incorrect because placing a colon before or after “such as” would create an error in sentence structure: a colon must be preceded by an independent clause. Choice D is incorrect because no comma is necessary here.

QUESTION 43

Choice A is the best answer because the transitional phrase “for example” appropriately indicates that the Help Me Investigate project discussed in the sentence is an example of the use of social media mentioned in the previous sentence.

Choices B, C, and D are incorrect because neither “therefore,” “however,” nor “in any case” indicates the true relationship between this and the previous sentence. The Help Me Investigate project discussed in the current sentence is an example of the use of social media mentioned in the previous sentence.

QUESTION 44

Choice C is the best answer because the full subject of the independent clause, “the advent of the digital age,” directly follows the dependent clause that introduces it.

Choices A, B, and D are incorrect because the subjects of their independent clauses do not directly follow the introductory dependent clause. “Far from marking the end of investigative journalism” refers to the “advent of the digital age,” not to “cooperation among journalists” (choice A) or “the number of potential investigators” (choice B). In choice D, an interrupting phrase (“by facilitating cooperation among journalists and ordinary citizens”) separates the subject from the dependent clause that modifies it.

Section 3: Math Test - No Calculator

QUESTION 1

Choice D is correct. From the graph, the *y*-intercept of line ℓ is (0, 1). The line also passes through the point (1, 2). Therefore the slope of the line is $\frac{2-1}{1-0}=\frac{1}{1}=1$, and in slope-intercept form, the equation for line ℓ is $y = x + 1$.

Choice A is incorrect. It is the equation of the vertical line that passes through the point (1, 0). Choice B is incorrect. It is the equation of the horizontal line that passes through the point (0, 1). Choice C is incorrect. The line defined by this equation has *y*-intercept (0, 0), whereas line ℓ has *y*-intercept (0, 1).

QUESTION 2

Choice A is correct. A circle has 360 degrees of arc. In the circle shown, *O* is the center of the circle and angle *AOC* is a central angle of the circle. From the figure, the two diameters that meet to form angle *AOC* are perpendicular, so the measure of angle *AOC* is 90°. This central angle intercepts minor arc *AC*, meaning minor arc *AC* has 90° of arc. Since the circumference (length) of the entire circle is 36, the length of minor arc *AC* is $\frac{90}{360} \times 36 = 9$.

Choices B, C, and D are incorrect. The perpendicular diameters divide the circumference of the circle into four equal arcs; therefore, minor arc *AC* is $\frac{1}{4}$ of the circumference. However, the lengths in choices B and C are, respectively, $\frac{1}{3}$ and $\frac{1}{2}$ the circumference of the circle, and the length in choice D is the length of the entire circumference. None of these lengths is $\frac{1}{4}$ the circumference.

QUESTION 3

Choice B is correct. Dividing both sides of the quadratic equation $4x^2 - 8x - 12 = 0$ by 4 yields $x^2 - 2x - 3 = 0$. The equation $x^2 - 2x - 3 = 0$ can be factored as $(x + 1)(x - 3) = 0$. This equation is true when $x + 1 = 0$ or $x - 3 = 0$. Solving for x gives the solutions to the original quadratic equation: $x = -1$ and $x = 3$.

Choices A and C are incorrect because −3 is not a solution of $4x^2 - 8x - 12 = 0$: $4(-3)^2 - 8(-3) - 12 = 36 + 24 - 12 \neq 0$. Choice D is incorrect because 1 is not a solution of $4x^2 - 8x - 12 = 0$: $4(1)^2 - 8(1) - 12 = 4 - 8 - 12 \neq 0$.

QUESTION 4

Choice C is correct. If *f* is a function of *x*, then the graph of *f* in the *xy*-plane consists of all points $(x, f(x))$. An *x*-intercept is where the graph intersects the *x*-axis; since all points on the *x*-axis have *y*-coordinate 0, the graph of *f* will cross the *x*-axis at values of *x* such that $f(x) = 0$. Therefore, the graph of a function *f* will have no *x*-intercepts if and only if *f* has no real zeros. Likewise, the graph of a quadratic function with no real zeros will have no *x*-intercepts.

Choice A is incorrect. The graph of a linear function in the *xy*-plane whose rate of change is not zero is a line with a nonzero slope. The *x*-axis is a horizontal line and thus has slope 0, so the graph of the linear function whose rate of change is not zero is a line that is not parallel to the *x*-axis. Thus, the graph must intersect the *x*-axis at some point, and this point is an *x*-intercept

of the graph. Choices B and D are incorrect because the graph of any function with a real zero must have an *x*-intercept.

QUESTION 5

Choice D is correct. If $x = 9$ in the equation $\sqrt{k+2} - x = 0$, this equation becomes $\sqrt{k+2} - 9 = 0$, which can be rewritten as $\sqrt{k+2} = 9$. Squaring each side of $\sqrt{k+2} = 9$ gives $k + 2 = 81$, or $k = 79$. Substituting $k = 79$ into the equation $\sqrt{k+2} - 9 = 0$ confirms this is the correct value for *k*.

Choices A, B, and C are incorrect because substituting any of these values for *k* in the equation $\sqrt{k+2} - 9 = 0$ gives a false statement. For example, if $k = 7$, the equation becomes $\sqrt{7+2} - 9 = \sqrt{9} - 9 = 3 - 9 = 0,$ which is false.

QUESTION 6

Choice A is correct. The sum of $(a^2 - 1)$ and $(a + 1)$ can be rewritten as $(a^2 - 1) + (a + 1)$, or $a^2 - 1 + a + 1$, which is equal to $a^2 + a + 0$. Therefore, the sum of the two expressions is equal to $a^2 + a$.

Choices B and D are incorrect. Since neither of the two expressions has a term with a^3, the sum of the two expressions cannot have the term a^3 when simplified. Choice C is incorrect. This choice may result from mistakenly adding the terms a^2 and a to get $2a^2$.

QUESTION 7

Choice C is correct. If Jackie works *x* hours as a tutor, which pays $12 per hour, she earns $12x$ dollars. If Jackie works *y* hours as a lifeguard, which pays $9.50 per hour, she earns $9.5y$ dollars. Thus the total, in dollars, Jackie earns in a week that she works *x* hours as a tutor and *y* hours as a lifeguard is $12x + 9.5y$. Therefore, the condition that Jackie wants to earn at least $220 is represented by the inequality $12x + 9.5y \geq 220$. The condition that Jackie can work no more than 20 hours per week is represented by the inequality $x + y \leq 20$. These two inequalities form the system shown in choice C.

Choice A is incorrect. This system represents the conditions that Jackie earns no more than $220 and works at least 20 hours. Choice B is incorrect. The first inequality in this system represents the condition that Jackie earns no more than $220. Choice D is incorrect. The second inequality in this system represents the condition that Jackie works at least 20 hours.

QUESTION 8

Choice A is correct. The constant term 331.4 in $S(T) = 0.6T + 331.4$ is the value of S when $T = 0$. The value $T = 0$ corresponds to a temperature of 0°C. Since $S(T)$ represents the speed of sound, 331.4 is the speed of sound, in meters per second, when the temperature is 0°C.

Choice B is incorrect. When $T = 0.6$°C, $S(T) = 0.6(0.6) + 331.4 = 331.76$, not 331.4, meters per second. Choice C is incorrect. Based on the given formula, the speed of sound increases by 0.6 meters per second for every increase of temperature by 1°C, as shown by the equation $0.6(T + 1) + 331.4 = (0.6T + 331.4) + 0.6$. Choice D is incorrect. An increase in the speed of sound, in meters per second, that corresponds to an increase of 0.6°C is $0.6(0.6) = 0.36$.

QUESTION 9

Choice A is correct. Substituting x^2 for y in the second equation gives $2(x^2) + 6 = 2(x + 3)$. This equation can be solved as follows:

$2x^2 + 6 = 2x + 6$ (Apply the distributive property.)

$2x^2 + 6 - 2x - 6 = 0$ (Subtract $2x$ and 6 from both sides of the equation.)

$2x^2 - 2x = 0$ (Combine like terms.)

$2x(x - 1) = 0$ (Factor both terms on the left side of the equation by $2x$.)

Thus, $x = 0$ and $x = 1$ are the solutions to the system. Since $x > 0$, only $x = 1$ needs to be considered. The value of y when $x = 1$ is $y = x^2 = 1^2 = 1$. Therefore, the value of xy is $(1)(1) = 1$.

Choices B, C, and D are incorrect and likely result from a computational or conceptual error when solving this system of equations.

QUESTION 10

Choice B is correct. Substituting $a^2 + b^2$ for z and ab for y into the expression $4z + 8y$ gives $4(a^2 + b^2) + 8ab$. Multiplying $a^2 + b^2$ by 4 gives $4a^2 + 4b^2 + 8ab$, or equivalently $4(a^2 + 2ab + b^2)$. Since $(a^2 + 2ab + b^2) = (a + b)^2$, it follows that $4z + 8y$ is equivalent to $(2a + 2b)^2$.

Choices A, C, and D are incorrect and likely result from errors made when substituting or factoring.

QUESTION 11

Choice C is correct. The volume of right circular cylinder A is given by the expression $\pi r^2 h$, where r is the radius of its circular base and h is its height. The volume of a cylinder with twice

the radius and half the height of cylinder A is given by $\pi(2r)^2(\frac{1}{2})h$, which is equivalent to $4\pi r^2(\frac{1}{2})h = 2\pi r^2 h$. Therefore, the volume is twice the volume of cylinder A, or 2 × 22 = 44.

Choice A is incorrect and likely results from not multiplying the radius of cylinder A by 2. Choice B is incorrect and likely results from not squaring the 2 in $2r$ when applying the volume formula. Choice D is incorrect and likely results from a conceptual error.

QUESTION 12

Choice D is correct. Since 9 can be rewritten as 3^2, $9^{\frac{3}{4}}$ is equivalent to $3^{2(\frac{3}{4})}$. Applying the properties of exponents, this can be written as $3^{\frac{3}{2}}$, which can further be rewritten as $3^{\frac{2}{2}}(3^{\frac{1}{2}})$, an expression that is equivalent to $3\sqrt{3}$.

Choices A is incorrect; it is equivalent to $9^{\frac{1}{3}}$. Choice B is incorrect; it is equivalent to $9^{\frac{1}{4}}$. Choice C is incorrect; it is equivalent to $3^{\frac{1}{2}}$.

QUESTION 13

Choice B is correct. When n is increased by 1, t increases by the coefficient of n, which is 1.

Choices A, C, and D are incorrect and likely result from a conceptual error when interpreting the equation.

QUESTION 14

Choice C is correct. The graph of $y = -f(x)$ is the graph of the equation $y = -(2^x + 1)$, or $y = -2^x - 1$. This should be the graph of a decreasing exponential function. The y-intercept of the graph can be found by substituting the value $x = 0$ into the equation, as follows: $y = -2^0 - 1 = -1 - 1 = -2$. Therefore, the graph should pass through the point (0, −2). Choice C is the only function that passes through this point.

Choices A and B are incorrect because the graphed functions are increasing instead of decreasing. Choice D is incorrect because the function passes through the point (0, −1) instead of (0, −2).

QUESTION 15

Choice D is correct. Since gasoline costs $4 per gallon, and since Alan's car travels an average of 25 miles per gallon, the expression $\frac{4}{25}$ gives the cost, in dollars per mile, to drive the car. Multiplying $\frac{4}{25}$ by *m* gives the cost for Alan to drive *m* miles in his car. Alan wants to reduce his weekly spending by $5, so setting $\frac{4}{25}m$ equal to 5 gives the number of miles, *m*, by which he must reduce his driving.

Choices A, B, and C are incorrect. Choices A and B transpose the numerator and the denominator in the fraction. The fraction $\frac{25}{4}$ would result in the unit miles per dollar, but the question requires a unit of dollars per mile. Choices A and C set the expression equal to 95 instead of 5, a mistake that may result from a misconception that Alan wants to reduce his driving by 5 miles each week; instead, the question says he wants to reduce his weekly expenditure by $5.

QUESTION 16

The correct answer is 4. The equation $60h + 10 \leq 280$, where *h* is the number of hours the boat has been rented, can be written to represent the situation. Subtracting 10 from both sides and then dividing by 60 yields $h \leq 4.5$. Since the boat can be rented only for whole numbers of hours, the maximum number of hours for which Maria can rent the boat is 4.

QUESTION 17

The correct answer is $\frac{6}{5}$, or 1.2. To solve the equation $2(p + 1) + 8(p - 1) = 5p$, first distribute the terms outside the parentheses to the terms inside the parentheses: $2p + 2 + 8p - 8 = 5p$. Next, combine like terms on the left side of the equal sign: $10p - 6 = 5p$. Subtracting $10p$ from both sides yields $-6 = -5p$. Finally, dividing both sides by −5 gives $p = \frac{6}{5} = 1.2$. Either 6/5 or 1.2 can be gridded as the correct answer.

QUESTION 18

The correct answer is $\frac{21}{4}$, or 5.25. Use substitution to create a one-variable equation that can be solved for *x*. The second equation gives that $y = 2x$. Substituting $2x$ for *y* in the first equation gives $\frac{1}{2}(2x + 2x) = \frac{21}{2}$. Dividing both sides of this equation by $\frac{1}{2}$ yields $(2x + 2x) = 21$. Combining

like terms results in $4x = 21$. Finally, dividing both sides by 4 gives $x = \frac{21}{4} = 5.25$. Either 21/4 or 5.25 can be gridded as the correct answer.

QUESTION 19

The correct answer is 2. The given expression can be rewritten as $\frac{2x+6}{(x+2)^2} - \frac{2x+4}{(x+2)^2}$, which is equivalent to $\frac{2x+6-2x-4}{(x+2)^2}$, or $\frac{2}{(x+2)^2}$. This is in the form $\frac{a}{(x+2)^2}$; therefore, $a = 2$.

QUESTION 20

The correct answer is 97. The intersecting lines form a triangle, and the angle with measure of $x°$ is an exterior angle of this triangle. The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles of the triangle. One of these angles has measure of 23° and the other, which is supplementary to the angle with measure 106°, has measure of 180° − 106° = 74°. Therefore, the value of x is 23 + 74 = 97.

Section 4: Math Test - Calculator

QUESTION 1

Choice D is correct. The change in the number of 3-D movies released between any two consecutive years can be found by first estimating the number of 3-D movies released for each of the two years and then finding the positive difference between these two estimates. Between 2003 and 2004, this change is approximately 2 − 2 = 0 movies; between 2008 and 2009, this change is approximately 20 − 8 = 12 movies; between 2009 and 2010, this change is approximately 26 − 20 = 6 movies; and between 2010 and 2011, this change is approximately 46 − 26 = 20 movies. Therefore, of the pairs of consecutive years in the choices, the greatest increase in the number of 3-D movies released occurred during the time period between 2010 and 2011.

Choices A, B, and C are incorrect. Between 2010 and 2011, approximately 20 more 3-D movies were released. The change in the number of 3-D movies released between any of the other pairs of consecutive years is significantly smaller than 20.

QUESTION 2

Choice C is correct. Because *f* is a linear function of *x*, the equation $f(x) = mx + b$, where *m* and *b* are constants, can be used to define the relationship between *x* and $f(x)$. In this equation, *m* represents the increase in the value of $f(x)$ for every increase in the value of *x* by 1. From the table, it can be determined that the value of $f(x)$ increases by 8 for every increase in the value of *x* by 2. In other words, for the function *f* the value of *m* is $\frac{8}{2}$, or 4. The value of *b* can be found by substituting the values of *x* and $f(x)$ from any row of the table and the value of *m* into the equation $f(x) = mx + b$ and solving for *b*. For example, using $x = 1$, $f(x) = 5$, and $m = 4$ yields $5 = 4(1) + b$. Solving for *b* yields $b = 1$. Therefore, the equation defining the function *f* can be written in the form $f(x) = 4x + 1$.

Choices A, B, and D are incorrect. Any equation defining the linear function *f* must give values of $f(x)$ for corresponding values of *x*, as shown in each row of the table. According to the table, if $x = 3$, $f(x) = 13$. However, substituting $x = 3$ into the equation given in choice A gives $f(3) = 2(3) + 3$, or $f(3) = 9$, not 13. Similarly, substituting $x = 3$ into the equation given in choice B gives $f(3) = 3(3) + 2$, or $f(3) = 11$, not 13. Lastly, substituting $x = 3$ into the equation given in choice D gives $f(3) = 5(3)$, or $f(3) = 15$, not 13. Therefore, the equations in choices A, B, and D cannot define *f*.

QUESTION 3

Choice A is correct. If 2.5 ounces of chocolate are needed for each muffin, then the number of ounces of chocolate needed to make 48 muffins is $48 \times 2.5 = 120$ ounces. Since 1 pound = 16 ounces, the number of pounds that is equivalent to 120 ounces is $\frac{120}{16}$ = 7.5 pounds. Therefore, 7.5 pounds of chocolate are needed to make the 48 muffins.

Choice B is incorrect. If 10 pounds of chocolate were needed to make 48 muffins, then the total number of ounces of chocolate needed would be $10 \times 16 = 160$ ounces. The number of ounces of chocolate per muffin would then be $\frac{160}{48}$ = 3.33 ounces per muffin, not 2.5 ounces per muffin. Choices C and D are also incorrect. Following the same procedures as used to test choice B gives 16.8 ounces per muffin for choice C and 40 ounces per muffin for choice D, not 2.5 ounces per muffin. Therefore, 50.5 and 120 pounds cannot be the number of pounds needed to make 48 signature chocolate muffins.

QUESTION 4

Choice B is correct. The value of $c + d$ can be found by dividing both sides of the given equation by 3. This yields $c + d = \frac{5}{3}$.

Choice A is incorrect. If the value of $c + d$ is $\frac{3}{5}$, then $3 \times \frac{3}{5} = 5$; however, $\frac{9}{5}$ is not equal to 5.

Choice C is incorrect. If the value of $c + d$ is 3, then $3 \times 3 = 5$; however, 9 is not equal to 5.

Choice D is incorrect. If the value of $c + d$ is 5, then $3 \times 5 = 5$; however, 15 is not equal to 5.

QUESTION 5

Choice C is correct. The weight of an object on Venus is approximately $\frac{9}{10}$ of its weight on Earth. If an object weighs 100 pounds on Earth, then the object's weight on Venus is given by $\frac{9}{10}(100) = 90$ pounds. The same object's weight on Jupiter is approximately $\frac{23}{10}$ of its weight on Earth; therefore, the object weighs $\frac{23}{10}(100) = 230$ pounds on Jupiter. The difference between the object's weight on Jupiter and the object's weight on Venus is $230 - 90 = 140$ pounds. Therefore, an object that weighs 100 pounds on Earth weighs 140 more pounds on Jupiter than it weighs on Venus.

Choice A is incorrect because it is the weight, in pounds, of the object on Venus. Choice B is incorrect because it is the weight, in pounds, of an object on Earth if it weighs 100 pounds on Venus. Choice D is incorrect because it is the weight, in pounds, of the object on Jupiter.

QUESTION 6

Choice B is correct. Let n be the number of novels and m be the number of magazines that Sadie purchased. If Sadie purchased a total of 11 novels and magazines, then $n + m = 11$. It is given that the combined price of 11 novels and magazines is \$20. Since each novel sells for \$4 and each magazine sells for \$1, it follows that $4n + m = 20$. So the system of equations below must hold.

$$4n + m = 20$$
$$n + m = 11$$

Subtracting side by side the second equation from the first equation yields $3n = 9$, so $n = 3$. Therefore, Sadie purchased 3 novels.

Choice A is incorrect. If 2 novels were purchased, then a total of \$8 was spent on novels. That leaves \$12 to be spent on magazines, which means that 12 magazines would have been purchased. However, Sadie purchased a total of 11 novels and magazines. Choices C and D are incorrect. If 4 novels were purchased, then a total of \$16 was spent on novels. That leaves \$4 to be spent on magazines, which means that 4 magazines would have been purchased. By the

same logic, if Sadie purchased 5 novels, she would have no money at all ($0) to buy magazines. However, Sadie purchased a total of 11 novels and magazines.

QUESTION 7

Choice A is correct. The DBA plans to increase its membership by *n* businesses each year, so *x* years from now, the association plans to have increased its membership by *nx* businesses. Since there are already *b* businesses at the beginning of this year, the total number of businesses, *y*, the DBA plans to have as members *x* years from now is modeled by $y = nx + b$.

Choice B is incorrect. The equation given in choice B correctly represents the increase in membership *x* years from now as *nx*. However, the number of businesses at the beginning of the year, *b*, has been subtracted from this amount of increase, not added to it. Choices C and D are incorrect because they use exponential models to represent the increase in membership. Since the membership increases by *n* businesses each year, this situation is correctly modeled by a linear relationship.

QUESTION 8

Choice C is correct. The first expression $(1.5x - 2.4)^2$ can be rewritten as $(1.5x - 2.4)(1.5x - 2.4)$. Applying the distributive property to this product yields $(2.25x^2 - 3.6x - 3.6x + 5.76) - (5.2x^2 - 6.4)$. This difference can be rewritten as $(2.25x^2 - 3.6x - 3.6x + 5.76) + (-1)(5.2x^2 - 6.4)$. Distributing the factor of −1 through the second expression yields $2.25x^2 - 3.6x - 3.6x + 5.76 - 5.2x^2 + 6.4$. Regrouping like terms, the expression becomes $(2.25x^2 - 5.2x^2) + (-3.6x - 3.6x) + (5.76 + 6.4)$. Combining like terms yields $-2.95x^2 - 7.2x + 12.16$.

Choices A, B, and D are incorrect and likely result from errors made when applying the distributive property or combining the resulting like terms.

QUESTION 9

Choice B is correct. In 1908, the marathon was lengthened by 42 − 40 = 2 kilometers. Since 1 mile is approximately 1.6 kilometers, the increase of 2 kilometers can be converted to miles by multiplying as shown: $2\,\text{kilometers} \times \frac{1\,\text{mile}}{1.6\,\text{kilometers}} = 1.25\,\text{miles}$.

Choices A, C, and D are incorrect and may result from errors made when applying the conversion rate or other computational errors.

QUESTION 10

Choice A is correct. The density *d* of an object can be found by dividing the mass *m* of the object by its volume *V*. Symbolically this is expressed by the equation $d = \frac{m}{V}$. Solving this equation for *m* yields *m* = *dV*.

Choices B, C, and D are incorrect and are likely the result of errors made when translating the definition of density into an algebraic equation and errors made when solving this equation for *m*. If the equations given in choices B, C, and D are each solved for density *d*, none of the resulting equations are equivalent to $d = \frac{m}{V}$.

QUESTION 11

Choice A is correct. The equation −2*x* + 3*y* = 6 can be rewritten in the slope-intercept form as follows: $y = \frac{2}{3}x + 2$. So the slope of the graph of the given equation is $\frac{2}{3}$. In the *xy*-plane, when two nonvertical lines are perpendicular, the product of their slopes is −1. So, if *m* is the slope of a line perpendicular to the line with equation $y = \frac{2}{3}x + 2$, then $m \times \frac{2}{3} = -1$, which yields $m = -\frac{3}{2}$. Of the given choices, only the equation in choice A can be rewritten in the form $y = -\frac{3}{2}x + b$, for some constant *b*. Therefore, the graph of the equation in choice A is perpendicular to the graph of the given equation.

Choices B, C, and D are incorrect because the graphs of the equations in these choices have slopes, respectively, of $-\frac{3}{4}$, $-\frac{1}{2}$, and $-\frac{1}{3}$, not $-\frac{3}{2}$.

QUESTION 12

Choice D is correct. Adding the two equations side by side eliminates *y* and yields *x* = 6, as shown.

$$\begin{array}{r} \frac{1}{2}y = 4 \\ x - \frac{1}{2}y = 2 \\ \hline x + 0 = 6 \end{array}$$

If (*x*, *y*) is a solution to the system, then (*x*, *y*) satisfies both equations in the system and any equation derived from them. Therefore, *x* = 6.

Choices A, B, and C are incorrect and may be the result of errors when solving the system.

QUESTION 13

Choice D is correct. Any point (x, y) that is a solution to the given system of inequalities must satisfy both inequalities in the system. Since the second inequality in the system can be rewritten as $y < x - 1$, the system is equivalent to the following system.

$$y \leq 3x + 1$$
$$y < x - 1$$

Since $3x + 1 > x - 1$ for $x > -1$ and $3x + 1 \leq x - 1$ for $x \leq -1$, it follows that $y < x - 1$ for $x > -1$ and $y \leq 3x + 1$ for $x \leq -1$. Of the given choices, only $(2, -1)$ satisfies these conditions because $-1 < 2 - 1 = 1$.

Alternate approach: Substituting $(2, -1)$ into the first inequality gives $-1 \leq 3(2) + 1$, or $-1 \leq 7$, which is a true statement. Substituting $(2, -1)$ into the second inequality gives $2 - (-1) > 1$, or $3 > 1$, which is a true statement. Therefore, since $(2, -1)$ satisfies both inequalities, it is a solution to the system.

Choice A is incorrect because substituting -2 for x and -1 for y in the first inequality gives $-1 \leq 3(-2) + 1$, or $-1 \leq -5$, which is false. Choice B is incorrect because substituting -1 for x and 3 for y in the first inequality gives $3 \leq 3(-1) + 1$, or $3 \leq -2$, which is false. Choice C is incorrect because substituting 1 for x and 5 for y in the first inequality gives $5 \leq 3(1) + 1$, or $5 \leq 4$, which is false.

QUESTION 14

Choice A is correct. According to the table, 74 orthopedic surgeons indicated that research is their major professional activity. Since a total of 607 surgeons completed the survey, it follows that the probability that the randomly selected surgeon is an orthopedic surgeon whose indicated major professional activity is research is 74 out of 607, or 74/607, which is ≈ 0.122.

Choices B, C, and D are incorrect and may be the result of finding the probability that the randomly selected surgeon is an orthopedic surgeon whose major professional activity is teaching (choice B), an orthopedic surgeon whose major professional activity is either teaching or research (choice C), or a general surgeon or orthopedic surgeon whose major professional activity is research (choice D).

QUESTION 15

Choice A is correct. Statement I need not be true. The fact that 78% of the 1,000 adults who were surveyed responded that they were satisfied with the air quality in the city does not mean that the exact same percentage of all adults in the city will be satisfied with the air quality in the city. Statement II need not be true because random samples, even when they are of the same size, are not necessarily identical with regard to percentages of people in them who have a certain opinion. Statement III need not be true for the same reason that statement II need not be true: results from different samples can vary. The variation may be even bigger for this sample since it would be selected from a different city. Therefore, none of the statements must be true.

Choices B, C, and D are incorrect because none of the statements must be true.

QUESTION 16

Choice D is correct. According to the given information, multiplying a tree species' growth factor by the tree's diameter is a method to approximate the age of the tree. Multiplying the growth factor, 4.0, of the American elm given in the table by the given diameter of 12 inches yields an approximate age of 48 years.

Choices A, B, and C are incorrect because they do not result from multiplying the given diameter of an American elm tree with that tree species' growth factor..

QUESTION 17

Choice D is correct. The growth factor of a tree species is approximated by the slope of a line of best fit that models the relationship between diameter and age. A line of best fit can be visually estimated by identifying a line that goes in the same direction of the data and where roughly half the given data points fall above and half the given data points fall below the line. Two points that fall on the line can be used to estimate the slope and *y*-intercept of the equation of a line of best fit. Estimating a line of best fit for the given scatterplot could give the points (11, 80) and (15, 110). Using these two points, the slope of the equation of the line of best fit can be calculated as $\frac{110-80}{15-11}$, or 7.5. The slope of the equation is interpreted as the growth factor for a species of tree. According to the table, the species of tree with a growth factor of 7.5 is shagbark hickory.

Choices A, B, and C are incorrect and likely result from errors made when estimating a line of best fit for the given scatterplot and its slope.

QUESTION 18

Choice C is correct. According to the given information, multiplying a tree species' growth factor by the tree's diameter is a method to approximate the age of the tree. A white birch with a diameter of 12 inches (or 1 foot) has a given growth factor of 5 and is approximately 60 years old. A pin oak with a diameter of 12 inches (or 1 foot) has a given growth factor of 3 and is approximately 36 years old. The diameters of the two trees 10 years from now can be found by dividing each tree's age in 10 years, 70 years, and 46 years, by its respective growth factor. This yields 14 inches and $15\frac{1}{3}$ inches. The difference between $15\frac{1}{3}$ and 14 is $1\frac{1}{3}$, or approximately 1.3 inches.

Choices A, B, and D are incorrect and a result of incorrectly calculating the diameters of the two trees in 10 years.

QUESTION 19

Choice B is correct. Triangles *ADB* and *CDB* are congruent to each other because they are both 30°-60°-90° triangles and share the side $\overline{BD}$. In triangle *ADB*, side $\overline{AD}$ is opposite to the angle 30°; therefore, the length of $\overline{AD}$ is half the length of hypotenuse $\overline{AB}$. Since the triangles are congruent, *AB* = *BC* = 12. So the length of $\overline{AD}$ is $\frac{12}{2} = 6$.

Choice A is incorrect. If the length of $\overline{AD}$ were 4, then the length of $\overline{AB}$ would be 8. However, this is incorrect because $\overline{AB}$ is congruent to $\overline{BC}$, which has a length of 12. Choices C and D are also incorrect. Following the same procedures as used to test choice A gives $\overline{AB}$ a length of $12\sqrt{2}$ for choice C and $12\sqrt{3}$ for choice D. However, these results cannot be true because $\overline{AB}$ is congruent to $\overline{BC}$, which has a length of 12.

QUESTION 20

Choice D is correct. The graph on the right shows the change in distance from the ground of the mark on the rim over time. The *y*-intercept of the graph corresponds to the mark's position at the start of the motion (*t* = 0); at this moment, the mark is at its highest point from the ground. As the wheel rolls, the mark approaches the ground, its distance from the ground decreasing until it reaches 0—the point where it touches the ground. After that, the mark moves up and away from the ground, its distance from the ground increasing until it reaches its maximum height from the ground. This is the moment when the wheel has completed a full rotation. The remaining part of the graph shows the distance of the mark from the ground during the second rotation of the wheel. Therefore, of the given choices, only choice D is in agreement with the given information.

Choice A is incorrect because the speed at which the wheel is rolling does not change over time, meaning the graph representing the speed would be a horizontal line. Choice B is incorrect because the distance of the wheel from its starting point to its ending point increases continuously; the graph shows a quantity that changes periodically over time, alternately decreasing and increasing. Choice C is incorrect because the distance of the mark from the center of the wheel is constant and equals the radius of the wheel. The graph representing this distance would be a horizontal line, not the curved line of the graph shown.

QUESTION 21

Choice A is correct. The equation can be rewritten as $1-\frac{b}{a}=c$, or equivalently $1-c=\frac{b}{a}$. Since $a < 0$ and $b > 0$, it follows that $\frac{b}{a}<0$, and so $1 - c < 0$, or equivalently $c > 1$.

Choice B is incorrect. If $c = 1$, then $a - b = a$, or $b = 0$. But it is given that $b > 0$, so $c = 1$ cannot be true. Choice C is incorrect. If $c = -1$, then $a - b = -a$, or $2a = b$. But this equation contradicts the premise that $a < 0$ and $b > 0$, so $c = -1$ cannot be true. Choice D is incorrect. For example, if $c = -2$, then $a - b = -2a$, or $3a = b$. But this contradicts the fact that a and b have opposite signs, so $c < -1$ cannot be true.

QUESTION 22

Choice C is correct. It is given that 34.6% of 26 students in Mr. Camp's class reported that they had at least two siblings. Since 34.6% of 26 is 8.996, there must have been 9 students in the class who reported having at least two siblings and 17 students who reported that they had fewer than two siblings. It is also given that the average eighth-grade class size in the state is 26 and that Mr. Camp's class is representative of all eighth-grade classes in the state. This means that in each eighth-grade class in the state there are about 17 students who have fewer than two siblings. Therefore, the best estimate of the number of eighth-grade students in the state who have fewer than two siblings is 17 × (number of eighth-grade classes in the state), or 17 × 1,800 = 30,600.

Choice A is incorrect because 16,200 is the best estimate for the number of eighth-grade students in the state who have at least, not fewer than, two siblings. Choice B is incorrect because 23,400 is half of the estimated total number of eighth-grade students in the state; however, since the students in Mr. Camp's class are representative of students in the eighth-grade classes in the state and more than half of the students in Mr. Camp's class have fewer than two siblings, more than half of the students in each eighth-grade class in the state have fewer than two siblings, too. Choice D is incorrect because 46,800 is the estimated total number of eighth-grade students in the state.

QUESTION 23

Choice D is correct. The linear function that represents the relationship will be in the form $r(p) = ap + b$, where a and b are constants and $r(p)$ is the monthly rental price, in dollars, of a property that was purchased with p thousands of dollars. According to the table, (70, 515) and (450, 3,365) are ordered pairs that should satisfy the function, which leads to the system of equations below.

$$\begin{cases} 70a + b = 515 \\ 450a + b = 3{,}365 \end{cases}$$

Subtracting side by side the first equation from the second eliminates b and gives $380a = 2{,}850$; solving for a gives $a = \frac{2{,}850}{380} = 7.5$. Substituting 7.5 for a in the first equation of the system gives $525 + b = 515$; solving for b gives $b = -10$. Therefore, the linear function that represents the relationship is $r(p) = 7.5p - 10$.

Choices A, B, and C are incorrect because the coefficient of p, or the rate at which the rental price, in dollars, increases for every thousand-dollar increase of the purchase price is different from what is suggested by these choices. For example, the Glenview Street property was purchased for $140,000, but the rental price that each of the functions in these choices provides is significantly off from the rental price given in the table, $1,040.

QUESTION 24

Choice B is correct. Let x be the original price, in dollars, of the Glenview Street property. After the 40% discount, the price of the property became $0.6x$ dollars, and after the additional 20% off the discounted price, the price of the property became $0.8(0.6x)$. Thus, in terms of the original price of the property, x, the purchase price of the property is $0.48x$. It follows that $0.48x = 140{,}000$. Solving this equation for x gives $x = 291{,}666.\overline{6}$. Therefore, of the given choices, $291,700 best approximates the original price of the Glenview Street property.

Choice A is incorrect because it is the result of dividing the purchase price of the property by 0.4, as though the purchase price were 40% of the original price. Choice C is incorrect because it is the closest to dividing the purchase price of the property by 0.6, as though the purchase price were 60% of the original price. Choice D is incorrect because it is the result of dividing the purchase price of the property by 0.8, as though the purchase price were 80% of the original price.

QUESTION 25

Choice D is correct. Of the first 150 participants, 36 chose the first picture in the set, and of the 150 remaining participants, *p* chose the first picture in the set. Hence, the proportion of the participants who chose the first picture in the set is $\frac{36+p}{300}$. Since more than 20% of all the participants chose the first picture, it follows that $\frac{36+p}{300} > 0.20$. This inequality can be rewritten as $p + 36 > 0.20(300)$. Since *p* is a number of people among the remaining 150 participants, $p \leq 150$.

Choices A, B, and C are incorrect and may be the result of some incorrect interpretations of the given information or of computational errors.

QUESTION 26

Choice B is correct. A cube has 6 faces of equal area, so if the total surface area of a cube is $6\left(\frac{a}{4}\right)^2$, then the area of one face is $\left(\frac{a}{4}\right)^2$. Likewise, the area of one face of a cube is the square of one of its sides; therefore, if the area of one face is $\left(\frac{a}{4}\right)^2$, then the length of one side of the cube is $\frac{a}{4}$. Since the perimeter of one face of a cube is four times the length of one side, the perimeter is $4\left(\frac{a}{4}\right) = a$.

Choice A is incorrect because if the perimeter of one face of the cube is $\frac{a}{4}$, then the total surface area of the cube is $6\left(\frac{\frac{a}{4}}{4}\right)^2 = 6\left(\frac{a}{16}\right)^2$, which is not $6\left(\frac{a}{4}\right)^2$. Choice C is incorrect because if the perimeter of one face of the cube is 4*a*, then the total surface area of the cube is $6\left(\frac{4a}{4}\right)^2 = 6a^2$, which is not $6\left(\frac{a}{4}\right)^2$. Choice D is incorrect because if the perimeter of one face of the cube is 6*a*, then the total surface area of the cube is $6\left(\frac{6a}{4}\right)^2 = 6\left(\frac{3a}{2}\right)^2$, which is not $6\left(\frac{a}{4}\right)^2$.

QUESTION 27

Choice C is correct. If the mean score of 8 players is 14.5, then the total of all 8 scores is 14.5 × 8 = 116. If the mean of 7 scores is 12, then the total of all 7 scores is 12 × 7 = 84. Since the set of 7 scores was made by removing the highest score of the set of 8 scores, then the difference between the total of all 8 scores and the total of all 7 scores is equal to the removed score: 116 − 84 = 32.

Choice A is incorrect because if 20 is removed from the group of 8 scores, then the mean score of the remaining 7 players is $\frac{(14.5\cdot 8)-20}{7}\approx 13.71$, not 12. Choice B is incorrect because if 24 is removed from the group of 8 scores, then the mean score of the remaining 7 players is $\frac{(14.5\cdot 8)-24}{7}\approx 13.14$, not 12. Choice D is incorrect because if 36 is removed from the group of 8 scores, then the mean score of the remaining 7 players is $\frac{(14.5\cdot 8)-36}{7}\approx 11.43$, not 12.

QUESTION 28

Choice C is correct. The slope of a line is $\frac{\text{rise}}{\text{run}}$ and can be calculated using the coordinates of any two points on the line. For example, the graph of *f* passes through the points (0, 3) and (2, 4), so the slope of the graph of *f* is $\frac{4-3}{2-0}=\frac{1}{2}$. The slope of the graph of function *g* is 4 times the slope of the graph of *f*, so the slope of the graph of *g* is $4\left(\frac{1}{2}\right)=2$. Since the point (0, −4) is the *y*-intercept of *g*, *g* is defined as $g(x) = 2x - 4$. It follows that $g(9) = 2(9) - 4 = 14$.

Choice A is incorrect because if $g(9) = 5$, then the slope of the graph of function *g* is $\frac{-4-5}{0-9}=1$, which is not 4 times the slope of the graph of *f*. Choices B and D are also incorrect. The same procedures used to test choice A yields $\frac{-4-9}{0-9}=\frac{13}{9}$ and $\frac{-4-18}{0-9}=\frac{22}{9}$ for the slope of the graph of *g* for choices B and D, respectively. Neither of these slopes is 4 times the slope of the graph of *f*.

QUESTION 29

Choice B is correct. The standard equation of a circle in the *xy*-plane is of the form $(x - h)^2 + (y - k)^2 = r^2$, where (h, k) are the coordinates of the center of the circle and *r* is the radius. To convert the given equation to the standard form, complete the squares. The first two terms need a 100 to complete the square, and the second two terms need a 64. Adding 100 and 64 to both sides of the given equation yields $(x^2 + 20x + 100) + (y^2 + 16y + 64) = -20 + 100 + 64$, which

is equivalent to $(x + 10)^2 + (y + 8)^2 = 144$. Therefore, the coordinates of the center of the circle are (−10, −8).

Choice A is incorrect and is likely the result of not properly dividing when attempting to complete the square. Choice C is incorrect and is likely the result of making a sign error when evaluating the coordinates of the center. Choice D is incorrect and is likely the result of not properly dividing when attempting to complete the square and making a sign error when evaluating the coordinates of the center.

QUESTION 30

Choice B is correct. The given equation can be thought of as the difference of two squares, where one square is x^2 and the other square is $\left(\sqrt{a}\right)^2$. Using the difference of squares formula, the equation can be rewritten as $y = \left(x + \sqrt{a}\right)\left(x - \sqrt{a}\right)$.

Choices A, C, and D are incorrect because they are not equivalent to the given equation. Choice A is incorrect because it is equivalent to $y = x^2 - a^2$. Choice C is incorrect because it is equivalent to $y = x^2 - \frac{a^2}{4}$. Choice D is incorrect because it is equivalent to $y = x^2 + 2ax + a^2$.

QUESTION 31

The correct answer is 1492. Let x be the number of watts that is equal to 2 horsepower. Since 5 horsepower is equal to 3730 watts, it follows that $\frac{2}{5} = \frac{x}{3730}$. Solving this proportion for x yields $5x = 7460$, or $x = \frac{7460}{5} = 1492$.

QUESTION 32

The correct answer is $\frac{29}{3}$. It is given that the height of the original painting is 29 inches and the reproduction's height is $\frac{1}{3}$ the original height. One-third of 29 is $\frac{29}{3}$, or $9.\overline{6}$. Either the fraction 29/3 or the decimals 9.66 or 9.67 can be gridded as the correct answer.

QUESTION 33

The correct answer is 7. It is given that $PQ = RS$, and the diagram shows that $PQ = x - 1$ and $RS = 3x - 7$. Therefore, the equation $x - 1 = 3x - 7$ must be true. Solving this equation for x leads to

$2x = 6$, so $x = 3$. The length of segment PS is the sum of the lengths of PQ, QR, and RS, which is $(x - 1) + x + (3x - 7)$, or equivalently $5x - 8$. Substituting 3 for x in this expression gives $5(3) - 8 = 7$.

QUESTION 34

The correct answer is 9. Since the point (2, 5) lies on the graph of $y = f(x)$ in the xy-plane, the ordered pair (2, 5) must satisfy the equation $y = f(x)$. That is, $5 = f(2)$, or $5 = k - 2^2$. This equation simplifies to $5 = k - 4$. Therefore, the value of the constant k is 9.

QUESTION 35

The correct answer is 13. Let w represent the width of the rectangular garden, in feet. Since the length of the garden will be 5 feet longer than the width of the garden, the length of the garden will be $w + 5$ feet. Thus the area of the garden will be $w(w + 5)$. It is also given that the area of the garden will be 104 square feet. Therefore, $w(w + 5) = 104$, which is equivalent to $w^2 + 5w - 104 = 0$. The quadratic formula can be used or the equation above can be factored to result in $(w + 13)(w - 8) = 0$. Therefore, $w = 8$ and $w = -13$. Because width cannot be negative, the width of the garden must be 8 feet. This means the length of the garden must be $8 + 5 = 13$ feet.

QUESTION 36

The correct answer is 80. The measure of an angle inscribed in a circle is half the measure of the central angle that intercepts the same arc. That is, $\text{m}\angle A = \frac{x^\circ}{2}$. Also, the sum of the interior angles of quadrilateral $ABCP$ is 360°, and the measure of the obtuse angle P is $360° - x°$. Hence, $\frac{x^\circ}{2} + 20^\circ + (360^\circ - x^\circ) + 20^\circ = 360^\circ$. Simplifying this equation gives $\frac{x^\circ}{2} = 40^\circ$, and so $x = 80$.

Alternate approach: If points A and P are joined, then the triangles that will be formed, APB and APC, are isosceles because $PA = PB = PC$. It follows that the base angles on both triangles each have measure of 20°. Angle A consists of two base angles, and therefore, $\text{m}\angle A = 40^\circ$. Since the measure of an angle inscribed in a circle is half the measure of the central angle that intercepts the same arc, it follows that the value of x is 80°.

QUESTION 37

The correct answer is 43.5, 43, or 44. The distance from Ms. Simon's home to her workplace is $0.6 + 15.4 + 1.4 = 17.4$ miles. Ms. Simon took 24 minutes to drive this distance. Since there are 60 minutes in one hour, her average speed, in miles per hour, for this trip is $\frac{17.4}{24} \times 60 = 43.5$ miles per hour. Based on the directions, 87/2 or 43.5 can be gridded as the correct answer. We

are accepting 43 and 44 as additional correct answers because the precision of the measurements provided does not support an answer with three significant digits.

QUESTION 38

The correct answer is 6. Ms. Simon travels 15.4 miles on the freeway, and her average speed for this portion of the trip is 50 miles per hour when there is no traffic delay. Therefore, when there is no traffic delay, Ms. Simon spends $\frac{15.4\,\text{miles}}{50\ \text{mph}} = 0.308\ \text{hours}$ on the freeway. Since there are 60 minutes in one hour, she spends (0.308)(60) = 18.48 minutes on the freeway when there is no delay. Leaving at 7:00 a.m. results in a trip that is 33% longer, and 33% of 18.48 minutes is 6.16; the travel time for each of the other two segments does not change. Therefore, rounded to the nearest minute, it takes Ms. Simon 6 more minutes to drive to her workplace when she leaves at 7:00 a.m.