PSAT/NMSQT®

Preliminary SAT/National Merit Scholarship Qualifying Test

and **PSAT™ 10**

Practice Test #3

ANSWER EXPLANATIONS

These answer explanations are for students taking the digital PSAT/NMSQT in nondigital format.

SAT® Suite

© 2026 College Board. College Board, SAT, and the acorn logo are registered trademarks of College Board. PSAT/NMSQT is a registered trademark of College Board and National Merit Scholarship Corporation. NMSC, National Merit, and the corporate "Lamp of Learning" logo are federally registered service marks of National Merit Scholarship Corporation.

Reading and Writing

Module 1

(33 questions)

QUESTION 1

Choice C is the best answer because as used in the text, "appeared" most nearly means arrived. The text describes Mrs. Burgess explaining to a guest that her husband "had been detained" by an unanticipated meeting. This indicates that Mrs. Burgess's husband had been delayed and therefore wasn't present when he was expected to join Mrs. Burgess and her guest. In other words, the text indicates that Mrs. Burgess's husband hadn't appeared, or arrived, at the expected time, seven o'clock.

Choice A is incorrect because "developed" means gradually grew or evolved, and there's nothing in the text to indicate that Mrs. Burgess's husband grew or evolved in any way. The text indicates that Mr. Burgess was expected to be physically present at seven but had been delayed by a meeting, suggesting that Mr. Burgess hadn't appeared, or arrived, when he had intended. *Choice B* is incorrect because "responded" means replied or reacted, and there's nothing in the text to indicate that Mrs. Burgess's husband replied to anyone or reacted to anything. The text indicates that Mr. Burgess was expected to be physically present at seven but had been delayed by a meeting, suggesting that Mr. Burgess hadn't appeared, or arrived, when he had intended. *Choice D* is incorrect because "pretended" means took on a false or deceptive appearance, and there's nothing in the text to indicate that Mrs. Burgess's husband was putting on a false act. The text depicts Mrs. Burgess explaining to a guest that her husband had been delayed by an unanticipated meeting, suggesting that her husband hadn't been able to come home when he intended, not that he was deceiving anyone.

QUESTION 2

Choice C is the best answer because it most logically completes the text's discussion of wildfires in Antarctica. In this context, "occurred" means happened or took place. The text indicates that scientists used to believe "wildfires likely never happened in Antarctica," but then goes on to explain that researchers discovered charcoal that "likely came from a tree that burned in a fire." This context supports the idea that wildfires may have indeed occurred—that is, taken place—in Antarctica millions of years ago, contrary to what scientists previously thought.

Choice A is incorrect because saying that wildfires "returned" in Antarctica wouldn't make sense in context. "Returned" implies that wildfires had previously been present and came back, but the text is discussing evidence that wildfires happened at all, not that the wildfires came back after an absence. *Choice B* is incorrect because saying that wildfires "rotated," or alternated in a series, in Antarctica wouldn't make sense in context. Since the text is discussing the question of whether wildfires occurred in Antarctica at all, it isn't logical to speak of them alternating in a series. *Choice D* is incorrect because "offended," meaning to cause hurt or displeasure to a person or group, or to violate a rule, wouldn't make logical sense in the text. Wildfires are natural events and cannot cause emotional offense or violate rules. Nor does Antarctica represent an entity that could be offended.

QUESTION 3

Choice B is the best answer because it most logically completes the text's discussion of consumer behavior in relation to price changes. In this context, "respond to" means react to something. The text describes how consumers adjust their purchasing behavior based on price changes: they buy fewer nonessential products when prices rise and buy more of those products when prices fall. This context supports the idea that consumers respond to rising prices of nonessential products by purchasing fewer of them.

Choice A is incorrect. In this context, "differ from" would mean that something or someone is unlike or distinct from something or someone else, and it wouldn't be logical to say that people are distinct from price changes. *Choice C* is incorrect because in this context, "think of" would mean to consider. The focus of the text is on the actions people take when prices of nonessential products change; the text states that when the prices fall, they buy more of those products, and when the prices rise, they take the opposite action—that is, they buy fewer of those products. This suggests that people respond to rising prices by taking action, not that they merely think of them. *Choice D* is incorrect because in this context, "agree with" would mean to regard with approval. The focus of the text is on the actions people take when prices of nonessential products change; the text states that when the prices fall, they buy more of those products, and when the prices rise, they take the opposite action—that is, they buy fewer of those products. This suggests that people respond to rising prices by taking action, not that they agree with them.

QUESTION 4

Choice A is the best answer because it most logically completes the text's discussion of Hayao Miyazaki's filmmaking approach. In this context, "withhold" means to hold back or refrain from giving. The text indicates that Miyazaki tends to present fantastical "characters and events" without giving viewers much "backstory or explanation," which suggests he deliberately refrains from giving much background information about the fantasy elements in his films. This context supports the idea that Miyazaki tends to withhold "details and exposition" about the fantasy elements.

Choice B is incorrect because saying that Miyazaki tends to "celebrate," or honor or praise, "details and exposition" about fantasy elements in his movies wouldn't make sense in context. If Miyazaki celebrated "details and exposition" about such elements, he would draw attention to them rather than minimize them. The text explicitly states that the fantasy elements are presented with "little backstory or explanation," indicating withholding, not emphasis. *Choice C* is incorrect because saying that Miyazaki tends to "combine," or unite or merge, "details and exposition" about fantasy elements in his movies wouldn't make sense in context. The text is discussing how little information Miyazaki provides about fantasy elements in his movies, not whether or how he merges such information. *Choice D* is incorrect because in this context, "invent" would mean to create something new or make up something. Saying Miyazaki invents "details and exposition" about fantasy elements in his movies would suggest that he makes up this information. However, the text states that he presents fantasy elements with "little backstory or explanation," indicating that he avoids providing such details, not that he invents them.

QUESTION 5

Choice B is the best answer because based on the text, Wong most likely means she is engaging in, or devoting herself to, an important part of her writing process. In the text, Wong describes how, during what appears to be procrastination ("these distractions," doing "nothing," and "daydreaming"), she actually develops key elements of her writing: "a vibe," "a point," "a phrase," "a hook," "a title," "an image." She goes on to indicate that "a connection or epiphany can happen" during these activities. By stating she is "composing, even if words don't immediately materialize," Wong is arguing that this seemingly idle time is actually a productive part of her creative process—she is mentally developing her work even before putting words on the page.

Choice A is incorrect because the text doesn't suggest that Wong is deceiving, or tricking, herself. Instead, the text indicates that she is making a deliberate argument that her daydreaming and seemingly idle time are genuinely productive and do not amount to self-deception about her feelings regarding any subject. *Choice C* is incorrect because while Wong mentions in the text that "watching or reading something brilliant" can spark connections, the text's main point is that she is actively developing ideas for her own writing during this time, not simply being soothed, or comforted. *Choice D* is incorrect because the text emphasizes the emergence of creative elements like phrases, hooks, and images rather than

the gathering, or collecting, of sources of information. In the text, Wong is describing the mental process of developing her own ideas, not the act of collecting external sources to use in her writing.

QUESTION 6

Choice A is the best answer because it most accurately describes the function of the underlined sentence in the text as a whole. The text begins by providing context about human-robot collaboration in factories, then states that a research team ran an experiment to study how working with robots affects relationships between humans who work together. The text goes on to note that the experiment included teams making electric motor parts. The underlined sentence then specifies the two types of teams: one with only humans and one with both humans and robots. Because there were teams with robots and teams without robots, the researchers were able to find out whether differences between the willingness of participants on either team to share could be explained by the presence of robots on a team. Thus, the underlined portion explains an important part of the experiment's design.

Choice B is incorrect because the underlined sentence describes one aspect of the experimental setup, not a problem that inspired the study. Although the first sentence of the text establishes the context that inspired the research (human-robot cooperation in factories), neither the text as a whole nor the underlined sentence illustrates a specific problem that the study was designed to solve. *Choice C* is incorrect because the research question—whether working with robots affects relationships between humans—is stated earlier in the text, not in the underlined sentence. *Choice D* is incorrect because the experiment's results are stated not in the underlined sentence but in the text's final sentence, which indicates that the researchers found that participants from teams with robots were more likely to share with each other than participants from teams without robots; the underlined sentence just describes one part of the experiment's design.

QUESTION 7

Choice C is the best answer because it most accurately describes the function of the underlined portion in the text as a whole. The underlined portion presents a discrepancy: although Dash's film was "imaginative" and "critically acclaimed," with "a wide release" and "a highly appreciative global audience," it "never received the plaudits it deserved within the US film industry." The text then goes on to describe how interest in the film "reignited" with Beyoncé's release of *Lemonade*, which contained numerous allusions to Dash's film. This renewed interest partially rectified the lack of recognition the film initially received. Thus, the underlined portion presents a discrepancy that the text demonstrates was partially rectified by the film's influence on a later work.

Choice A is incorrect because the text doesn't suggest that receiving more recognition would have prevented the influence of Dash's film on *Lemonade*; rather, it presents *Lemonade* as helping to rectify the lack of recognition for Dash's film. *Choice B* is incorrect because the underlined portion doesn't expand

on an earlier attribute of Dash's film to draw distinctions between it and *Lemonade*; instead, it presents a contrast between the quality of Dash's film and its lack of industry recognition. *Choice D* is incorrect because the underlined portion doesn't mention or allude to the reception of Beyoncé's *Lemonade* and instead focuses on the discrepancy between the merits of Dash's film, on the one hand, and the industry's reception of the film, on the other.

QUESTION 8

Choice B is the best answer because it accurately states the main purpose of the text. The text describes the young man as procrastinating (delaying) to "broach" (bring up) the subject of the tutoring position's "terms," or the details about how much he will be compensated for tutoring the woman's child. He is unable to find an "opening," or an opportunity in the conversation, to discuss this matter with his potential employer, who instead repeats "over and over everything but the thing he would have liked to hear"—namely, the amount the young man will be paid for tutoring her child. Thus, the text's main purpose is to portray the difficulty a person has with raising a topic of conversation.

Choice A is incorrect because the text doesn't portray either the young man as trying to change the woman's mind on a particular issue or her trying to change his; instead, it describes his difficulty in raising an issue—the amount he will be paid for tutoring—in his conversation with her. *Choice C* is incorrect because the text doesn't criticize the young man for struggling to raise the issue of compensation in his conversation with the woman or suggest that the reason he struggles is that he is a timid person; instead, the text portrays his struggle in a sympathetic light, referring to him as a "poor young man" because of the difficulties he faces. *Choice D* is incorrect. In the text, the young man struggles to raise the topic of compensation because the woman both dominates the conversation and, perhaps intentionally, neglects to raise the topic herself. While these two differing conversational approaches may suggest a corresponding difference in personality, this is not the main focus of the text. Instead, the text is primarily concerned with the young man's dilemma as he attempts to speak of compensation.

QUESTION 9

Choice A is the best answer because it most accurately describes the function of the underlined portion in the text as a whole. The text describes the mushroom species *C. geaster* as elusive because it is found only in limited locations. The text then goes on to state that "the mushroom appears to be very selective." The underlined portion immediately follows this characterization by specifying that the mushroom lives on decaying parts of only a few tree species that are found in "these areas," namely Texas, Oklahoma, and the Miyazaki and Nara Prefectures, which the text earlier indicated are the only areas in which the mushroom has been observed. Thus, the underlined portion elaborates on the earlier characterization of *C. geaster* as selective by providing concrete details about the limited conditions in which it's found.

Choice B is incorrect because the underlined portion provides specific information about where the mushroom is found in order to elaborate on its selectivity rather than to emphasize uncertainty. The uncertainty mentioned earlier in the text concerns *C. geaster*'s distribution to only a few locations in the US and Japan, but the underlined portion doesn't reinforce this uncertainty. *Choice C* is incorrect because the underlined portion doesn't indicate that the mushroom causes harm to trees; it simply describes where the mushroom is found (on decaying stumps and roots). *Choice D* is incorrect because although the underlined portion describes where *C. geaster* is found, it doesn't explain a relationship between the mushroom and its habitats; the text explicitly notes that scientists don't know exactly why *C. geaster* lives where it does.

QUESTION 10

Choice A is the best answer because it most accurately describes the main purpose of the text. The text begins by explaining that as part of a study of the biomechanics of wing motion in fruit flies, Johan M. Melis et al. developed a convolutional neural network (CNN) model in order to predict patterns of wing motion produced by muscle activity. The text then indicates that the model's output aligned with findings of previous studies in which researchers had measured these muscle activity patterns directly, thereby providing evidence of the CNN model's effectiveness. The text further notes that this alignment was "one of several indications" that the model accurately represented biomechanical processes. Thus, the text's main purpose is to present evidence in support of the efficacy of Melis et al.'s CNN model.

Choice B is incorrect because the text doesn't explain why Melis et al. chose to use a CNN model instead of direct measurement; rather, the text describes the model's purpose and provides evidence of its effectiveness. The text refers to measurements from direct observation to emphasize the accuracy of the model's predictions, not to explain why Melis et al. chose to develop the CNN model in the first place. *Choice C* is incorrect. Though the text implies that Melis et al.'s CNN model accurately predicted patterns of wing motion, it doesn't explain how Melis et al. improved or refined their model to achieve this accuracy. *Choice D* is incorrect. Though the text does compare results Melis et al. obtained using their CNN model with results from previous studies, the text states that the prior results were obtained through direct measurement, not through other models.

QUESTION 11

Choice B is the best answer because it presents a statement about the Federal Theatre Project (FTP) that is supported by the text. The text indicates that the FTP was one of several government programs that "provided jobs during the Depression." The text also states that the FTP "brought theater to audiences across the country." Thus, the text directly indicates that the FTP created jobs while also making theater accessible to audiences all over the country.

Choice A is incorrect. Although the text mentions that the FTP was able to reach new audiences through touring, which suggests that the theater workers in such productions traveled, the text doesn't claim that these workers traveled to see

new theatrical productions. Rather, the text implies that they traveled in order to work or perform in productions. *Choice C* is incorrect. While the text states that the FTP brought theater productions to rural areas through touring, it doesn't suggest that urban theater productions were moved to rural areas. In addition, the text doesn't discuss the cost of theater productions. *Choice D* is incorrect because the text doesn't discuss the quality of theater productions. In addition, although the text establishes that the FTP was a government program, it doesn't indicate that the government had creative oversight with regard to the FTP's productions.

QUESTION 12

Choice B is the best answer because the text indicates that in his *Histories*, Herodotus wrote of the magnificence of the underground complex at Hawara. According to the text's paraphrase of Herodotus's work, the complex contained "3,000 chambers adorned with carved figures, a dozen courts flanked by white stone pillars, and many winding passages." The text also indicates that Herodotus used the phrase "an unending marvel" to describe the complex. Therefore, the text indicates that Herodotus included in his *Histories* an account of the magnificence of the complex that once stood beneath the pyramid at Hawara.

Choice A is incorrect because the text doesn't address how long it took to construct the pyramid at Hawara or the underlying complex. Rather, the text emphasizes details from the *Histories* about the magnificence of the underground complex beneath the pyramid at Hawara. *Choice C* is incorrect. Although the text does state that the pyramid and underlying structure were built during "a period of great prosperity," this would indicate that the period of prosperity existed before the construction began rather than that the building of these structures caused a period of prosperity. *Choice D* is incorrect because the text doesn't address how, or whether, Herodotus was able to see the complex at Hawara. Although it indicates that Herodotus claimed to have seen the complex, the text offers no information to substantiate that claim.

QUESTION 13

Choice D is the best answer because it presents a statement that, if true, would most directly support the text's characterization of the Chandrayaan-2 mission. The text asserts that although the mission's lander and rover crashed, its orbiter continued to orbit the Moon. Moreover, the text states that the mission has "provided some important information" despite the crash. Since only the orbiter remained in orbit, it can be inferred that the information was obtained by this craft. If the orbiter not only remained in orbit but also identified possible signs of water, as this choice states, then these details would support the text's characterization of the mission as having provided some scientific information.

Choice A is incorrect because it addresses the mission's goal of placing a lander on the Moon, not the mission's success in providing important information despite failing to achieve that goal. Indeed, by stating that goal, this choice actually emphasizes the mission's shortcomings instead of supporting the text's characterization of the mission as partially successful. *Choice B* is incorrect

because this choice states the success of a different mission, Chandrayaan-3, in 2023. Information about a subsequent mission would have no bearing on whether the Chandrayaan-2 mission itself provided important information. *Choice C* is incorrect because this statement describes technical specifications of the Chandrayaan-2 rover—specifically, its number of wheels and weight. These details are irrelevant to the text's characterization of the mission as having successfully provided scientific information despite the crash.

QUESTION 14

Choice C is the best answer because it best describes data from the table that support the researchers' two-part conclusion: that their proposed model maximized profit and that the proposed model might not be ideal for firms needing to minimize cash outflows (costs). The table shows that the proposed model has the highest total profit at 11,344,003 dollars, which supports the first part of the conclusion. The table also shows that the proposed model has a total cost of 30,933,469 dollars, which is higher than the total cost of the lexicographic model and the heuristic model (each at 30,528,134 dollars). The proposed model's higher cost supports the second part of the conclusion that the proposed model might not be ideal for firms needing to minimize cash outflows. Additionally, the fact that the lexicographic model achieves higher profit than the heuristic model while maintaining the same total cost shows that increased profit does not always require increased costs, illustrating why the higher cost of the proposed model may be a concern for firms seeking to minimize cash outflows.

Choice A is incorrect because although the statement accurately reports that the proposed model has the highest total revenue, LCFS revenue, and total cost, it does not use the data to support the second part of the researchers' conclusion: that the model might not be ideal for firms needing to minimize cash outflows. Merely listing the highest values in the table does not explain the trade-off between higher profit and higher cost that the conclusion describes. *Choice B* is incorrect because while the statement about the three models' total revenue and total profit accurately compares total revenue and total profit across models based on the table, it does not address costs and therefore does not support the part of the conclusion that states that the proposed model may present a disadvantage for firms seeking to minimize cash outflows. *Choice D* is incorrect because it focuses on the relationship between total profit and LCFS revenue (in the proposed and lexicographic models), which does not directly address the researchers' conclusion. The conclusion concerns a trade-off in the proposed model: although it maximizes profit, it may be less suitable for firms seeking to keep cash outflows (total cost) low. Therefore, supporting data would need to show that the proposed model yields the highest profit while also requiring higher total cost than at least one of the other models.

QUESTION 15

Choice D is the best answer because it presents a statement that, if true, would most strongly support the text's description of *On Earth We're Briefly Gorgeous* as representative of autofiction. The text identifies two ways in which writers of autofiction, a literary form that combines elements of autobiography and fiction, blur the distinction between authors and their characters: autofiction writers typically model their protagonists' lives after their own and they use a first person narrative voice that is forthright and confessional. That is, protagonists of autofiction, who are proxies of their authors, reveal intimate information about themselves in a frank, unguarded manner. The statement that the family of the protagonist of Vuong's novel is "virtually identical" to his own family aligns with the text's claim that the lives of autofiction protagonists closely resemble those of their authors. Moreover, the statement that Vuong's narrator is "surprisingly frank" aligns with the text's claim about the confessional quality of autofiction. Because these features of Vuong's novel directly illustrate the techniques typically used in autofiction to emphasize its autobiographical aspects, the statement would support the text's description of *On Earth We're Briefly Gorgeous* as representative of autofiction's erasure of the typical distinction between authors of fiction and their characters.

Choice A is incorrect because the statement's description of Vuong's use of poetic language and its blurring of the distinction between poetry and fiction isn't relevant to the text's description of the novel as a representative work of autofiction. The text's discussion of autofiction emphasizes ways in which the form typically blurs the distinction between fiction and autobiography, not the distinction between fiction and poetry. *Choice B* is incorrect because the statement describes the narrative form of Vuong's novel—a letter written by the protagonist to his mother detailing events in chronological order—but it doesn't explicitly discuss any autobiographical dimensions of this aspect of its form that would contribute to the novel's erasure of the distinction between its author and his protagonist. The text suggests that autofictions achieve this erasure by featuring protagonists modeled after their authors and by using a frank, confessional narrative voice, neither of which are features that the characteristics of the novel's form discussed in this statement would illustrate. *Choice C* is incorrect. Although the statement notes that the protagonist of Vuong's novel resembles Vuong and that Vuong has referred to the protagonist as an "alter ego," or an alternate version of himself (details that speak to the text's characterization of authors of autofiction as typically modeling their protagonists after themselves), the statement doesn't address the text's claim about autofiction's typically confessional narrative voice. Moreover, the statement indicates that the protagonist doesn't mention his actual name and uses an alias. The fact that Vuong didn't explicitly name his protagonist after himself—as writers of autofictions typically do—wouldn't align with the text's description of the novel as representative of the erasure of the distinction between author and protagonist that occurs in autofiction. If anything, this detail would suggest one way in which the novel creates some distance between Vuong and his protagonist.

QUESTION 16

Choice D is the best answer because it presents a finding that, if true, would most directly support the text's characterization that the hypothesis of competition between birds and wasps was validated and that there was a clear indication of competitive advantage for birds. As the text explains, the researchers manipulated some nesting boxes to exclude birds and left other boxes accessible to both wasps and birds. If wasps nested in boxes that were accessible to birds less often than in boxes that excluded birds, this fact would suggest both competition between wasps and birds for nesting sites and wasps' competitive disadvantage in this competition. If 80% of co-occupations resulted in wasps abandoning the boxes while birds remained, this too would demonstrate birds' competitive advantage over wasps insofar as birds consistently won the competition for sites accessible to both birds and wasps.

Choice A is incorrect. If boxes manipulated to be accessible only to wasps showed a higher vacancy rate than boxes accessible to both wasps and birds, this fact would suggest wasps' preference for co-occupying the unmanipulated boxes with birds, thus undermining the hypothesis that wasps and birds compete for nesting sites. *Choice B* is incorrect. Because it doesn't indicate what percentage of nest initiation was attributable to wasps versus birds in boxes accessible to both, this finding fails to address the hypothesis that birds have a competitive advantage over wasps. *Choice C* is incorrect because finding that wasps were already in boxes when birds initiated nesting doesn't demonstrate competitive advantage for birds. If anything, this could suggest wasps have an advantage in being first, and without information about who ultimately retained the boxes, this finding doesn't support the hypothesis that birds have a competitive advantage over wasps.

QUESTION 17

Choice D is the best answer because it both accounts for the data shown in the graph and illustrates the researchers' point that increased total seagrass coverage does not necessarily make the seagrass ecosystem more resilient to environmental shocks. The graph shows that total seagrass coverage and widgeon grass coverage in the Chesapeake Bay increased substantially from 2012 to 2018 but then declined sharply in 2019. A sudden environmental shock in early 2019—unusually heavy rains causing algal blooms that blocked sunlight from reaching many seagrass species—would explain this sharp decline. This statement also illustrates the researchers' more general point: despite the previous increases in widgeon grass and total seagrass coverage, the ecosystem was still vulnerable to an environmental shock that affected multiple seagrass species.

Choice A is incorrect because this statement describes only the increases in seagrass coverage from 2012 to 2017. The statement does not illustrate the researchers' point about vulnerability to environmental shocks since an environmental shock would most likely cause a decline in seagrass coverage, such as the one the graph indicates took place in early 2019, when seagrass coverage suddenly declined sharply. *Choice B* is incorrect because if a 2019

water temperature increase in the bay could be tolerated by few species other than widgeon grass, the graph would be expected to show the coverage of widgeon grass remaining stable or increasing while the coverage of other seagrass declined; however, the graph shows widgeon grass coverage also declining sharply in 2019. *Choice C* is incorrect because if a fungal infection affecting only widgeon grass and eelgrass spread in early 2018, the graph would be expected to show declines in those species' coverage beginning in 2018. However, the graph shows continued increases in eelgrass coverage through 2018, with declines in all seagrass species (not just eelgrass and widgeon grass) occurring in 2019.

QUESTION 18

Choice C is the best answer because it most logically completes the text's discussion of displaying time-based media artworks. The text explains that artists who make time-based media artworks carefully choose specific equipment and materials to display those works. The text then addresses a challenge this can create: the original technologies age and can become outdated, meaning it may be hard to keep them working or to replace them. It follows, then, that if the technologies in time-based media artworks break and museums want to continue to exhibit the works, the artists' original visions may need to be adapted to make use of different types of equipment and materials.

Choice A is incorrect because the text focuses on the difficulty of maintaining or replacing outdated and broken technologies used in artworks museums already have, not on the cost of bringing in new works; the text makes no mention of budgets. Further, there's no reason to assume museums would want to replace a time-based media artwork that uses outdated or broken equipment with another work that requires technology. *Choice B* is incorrect because the text discusses the challenge of displaying artworks that involve carefully chosen technologies, focusing on the difficulty of keeping outdated technologies working or replacing them—suggesting that museums want to try to keep displaying them. Nothing in the text suggests that museums would want to discard these works when the technologies break; there's no mention of disposal. *Choice D* is incorrect because the text doesn't address the duration of viewers' experiences with time-based media artworks either now or in the past. The text focuses on the equipment used to display the works, not on how long viewers watch or listen to them.

QUESTION 19

Choice B is the best answer because it most logically completes the text's discussion of decarcinization in crustaceans. The text indicates that many decarcinized groups are extinct and have few living relatives, suggesting that decarcinization could be an "evolutionary dead-end" and that species with a crablike (carcinized) form are better suited for survival. However, the text presents frog crabs as an exception: they are a living decarcinized group with an evolutionary history stretching "as far back as the Early Cretaceous." And even though decarcinization generally leads to the loss of traits that help carcinized species survive within certain ecosystems, frog crabs are described as having traits suited to dwelling in sediment. This detail suggests that ecological

conditions influenced the persistence of frog crabs' decarcinized physical features and implies that a crablike body form would not have been ideally suited for the ecological conditions that frog crabs inhabit. Taken together, the details in the text therefore suggest that despite the evolutionary prevalence of carcinized forms, a crablike body form is not optimal for all species and that certain ecological conditions may favor the persistence of decarcinized forms.

Choice A is incorrect because it contradicts the text, which states that many decarcinized groups have very few living relatives. Additionally, frog crabs represent an example of a group that did benefit from decarcinization, as their decarcinized traits are implied to be well suited to their habitat. *Choice C* is incorrect because the text doesn't indicate that sideways walking or protected abdomens are traits of frog crabs, nor does it discuss which carcinized traits are most essential to frog crabs' survival. The text mentions that frog crabs have traits suited to dwelling in sediment, but these are implied to be decarcinized traits, not traits associated with carcinization. *Choice D* is incorrect because the text doesn't discuss or challenge previous studies of carcinization. Additionally, although the example of frog crabs challenges the view that decarcinization is an "evolutionary dead-end" with few survival benefits, this example doesn't necessarily imply that crablike or carcinized forms have less evolutionary value than previous research has suggested.

QUESTION 20

Choice C is the best answer. The convention being tested is the use of determiners. The plural demonstrative determiner "these" agrees in number with the plural noun "codebreakers."

Choice A is incorrect. The singular demonstrative determiner "that" doesn't agree in number with the plural noun "codebreakers." *Choice B* is incorrect. The singular demonstrative determiner "this" doesn't agree in number with the plural noun "codebreakers." *Choice D* is incorrect. The singular pronoun "it" can't be used as a determiner to modify the noun "codebreakers."

QUESTION 21

Choice D is the best answer. The convention being tested is the use of verb forms within a sentence. A main clause requires a finite (tensed) verb to perform the action of the subject (in this case, "the atomic structure of an element"), and this choice supplies the finite present tense verb "determines" to indicate what the atomic structure does.

Choice A is incorrect because it results in an ungrammatical sentence. The nonfinite participle "determining" doesn't supply the main clause with a finite verb. *Choice B* is incorrect because it results in an ungrammatical sentence. The nonfinite to-infinitive "to determine" doesn't supply the main clause with a finite verb. *Choice C* is incorrect because it results in an ungrammatical sentence. The nonfinite participle "having determined" doesn't supply the main clause with a finite verb.

QUESTION 22

Choice C is the best answer. The convention being tested is the use of verb forms within a sentence. A main clause requires a finite (tensed) verb to perform the action of the subject (in this case, "the painting"), and this choice supplies the finite present tense verb "features" to indicate what the painting depicts.

Choice A is incorrect because it results in an ungrammatical sentence. The nonfinite participle "featuring" doesn't supply the main clause with a finite verb. *Choice B* is incorrect because the finite present tense plural verb "feature" doesn't agree in number with the singular subject "the painting." *Choice D* is incorrect because it results in an ungrammatical sentence. The nonfinite to-infinitive "to feature" doesn't supply the main clause with a finite verb.

QUESTION 23

Choice A is the best answer. The convention being tested is the use and punctuation of a supplementary relative clause. This choice correctly uses a comma and the relative pronoun "which" to create a supplementary relative clause ("which advocated…1930s") that provides additional information about the National Council of American Indians.

Choice B is incorrect because it results in an ungrammatical sentence. A comma and the relative pronoun "which" are needed to create a supplementary relative clause that describes what the National Council of American Indians did. *Choice C* is incorrect because it results in an ungrammatical sentence. The relative pronoun "which" is needed to create a supplementary relative clause that describes what the National Council of American Indians did. *Choice D* is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with "Which." A relative clause beginning with "which" can't stand alone as a complete sentence.

QUESTION 24

Choice C is the best answer. The convention being tested is pronoun-antecedent agreement. The plural pronoun "them" agrees in number with the plural antecedent "her massive collage-based paintings" and clearly indicates that Crosby assembles the paintings by hand.

Choice A is incorrect because the pronoun "her" would illogically suggest that Crosby assembles herself, rather than her paintings. *Choice B* is incorrect because the singular pronoun "that" doesn't agree in number with the plural antecedent "her massive collage-based paintings." *Choice D* is incorrect because the singular pronoun "it" doesn't agree in number with the plural antecedent "her massive collage-based paintings."

QUESTION 25

Choice C is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period is used correctly to mark the boundary between one sentence ("The Eiger...revolution") and another ("Initiated... terror"). The participial phrase beginning with "initiated" modifies the subject of the second sentence, "this shift."

Choice A is incorrect because it results in a run-on sentence. The sentences ("The Eiger...revolution" and "initiated...terror") are fused without punctuation and/or a conjunction. *Choice B* is incorrect because it results in an ungrammatical sentence. The relative pronoun "that" can't be used in this way to join the sentences. *Choice D* is incorrect because it results in a comma splice. A comma can't be used in this way to mark the boundary between sentences.

QUESTION 26

Choice C is the best answer. The convention being tested is the use of punctuation within a sentence. This choice uses a semicolon in a conventional way to join the two main clauses in the sentence. (The first main clause is "The unconventional…'heteronyms,'" followed by the supplement "his…works"; the second main clause is "among…Reis," followed by the supplement "author… style.") The ideas expressed in the two clauses and their supplements are closely linked, so a semicolon is ideal for indicating the close nature of the ideas.

Choice A is incorrect because when coordinating two longer main clauses such as these, it's conventional to use a comma before the coordinating conjunction. *Choice B* is incorrect because a colon can't be used in this way before the conjunction "and." A colon is conventionally used to introduce an element that explains or amplifies the information in the preceding clause, not to precede a coordinating conjunction. *Choice D* is incorrect because it results in a comma splice. Without a conjunction following it, a comma can't be used in this way to join two main clauses.

QUESTION 27

Choice C is the best answer. The convention being tested is subject-modifier placement. This choice makes "Hilma af Klint" the subject of the sentence and places it immediately after the modifying phrase "a groundbreaking visual artist of her day." In doing so, this choice clearly establishes that Hilma af Klint—and not another noun in the sentence—is being described as a groundbreaking visual artist. Additionally, this choice places the noun phrase "her contemporaries" immediately before the modifying phrase "including artists Vasily Kandinsky and Piet Mondrian," clearly establishing that Kandinsky and Mondrian are examples of Hilma af Klint's contemporaries.

Choice A is incorrect because it results in a dangling modifier. The placement of the noun phrase "the explorations of Hilma af Klint" immediately after the modifying phrase illogically suggests that the explorations are a groundbreaking visual artist. *Choice B* is incorrect because it results in a misplaced modifier and a generally unclear sentence structure. The placement of the phrase "well before

many of her contemporaries" immediately after the opening modifier ("a groundbreaking visual artist of her day") separates the modifier from its intended subject ("Hilma af Klint"), thus failing to clearly establish who is being described as a groundbreaking visual artist. Additionally, this choice places the noun phrase "painting" directly before the modifying phrase "including artists Vasily Kandinsky and Piet Mondrian," illogically suggesting that Kandinsky and Mondrian are examples of modes of painting. *Choice D* is incorrect because it results in a misplaced modifier. The placement of the noun phrase "painting" immediately before the modifying phrase "including artists Vasily Kandinsky and Piet Mondrian" illogically suggests that Kandinsky and Mondrian are examples of modes of painting.

QUESTION 28

Choice A is the best answer. "For this reason" logically signals that the information in this sentence—that plays performed in-the-round often use minimal sets and scenery so the view of the actors is not blocked—is a consequence or result of the need for plays to remain visible from all angles.

Choice B is incorrect because "by contrast" illogically signals that using minimal sets and scenery to avoid blocking actors contrasts with the need for plays to remain visible from all angles. Instead, the sentence describes a consequence of the need for visibility. *Choice C* is incorrect because "instead" illogically signals that using minimal sets and scenery to avoid blocking actors is an alternative to the need for plays to remain visible from all angles. Instead, the sentence describes a consequence of the need for visibility. *Choice D* is incorrect because "next" illogically signals that using minimal sets and scenery to avoid blocking actors is the next, and distinctly separate, step in a process that follows the need for plays to remain visible from all angles. Instead, the sentence describes a direct consequence of the need for visibility.

QUESTION 29

Choice C is the best answer. "In reality" logically signals that the information that follows—that the Baroque aesthetic was just an extension of Renaissance stylings—presents what the art historians believe to be the actual truth, in contrast to the commonly held notion that the Baroque era was distinct.

Choice A is incorrect because "first of all" illogically signals that the information about the Baroque aesthetic being an extension of the Renaissance is the first in a series of claims. Instead, the sentence presents what the art historians believe to be the actual truth about the Baroque aesthetic. *Choice B* is incorrect because "similarly" illogically signals that the information about the Baroque aesthetic being an extension of the Renaissance is similar to the art historians' challenge. Instead, the sentence presents what the art historians believe to be the actual truth about the Baroque aesthetic. *Choice D* is incorrect because "nevertheless" illogically signals that the information about the Baroque aesthetic being an extension of the Renaissance is true despite the art historians' challenge to the notion of a distinct Baroque era. Instead, the information about the Baroque aesthetic being an extension of the Renaissance is the very basis for the historians' challenge; the sentence presents what the art historians believe to be the actual truth.

QUESTION 30

Choice D is the best answer. "On the other end of the spectrum" logically signals that the information in this sentence—that Chernow had access to extensive documentation when writing about Hamilton—presents a contrasting exception to the previous claim about the lack of accessible sources for pre-nineteenth-century subjects.

Choice A is incorrect because "to take one well-known example" illogically signals that the information about Chernow's extensive sources exemplifies the previous claim about the lack of accessible sources. Instead, Chernow's situation contrasts with that claim. *Choice B* is incorrect because "it thus came as no surprise that" illogically signals that the information about Chernow's extensive sources is an expected result of the previous claim about the lack of accessible sources. Instead, Chernow's situation contrasts with that claim. *Choice C* is incorrect because "in accordance with this premise" illogically signals that the information about Chernow's extensive sources aligns with the previous claim about the lack of accessible sources. Instead, Chernow's situation contrasts with that claim.

QUESTION 31

Choice B is the best answer because "in other words" logically signals that the claim made in this sentence—that the notion of plastic bags being recyclable is only wishful thinking—is a paraphrase or restatement of the claim made in the previous sentence: plastic bags' theoretical recyclability is countered by practical concerns, as shown by the paltry number of consumers who make the effort to take bags to specialty recycling centers.

Choice A is incorrect because "in response" illogically signals that the sentence's claim about plastic bags' recyclability being little more than wishful thinking is a reaction to the previous claim that the bags' theoretical recyclability is countered by the practical concerns of consumers. Instead, the sentence restates the previous claim. *Choice C* is incorrect because "at the same time" illogically signals that the sentence's claim about plastic bags' recyclability being little more than wishful thinking is occurring simultaneously with or serves as a counterpoint to the previous claim that the bags' theoretical recyclability is countered by the practical concerns of consumers. Instead, the sentence restates the previous claim. *Choice D* is incorrect because "however" illogically signals that the sentence's claim about plastic bags' recyclability being little more than wishful thinking contrasts with the previous claim that the bags' theoretical recyclability is countered by the practical concerns of consumers. Instead, the sentence restates the previous claim.

QUESTION 32

Choice B is the best answer. The sentence indicates the year the Schomburg Center was founded, noting that it was founded in 1925.

Choice A is incorrect. The sentence indicates who the Schomburg Center was named for; it doesn't indicate the year the center was founded. *Choice C* is incorrect. The sentence indicates what the Schomburg Center is; it doesn't indicate the year the center was founded. *Choice D* is incorrect. The sentence indicates the location of the Schomburg Center; it doesn't indicate the year the center was founded.

QUESTION 33

Choice B is the best answer. The sentence emphasizes the aesthetic qualities of SMA by quoting Knight, noting that SMA's handmade, "imperfect" look lends the "undeniably human" technique a "charm and a warmth and a beauty."

Choice A is incorrect. While the sentence quotes Knight, the quoted portion emphasizes the history of the SMA technique ("dates back to the dawn of cinema") rather than its aesthetic qualities. *Choice C* is incorrect. While the sentence quotes Knight, the quoted portion emphasizes a challenge of the SMA technique ("one opportunity to get it right") rather than its aesthetic qualities. *Choice D* is incorrect. While the sentence quotes Knight, the quoted portion emphasizes a challenge of the SMA technique ("a high-wire act") rather than its aesthetic qualities.

Reading and Writing

Module 2

(33 questions)

QUESTION 1

Choice D is the best answer because it most logically completes the text's discussion of the microbiologists' research on bacteria in coral reefs. In this context, "identify" means to recognize and distinguish something based on its characteristics. The text indicates that the team "classified the bacteria by looking at differences in their DNA." This detail, which provides information about *how* the microbiologists categorized the bacteria, supports the earlier claim that the team succeeded at identifying—that is, recognizing and distinguishing—as many as 3 million different species of bacteria.

Choice A is incorrect because saying that the team was able to "repair," or fix, 3 million species of bacteria wouldn't make sense in context. The text describes the team studying and classifying bacteria, not fixing them. *Choice B* is incorrect because saying that the team was able to "build," or construct, 3 million species of bacteria wouldn't make sense in context. The team discovered and classified existing bacteria; they didn't create new species. *Choice C* is incorrect because saying that the team was able to "command," or direct or control, 3 million species of bacteria wouldn't make sense in context. The text describes scientific observation and classification, not an effort to direct bacteria for some purpose.

QUESTION 2

Choice D is the best answer because it most logically completes the text's discussion of why people prefer human-created art over AI-generated art. In this context, "value" means to consider important or hold in high regard. The text presents a hypothesis explaining why people prefer human-created art: people appreciate art more when they believe more work went into its creation. This supports the idea that people value the effort behind a piece of art—that is, they regard the artist's effort as important when determining their appreciation of an artwork.

Choice A is incorrect because saying that people "prevent," or stop, the effort behind a piece of art wouldn't make sense in context. The text is discussing how people's perception of effort affects their appreciation of art, not how people stop effort from occurring. *Choice B* is incorrect because saying that people "neglect," or fail to give proper attention to, the effort behind a piece of art wouldn't make sense in context. The text indicates that people do pay attention to effort—in fact, their appreciation of art increases when they believe more work went into it. *Choice C* is incorrect because saying that people "perform," or carry out, the effort behind a piece of art wouldn't make sense in context. The text is discussing how people perceive the effort that went into creating art, not how they themselves carry out that effort.

QUESTION 3

Choice C is the best answer because it most logically completes the text's discussion of a particular hypothesis about kangaroo extinction. In this context, "revise" means to reconsider and alter based on new information. The text indicates that paleontologists had a hypothesis linking a "shift toward an arid climate" to the extinction of several species of kangaroos, but "new evidence" shows that the shift "occurred well before" the extinction. This context supports the idea that the new evidence is forcing paleontologists to revise—that is, reconsider and modify—their original hypothesis.

Choice A is incorrect because saying that paleontologists are forced to "recollect," or remember, the hypothesis wouldn't make sense in context. The text indicates that new evidence contradicts the hypothesis, which would require the paleontologists to reconsider rather than simply remember their earlier hypothesis. *Choice B* is incorrect because saying that paleontologists are forced to "introduce," or present for the first time, the hypothesis would contradict the text. The phrase "some paleontologists thought" indicates the hypothesis was already being entertained by paleontologists, so it wouldn't need to be introduced. *Choice D* is incorrect because saying that paleontologists are forced to "interpret," or explain the meaning of, the hypothesis wouldn't capture the effect of the new evidence. The text indicates that the evidence contradicts the hypothesis, which means the hypothesis needs to be revised or modified, not merely explained.

QUESTION 4

Choice A is the best answer because it most logically completes the text's discussion of cicada emergences in 2024. In this context, "a convergence" means a coming together or co-occurrence. The text indicates that in 2024, the emergences of two different cicada broods "coincided," or occurred at the same time, in the Midwest and Southeast United States, leading to an unusually large number (a trillion) of cicadas emerging across sixteen states that year.

Choice B is incorrect because describing the event as "a division," or a separation into parts, would contradict the text. The text describes two different broods emerging at the same time, not diverging in terms of their emergences. *Choice C* is incorrect because describing the event as "a succession," or a sequence of

things or events, wouldn't accurately describe what the text depicts. The text indicates that the emergences happened at the same time ("coincided"), not one after another. *Choice D* is incorrect because describing the event as "an expiration," or end point, wouldn't make sense in context. The text describes the simultaneous emergence of two cicada broods; this is the result of a rare overlap in the cicadas' life cycles and does not point to the conclusion of anything.

QUESTION 5

Choice B is the best answer because it most logically completes the text's discussion of how ancient Greek and Roman sculptures depicted human subjects. "Unflattering" means unappealing or less than ideal. The text establishes a contrast, signaled by the phrase "but in fact," between the common characterization of Greco-Roman sculpture as idealizing human subjects and the reality that many such sculptures depict people in highly unglamorous ways. Since idealizing involves enhancing a subject's good qualities, the logical contrast would be to depict them in an unflattering, or unfavorable, light.

Choice A is incorrect because "implausible" means not believable or unlikely to be true. While the text does establish a contrast with the idea that Greco-Roman sculptures idealize human subjects, the established contrast concerns how subjects are presented aesthetically, not whether the depictions are believable. *Choice C* is incorrect because "superficial" means lacking depth, substance, or seriousness. The text contrasts the characterization of Greco-Roman sculpture as idealizing human subjects with the acknowledgment that many such sculptures depict humans in a different way. This contrast is about whether humans are presented in a flattering light, not about whether the sculptures have depth or meaning. *Choice D* is incorrect because "imprecise" means lacking accuracy, exactness, or attention to detail. The text contrasts the characterization of Greco-Roman sculpture as idealizing human subjects with the observation that many sculptures highlight subjects' imperfections. This contrast addresses the artistic choice of how to portray subjects—in an idealizing versus an uncomplimentary manner—not the technical execution of the sculpture.

QUESTION 6

Choice C is the best answer because it states the main purpose of the text. In their exchange, Andrew and Robert present contrasting descriptions of one another. Andrew characterizes Robert as disliking farmwork and not having it in his "nature," or character. Robert agrees with this description of himself and, in turn, characterizes Andrew as "wedded to the soil" and a "product" of it—that is, devoted to the land and shaped by farmwork as a way of life. Andrew also characterizes Robert as more strongly identified with their farming family ("a Mayo through and through") and especially with their father, whose "life-work" is the farm. Thus, the main purpose of the text is to emphasize a difference between the two characters—namely, a difference in how they relate to the family farm.

Choice A is incorrect because no mystery is presented or solved in the dialogue between the two brothers; instead, they explore their contrasting feelings about the family farm. *Choice B* is incorrect because in the dialogue, the two brothers

discuss the family farm, not a vacation destination; indeed, they mention no other location besides the farm. *Choice D* is incorrect because in the dialogue, the two brothers never mention any goals they may share; instead, they focus exclusively on the difference in their respective feelings about the farm.

QUESTION 7

Choice D is the best answer because it most accurately states the function of the underlined sentence in the text as a whole. The text first establishes that there is a copy of *The Great Gatsby* with notes made by Sylvia Plath and that "Plath marked favorite passages and wrote down some of her thoughts." The underlined sentence then provides a specific example of one such note: next to a description of a character's feelings, Plath wrote the French phrase "L'Ennui." Thus, the underlined sentence gives an example of one of Plath's notes in the margins of *The Great Gatsby*.

Choice A is incorrect because nothing in the underlined sentence or in the text as a whole explains why Plath decided to become a poet; rather, the text describes her notes in a copy of *The Great Gatsby* and mentions a poem she later wrote. *Choice B* is incorrect because the text indicates Plath wrote the poem "Ennui" after reading *The Great Gatsby*, not before. *Choice C* is incorrect because, as the text explains, the phrase "L'Ennui" refers not to excitement but to "weariness and boredom." So even if Plath may have found Fitzgerald's writing exciting, the underlined sentence doesn't indicate that.

QUESTION 8

Choice A is the best answer because it presents a statement about many new albums that the author of Text 1 and the author of Text 2 would most likely agree with. The author of Text 1 begins by explaining that in the past when music albums were recorded on physical formats like records, musicians and music producers were limited in how many minutes of music they could include on an album. The text goes on to state that the amount of music artists can include on an album is no longer limited by physical formats. Text 1 then concludes by stating that this allows today's artists to make longer albums than artists in the past could. Similarly, the author of Text 2 notes that streaming services "remove the limitations of physical formats." Text 2 then argues that this explains why many new albums that were created for streaming services are longer than albums made for physical formats. Because both authors come to similar conclusions about how changes to album formats have affected album length over time, they would most likely agree with the statement that many new albums are longer than albums generally used to be.

Choice B is incorrect because neither text mentions anything about the loudness of albums. Both texts focus on album length and the constraints imposed by physical formats, not on album volume. *Choice C* is incorrect because neither text discusses artwork associated with albums. Rather, both texts address changes in album length resulting from the shift away from physical formats. *Choice D* is incorrect because neither text makes any claims about album sales. The author of Text 1 discusses how physical formats affected album length, and the author of

Text 2 discusses how music streaming services have affected album length and focus, but neither author addresses whether album sales have increased or decreased over time.

QUESTION 9

Choice C is the best answer because it presents a statement about He and colleagues' conclusion that is supported by the text. The text indicates that He and colleagues studied how a small change to a food-delivery phone app—making the default choice for each order "no cutlery"—affects how frequently customers request plastic cutlery. The text then says that the researchers' results led them to conclude that "small changes to the app could reduce plastic waste in China" by up to 3.26 million metric tons per year. In other words, the researchers concluded that small changes to how a food-delivery app works can greatly lower plastic waste.

Choice A is incorrect because the text doesn't discuss the popularity of food-delivery apps, nor does it discuss apps that prevent customers from requesting cutlery. Although the app that was studied can be adjusted so that "no cutlery" is the default option, the text implies that customers using the app can still request cutlery. *Choice B* is incorrect. Although the text discusses an environmentally friendly change to a food-delivery app, this reflects a choice made by researchers, not by consumers. In addition, the text doesn't address customers' understanding of how food-delivery phone apps work. *Choice D* is incorrect because the text doesn't address whether plastic waste in China is projected to increase in the future. Instead, the text describes how plastic waste in China could be reduced by making a small change to a food-delivery phone app.

QUESTION 10

Choice A is the best answer because it presents a reason for the scientific value of simulants that is supported by the text. The text explains that scientists who will send exploration devices to Mars can use simulants (materials that simulate different surfaces of planets) to better understand "how well their devices will handle the surface" when they are actually operated on Mars. This suggests the scientists are trying out the devices on a simulation of Mars's surface before actually sending them to Mars. Thus, simulants are important because they allow scientists to test the ability of equipment to withstand some of the conditions it will encounter during a real mission.

Choice B is incorrect. Although the text indicates that simulants can include soil from Earth, it indicates that scientists are using the materials to better understand how equipment will handle conditions on Mars, not on Earth. *Choice C* is incorrect because the text makes no mention of chemical properties or of tracking changes in planetary soils over time; it focuses instead on how planetary soil physically affects equipment (for example, sand and dust on Mars clogging filters). *Choice D* is incorrect. The text explains that scientists use simulants to study aspects of Mars's surface and how equipment will operate on Mars, but it doesn't address comparing those aspects to aspects of Earth's surface.

QUESTION 11

Choice C is the best answer because it presents a statement about the artist's beliefs that is supported by the text. The speaker describes the artist's thoughts after completing the sculpture, stating that the artist "proudly thought" two things: "And surely this shall last!" and "Fixed in immortal marble is my fame!" These lines indicate that the artist believed his sculpture would endure over time ("this shall last") and that this permanence would in turn secure his lasting reputation (he asserts that his fame is "fixed in immortal marble"). In other words, the artist believed the sculpture would bring him enduring fame by withstanding time.

Choice A is incorrect because the text doesn't indicate that the artist believed the sculpture would need repair. On the contrary, the artist believed the sculpture would "surely…last" and that his fame was "fixed in immortal marble," quotations that emphasize the work's permanence rather than its potential deterioration and restoration. *Choice B* is incorrect because the text doesn't indicate that the artist believes that his sculpture would be recognized as more beautiful than other images of Venus. The artist's thoughts focus on the permanence of the sculpture and his enduring fame, not on comparisons to other works. *Choice D* is incorrect because the text doesn't indicate that the artist believed the sculpture would be praised for its intricate details. Although the text mentions "the last touch of his chisel," the artist's statements emphasize the sculpture's permanence and his lasting fame, not its detailed craftsmanship.

QUESTION 12

Choice D is the best answer because it most accurately conveys the effect of omitting certain aspects of Alexander Hamilton's political beliefs from the musical. The text indicates that the musical depicts Hamilton as a "compelling and well-defined protagonist," but other aspects of Hamilton's life—such as his elitism and how he mistrusted others' democratic politics—were obscured, or left out. The text goes on to say that the musical's portrayal of Hamilton doesn't convey his ideological complexity. The fact that obscuring Hamilton's elitism and mistrust of democratic politics results in a "well-defined protagonist" who lacks complexity suggests that these aspects were omitted to create an unambiguous thematic presentation of Hamilton's life—one that presents him as simply a self-made success story rather than as the more complicated figure he really was.

Choice A is incorrect. Although the text points out that some important information about Hamilton's views has been left out of the musical, the text doesn't address whether Hamilton's contributions to US history have been overlooked more generally or suggest that the omissions from the musical were made in an attempt to highlight such an oversight. *Choice B* is incorrect because the text doesn't mention any prevailing historical consensus about Hamilton. Instead, the text indicates that the musical omitted certain aspects of Hamilton's views, not that it challenged established views about him. *Choice C* is incorrect. The text doesn't suggest that the musical's omissions were intended to encourage audiences to emulate Hamilton's politics. Rather, the text indicates that the omissions created a "compelling" protagonist, but it doesn't suggest the purpose was to promote Hamilton's political views, which the text says were partly omitted from the musical.

QUESTION 13

Choice D is the best answer because it presents a finding that, if true, would most directly support the underlined claim that the effect of product announcements fades quickly and companies therefore need to be careful in timing announcements and releases of new products. The text explains that announcing a new product before its release can increase consumer excitement, which can lead to more purchases. If, however, consumer surveys show low excitement for products that were announced long before their release, that would indicate that the excitement generated by an announcement diminishes over time, thereby supporting the claim that the effect fades quickly and timing of the announcement is therefore important.

Choice A is incorrect because a finding that consumers prefer new products over older products would have no bearing on the underlined claim. The underlined claim focuses on how the timing of product announcements and releases affects consumer excitement for new products; a finding about preferences for certain products wouldn't indicate anything about how the timing of product announcements affects these preferences. *Choice B* is incorrect. The existence of a link between the kinds of information companies provide about new products and purchase likelihood of those products wouldn't support the underlined claim. The underlined claim and the text as a whole focus on the link between consumer excitement and the timing of new product announcements, not on the link between the kinds of information contained in those announcements and purchase likelihood. *Choice C* is incorrect because a finding that consumers are more likely to buy from companies they already use would address brand loyalty, which is unrelated to the claim about the fading effect of new product announcements and the importance of timing those announcements well. This finding would reveal nothing about whether consumer excitement for new products diminishes over time.

QUESTION 14

Choice C is the best answer because it most effectively uses data from the graph to complete the statement that the degree to which spoilers increased enjoyment varied across stories. In the graph, "A Chess Problem" shows a relatively large difference between spoiled and unspoiled enjoyment ratings, with the spoiled rating at approximately 7 and the unspoiled rating at approximately 6, a difference of about 1 point. In contrast, "Owl Creek Bridge" shows a difference that is close to zero, with spoiled and unspoiled ratings both at approximately 5. This contrast between the two stories' ratings illustrates the variation in the degree of the spoiler effect on enjoyment ratings described in the text.

Choice A is incorrect because it does not effectively use data from the graph to complete the text's statement about variation in the degree to which spoilers increased readers' enjoyment of stories. In the graph, both "Blitzed" and "A Chess Problem" show relatively large differences between spoiled and unspoiled ratings (each close to a 1-point difference). Because the differences are comparable in size, these two stories' ratings do not clearly illustrate variation in the magnitude of the spoiler effect across stories. *Choice B* is incorrect because it does not

effectively use data from the graph to complete the text's statement about variation in the degree to which spoilers increased readers' enjoyment of stories. In the graph, "The Calm" and "Plumbing" show differences between spoiled and unspoiled ratings that are relatively similar (each a little under 1 point); these two stories' ratings therefore do not clearly illustrate variation in the magnitude of the spoiler effect across stories. *Choice D* is incorrect because it does not effectively use data from the graph to complete the text's statement about variation in the degree to which spoilers increased readers' enjoyment of stories. In the graph, both "Blitzed" and "Plumbing" show relatively large differences between spoiled and unspoiled ratings (each close to a 1-point difference). Because the differences are comparable in size, these two stories' ratings do not clearly illustrate variation in the magnitude of the spoiler effect across stories.

QUESTION 15

Choice C is the best answer because it best describes data from the table that support the conclusion that the mating environment hypothesis is not well supported by the researchers' observational data. The hypothesis predicts that plants adjust their sex allocation to compensate for reduced mating opportunities, which should increase the probability of successful pollination (that is, reproduction). The table shows that the proportion of male flowers changed substantially over the observation period. The proportion of male flowers was 0.45 on day 5, 0.50 on day 10, and 0.48 on day 15, and then it dropped to 0.13 on day 20 (meaning it had become overwhelmingly female biased by day 20). However, despite this dramatic shift in sex allocation, the estimated reproductive success rate of male flowers remained constant at 0.29 throughout the observation period. If the hypothesis were supported, the changes in sex allocation would be expected to affect reproductive success. However, the data show no such pattern, indicating that the hypothesis is not well supported.

Choice A is incorrect because a comparison of sex allocations over the course of the observational period doesn't address whether the described sex allocation patterns were associated with changes in reproductive success, which is what the mating environment hypothesis predicts. Moreover, while the table indicates that the proportion of male flowers on day 20 was 0.13 (meaning it was clearly female biased on that day), the table also indicates that the proportion of male flowers was 0.45 on day 5, 0.50 on day 10, and 0.48 on day 15—values that are all relatively close to an even split, with day 5 and day 15 being especially similar. A statement that sex allocation is "female biased" on days 5 and 20 and "largely evenly distributed" on days 10 and 15 therefore makes for an imprecise description of the data in the table. *Choice B* is incorrect because an observation about the relationship between the total number of open flowers and reproductive success doesn't address whether changes in sex allocation positively affect reproductive success, which is what the mating environment hypothesis predicts. *Choice D* is incorrect because it provides information that is largely irrelevant to the researchers' conclusion about the mating environment hypothesis. An observation about the timing of peaks in the total number of open flowers and in the proportion of male flowers doesn't address whether changes in sex allocation positively affect reproductive success, which is what the mating environment hypothesis predicts.

QUESTION 16

Choice C is the best answer because it most logically completes the text's discussion of methods for removing microplastics from water. The text establishes that filtration is widely used but presents a problem: it is typically unable to capture very small microplastics. The text then describes a sound wave treatment system that can remove very small microplastics, including those 0.01 mm wide. Because the sound wave system successfully removes the very small microplastics that filtration can't capture, it may help solve the problem associated with filtration—namely, its inability to capture very small microplastics.

Choice A is incorrect because the text doesn't compare the ability of filters and sound waves to remove large microplastics. The text states that filtration is often used to remove microplastics (less than 5 mm wide) but is typically unable to capture very small microplastics, implying that it can capture and remove larger ones, but the text doesn't suggest that filters are superior to sound waves for removing large microplastics. *Choice B* is incorrect. Although the text states that the sound wave system causes microplastic particles in water flowing through a metal tube to gather in different parts of the tube, which allows for clean and polluted water to exit through different outlets, this system is presented as an alternative to filtration. Tubes and outlets aren't explicitly characterized as components of filtration systems. *Choice D* is incorrect because the text doesn't suggest that combining filtration with sound waves enhances efficiency. The text presents the sound wave system as an alternative approach that addresses a limitation of filtration, not as an approach that should be combined with filtration.

QUESTION 17

Choice D is the best answer because it most logically completes the text's discussion of the importance of bark water for lichens. The text establishes that lichens in the control simulation had access to all water sources, whereas lichens in the experimental simulation had access to all water sources except bark water. The text then states that the experimental simulation predicted that certain species of lichens would experience decreased survival during summer due to evaporative water loss. In contrast, the control simulation, which provided access to bark water, did not predict decreased survival for these lichen species. Taken together, these findings suggest that access to bark water helped these lichen species survive during summer despite the effects of evaporative water loss. In other words, access to bark water may help offset the effects of seasonal (summer) water loss for some lichen species.

Choice A is incorrect. Although the text identifies multiple sources of water for lichens, it doesn't provide information about the proportions or amounts of absorbed water that come from each source. The text therefore doesn't support the inference that most of the water lichens absorb is bark water. *Choice B* is incorrect because the text doesn't suggest that only specialized lichen species can absorb bark water. The text indicates that within the control simulation, in which lichens had access to bark water, no species were found to experience a decrease in survival in the summer, whereas in the experimental simulation (in which bark water was excluded) certain species were predicted to experience a

decrease in survival in the summer. While these findings suggest that these lichen species benefit from absorbing bark water during dry seasons, they don't suggest that only some specialized species can absorb bark water. *Choice C* is incorrect because it reverses the relationship described in the text. The text indicates that the experimental simulation (in which bark water was excluded) predicted that some lichen species would experience decreased biomass production, meaning that access to bark water is associated with higher biomass production.

QUESTION 18

Choice D is the best answer. The convention being tested is the use of verb forms within a sentence. A main clause requires a finite (tensed) verb to perform the action of the subject (in this case, "historians"), and this choice supplies the finite present tense verb "believe" to indicate what historians think.

Choice A is incorrect because it results in an ungrammatical sentence. The nonfinite to-infinitive "to have believed" doesn't supply the main clause with a finite verb. *Choice B* is incorrect because it results in an ungrammatical sentence. The nonfinite to-infinitive "to believe" doesn't supply the main clause with a finite verb. *Choice C* is incorrect because it results in an ungrammatical sentence. The nonfinite participle "believing" doesn't supply the main clause with a finite verb.

QUESTION 19

Choice C is the best answer. The convention being tested is punctuation use within a sentence. No punctuation is needed between the preposition "from" and its complement "the private collections of French aristocrats." The complement completes the meaning of the preposition in the phrase "confiscated from the private collections," and any punctuation between them results in an ungrammatical sentence.

Choice A is incorrect because no punctuation is needed between the preposition and its complement. *Choice B* is incorrect because no punctuation is needed between the preposition and its complement. *Choice D* is incorrect because no punctuation is needed between the preposition and its complement.

QUESTION 20

Choice B is the best answer. The convention being tested is end-of-sentence punctuation and syntax. This choice correctly uses a period to punctuate a declarative sentence in which the linking verb "is" is followed by a fused relative clause ("what has earned him his enduring fame") that completes the sentence and makes a statement about what earned Machito his enduring fame.

Choice A is incorrect. The structure requires a clause that completes the declarative sentence that begins with "the fusion…is," not an interrogative clause that introduces a direct question, such as "what has his enduring fame earned him?" The word "what" functions not as a question word but as a fused relative pronoun (meaning "the thing that") to help explain what earned Machito his enduring fame. *Choice C* is incorrect because it results in a confusing and ungrammatical sentence that fails to complete the sentence with a logical

statement about what earned Machito his enduring fame. *Choice D* is incorrect. It's unconventional to use a question mark in this way to punctuate a declarative sentence that makes a statement, such as "However…fame." The word "what" functions not as a question word but as a fused relative pronoun (meaning "the thing that") to help explain what earned Machito his enduring fame.

QUESTION 21

Choice C is the best answer. The convention being tested is the use of punctuation within a sentence. This choice correctly uses a comma to mark the boundary between the introductory phrase ("In addition…crack") and the main clause ("mountain goats…cliffs").

Choice A is incorrect because it fails to mark the boundary between the introductory phrase ("In addition…crack") and the main clause ("mountain goats… cliffs") with appropriate punctuation. *Choice B* is incorrect. Including the conjunction "or" would illogically extend the series "groove or crack," making "mountain goats" appear to be another thing that hooves can dig into. Additionally, it fails to mark the boundary between the introductory phrase and the main clause with appropriate punctuation. *Choice D* is incorrect. Including the conjunction "or" would illogically extend the series "groove or crack," making "mountain goats" appear to be another thing that hooves can dig into.

QUESTION 22

Choice C is the best answer. The convention being tested is end-of-sentence punctuation. This choice correctly uses a period to punctuate a declarative sentence that makes a statement about Leopold's perspective ("For… development").

Choice A is incorrect. The structure requires a declarative clause that makes a statement about Leopold's views, not an interrogative clause that asks a direct question, such as "what did he view as unnecessary development." *Choice B* is incorrect. The structure requires a declarative clause that makes a statement about Leopold's views, not an interrogative clause that asks a direct question, such as "what did he view as unnecessary development?" *Choice D* is incorrect. It's unconventional to use a question mark in this way to punctuate a declarative sentence that makes a statement.

QUESTION 23

Choice A is the best answer. The convention being tested is pronoun-antecedent agreement. The plural pronoun "they" agrees in number with the plural antecedent "two oil landscape paintings," and clearly indicates that both paintings were displayed.

Choice B is incorrect because the singular pronoun "this" doesn't agree in number with the plural antecedent, which refers to two paintings. *Choice C* is incorrect because the singular pronoun "it" doesn't agree in number with the plural antecedent, which refers to two paintings. *Choice D* is incorrect because the indefinite pronoun "some" is vague in this context; it doesn't clearly indicate whether one painting or both paintings were displayed.

QUESTION 24

Choice A is the best answer. The convention being tested is subject-modifier placement. This choice makes the noun phrase "these personas" the subject of the sentence and places it immediately after the modifying phrase "fictional yet realistic." In doing so, this choice clearly establishes that the personas—and not another noun in the sentence—are being described as fictional yet realistic.

Choice B is incorrect because it results in a dangling modifier. The placement of the noun phrase "UX designers" immediately after the modifying phrase illogically suggests that the UX designers are fictional yet realistic. *Choice C* is incorrect because it results in a dangling modifier. The placement of the noun phrase "actual users" immediately after the modifying phrase illogically suggests that the users are fictional yet realistic. *Choice D* is incorrect because it results in a dangling modifier. The placement of the noun phrase "specific details" immediately after the modifying phrase illogically suggests that the specific details are fictional yet realistic.

QUESTION 25

Choice B is the best answer. The convention being tested is the use of punctuation within a sentence. This choice correctly uses a comma to mark the boundary between the main clause ("It explores…century") and the supplementary element ("revealing…US") that provides additional information about the documentary.

Choice A is incorrect because it fails to mark the boundary between the main clause and the supplementary element with appropriate punctuation. Without a comma, "revealing" could be misread as a restrictive (essential) modifier of "century," suggesting that the sentence is describing a specific type of century rather than introducing additional information about the documentary. *Choice C* is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with "revealing." *Choice D* is incorrect because a semicolon can't be used in this way to join the main clause ("It explores…century") and the supplementary element ("revealing…US"). A semicolon is conventionally used to join two main clauses, not a main clause and a supplementary phrase.

QUESTION 26

Choice B is the best answer. "To that end" logically signals that the information in this sentence—that A. Philip Randolph planned a large anti-segregation march—describes an action taken to achieve the goal stated in the previous sentence: to persuade President Roosevelt to ban racial segregation in the military.

Choice A is incorrect because "in some cases" illogically signals that the information about Randolph planning a march represents one of several possible scenarios related to the activists' efforts. Instead, the march was a specific action taken to achieve the activists' goal. *Choice C* is incorrect because "apart from that" illogically signals that the information about Randolph planning a march is separate from or in addition to the previous information about activists seeking to persuade the president. Instead, the march was an action taken to achieve the

activists' goal. *Choice D* is incorrect because "by comparison" illogically signals that the information about Randolph planning a march is being compared to the previous information about activists seeking to persuade the president. Instead, the march was an action taken to achieve the activists' goal.

QUESTION 27

Choice C is the best answer. "To be exact" logically signals that the information in this sentence—that echinoderms are classified as macrobenthic organisms—provides more specific, precise details elaborating on the previous general information about echinoderms being benthic organisms.

Choice A is incorrect because "as a result" illogically signals that the information about echinoderms being macrobenthic organisms is a consequence of the previous information about them being benthic organisms. Instead, the sentence provides more specific details about their classification. *Choice B* is incorrect because "in other words" illogically signals that the information about echinoderms being macrobenthic organisms is a paraphrase or restatement of the previous information about them being benthic organisms. Instead, the sentence provides more specific details about their classification. *Choice D* is incorrect because "by contrast" illogically signals that the information about echinoderms being macrobenthic organisms contrasts with the previous information about them being benthic organisms. Instead, the sentence provides more specific details about their classification.

QUESTION 28

Choice B is the best answer. The sentence describes the process of chroma keying, noting that it involves filming two videos and then using video editing software to replace the blue or green background of one video with the desired background of the other.

Choice A is incorrect. The sentence explains why blue and green backgrounds are preferred; it doesn't describe the chroma keying process. *Choice C* is incorrect. The sentence defines chroma keying in general terms, noting only that it is "often used to replace the background in a video" without describing the process. *Choice D* is incorrect. The sentence notes that chroma keying can be used to "replace the background in a video"; it doesn't describe the process of chroma keying.

QUESTION 29

Choice D is the best answer. The sentence emphasizes a similarity between Macready and Keene, noting that both were actor-managers who managed theaters where they also performed.

Choice A is incorrect. While the sentence does emphasize a similarity between Macready and Keene, it misrepresents information from the notes: Keene managed Laura Keene's Theatre in New York, not the Covent Garden Theatre in London. *Choice B* is incorrect. The sentence doesn't emphasize a similarity between Macready and Keene; instead, it uses Keene as an example of an

actor-manager. *Choice C* is incorrect because the sentence emphasizes a difference between Macready and Keene (the locations of their theaters) rather than emphasizing a similarity between them.

QUESTION 30

Choice C is the best answer. The sentence explains Cummings and Knapp's contribution to Lullfitz's study, noting that they provided information about their ancestors transporting youlk plants, which supported Lullfitz's hypothesis about the plants.

Choice A is incorrect. While the sentence mentions that Cummings and Knapp assisted with Lullfitz's study, it doesn't explain what their specific contribution was. *Choice B* is incorrect. The sentence misrepresents information from the notes; Cummings and Knapp confirmed Lullfitz's hypothesis about the plants' transportation, not her finding about the plants' DNA sequences. *Choice D* is incorrect. While the sentence indicates that Cummings and Knapp had information that was relevant to Lullfitz's study, it doesn't explain what that information was or how it contributed to her study.

QUESTION 31

Choice B is the best answer. The sentence specifies Percival Lowell's contributions to the discovery of Pluto, noting that he began the search in 1905 and left money to upgrade the observatory where Pluto was later discovered.

Choice A is incorrect. The sentence misrepresents information from the notes; Clyde Tombaugh, not Lowell, recorded the first photographic evidence of Pluto in 1930. *Choice C* is incorrect. The sentence describes Tombaugh's contribution to the discovery of Pluto and merely mentions that it occurred at Lowell's observatory; it doesn't specify Lowell's contributions to the discovery. *Choice D* is incorrect. While the sentence mentions that Lowell was honored for his contributions, it doesn't specify what those contributions were.

QUESTION 32

Choice D is the best answer. The sentence makes a generalization about how word order is employed across languages, noting that the majority of languages place the subject before the verb and object (since 87% use SVO or SOV order).

Choice A is incorrect. The sentence defines the term "word order"; it doesn't make a generalization about how word order is employed across languages. *Choice B* is incorrect. The sentence describes how linguistic typologists use word order; it doesn't make a generalization about how word order is employed across languages. *Choice C* is incorrect. The sentence describes what linguistic typologists do; it doesn't make a generalization about how word order is employed across languages.

QUESTION 33

Choice D is the best answer. The sentence emphasizes a difference between carbon nanotubes and graphite, noting that the graphene sheets in graphite are stacked, whereas the graphene sheets in carbon nanotubes form a cylinder.

Choice A is incorrect. The sentence misrepresents information from the notes by describing graphite as cylindrical and by attributing the flat honeycomb pattern to nanotubes rather than to graphene sheets. *Choice B* is incorrect. The sentence doesn't emphasize a difference between nanotubes and graphite; while it states that there is a contrast between the two, it describes graphite only as "a carbon allotrope composed of graphene sheets," which is also true of carbon nanotubes. *Choice C* is incorrect because, in mentioning only that graphite and carbon nanotubes are "composed of stacked or wrapped graphene sheets," the sentence doesn't emphasize the difference between the two structural forms (graphite is stacked, while carbon nanotubes are wrapped).

Math

Module 1

(27 questions)

QUESTION 1

Choice D is correct. If the number of plants sold increased each day during a four-day period, it follows that the number of plants sold on each of the days must be greater than the number of plants sold on the previous day. The line graph in choice D shows the number of plants sold increasing from left to right, indicating that the number of plants sold on each of the days is greater than the number of plants sold on the previous day. Therefore, of the given choices, choice D is the only line graph that shows the number of plants sold increasing each day.

Choice A is incorrect. This line graph shows that the number of plants sold remained constant each day rather than increased each day. *Choice B* is incorrect. This line graph shows that the number of plants sold decreased each day rather than increased each day. *Choice C* is incorrect. This line graph shows that the number of plants sold increased from day 1 to day 2 but then decreased from day 2 to day 3 and from day 3 to day 4 rather than increased each day.

QUESTION 2

Choice D is correct. It's given that the solution to a system of linear equations is $(5, 5)$. It follows that the graph of the two lines represented by the system intersect at the point $(5, 5)$. Of the given choices, only choice D is a graph of two lines that intersect at the point $(5, 5)$. Therefore, of the given choices, only choice D could be the graph of the equations in the system.

Choice A is incorrect. This is the graph of a system of linear equations whose solution is $(2.5, 2.5)$ rather than $(5, 5)$. *Choice B* is incorrect. This is the graph of a system of linear equations whose solution is $(5, 0)$ rather than $(5, 5)$. *Choice C* is incorrect. This is the graph of a system of linear equations with no solutions rather than a system of linear equations whose solution is $(5, 5)$.

QUESTION 3

Choice D is correct. It's given that during a race, a bicyclist's speed was 37 feet per second. Since 1 minute is equal to 60 seconds, 37 feet per second is equivalent to $\left(\frac{37 \text{ feet}}{1 \text{ second}}\right)\left(\frac{60 \text{ seconds}}{1 \text{ minute}}\right)$, or 2,220 feet per minute.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice B is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.

QUESTION 4

Choice A is correct. It's given that the system has infinitely many solutions. A system of two linear equations has infinitely many solutions when the two linear equations are equivalent. For the equations $y = 4x - 13$ and $y = ax - 13$ to be equivalent, the coefficients of x must be the same. Therefore, the value of a is 4.

Choice B is incorrect. If $a = -9$, the system of equations would have exactly one solution rather than infinitely many solutions. *Choice C* is incorrect. If $a = -13$, the system of equations would have exactly one solution rather than infinitely many solutions. *Choice D* is incorrect. If $a = -17$, the system of equations would have exactly one solution rather than infinitely many solutions.

QUESTION 5

Choice A is correct. Adding 38 to each side of the given equation $y - 38 = mx$, where m, x, and y are distinct positive numbers, yields $y = mx + 38$. Therefore, the equation $y = mx + 38$ correctly expresses y in terms of m and x.

Choice B is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 6

The correct answer is 40. It's given that Mara has read 120 pages of a 160-page research paper. The number of pages remaining can be found by subtracting the number of pages read from the total number of pages, which is $160 - 120$, or 40 pages. It's also given that Mara reads 1 page every minute on average. It follows that Mara will spend $1(40)$, or 40, minutes reading the remaining pages of the research paper.

QUESTION 7

The correct answer is 27. The table shows that 6 homes were designed 21 to 25 years ago, 12 homes were designed 26 to 30 years ago, and 9 homes were designed 31 to 35 years ago. Therefore, $6 + 12 + 9$, or 27, of the 58 homes were designed by the architecture firm 21 or more years ago.

QUESTION 8

Choice C is correct. The vertex of the graph shown represents a maximum value. The vertical axis, y, gives the estimated revenue, in dollars, for a company when the price of the company's product is x dollars. Therefore, the y-value of the vertex of the graph represents the maximum estimated revenue, in dollars, in this context.

Choice A is incorrect and may result from conceptual errors. *Choice B* is incorrect and may result from conceptual errors. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 9

Choice C is correct. It's given that the equation $y = 500 - 148x$ gives the machine's distance, in meters, from the designated location x hours after the start of the experiment. For a linear equation of the form $y = b + mx$, where m and b are constants, b represents the value of y when $x = 0$. It follows that in the given equation, 500 represents the value of y when $x = 0$. Since $x = 0$ corresponds to the start of the experiment, the best interpretation of 500 in this context is the machine's distance y, in meters, from the designated location at the start of the experiment.

Choice A is incorrect and may result from conceptual errors. *Choice B* is incorrect. The machine's velocity, in meters per hour, during the experiment is the best interpretation of -148, not 500. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 10

Choice C is correct. Adding the first equation to the second equation in the given system yields $(6x + (-6x)) + (6y + 2y) = 50 + 6$, or $8y = 56$. Dividing both sides of this equation by 8 yields $y = 7$.

Choice A is incorrect. This is the value of $-2y$, not y. *Choice B* is incorrect. This is the value of $-y$, not y. *Choice D* is incorrect. This is the value of $2y$, not y.

QUESTION 11

Choice C is correct. It's given that the scatterplot shows the relationship between two variables, x and y, and the data are modeled using a linear equation. As the x-values of the points in the scatterplot increase, the y-values also increase, which indicates that the slope of this linear model is positive. Additionally, data points near $(2, 2)$, $(10, 10)$, and $(12, 12)$ indicate that y increases at approximately the same rate as x. Of the given equations, $y = x$ best represents this relationship, since the x-values of the data points tend to be similar to the y-values. Therefore, the most appropriate linear model for the data shown is $y = x$.

Choice A is incorrect. This equation indicates that the *y*-values of the points in the scatterplot decrease as the *x*-values increase, and the slope of this linear model is negative, not positive. *Choice B* is incorrect. This equation indicates that the *y*-values of the points in the scatterplot decrease as the *x*-values increase, and the slope of this linear model is negative, not positive. *Choice D* is incorrect. This equation indicates that the *y*-values of the points in the scatterplot increase at a faster rate than the *x*-values, not at approximately the same rate.

QUESTION 12

Choice A is correct. It's given that g is defined by $g(x) = (14 - 2x)(8 + 2x)$, which represents a quadratic function with a maximum value. The maximum value of $g(x)$ corresponds to the value of x that's equidistant from the two zeros of the function g. The zeros of the function g are the values of x for which $g(x) = 0$. Substituting 0 for $g(x)$ in the equation $g(x) = (14 - 2x)(8 + 2x)$ yields $0 = (14 - 2x)(8 + 2x)$. By the zero product property, if $0 = (14 - 2x)(8 + 2x)$, then either $14 - 2x = 0$, or $8 + 2x = 0$, or both. Subtracting 14 from both sides of the equation $14 - 2x = 0$ yields $-2x = -14$. Dividing both sides of this equation by -2 yields $x = 7$. Subtracting 8 from both sides of the equation $8 + 2x = 0$ yields $2x = -8$. Dividing both sides of this equation by 2 yields $x = -4$. It follows that the zeros of function g are 7 and -4. The value of x that is equidistant from $x = 7$ and $x = -4$ is equivalent to the mean of $x = 7$ and $x = -4$, which is $x = \frac{7 + (-4)}{2}$, or $x = 1.5$. Since 1.5 is equidistant from 7 and -4, the value of x for which $g(x)$ reaches its maximum is 1.5.

Choice B is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 13

The correct answer is 2. Substituting 5 for x in the given equation yields $f(5) = \frac{12}{11 - 5}$, which is equivalent to $f(5) = \frac{12}{6}$, or $f(5) = 2$.

QUESTION 14

The correct answer is -9. It's given that the *y*-intercept of the graph of $5x + 3y = -27$ in the *xy*-plane is $(0, y)$. Substituting 0 for x in the equation $5x + 3y = -27$ yields $5(0) + 3y = -27$, or $3y = -27$. Dividing both sides of this equation by 3 yields $y = -9$. Therefore, the value of y is -9.

QUESTION 15

Choice B is correct. It's given that the product of a positive number x and the number that is 1 less than x is equal to 72, which can be represented by the equation $x(x-1)=72$. Using the distributive property to expand the left-hand side of this equation yields $x^2-x=72$. Subtracting 72 from both sides of this equation yields $x^2-x-72=0$. Factoring the left-hand side of this equation yields $(x-9)(x+8)=0$. By the zero-product property, if the product of two factors is zero, then at least one of the factors must be zero. Setting each factor equal to zero yields $x-9=0$ and $x+8=0$. Adding 9 to both sides of the equation $x-9=0$ yields $x=9$. Subtracting 8 from both sides of the equation $x+8=0$ yields $x=-8$. Since x represents a positive number, $x=9$.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 16

Choice C is correct. It's given that $1.28n$ represents the result of increasing the positive quantity n by p%. The result of increasing the quantity n by p% is the sum of n and p% of n, expressed as $n+\frac{p}{100n}$, or $\left(1+\frac{p}{100}\right)n$. Since $1.28n$ and $\left(1+\frac{p}{100}\right)n$ represent the same quantity, it follows that $1.28n=\left(1+\frac{p}{100}\right)n$. Dividing both sides of this equation by n yields $1.28=1+\frac{p}{100}$. Subtracting 1 from both sides of this equation yields $0.28=\frac{p}{100}$. Multiplying both sides of this equation by 100 yields $p=28$. Therefore, the value of p is 28.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice B is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 17

Choice C is correct. It's shown in the figure that triangle JKL has a right angle at $\angle K$ and the length of $\overline{JL}$ is 95. Since $\angle K$ is a right angle, $\overline{JL}$ is the hypotenuse, $\overline{JK}$ is the leg opposite $\angle L$, and $\overline{KL}$ is the leg adjacent to $\angle L$. The tangent of an acute angle in a right triangle is the ratio of the length of the leg opposite the angle to the length of the leg adjacent to the angle. Therefore, $\tan L=\frac{JK}{KL}$. It's given that the tangent of $\angle L$ is $\frac{3}{4}$, which can be written as $\tan L=\frac{3}{4}$. Since $\tan L=\frac{JK}{KL}$ and $\tan L=\frac{3}{4}$, it follows that $\frac{JK}{KL}=\frac{3}{4}$, which can be rewritten as $JK=\frac{3}{4}(KL)$. Let $KL=x$, where x is positive. It follows that $JK=\frac{3}{4}x$. By the Pythagorean theorem, $JK^2+KL^2=JL^2$. Substituting $\frac{3}{4}x$ for JK, x for KL, and 95 for JL in this equation yields $\left(\frac{3}{4}x\right)^2+x^2=95^2$, or $\frac{9}{16}x^2+x^2=9{,}025$. Combining like terms on the left-hand side of this equation yields $\frac{25}{16}x^2=9{,}025$. Multiplying both sides of this equation by $\frac{16}{25}$ yields $x^2=\frac{16}{25}(9{,}025)$, or $x^2=5{,}776$. Since x is positive, $x=\sqrt{5{,}776}$, or $x=76$. Substituting 76 for x in the equation $JK=\frac{3}{4}x$ yields $JK=\frac{3}{4}(76)$, or $JK=57$. Therefore, the length of $\overline{JK}$ is 57.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect. This is the length of $\overline{KL}$, not $\overline{JK}$.

QUESTION 18

Choice D is correct. Based on the table, there are a total of 48 sweatshirts that are Tigers sweatshirts and there are 24 that are both Tigers sweatshirts and medium. The probability of selecting at random a sweatshirt that is medium, given that the sweatshirt is a Tigers sweatshirt, is equal to the number of sweatshirts that are both Tigers sweatshirts and medium divided by the total number of Tigers sweatshirts. Therefore, the probability of selecting at random a sweatshirt that is medium, given that the sweatshirt is a Tigers sweatshirt, is $\frac{24}{48}$, or 0.50.

Choice A is incorrect. This is the approximate probability of selecting at random a sweatshirt that is medium and a Tigers sweatshirt from all 114 sweatshirts. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This is the approximate probability of selecting at random a sweatshirt that is a Tigers sweatshirt, given that it is medium.

QUESTION 19

Choice D is correct. It's given that for the linear function p, $p(c) = -2$, where c is a constant, $p(5) = 22$, and the slope of the graph of $y = p(x)$ in the xy-plane is 4. Since $p(c) = -2$ and $p(5) = 22$, it follows that the graph of $y = p(x)$ in the xy-plane contains the points $(c, -2)$ and $(5, 22)$. The slope, m, of a line that passes through the points (x_1, y_1) and (x_2, y_2) can be found using the formula $m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$. Substituting $(c, -2)$ for (x_1, y_1), $(5, 22)$ for (x_2, y_2), and 4 for m yields $4 = \frac{(22 - (-2))}{(5 - c)}$, or $4 = \frac{24}{(5 - c)}$. Multiplying both sides of this equation by $5 - c$ yields $4(5 - c) = 24$, or $20 - 4c = 24$. Subtracting 20 from both sides of this equation yields $-4c = 4$. Dividing both sides of this equation by -4 yields $c = -1$. It's also given that for the linear function t, $t(c) = -5$ and $t(6) = 44$. Since $c = -1$, it follows that $t(-1) = -5$. Since $t(-1) = -5$ and $t(6) = 44$, it follows that the graph of $y = t(x)$ in the xy-plane contains the points $(-1, -5)$ and $(6, 44)$. Substituting $(-1, -5)$ for (x_1, y_1) and $(6, 44)$ for (x_2, y_2) in the slope formula yields $m = \frac{(44 - (-5))}{(6 - (-1))}$, which is equivalent to $m = \frac{49}{7}$, or $m = 7$. Therefore, the slope of the graph of $y = t(x)$ in the xy-plane is 7.

Choice A is incorrect. This is the value of c, not the slope of the graph of $y = t(x)$ in the xy-plane. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This is the slope of the graph of $y = p(x)$ in the xy-plane, not the slope of the graph of $y = t(x)$ in the xy-plane.

QUESTION 20

The correct answer is 85. The perimeter of a square is the sum of the lengths of its four equal sides, which can be expressed as $4s$, where s represents the length of one side. It's given that the perimeter can be expressed as $4(85)$, meaning $4s = 4(85)$. Dividing both sides of this equation by 4 yields $s = 85$. Therefore, the length of one side of this square is 85 units.

QUESTION 21

The correct answer is 4. It's given that $5x - 6y = x^2$ and $5x - 6y = 16$. Substituting x^2 for $5x - 6y$ in the second equation of the given system yields $x^2 = 16$. Taking the square root of both sides of this equation yields $x = 4$ or $x = -4$. It's given that a solution to the given system of equations is (x, y), where x is positive. It follows that the value of x is 4.

QUESTION 22

Choice A is correct. It's given that the exponential function f is defined by $f(x) = ab^x$, where a and b are positive constants. It's also given that $f(n) = p$, where n and p are constants. Since f is an exponential function where a and b are positive constants, it follows that the value of the function is always positive. Therefore, the value of p must be greater than 0. Substituting n for x in the equation $f(x) = ab^x$ yields $f(n) = ab^n$. Substituting p for $f(n)$ in this equation yields $p = ab^n$. Substituting $n + 1$ for x in the equation $f(x) = ab^x$ yields $f(n + 1) = ab^{(n+1)}$. By the product property of exponents, $b^{(n+1)}$ is equivalent to $b(b^n)$. Therefore, $f(n + 1) = a(b)^{(n+1)}$ is equivalent to $f(n + 1) = ab(b)^n$, or $f(n + 1) = b(ab^n)$. Substituting p for ab^n in this equation yields $f(n + 1) = b(p)$. It's also given that the value of $f(n + 1)$ is 83.00% less than the value of p, where n and p are constants. It follows that $f(n + 1) = p - 0.83p$, or $f(n + 1) = 0.17p$. Substituting $0.17p$ for $f(n + 1)$ in the equation $f(n + 1) = b(p)$ yields $0.17p = b(p)$. Dividing both sides of this equation by p yields $0.17 = b$. Therefore, the value of b is 0.17.

Choice B is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect. This is the value of b if the value of $f(n + 1)$ is 83.00% more, not less, than the value of p.

QUESTION 23

Choice A is correct. It's given that the graph of $y = f(x) - k$ is shown in the xy-plane. This graph crosses the x-axis once at a negative x-value and twice at distinct positive x-values. It's given that k is a positive constant, so the graph of $y = f(x)$ is the result of shifting the graph of $y = f(x) - k$ up by k units. It follows that for any positive value of k, the graph of $y = f(x)$ must cross the x-axis exactly once at a negative x-value. When a graph crosses the x-axis at $x = -c$, where c is a positive constant, the equation that defines the graph must have a linear factor $x + c$ with an odd exponent. If a and b are positive constants, then choice A, $f(x) = (x - a)^2(x + b)$, has a linear factor $x + b$ with an exponent of 1, which is odd. Therefore, of the given choices, only $f(x) = (x - a)^2(x + b)$ could define f.

Choice B is incorrect and may result from conceptual errors. *Choice C* is incorrect and may result from conceptual errors. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 24

Choice B is correct. It's given that $\sqrt{(x+13)^2} = x + 13$. The square root of a squared expression, $\sqrt{(a^2)}$, equals $|a|$. Therefore, the given equation can be rewritten as $|x + 13| = x + 13$, which is true for all values of x such that $x + 13 \geq 0$. By the definition of absolute value, $x + 13 = x + 13$ or $x + 13 = -(x + 13)$. Subtracting 13 from both sides of the equation $x + 13 = x + 13$ yields $x = x$. Therefore, this equation is true for all values of x such that $x + 13 \geq 0$. Applying the distributive property to the equation $x + 13 = -(x + 13)$ yields $x + 13 = -x - 13$. Subtracting 13 from both sides of this equation yields $x = -x - 26$. Adding x to both sides of this equation yields $2x = -26$. Dividing both sides of this equation by 2 yields $x = -13$. It follows that since the given equation is true for all values of x such that $x + 13 \geq 0$, or $x \geq -13$, the least value of x that is a solution to the given equation is -13.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 25

Choice B is correct. It's given that $\frac{36x + 55}{11} = \frac{k}{22}x + n$ and that the equation has infinitely many solutions. For an equation to have infinitely many solutions, the two sides of the equation must be equivalent. Therefore, the expressions $\frac{36x + 55}{11}$ and $\frac{k}{22}x + n$ should have equal coefficients of x and equal constant terms. The expression $\frac{36x + 55}{11}$ is equivalent to $\frac{36}{11}x + \frac{55}{11}$. Therefore, $\frac{36}{11} = \frac{k}{22}$. Multiplying both sides of this equation by 22 yields $\frac{36}{11}(22) = k$, or $k = 72$. Similarly, $\frac{55}{11} = n$, or $n = 5$. Therefore, the value of kn is $72(5)$, or 360.

Choice A is incorrect and may result from various conceptual or calculation errors. *Choice C* is incorrect and may result from various conceptual or calculation errors. *Choice D* is incorrect and may result from various conceptual or calculation errors.

QUESTION 26

Choice B is correct. It's given that in triangle ABC and triangle DEF, sides AB and DE each have a side length of 6 inches, and angles A and D each have an angle measure of 65°. Within these triangles, angles A and D are adjacent to sides AB and DE, respectively. Statement I is that the measures of angles B and C are equal. Since these two angles are in the same triangle, this information is not sufficient to prove whether triangle ABC is congruent to triangle DEF. Statement II is that the lengths of sides AC and DF are equal. If sides AC and DF have equal length, then the triangles have two sides and the included angle

that are congruent, which is sufficient to prove that the triangles are congruent by side-angle-side (SAS) conditions. Statement III is that the lengths of sides BC and EF are equal. Since these two sides aren't adjacent to the given angles A and D, this information is not sufficient to prove whether the triangles are congruent. Thus, of the additional pieces of information, II is sufficient, but I and III are not sufficient to prove whether triangle ABC is congruent to triangle DEF.

Choice A is incorrect and may result from conceptual errors. *Choice C* is incorrect and may result from conceptual errors. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 27

The correct answer is 6. It's given that $32x + 84y = 360$ represents the volume of compost x, in cubic feet, and the volume of soil y, in cubic feet, in a mixture of compost and soil that weighs 360 pounds. Thus, if the volume of soil in the mixture is 2 cubic feet, then $y = 2$. Substituting 2 for y in the equation $32x + 84y = 360$ yields $32x + 84(2) = 360$, or $32x + 168 = 360$. Subtracting 168 from both sides of this equation yields $32x = 192$. Dividing both sides of this equation by 32 yields $x = 6$. Therefore, if the volume of soil in the mixture is 2 cubic feet, then the volume of compost in the mixture, in cubic feet, is 6.

Math

Module 2
(27 questions)

QUESTION 1

Choice B is correct. The *y*-intercept of a graph is the point where the graph intersects the *y*-axis, and the *y*-intercept always has an *x*-coordinate of 0. In the graph in choice B, the curve intersects the *y*-axis at the point where the *y*-coordinate is 5, so the *y*-intercept of this graph is $(0, 5)$.

Choice A is incorrect. This graph has a *y*-intercept of $(0, 4)$, not $(0, 5)$. *Choice C* is incorrect. This graph has a *y*-intercept of $(0, 6)$, not $(0, 5)$. *Choice D* is incorrect. This graph has a *y*-intercept of $(0, 7)$, not $(0, 5)$.

QUESTION 2

Choice D is correct. The graph gives the area y, in square inches, for each triangular piece of plywood with base length x, in inches, and $x > 0$. The point (x, y) on the graph where $x = 4$ has a corresponding *y*-value of approximately 30. Therefore, the best estimate of the area, in square inches, of a triangular piece of plywood with a base length of 4 inches is 30.

Choice A is incorrect. This is the base length, in inches, of the triangular piece of plywood. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 3

Choice B is correct. It's given that an object's average acceleration, in meters per second squared, is the change in the object's speed, in meters per second, divided by the time during which the change occurred, in seconds. It's also given that the car's speed changes by 58 meters per second in 8 seconds. It follows that the car's average acceleration, in meters per second squared, during this time period is $\frac{58}{8}$, or 7.25.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 4

Choice C is correct. It's given that the length of each side of triangle A is 280 millimeters and that the length of each side of triangle B is double the length of each side of triangle A. Therefore, the length of each side of triangle B is 2 times the length of each side of triangle A, which can be represented by the expression $2(280)$, or 560. Therefore, the length, in millimeters, of each side of triangle B is 560.

Choice A is incorrect. This is the length of each side of triangle A, not triangle B. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 5

Choice A is correct. It's given that when $x = 0$, the value of y is 60, and for every increase in the value of x by 1, the corresponding value of y increases by 10% of its previous value. This relationship can be represented by an exponential equation of the form $y = a\left(1 + \frac{p}{100}\right)^x$, where the value of y is a when $x = 0$ and for every increase in the value of x by 1, the corresponding value of y increases by p% of its previous value. For this relationship, $a = 60$ and $p = 10$. Substituting 60 for a and 10 for p in the equation $y = a\left(1 + \frac{p}{100}\right)^x$ yields $y = 60\left(1 + \frac{10}{100}\right)^x$, or $y = 60(1.10)^x$.

Choice B is incorrect. This equation represents a relationship where for every increase in the value of x by 1, the corresponding value of y increases by 1%, not 10%, of its previous value. *Choice C* is incorrect. This equation represents a relationship where when $x = 0$, the value of y is 10, not 60, and for every increase in the value of x by 1, the corresponding value of y increases by 60%, not 10%, of its previous value. *Choice D* is incorrect. This equation represents a relationship where when $x = 0$, the value of y is 10, not 60, and for every increase in the value of x by 1, the corresponding value of y increases by 6%, not 10%, of its previous value.

QUESTION 6

The correct answer is 80. It's given that a recreational speedboat can travel at a maximum speed of 20 meters per second. At this speed, the boat would travel $\left(\frac{20 \text{ meters}}{1 \text{ second}}\right)(4 \text{ seconds})$, or 80 meters in 4 seconds.

Alternate approach: It's given that a recreational speedboat can travel at a maximum speed of 20 meters per second. This speed can be written as $\frac{20 \text{ meters}}{1 \text{ second}}$. Let x represent the distance, in meters, the speedboat would travel in 4 seconds at this maximum speed. It follows that $\frac{20 \text{ meters}}{1 \text{ second}} = \frac{x \text{ meters}}{4 \text{ seconds}}$, which can be written as $\frac{20}{1} = \frac{x}{4}$, or $20 = \frac{x}{4}$. Multiplying each side of this equation by 4 yields $x = 80$. Therefore, at this maximum speed, the speedboat would travel 80 meters in 4 seconds.

QUESTION 7

The correct answer is 64. 10% of a quantity means $\frac{10}{100}$ times the quantity. Therefore, 10% of 640 can be represented as $\left(\frac{10}{100}\right)(640)$, which is equivalent to $0.10(640)$, or 64. Therefore, 10% of 640 is 64.

QUESTION 8

Choice D is correct. The expression $4xy(2x^2 + 6y)$ can be rewritten as $4xy(2x^2) + 4xy(6y)$, which is equivalent to $8x^3y + 24xy^2$.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 9

Choice A is correct. It's given that h represents the number of hours Sophia worked at her full-time job and c represents the number of hours she worked at her part-time job. Therefore, in the equation $23h + 10c = 1{,}007$, the coefficients 23 and 10 represent the hourly earnings in dollars at the full-time and part-time jobs, respectively. Thus, the best interpretation of 23 in this context is the amount, in dollars, Sophia earned for each hour she worked at her full-time job.

Choice B is incorrect. This is the best interpretation of 10, not 23. *Choice C* is incorrect. This is the best interpretation of h, not 23. *Choice D* is incorrect. This is the best interpretation of c, not 23.

QUESTION 10

Choice B is correct. It's given that function f is defined by $f(x) = \frac{5}{11}x$. Therefore, the equation representing the graph of $y = f(x)$ in the xy-plane is $y = \frac{5}{11}x$. For a linear equation in the form $y = mx + b$, m represents the slope of the graph and $(0, b)$ is the y-intercept of the graph of $y = f(x)$ in the xy-plane. Since the value of m in the equation $y = \frac{5}{11}x$ is $\frac{5}{11}$, the slope of the graph of $y = f(x)$ in the xy-plane is $\frac{5}{11}$.

Choice A is incorrect. This is the value of b, not m. *Choice C* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 11

Choice C is correct. It's given that the average weight w, in pounds, per bag is estimated to be 1.03, with a margin of error of 0.05 pounds. This means that plausible values of w are between $1.03 - 0.05$, or 0.98, and $1.03 + 0.05$, or 1.08. Therefore, the most appropriate conclusion is $0.98 \leq w \leq 1.08$.

Choice A is incorrect because it doesn't account for the margin of error, which gives more than one plausible value of w. *Choice B* is incorrect because it doesn't include values of w between 1.03 and 1.08, which are also plausible. *Choice D* is incorrect because it doesn't include values of w between 0.98 and 1.03, which are also plausible.

QUESTION 12

Choice C is correct. The base of a cylinder is a circle with a diameter equal to the diameter of the cylinder. The volume, V, of a cylinder can be found by multiplying the area of the circular base, A, by the height of the cylinder, h, or $V = Ah$. The area of a circle can be found using the formula $A = \pi r^2$, where r is the radius of the circle. It's given that the diameter of the cylinder is 12 inches. Thus, the radius of the circular base of the cylinder is 6 inches. Substituting 6 for r in the formula $A = \pi r^2$ gives $A = \pi(6)^2$, or $A = 36\pi$. It's given that the height h of the cylinder is 21 inches. Substituting 36π for A and 21 for h in the formula $V = Ah$ gives $V = 36\pi(21)$, or $V = 756\pi$. Thus, the volume of the cylinder is 756π cubic inches.

Choice A is incorrect. This is the area, in square inches, of the circular base of the cylinder. *Choice B* is incorrect and may result from calculating the area of the circular base as $2\pi r$ rather than πr^2. *Choice D* is incorrect. This is the volume, in cubic inches, of a cylinder with a radius, not a diameter, of 12 inches and a height of 21 inches.

QUESTION 13

The correct answer is 20. The area of a rectangle is equal to its length times its width. It's given that the length of the rectangle is 20 inches and the width is 1 inch, so the area, in square inches, is $(20)(1)$, or 20.

QUESTION 14

The correct answer is 30. It's given that function f is defined by $f(x) = 9x + 21$. Substituting 1 for x in the given function yields $f(1) = 9(1) + 21$, or $f(1) = 30$. Therefore, when $x = 1$, the value of $f(x)$ is 30.

QUESTION 15

Choice D is correct. It's given that Luca plants 205 seedlings per hour. It's also given that Luca planted seedlings for 1 hour on Monday. It follows that he planted $205(1)$, or 205, seedlings on Monday. It's given that Luca planted seedlings for t hours on Tuesday. It follows that he planted $205(t)$, or $205t$, seedlings on Tuesday. The total number of seedlings planted on Monday and Tuesday can therefore be written as $205 + 205t$, or $205t + 205$. Factoring out the common factor of 205 from this expression yields $205(t + 1)$. Therefore, $s(t) = 205(t + 1)$ gives the total number of seedlings Luca planted on Monday and Tuesday.

Choice A is incorrect. This gives the total number of seedlings Luca planted on Tuesday, not the total number of seedlings he planted on Monday and Tuesday. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 16

Choice D is correct. It's given that, each year, the silver maple tree's height increase was 2.3 feet. It's also given that, each year, the red maple tree's height increase was 32% less than the silver maple tree's height increase in the same year. Therefore, each year, the red maple tree's height increase was $2.3 - 0.32(2.3)$, or 1.564, feet. Thus, during these 5 years, the red maple tree's height increased at a constant rate. Therefore, an increasing linear function best models how the height of the red maple tree changed over time during these 5 years.

Choice A is incorrect and may result from conceptual errors. *Choice B* is incorrect and may result from conceptual errors. *Choice C* is incorrect and may result from conceptual errors.

QUESTION 17

Choice D is correct. Multiplying both sides of the given equation by 24 yields $(x - 19) = 3(x - 19)$. Subtracting $(x - 19)$ from both sides of this equation yields $0 = 2(x - 19)$. Dividing both sides of this equation by 2 yields $0 = x - 19$, or $x - 19 = 0$. Adding 38 to both sides of this equation yields $x + 19 = 38$. Therefore, the value of $x + 19$ is 38.

Choice A is incorrect. This is the value of $x - 19$, not $x + 19$. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This is the value of x, not $x + 19$.

QUESTION 18

Choice A is correct. The solutions to a system of three equations are the points where all three of the graphs of the equations intersect. In the graph of the system of three equations shown, all three of the graphs of the equations intersect at a single point. Therefore, this system has 1 solution.

Choice B is incorrect and may result from conceptual errors. *Choice C* is incorrect and may result from conceptual errors. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 19

Choice D is correct. If the ordered pairs (x, y) are solutions to the given system, then they must satisfy both inequalities $y < 48 - 8x$ and $\frac{y}{8} > 10$. Multiplying both sides of the inequality $\frac{y}{8} > 10$ by 8 yields $y > 80$. Combining $y > 80$ with $y < 48 - 8x$ gives $80 < y < 48 - 8x$. It follows that $80 < 48 - 8x$, and that this inequality can be used to find the values of x that satisfy the given system. Adding $8x$ to both sides of this inequality yields $80 + 8x < 48$. Subtracting 80 from both sides of this inequality yields $8x < -32$. Dividing both sides of this inequality by 8 yields $x < -4$. Therefore, the inequality $x < -4$ represents the x values for all solutions that satisfy the given system of inequalities.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 20

The correct answer is 72. Based on the figure, the angle with measure $x°$ and the angle with measure 108° together form a straight line. Therefore, these two angles are supplementary, so the sum of their measures is 180°. It follows that $x + 108 = 180$. Subtracting 108 from both sides of this equation yields $x = 72$.

QUESTION 21

The correct answer is 4. It's given that $4x^3 + 32$ is equivalent to $k(x^3 + 8)$, where k is a constant. Since the expression $4x^3 + 32$ has a common factor of 4, it can be rewritten as $4(x^3 + 8)$. Therefore, $4(x^3 + 8)$ is equivalent to $k(x^3 + 8)$. It follows that the value of k is 4.

QUESTION 22

Choice C is correct. The solutions to a quadratic equation of the form $ax^2 + bx + c = 0$, where a, b, and c are constants, can be calculated using the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. The given equation is of this form, where $a = 3$, $b = -3$, and $c = -1$. Substituting these values into the quadratic formula yields $x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(3)(-1)}}{(2)(3)}$, or $x = \frac{3 \pm \sqrt{21}}{6}$. These solutions can be rewritten as $x = \frac{3}{6} \pm \frac{\sqrt{21}}{6}$, or $x = \frac{1}{2} \pm \frac{\sqrt{21}}{6}$.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice B is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect. These are the solutions to $3x^2 + 3x - 1 = 0$, not $3x^2 - 3x - 1 = 0$.

QUESTION 23

Choice B is correct. It's given that 7 resistors connected in series have a total resistance of 110 ohms and that the total resistance of 3 resistors in the circuit is 90 ohms. This means the total resistance of the other 4 resistors is $110 - 90$, or 20, ohms. Since the resistance of each resistor is positive, the resistance, x, in ohms, of one of these 4 resistors is greater than 0 and less than 20. Therefore, $0 < x < 20$.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 24

Choice B is correct. It's given that x represents the pressure, in atmospheres (atm), mixture A contributes to the tank and y represents the pressure, in atm, mixture B contributes to the tank. It's also given that the total pressure of the combined gas mixtures is 80 atm, so $x + y = 80$ represents the sum of the partial pressures contributed by mixtures A and B. Mixture A contributes x atm of pressure, 27% of which is contributed by oxygen, so the

oxygen contribution from mixture A is $0.27x$ atm. Mixture B contributes y atm of pressure, 45% of which is contributed by oxygen, so the oxygen contribution from mixture B is $0.45y$ atm. Since 36% of the total pressure of 80 atm is contributed by oxygen, the total pressure contributed by oxygen is $0.36(80)$. Therefore, the equation $0.27x + 0.45y = 0.36(80)$ represents the contributions by oxygen to the total pressure of the combined mixture. Therefore, the system of equations that represents this situation is $x + y = 80$ and $0.27x + 0.45y = 0.36(80)$.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 25

Choice A is correct. It's given that line k is defined by $y = mx + b$. For a graph of a line in the xy-plane with an equation $y = mx + b$, m is the slope of the line and $(0, b)$ is its y-intercept. Since lines k and ℓ are perpendicular, the slope of line ℓ is the negative reciprocal of the slope of line k. Thus, line ℓ can be defined by the equation $y = -\frac{1}{m}x + c$, where $(0, c)$ is the y-intercept of line ℓ. It's also given that lines k and ℓ intersect at the point $(2, 8)$. Therefore, the point $(2, 8)$ lies on line ℓ. Substituting 2 for x and 8 for y into the equation $y = -\frac{1}{m}x + c$ yields $8 = -\frac{1}{m}(2) + c$, or $8 = -\frac{2}{m} + c$. Adding $\frac{2}{m}$ to both sides of this equation yields $8 + \frac{2}{m} = c$, or $c = 8 + \frac{2}{m}$. Substituting $8 + \frac{2}{m}$ for c in the line ℓ equation yields $y = -\frac{1}{m}x + 8 + \frac{2}{m}$. Substituting 3 for x in $y = -\frac{1}{m}x + 8 + \frac{2}{m}$ yields $y = -\frac{3}{m} + 8 + \frac{2}{m}$, or $y = 8 - \frac{1}{m}$. Therefore, the point $\left(3, 8 - \frac{1}{m}\right)$ lies on line ℓ.

Choice B is incorrect. This may result from using $\frac{1}{m}$, rather than $-\frac{1}{m}$, as the slope of line ℓ. *Choice C* is incorrect. This may result from using $-m$, rather than $-\frac{1}{m}$, as the slope of line ℓ. *Choice D* is incorrect. This point lies on line k, not line ℓ.

QUESTION 26

Choice B is correct. It's given that the histogram summarizes a data set of the weights, in pounds, of 14 young female jaguars. The median of a data set with an even number of elements is between the two middle elements when the elements are in numerical order. For 14 elements in numerical order, the median is between the 7th and 8th elements. For the original data set represented in the histogram, the 7th and 8th elements in the ordered set have values that are between 85 and 90. Therefore, the median of the data set will also have a value that is between 85 and 90. If an additional weight of 32 pounds is added to the original data set to create a new data set of 15 weights, the median of the new data set will be the 8th element. Since 32 is less than the value of all of the elements in the original data set, the 8th element in the ordered new data set is the 7th element of the original data set, which has a value that is between 85 and 90. Therefore, the medians of the original and new data sets are between 85 and 90. It follows that

the median of the new data set is not necessarily less than the median of the original data set. The mean of a data set is the sum of the values of the elements divided by the number of elements of the data set. For the original data set represented by the histogram, the sum of the values of the elements can be represented by the variable T, and the mean of the original data set is equal to $\frac{T}{14}$ pounds. Since it's given that all of the jaguars in the original data set have a weight of at least 70 pounds, the value of T is at least $(70)(14)$, or 980. If an additional weight of 32 pounds is added to create a new data set of 15 weights, the mean of the new data set can be represented by $\frac{T+32}{15}$. The mean of the new data set is less than the mean of the original data set if and only if $\frac{T+32}{15}$ is less than $\frac{T}{14}$, or $\frac{T+32}{15} < \frac{T}{14}$. Multiplying both sides of this inequality by 14 yields $\frac{14(T+32)}{15} < T$. Multiplying both sides of this inequality by 15 yields $14(T+32) < 15T$, or $14T + 448 < 15T$. Subtracting $14T$ from both sides of this inequality yields $448 < T$. Since T is at least 980, 448 must be less than T. Thus, it follows that $\frac{T+32}{15} < \frac{T}{14}$. Therefore, the mean of the new data set must be less than the mean of the original data set.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice C is incorrect and may result from conceptual or calculation errors.
Choice D is incorrect and may result from conceptual or calculation errors.

QUESTION 27

The correct answer is either 245 or -246. It's given that $(x-245)(x+246)=0$. By the zero-product property, if the product of two factors is zero, then at least one of the factors must be zero. Setting each factor equal to zero yields $x-245=0$ or $x+246=0$. Adding 245 to both sides of the equation $x-245=0$ yields $x=245$. Subtracting 246 from both sides of the equation $x+246=0$ yields $x=-246$. Therefore, the solutions to the given equation are 245 and -246. Note that 245 and -246 are examples of ways to enter a correct answer.