The SAT®

Practice Test #8

ANSWER EXPLANATIONS

These answer explanations are for students taking the digital SAT in nondigital format.

SAT®

Reading and Writing

Module 1
(33 questions)

QUESTION 1

Choice B is the best answer because it most logically completes the text's discussion of Juarez. In this context, "important" means marked by significant work or consequence. The text indicates that Juarez, who was the first president of Mexico from an Indigenous community, became a certain kind of figure in Mexico's history. It then supports that claim by describing some of the "many significant accomplishments" from Juarez's long tenure in office. This context conveys that Juarez is a significant and consequential figure in Mexico's history.

Choice A is incorrect because the text focuses on Juarez's role as the first president of Mexico from an Indigenous community and on his many major accomplishments during his lengthy time in office; nothing in the text suggests that Juarez was "unpredictable," or tended to behave in ways that couldn't be predicted. *Choice C* is incorrect because nothing in the text suggests that Juarez was a particularly "secretive" figure, or that he tended to keep things private or hidden from others. Instead, the text focuses on things that are known about Juarez: that he was the first president of Mexico from an Indigenous community, that he had a lengthy tenure, and that his many major accomplishments included consolidating the national government's authority and advancing Indigenous rights. *Choice D* is incorrect because the text focuses on the idea that Juarez, who was the first president of Mexico from an Indigenous community, had many major accomplishments during his lengthy time in office. Rather than suggesting that Juarez was an "ordinary," or common and typical, figure in Mexico's history, this context conveys that Juarez was instead a notable figure.

QUESTION 2

Choice D is the best answer because it most logically completes the text's discussion of the research that Lopes-Ferreira and her colleagues are conducting on the stingray species *Potamotrygon rex*. As used in this context, "a substantial" effect means an effect that is sizable or noteworthy. The text indicates that the

researchers are seeking to determine whether there are "considerable variations" in the potency of stingray venom that are associated with variation in the stingrays' age and sex. This context suggests that the researchers want to find out whether stingray age and sex have a substantial effect on venom toxicity.

Choice A is incorrect because there's nothing in the text that suggests that the researchers have been studying whether the stingrays' age and sex have "a disconcerting," or an unsettling and disturbing, effect on the stingrays' venom. The text indicates that the researchers wish to determine if stingray age and sex cause large variations in the toxicity of stingray venom, not if the effect of age and sex is disconcerting. *Choice B* is incorrect because the text indicates that researchers want to find out whether differences in stingray age and sex produce differences in stingray venom, not that the researchers want to find out whether age and sex have "an acceptable," or a satisfactory, effect on venom. The text makes no mention of what would make an effect on venom toxicity acceptable and gives no indication that the researchers are interested in that question. *Choice C* is incorrect because it wouldn't make sense in context for the researchers to be looking for "an imperceptible," or an unnoticeable, effect of age and sex on stingray venom. The text says that the researchers are trying to determine if there are "considerable variations" in venom toxicity linked to age and sex, not that the researchers are trying to find effects that they can't perceive.

QUESTION 3

Choice A is the best answer because it most logically completes the text's discussion of how kelp forests help marine animals. In this context, "tranquil" means free from disturbance, or calm. The text indicates that ocean currents are powerful and make it difficult for marine animals to hide from predators and that kelp forests slow currents down to create calmer areas. In other words, kelp forests create a more tranquil environment.

Choice B is incorrect because the text indicates that kelp forests provide shelter for marine animals, meaning they create environments that are safer, not more "dangerous." *Choice C* is incorrect because the text discusses how kelp forests affect currents in the ocean, and it isn't clear how an ocean environment could be "imaginative," or full of imagination. *Choice D* is incorrect because the text indicates that kelp forests create a calm and safe environment, and an environment that is "surprising" would be characterized by unexpected occurrences, not calmness.

QUESTION 4

Choice C is the best answer because it logically and precisely completes the text's discussion of *The Mule Bone*, a play that Zora Neale Hurston and Langston Hughes wrote together. In this context, "collaboration" means working together with someone to write a literary work. The text indicates that most writers prefer to work alone and that working together destroyed the friendship between Hurston and Hughes. This establishes that *The Mule Bone* is a relatively rare example of collaboration in literature.

Choice A is incorrect because in this context, "characterization" would mean a literary work's portrayal of characters' psychological experiences and motivations, but the text doesn't discuss characterization in *The Mule Bone* specifically or in collaborative works more generally. *Choice B* is incorrect because in this context, "interpretation" would mean the explanation of a literary work's meaning or significance, but the text doesn't discuss how readers or critics have interpreted *The Mule Bone*; instead, the text discusses how the play was written collaboratively and how the writing process affected the two authors. *Choice D* is incorrect because in this context, "commercialization" would mean writing a literary work in such a way as to ensure its commercial appeal, but the text never discusses commercial appeal as a factor in the writing of *The Mule Bone* specifically or the writing of collaborative works more generally.

QUESTION 5

Choice C is the best answer because it most logically completes the text's discussion of how Ofelia Zepeda has contributed to the field of linguistics. As used in this context, "extensive" means having a wide or considerable extent. The text indicates that Zepeda's many accomplishments in linguistics are varied, including teaching linguistics, writing poetry in more than one language, creating a grammar book, and co-founding a language institute. This context supports the idea that Zepeda's contributions to the field are extensive.

Choice A is incorrect because the sentence presents Zepeda's accomplishments as examples to support the claim made in the first part of the sentence. It wouldn't make sense to say that achievements as a professor, poet and author, and co-founder of a language institute demonstrate that Zepeda's contributions in her field are "pragmatic," or related to practical matters and not involving intellectual or artistic matters. *Choice B* is incorrect because the sentence presents Zepeda's accomplishments as a professor, poet and author, and co-founder of a language institute as examples to support the claim made in the first part of the sentence. There's no reason to believe that the positive achievements listed demonstrate that Zepeda's contributions in her field are "controversial," or have caused disputes and opposing viewpoints. *Choice D* is incorrect because in this context, "universal" would mean including or covering everything in a group. The sentence presents Zepeda's accomplishments as examples to support the claim made in the first part of the sentence, and it wouldn't make sense to say that these specific achievements—particularly as the author of a grammar book specific to the Tohono O'odham language—demonstrate that Zepeda's contributions relate to everything in the field of linguistics.

QUESTION 6

Choice C is the best answer because it most accurately describes the main purpose of the text. The text states that archaeologists recently discovered a well-preserved food shop, or *thermopolium*, in Pompeii, Italy. The text then further describes the contents of the discovery and provides an example of what was found. Thus, the overall purpose of the text is to present a recent archaeological discovery.

Choice A is incorrect. Although the text states that archaeologists found ancient artworks, it doesn't compare these artworks to modern ones or to any other artworks. *Choice B* is incorrect. Although the archaeological discovery discussed in the text was made in Italy, the text doesn't provide any information about politics or government in Italy. *Choice D* is incorrect because the text doesn't discuss the climate where the archaeological discovery was made or in any other region.

QUESTION 7

Choice D is the best answer because it most accurately reflects the main purpose of the text. The text portrays Miss Pyne as awaiting the arrival of a carriage while Martha brings strawberries and flowers from the garden into the house. The text also describes the surroundings of the scene, stating that Miss Pyne looks "stately and calm," the evening is bright and cool, and birds are singing in the garden as the sun sets. Then the last sentence states that the house was "wide open to the long-expected guest," which strongly suggests that Miss Pyne's anticipation and Martha's activities were in preparation for the guest who is expected to arrive in the carriage. Thus, the text depicts the setting and conveys what these characters are doing as they await the arrival of their visitor.

Choice A is incorrect because there is nothing in the text to indicate that the characters feel any worry about the guest's arrival. The text indicates that the guest was "long-expected," but characterizing Miss Pyne as "stately and calm" conflicts with the idea that the characters are worried about the guest. *Choice B* is incorrect because the text describes a moment in time when two characters are awaiting the arrival of a visitor rather than an extended period over which characters could be seen changing. *Choice C* is incorrect. Although the text describes the activity indoors (Miss Pyne sitting calmly), it describes a higher level of activity, not stillness, outside (Martha bringing fruit and flowers and birds singing).

QUESTION 8

Choice A is the best answer because it most accurately describes the overall structure of the text. The narrator begins by explaining how Charlot carefully delivers Atlante's letter to Rinaldo, and then relates that Rinaldo feels "transported with joy" after reading the letter. Therefore, the overall structure of the text is best described as a description of the delivery of a letter followed by the portrayal of a character's happiness after reading the letter.

Choice B is incorrect because the text indicates that the letter has been written; there's no explanation why another character hasn't written one. In addition, the text's description of Rinaldo "in a melancholy posture" suggests that he's sad and thoughtful, not that he's desperate to receive the letter. *Choice C* is incorrect. Although the text states that Charlot won't toss the letter to Rinaldo because she doesn't want it to fall, the text doesn't refer to the contents of the letter. Instead, the text describes how happy Rinaldo feels after reading it. *Choice D* is incorrect. Although the text does describe Rinaldo's reaction to the letter, the text doesn't begin by discussing Atlante's inspiration for writing the letter. Instead, the text begins by discussing the delivery of the letter.

QUESTION 9

Choice A is the best answer because it best describes how the underlined portion functions in the text as a whole. The text says that the increased production quotas of food processing companies during World War II enabled employees to make better bargains in exchange for their labor. The underlined portion presents an example of this increased bargaining power: employees requested more favorable benefits, and employers complied because they were under pressure to fulfill the demanding terms of their contracts. Thus, the underlined portion of the text elaborates on a claim about labor relations in a particular industry (food processing) made earlier in the text.

Choice B is incorrect because there is no indication in the text that the economic factors that influenced food processing also influenced other parts of the economy; thus, the bargaining described in the underlined portion of the text cannot be called an example of a trend. *Choice C* is incorrect because the underlined portion supports the historical narrative of labor activism in food processing that is sketched in the text, instead of noting an exception to that narrative. *Choice D* is incorrect because while the underlined portion does discuss the demands that workers made in exchange for their labor, it does not discuss the identities of the workers.

QUESTION 10

Choice D is the best answer because it states why Wang and his team's discovery of the *Terropterus xiushanensis* fossil was significant. The text explains that up until Wang and his team's discovery, the only fossil evidence of mixopterids came from the paleocontinent of Laurussia. Wang and his team, however, identified fossil remains of a mixopterid species from the paleocontinent Gondwana. Therefore, the team's discovery was significant because the fossil remains of a mixopterid species were outside of the paleocontinent Laurussia.

Choice A is incorrect. Although the text states that Wang and his team identified fossilized remains of a mixopterid species that lived more than 400 million years ago, it doesn't indicate that mixopterid fossils previously found by scientists dated to a more recent period than that. *Choice B* is incorrect. Although the text states that mixopterids are related to modern arachnids and horseshoe crabs, it doesn't suggest that the fossil discovered by Wang and his team confirmed that this relationship is closer than scientists had previously thought. *Choice C* is incorrect because the team's fossil established the presence of mixopterids on Gondwana, not on Laurussia. Moreover, the text only discusses the fossil in relation to the geographical distribution of mixopterids, not in relation to their evolution.

QUESTION 11

Choice B is the best answer because it most effectively uses data from the table to complete the statement about video game availability. The text states that just a few games released in the past are available today and then indicates that there is a period of years from which only 14.22 percent of the games released are available. The table shows that 14.22 percent of games are still available from the years 1995–1999.

Choice A is incorrect because the years 2000–2004 are not represented in the table. *Choice C* is incorrect because the years 1970–1974 are not represented in the table. *Choice D* is incorrect because the years 1985–1989 correspond to a percentage of games still available of 15.38 percent, not 14.22 percent.

QUESTION 12

Choice C is the best answer. The table shows the depths below the ocean surface at which four species of deep-sea fish live. According to the table, the range of depths at which the southern stoplight loosejaw lives is 500–2,000 meters below the surface.

Choice A is incorrect because the table indicates that the southern stoplight loosejaw lives 500–2,000 meters below the ocean surface, not at depths more than 2,000 meters below the surface. *Choice B* is incorrect because the table indicates that the southern stoplight loosejaw lives 500–2,000 meters below the ocean surface, not 150–400 meters below the surface. *Choice D* is incorrect because the table indicates that the southern stoplight loosejaw lives 500–2,000 meters below the ocean surface, not 250–500 meters below the surface.

QUESTION 13

Choice A is the best answer because it effectively uses data from the table to complete the statement, identifying the month in which the United States had the highest number of housing starts in 2022. According to the table, which shows the number of US housing starts from January to April 2022, the highest number of housing starts was 1,803 thousand, which occurred in April.

Choice B is incorrect because March had 1,713 thousand housing starts, which is lower than the number of starts in April and in February. *Choice C* is incorrect because January had 1,669 thousand housing starts, which is the lowest of all the months listed in the table. *Choice D* is incorrect because February had 1,771 thousand housing starts, which is lower than the number of starts in April.

QUESTION 14

Choice A is the best answer because it presents a finding that, if true, would support the claim about Chambi's photographs. The text describes a student advancing the claim that Chambi's photographs "have considerable ethnographic value"—meaning that they are valuable as records of cultures—and that they "capture diverse elements of Peruvian society" in a respectful way. If it's true that Chambi carefully photographed people from a range of different communities in Peru as well as photographed the customs and sites of different communities, that would lend support to the claim that the photographs have ethnographic value as depictions of diverse elements of society in Peru.

Choice B is incorrect because the student's claim is that Chambi's photographs have considerable ethnographic value because they depict diverse elements of Peruvian society; the student doesn't claim anything about the technical skill demonstrated in the photographs. *Choice C* is incorrect because neither Chambi's reputation nor the locations where his photographs may have been

published would be relevant to the student's claim that his photographs are valuable as an ethnographic record of Peru's diverse society. *Choice D* is incorrect because the popularity among other photographers of the people and places that Chambi photographed would be irrelevant to the student's claim that Chambi's photographs are valuable as an ethnographic record of Peru's diverse society.

QUESTION 15

Choice D is the best answer because it presents a finding that, if true, would most directly support the researchers' hypothesis about the connection between the dusky shark population decline and the eastern oyster population decline. The text indicates that although dusky sharks don't usually eat eastern oysters, they do consume cownose rays, which are the main predators of eastern oysters. An increase in the abundance of cownose rays in the region in response to a decline in the abundance of dusky sharks would directly support the researchers' hypothesis: a higher number of cownose rays would consume more eastern oysters, driving down the oyster population.

Choice A is incorrect because a finding that there's an association between a decline in the regional abundance of some of dusky sharks' prey and the regional abundance of dusky sharks wouldn't directly support the researchers' hypothesis that a decline in dusky sharks has led to a decline in eastern oysters in the region. Although such a finding might help explain why shark abundance has declined, it would reveal nothing about whether the shark decline is related to the oyster decline. *Choice B* is incorrect because a finding that eastern oyster abundance tends to be greater when dusky sharks and cownose rays are present than when only dusky sharks are present wouldn't support the researchers' hypothesis that a decline in dusky sharks has led to a decline in eastern oysters in the region. The text indicates that the sharks prey on the rays, which are the main predators of the oysters; if oyster abundance is found to be greater when rays are present than when rays are absent, that would suggest that rays aren't keeping oyster abundance down, and thus that a decline in rays' predators, which would be expected to lead to an increase in the abundance of rays, wouldn't bring about a decline in oyster abundance as the researchers hypothesize. *Choice C* is incorrect because a finding that consumption of eastern oysters by cownose rays increased substantially before dusky sharks declined in regional abundance wouldn't support the researchers' hypothesis that the decline in dusky sharks has led to a decline in eastern oysters in the region. Such a finding would suggest that some factor other than shark abundance led to an increase in rays' consumption of oysters and thus to a decrease in oyster abundance, thereby weakening the researchers' hypothesis.

QUESTION 16

Choice C is the best answer because it presents a finding that, if true, would support the researchers' hypothesis about the plants' dependence on dissolving rock. The text indicates that the roots of the two plant species grow directly into quartzite rock, where hairs on the roots secrete acids that dissolve the rock. The researchers hypothesize that the plants depend on this process because

dissolving rock opens spaces for the roots to grow and releases phosphates that provide the plants with phosphorus, a vital nutrient. If the plants carry out this process of dissolving rock even when the rock already has spaces into which the roots could grow, that would support the researchers' hypothesis because it suggests that the plants are getting some advantage—such as access to phosphorus—from the action of dissolving rock. If the plants don't benefit from dissolving rock, they would be expected to grow in the cracks that already exist, as doing so would mean that the plants don't have to spend energy creating and secreting acids; if, however, the plants create new entry points by dissolving rock even when cracks already exist, that would support the hypothesis that they depend on dissolving rock for some benefit.

Choice A is incorrect because the existence of soil-inhabiting members of the Velloziaceae family with similar root structures to those of the two species discussed in the text wouldn't support the researchers' hypothesis that the species discussed in the text depend on dissolving rock. If other such members exist, that might suggest that the root structures can serve more functions than secreting acids to dissolve rock (since dissolving rock may not be necessary for plants living in soil), but that wouldn't suggest anything about whether the species discussed in the text benefit from dissolving rock. *Choice B* is incorrect because differences in the proportions of citric and malic acid secreted by the two species would be irrelevant to the hypothesis that the plants depend on dissolving rock. There's no information in the text to suggest that the proportion of each acid has any bearing on the process of dissolving rock or on any benefits the plants might receive from that process. *Choice D* is incorrect because if the two species thrive on rocks without phosphates, that would weaken the researchers' hypothesis that the plants depend on dissolving rock partly because dissolving rock gives them access to phosphates. If the plants can survive on rocks without getting a vital nutrient by dissolving those rocks, then either the nutrient isn't actually vital for those plants or they can get the nutrient in some way other than by dissolving rocks.

QUESTION 17

Choice A is the best answer because it most logically completes the text's discussion of mosquito repellents. The text begins by explaining that many repellents work by using natural components to activate multiple odor receptors on mosquitoes' antennae, and that new repellents must be created whenever mosquitoes become resistant to older ones. The text then highlights a research team's discovery that EBF, a molecular component of a chrysanthemum-flower extract, can repel mosquitoes by activating a single odor receptor, Or31, that is shared by all species of mosquitoes known to carry diseases. The text suggests that compared to the repellents mentioned earlier, a repellent that acts on the Or31 receptor would be more effective: by noting that all mosquito species known to carry diseases share the Or31 receptor, the text suggests that the Or31 receptor may be unique in this respect, meaning that a repellent such as EBF that acts on it would be more effective since it works on a single receptor shared by all mosquito species that carry diseases, rather than a combination of receptors that is not shared by all species. Once mosquitoes become resistant to EBF, it would

therefore make sense for researchers to look for other molecular components similar to EBF that target the activation of Or31 receptors, since a single such component could also repel all disease-carrying mosquitoes.

Choice B is incorrect because nothing in the text suggests that EBF molecules are difficult to extract from chrysanthemums and that investigating alternative extraction methods would therefore be useful for developing efficient and effective mosquito repellents. Rather, the text suggests that researchers developing new mosquito repellents should aim to identify molecular components similar to EBF, since that component targets the Or31 odor receptor shared by all species of mosquitoes known to carry diseases. *Choice C* is incorrect because nothing in the text suggests that researchers are unaware of the precise location of Or31 and other odor receptors in mosquitoes' antennae or that knowing this information would be useful for developing efficient and effective mosquito repellents. Rather, the text suggests that researchers developing new mosquito repellents should aim to identify molecular components similar to EBF, which targets the Or31 odor receptor. *Choice D* is incorrect because it doesn't logically follow that the discovery of one odor receptor shared by all disease-bearing mosquitoes should lead to further research into which repellents might activate the greatest number of odor receptors. Rather, the text suggests that researchers developing new mosquito repellents should instead search for additional molecular components that, like EBF, activate the one odor receptor that is known to be shared by all disease-bearing mosquitoes.

QUESTION 18

Choice D is the best answer because it most logically completes the text's discussion of Shultz's finding about male tanagers. The text explains that because carotenoids both contribute to deeply saturated feathers and offer health benefits, having deeply saturated feathers is usually "an honest signal" (a true indication) that a bird is generally fit. However, Shultz and others have found that certain male tanagers can appear to have deeply saturated feathers even if they haven't consumed a diet rich in carotenoids, thanks to microstructures in their feathers that manipulate light. If those birds aren't necessarily eating carotenoid-rich diets, they may actually be less fit than other birds that appear to have similarly saturated feathers; this suggests that a male tanager's appearance may function as a dishonest signal, or a false indication, of the bird's overall fitness.

Choice A is incorrect because Shultz's finding suggests that some tanagers can signal fitness without consuming the carotenoids that contribute to fitness, thereby making those signals dishonest, not that tanagers can give honest signals of their fitness without consuming carotenoids. *Choice B* is incorrect because Shultz's finding suggests that the microstructures in certain tanagers' feathers can give a dishonest signal of fitness, not that the microstructures are less effective than actual pigmentation for signaling fitness. Whether the signal of fitness is honest or dishonest has no bearing on how effective the signal is: a signal is effective if potential mates behave as though it's true, regardless of whether it's actually true. Since there's no information in the text about how potential mates respond to the dishonest signals of some tanagers, there's no

support for the idea that the dishonest signals are less effective than the honest signals. *Choice C* is incorrect because Shultz's finding suggests that certain male tanagers may appear to be fitter than they actually are, not that scientists haven't determined why tanagers prefer mates with colorful appearances.

QUESTION 19

Choice C is the best answer. The convention being tested is subject-verb agreement. The singular verb "has been" agrees in number with the singular subject "writing."

Choice A is incorrect because the plural verb "were" doesn't agree in number with the singular subject "writing." *Choice B* is incorrect because the plural verb "have been" doesn't agree in number with the singular subject "writing." *Choice D* is incorrect because the plural verb "are" doesn't agree in number with the singular subject "writing."

QUESTION 20

Choice B is the best answer. The convention being tested is the use of non-finite (untensed) verb forms in a sentence. The modal "would," which indicates the future from a perspective in the past, should be accompanied by a non-finite plain form verb. In this choice, the non-finite plain form verb "create" is used correctly in conjunction with the non-finite plain form verb "increase" to describe what the lock would do.

Choice A is incorrect because the finite present tense verb "creates" can't be used in this way with the modal "would" to describe what the lock would do. *Choice C* is incorrect because the present participle "creating" can't be used in this way with the modal "would" to describe what the lock would do. *Choice D* is incorrect because the finite past tense verb "created" can't be used in this way with the modal "would" to describe what the lock would do.

QUESTION 21

Choice B is the best answer. The convention being tested is the use of punctuation around noun phrases. No punctuation is needed because the coordinated noun phrase "Thomas Hart Benton and Jackson Pollock" is a restrictive appositive, meaning that it provides essential identifying information about the noun phrase before it, "the renowned twentieth-century US artists."

Choice A is incorrect because no punctuation is needed between the noun phrase "the renowned twentieth-century US artists" and the restrictive appositive "Thomas Hart Benton and Jackson Pollock." Additionally, no punctuation is needed between the sentence's subject ("paintings by the renowned twentieth-century US artists Thomas Hart Benton and Jackson Pollock") and the main verb ("were featured"). *Choice C* is incorrect because no punctuation is needed between the coordinated elements "Thomas Hart Benton" and "Jackson Pollock." Additionally, no punctuation is needed between the sentence's subject ("paintings by the renowned twentieth-century US artists Thomas Hart Benton and Jackson Pollock") and the main verb ("were featured"). *Choice D* is incorrect because no

punctuation is needed between the noun phrase "the renowned twentieth-century US artists" and the restrictive appositive "Thomas Hart Benton and Jackson Pollock."

QUESTION 22

Choice A is the best answer. The convention being tested is the use of punctuation to mark boundaries between supplements and clauses. The comma after "equations" is used to separate the independent clause ("Hopper's… equation") from the supplementary adverb phrase "though." The colon after "though" is used to mark the boundary between the clause ending with "though" and the following clause ("as…age"). A colon used in this way introduces information that illustrates or explains information that has come before it. In this case, the colon after "though" introduces the following explanation of how Hopper's subsequent career would involve more than just solving equations: she would become a pioneering computer programmer.

Choice B is incorrect because it results in a comma splice. A comma can't be used in this way to join two independent clauses ("Hopper's…though" and "as… age") such as these. *Choice C* is incorrect because it results in an illogical sequence of sentences. Placing the period after "equations" and beginning the next sentence with "Though" illogically suggests that the following information (that Hopper would help usher in the digital age) is contrary to the information in the previous sentence (Hopper's subsequent career would involve more than just solving equations). Instead, the information that follows supports the information from the previous sentence by explaining how her work and influence extended beyond solely solving equations. *Choice D* is incorrect because it results in a run-on sentence. The two independent clauses ("Hopper's…though" and "as…age") are fused without punctuation.

QUESTION 23

Choice D is the best answer. The convention being tested is subject-verb agreement. The plural verb "attest" agrees in number with the plural subject "trailblazing accomplishments."

Choice A is incorrect because the singular verb "attests" doesn't agree in number with the plural subject "trailblazing accomplishments." *Choice B* is incorrect because the singular verb "has attested" doesn't agree in number with the plural subject "trailblazing accomplishments." *Choice C* is incorrect because the singular verb "is attesting" doesn't agree in number with the plural subject "trailblazing accomplishments."

QUESTION 24

Choice C is the best answer. The convention being tested is the punctuation of a supplementary phrase following a clause. This choice uses a comma to separate the supplementary adverb phrase "however" from the independent clause it modifies ("They…antiquity") and uses a semicolon to join the first independent clause ("They…antiquity") and the second independent clause ("some…literature").

Further, placing the semicolon after "however" indicates that the information in the clause that this is part of (that neoclassical writers were not the first to adopt classical literary modes) is contrary to what might be assumed from the information in the previous sentence (that the neoclassical writers were unique in imitating classical epic poetry and satires).

Choice A is incorrect because it fails to mark the boundary after "however" between the two independent clauses with appropriate punctuation. *Choice B* is incorrect because the comma after "however" can't be used in this way to mark the boundary between the two independent clauses. *Choice D* is incorrect because placing the semicolon after "antiquity" illogically indicates that the information in the clause that this is part of (that prominent Renaissance figures were also influenced by classical literature) is contrary to the information in the previous clause (that neoclassical writers were not the first to adopt classical literary modes).

QUESTION 25

Choice C is the best answer. The convention being tested is the use of punctuation and verb forms within a sentence. This choice leaves the verb "admired" in its nonfinite past participle form to function within a supplementary element ("much…followed"). Offset by commas after "works" and "followed," this supplementary element interrupts the main clause ("English poet and Shakespeare contemporary John Donne's works…had…been essentially gathering dust…") with additional information about the works' reception during Donne's lifetime.

Choice A is incorrect because it fails to offset the supplementary element ("much…followed") with appropriate punctuation, and using the finite verb "were much admired" results in an ungrammatical sentence. *Choice B* is incorrect because using the finite verb "were much admired" results in an ungrammatical sentence. *Choice D* is incorrect because it fails to offset the supplementary element ("much…followed") with appropriate punctuation, and using the finite verb "had been much admired" results in an ungrammatical sentence.

QUESTION 26

Choice D is the best answer. The convention being tested is subject-modifier placement. This choice makes "silica glass's atomic arrangement" the subject of the sentence and places it immediately after the modifying phrase "compared to that of alumina glass." In doing so, this choice clearly establishes that silica glass's atomic arrangement—and not another noun in the sentence—is being compared to the atomic arrangement ("that") of alumina glass.

Choice A is incorrect because it results in a dangling modifier. The placement of the noun phrase "silica glass" immediately after the modifying phrase illogically suggests that silica glass itself (rather than its atomic arrangement) is being compared to alumina glass's atomic arrangement. *Choice B* is incorrect because it results in a dangling modifier. The placement of the noun phrase "silica glass" immediately after the modifying phrase illogically suggests that silica glass itself (rather than its atomic arrangement) is being compared to alumina glass's atomic

arrangement. *Choice C* is incorrect because it results in a dangling modifier. The placement of the noun phrase "a significant disadvantage" immediately after the modifying phrase illogically suggests that "a significant disadvantage" is being compared to alumina glass's atomic arrangement.

QUESTION 27

Choice A is the best answer. "Still" logically signals that the information about Sher-Gil in this sentence—that she longed to leave Paris and return to India—contrasts with what one would expect after reading about Sher-Gil's experiences in Paris in the previous sentences.

Choice B is incorrect because "therefore" illogically signals that the information about Sher-Gil in this sentence is a result or consequence of the descriptions in the previous sentences. Instead, this information contrasts with what one would expect after reading about Sher-Gil's experiences in Paris. *Choice C* is incorrect because "indeed" illogically signals that the information about Sher-Gil in this sentence offers additional emphasis in support of the descriptions in the previous sentences. Instead, this information contrasts with what one would expect after reading about Sher-Gil's experiences in Paris. *Choice D* is incorrect because "furthermore" illogically signals that the information about Sher-Gil in this sentence offers additional support for or confirmation of the descriptions in the previous sentences. Instead, this information contrasts with what one would expect after reading about Sher-Gil's experiences in Paris.

QUESTION 28

Choice B is the best answer. "Specifically" logically signals that the information in this sentence—that Molina and Rowland's research laid the foundation for a later treaty—provides specific, precise details elaborating on the previous sentence's more general claim about the influence of the research.

Choice A is incorrect because "regardless" illogically signals that the information in this sentence is true despite the previous sentence's claim about the influence of Molina and Rowland's research. Instead, this information—that the research laid the foundation for a later treaty—provides specific details elaborating on the previous claim. *Choice C* is incorrect because "however" illogically signals that the information in this sentence contrasts with the previous sentence's claim about the influence of Molina and Rowland's research. Instead, this information—that the research laid the foundation for a later treaty—provides specific details elaborating on the previous claim. *Choice D* is incorrect because "earlier" illogically signals that the information in this sentence occurred at a time before Molina and Rowland's research influenced the fight against CFCs. Instead, this information—that the research laid the foundation for a later treaty—provides specific details elaborating on the previous claim about the research's influence.

QUESTION 29

Choice C is the best answer. "Indeed" logically signals that the description of the art installation in this sentence—its blue room and preening unicorn that leave visitors "dazzled and confused"—offers additional emphasis in support of the previous sentence's claim about the installation's "whimsical yet perplexing experience."

Choice A is incorrect because "second" illogically signals that the description in this sentence is a second, separate claim from the previous sentence's claim about the installation's "whimsical yet perplexing experience." Instead, the specific details describing the installation emphasize and support the previous claim. *Choice B* is incorrect because "instead" illogically signals that the description in this sentence is an alternative to the previous sentence's claim about the installation's "whimsical yet perplexing experience." Rather, the specific details describing the installation emphasize and support that claim. *Choice D* is incorrect because "nevertheless" illogically signals that the description in this sentence is true despite the previous sentence's claim about the installation's "whimsical yet perplexing experience." Instead, the specific details describing the installation emphasize and support that claim.

QUESTION 30

Choice A is the best answer. The sentence emphasizes the distance covered by the Philadelphia and Lancaster Turnpike, noting that the turnpike, which connected the two Pennsylvania cities in its name, was sixty-two miles long.

Choice B is incorrect. The sentence emphasizes the significance of the turnpike; it doesn't emphasize the distance that the turnpike covered. *Choice C* is incorrect. While the sentence mentions that the turnpike connected two Pennsylvania cities, it doesn't emphasize the specific distance covered by the turnpike. *Choice D* is incorrect. The sentence emphasizes when the turnpike was built; it doesn't emphasize the distance that the turnpike covered.

QUESTION 31

Choice C is the best answer. The sentence emphasizes the aim, or goal, of the research study, noting what Terada set out to do: determine whether some of the Moon's oxygen was coming from Earth.

Choice A is incorrect. The sentence focuses on how the Kaguya satellite collected data; it doesn't emphasize the aim of the research study. *Choice B* is incorrect. While the sentence mentions what Terada was curious about before conducting the research study, it doesn't emphasize his study's aim. *Choice D* is incorrect. The sentence presents the research study's conclusion; it doesn't emphasize the study's aim.

QUESTION 32

Choice A is the best answer. The sentence emphasizes the aim of the research study by highlighting what the researchers conducting the study wanted to know—specifically, which factors influence clutch size among lizards.

Choice B is incorrect because the sentence emphasizes what researchers determined at the end of the study, not what the study's aim was. *Choice C* is incorrect because the sentence emphasizes a finding from the research study, not the aim of the study. *Choice D* is incorrect because the sentence emphasizes the research study's methodology, not its aim.

QUESTION 33

Choice D is the best answer. The sentence uses information from the notes to make a generalization about the kind of study Glickman, Brown, and Song conducted. Specifically, the sentence indicates that the study was of a kind that used statistical methods to address questions of authorship within the field of music.

Choice A is incorrect because the sentence summarizes the methodology and findings of a particular analysis of a single song; it doesn't make a generalization about the kind of study conducted. *Choice B* is incorrect because the sentence mentions the data and conclusion of a particular analysis of a single song; it doesn't make a generalization about the kind of study conducted. *Choice C* is incorrect because the sentence focuses on a specific conclusion from a particular analysis of a single song; it doesn't make a generalization about the kind of study conducted.

Reading and Writing

Module 2

(33 questions)

QUESTION 1

Choice B is the best answer because it best completes the text's discussion of how viewers respond to colors. The text presents something art scholars have noted and gives the example of people tending to find paintings with blues and greens more appealing than those with yellows and oranges. This context conveys that certain colors are more "attractive to" viewers than other colors are.

Choice A is incorrect because the text indicates only that people tend to find some colors more appealing than others and gives no indication that certain colors are ever "confusing for," or puzzling to, viewers. *Choice C* is incorrect because the text discusses the relative appeal of certain colors in paintings but gives no indication that any colors would ever be "corrected by" viewers, or somehow fixed or improved by them. *Choice D* is incorrect because it wouldn't make much sense to say that some colors are more "similar to" viewers than others, which would suggest that colors and viewers are alike to different degrees. Further, the text primarily emphasizes a difference, not a similarity, in how appealing paintings tend to be based on the colors they contain.

QUESTION 2

Choice A is the best answer because it most logically completes the text's discussion of how biodiversity loss due to invasive species can be avoided. As used in this context, "preventable" means able to be stopped or kept from happening. The text indicates that "people can take simple steps" to avoid bringing possible invasive species into new environments. It presents these steps as an example of how biodiversity loss due to invasive species is preventable.

Choice B is incorrect because it wouldn't make sense to say that a simple step like washing your shoes after traveling is an example of biodiversity loss due to invasive species being "undeniable," or something that can't be proved to be wrong. Although the text may suggest that biodiversity loss due to invasive species is something that really happens, the word that completes the text must

make the first sentence into an assertion that is illustrated by the second sentence, and the second sentence illustrates the idea that biodiversity loss due to invasive species is preventable, not undeniable. *Choice C* is incorrect because it wouldn't make sense to say that a simple step like washing your shoes after traveling is an example of biodiversity loss due to invasive species being "common," or something that happens regularly. Additionally, the text doesn't provide any information about how frequently invasive species cause biodiversity loss. *Choice D* is incorrect because it wouldn't make sense to say that a simple step like washing your shoes after traveling is an example of biodiversity loss due to invasive species being "concerning," or something that is troubling or causes worry. Although the text implies that the phenomenon of biodiversity loss due to invasive species is itself a concerning phenomenon, the word that completes the text must make the first sentence into an assertion that is illustrated by the second sentence, and the second sentence illustrates the idea that biodiversity loss due to invasive species is preventable, not concerning.

QUESTION 3

Choice B is the best answer because it most logically completes the text's discussion about recycling plastics. In this context, "inadequate" means not satisfactory. The text indicates that the mechanical plastic-recycling process affects the environment and causes "the loss of material quality." The text contrasts that with Chazovachii's chemical plastic-recycling process, which is cleaner and produces a desirable product. The text's emphasis on the negative aspects of mechanical recycling suggests that it is inadequate in terms of environmental impact and the quality of the material the process yields.

Choice A is incorrect because in this context "resilient" would mean able to withstand difficulty and the text does not characterize the plastic-recycling process as having this quality or describe any difficulties that these processes might need to overcome. *Choice C* is incorrect because in this context "dynamic" would mean constantly changing. Although the text suggests that there have been changes in the field of recycling, as is the case with the advent of Chazovachii's chemical recycling process, there is nothing to suggest that the mechanical process itself has changed or is prone to change. *Choice D* is incorrect because in this context "satisfactory" would mean acceptable but not perfect. The text mentions only shortcomings of the mechanical process (environmental effects and lower material quality), so the text more strongly supports a negative view of this process and provides no evidence that it would be considered satisfactory.

QUESTION 4

Choice D is the best answer because it most logically completes the text's discussion of the Three Sisters intercropping system. As used in this context, "intricate" would mean made up of complexly related elements. The text indicates that in the Three Sisters system, maize, squash, and beans form a "web of relations" in which the crops interact in various ways. The text's description of these interactions—the bean vines growing on the maize stalks, the squash vines keeping weeds away, and the beans adding nutrients that the maize and squash use—provides context suggesting that this "web of relations" is intricate.

Choice A is incorrect because describing the relationship among the crops in the Three Sisters system as "indecipherable," or impossible to comprehend, would not make sense in context. Although the text presents the relationship as complex, the text's description of the role that each crop plays makes it clear that the relationship is well understood, not indecipherable. *Choice B* is incorrect because the text discusses the practical benefits that each plant in the Three Sisters system provides to other members of the system, showing that the relationship among the crops that make up the system is not "ornamental," or mainly serving a decorative purpose. *Choice C* is incorrect because describing the relationship among the crops in the Three Sisters system as "obscure," or unknown or poorly understood, would not make sense in context. Although the text presents the relationship as complex, the text's description of the role that each crop plays makes it clear that the relationship is well understood, not obscure.

QUESTION 5

Choice D is the best answer because it most logically completes the text's discussion of baleen whale accessory spleens. In this context, "latent" means dormant or functionless. The text sets up a contrast between the idea that baleen whale accessory spleens appear not to have a function and the research indicating that the accessory spleen may actually have a role in supporting the whales' diving mechanisms. This context therefore conveys the idea that the assumption that baleen whale accessory spleens are latent may be incorrect.

Choice A is incorrect because it wouldn't make sense to say that the role of the accessory spleen is "replicable," or capable of being reproduced. The text indicates that the role of the accessory spleen seems to have no function, but some researchers think it does have a role; the text doesn't address whether the role of the accessory spleen could or couldn't be reproduced. *Choice B* is incorrect because suggesting that the role of the accessory spleen is "predetermined," or decided in advance, wouldn't make sense in context. Although the researchers may agree that the role of the accessory spleen or any other organ hasn't been determined in advance, the text focuses on the idea that the accessory spleen was thought to have been functionless but may in fact serve an active role for baleen whales. *Choice C* is incorrect because it's the opposite of what the context of the text is conveying. The second sentence of the text indicates that baleen whale accessory spleens may not be useless, not that they aren't "operative," or functional.

QUESTION 6

Choice A is the best answer because it most accurately states the main purpose of the text. After providing a brief introduction to computer scientist Luis von Ahn, the text focuses on discussing how von Ahn's digitization work led to the invention of a digital security test known as reCAPTCHA.

Choice B is incorrect because the text doesn't address how digital scanners work. *Choice C* is incorrect. Although the text mentions von Ahn's book-digitizing project, that information is provided as a detail, not as the main purpose of the text. *Choice D* is incorrect because the text doesn't provide any indication of reCAPTCHA's popularity; instead, it describes reCAPTCHA's origin.

QUESTION 7

Choice C is the best answer because it most accurately describes the overall structure of the text. Throughout the text, the speaker characterizes nighttime as if it were a person who wears clothing ("a garment" that is "velvet soft" and "violet blue") and a veil "over her face" and who moves her hands "slowly with their gem-starred light" through her dark hair. Thus, the text is structured as an extended comparison of night to a human being.

Choice A is incorrect because the text never mentions any particular location; instead, it focuses on presenting a single description of night as a person with certain clothing and features. *Choice B* is incorrect because the text doesn't make any reference to the sun or sunrise; instead, it focuses on presenting a single image of night as a person with certain clothing and features. *Choice D* is incorrect. Rather than describing how nighttime changes seasonally (or in any other way), the text presents a single image of night as a person with certain clothing and features.

QUESTION 8

Choice A is the best answer because it most accurately portrays the main purpose of the text. At the beginning of the text, Tom asserts that he and the other people staging the play are doing so only for "a little amusement among ourselves" and aren't interested in attracting an audience or any attention with the production. Then, Tom promises that the play they chose is modest and appropriate, and he further reasons that using the well-written prose of "some respectable author" is better than using their own words. Overall, the main purpose of the text is to convey Tom's promise that the play will be inoffensive and involve only a few people.

Choice B is incorrect because the text doesn't indicate that Tom had earlier intentions for the play's performance or that anything has changed since the group first decided to stage a play. Instead, the text focuses on how harmless the entire endeavor will be. *Choice C* is incorrect. Although Tom mentions that using the words of a "respectable author" will be better than using their own words, he never addresses the idea that the people around him generally aren't skilled enough to stage a play. *Choice D* is incorrect because in the text Tom specifically says that they "want no audience, no publicity," which indicates that they don't plan on promoting the play at all.

QUESTION 9

Choice A is the best answer because based on Text 2, it represents how Behrenfeld and colleagues would most likely respond to the "conventional wisdom" discussed in Text 1. The conventional wisdom cited holds the opinion that when there is species diversity within a phytoplankton population, "one species should emerge after outcompeting the rest"—that is, after being so successful in competing for resources that the other species vanish from the population. However, Text 2 explains that according to Behrenfeld and colleagues, phytoplankton are so small and spaced so far apart in the water that there is "much less" direct competition for resources within phytoplankton populations than scientists had previously thought.

Choice B is incorrect because Text 2 never discusses whether routine replenishment of ocean nutrients affects competition between phytoplankton species. *Choice C* is incorrect because the interspecies competition discussed in both texts is specifically between phytoplankton species, and neither text considers whether phytoplankton compete for resources with larger nonphytoplankton species. *Choice D* is incorrect because according to Text 2, Behrenfeld and colleagues argue that water density decreases, not increases, competition between phytoplankton species.

QUESTION 10

Choice D is the best answer because it most accurately describes what the narrator and Mario did while riding in the car. The text describes a car trip that the narrator is taking with her family. The text states that during the car ride, the narrator and Mario "played games" to see how many different license plates they could spot.

Choice A is incorrect because the text doesn't mention the narrator and Mario reading during the car ride and instead describes them playing games. *Choice B* is incorrect because the text doesn't mention the narrator and Mario singing songs during the car ride and instead describes them playing games. *Choice C* is incorrect because the text doesn't mention the narrator and Mario sleeping during the car ride and instead describes them playing games.

QUESTION 11

Choice B is the best answer because it presents a statement about how Richard Wagner achieved moments of extremely high volume in his operas that is supported by the text. The text states that European composers experimented with volume in their works by increasing the number of musicians in the orchestra and provides the example of Wagner, who "added more horns, trombones, and tubas to the orchestra." The text explains that by having more of these instruments playing at the same time, the overall volume of the orchestra could be dramatically increased at key moments in Wagner's operas.

Choice A is incorrect because the text never indicates that Wagner moved his operas indoors to achieve moments of extremely high volume, nor does it indicate that his operas were previously performed outdoors. The only technique discussed in the text for achieving extremely high volume is Wagner's addition of more instruments to create a bigger, louder orchestra. *Choice C* is incorrect because the text never says that Wagner built or used a specially designed concert hall to increase volume through echoes. The only technique discussed in the text is Wagner's addition of more instruments to create a bigger, louder orchestra. *Choice D* is incorrect because the text never mentions any special training for singers related to volume or singing for extended periods. The text's focus is entirely on the orchestra and how Wagner and other European composers used instruments to experiment with volume in their musical works.

QUESTION 12

Choice C is the best answer because it presents a statement about the difrasismo *in cuauhtli in ocelotl* that is directly supported by the text. The text begins by describing difrasismo, a device used in Classical Nahuatl poetry. The text then mentions the device's two functions: a formal one (giving structure to lines of verse) and a ritualistic one. The text indicates that the relation between the words in a difrasismo may appear tenuous without the additional information supplied by Aztec ceremonial culture but that the meaning becomes intelligible in the context of that information. Therefore, the difrasismo's apparent obscurity can be resolved when considered in the proper cultural context.

Choice A is incorrect because the text doesn't indicate that the two nouns used in a difrasismo are semantically equivalent; instead, the text indicates that the two nouns used in a difrasismo make up a single metaphor whose meaning is often intelligible only in the context of information supplied by Aztec ceremonial culture. *Choice B* is incorrect because the text doesn't indicate that there's a relationship between the formal function of the difrasismo and the difrasismo's intelligibility. Additionally, the text suggests that present-day readers who are familiar with Aztec ceremonial culture wouldn't find the difrasismo to be unintelligible. *Choice D* is incorrect because the text doesn't indicate that the frequency of difrasismo's use in Classical Nahuatl is a necessary feature of intelligibility: the text indicates that an infrequently used difrasismo would presumably also be intelligible to members of an Aztec audience who are sufficiently familiar with Aztec ceremonial culture.

QUESTION 13

Choice D is the best answer because it most accurately states the main idea of the text. The text explains that economist Adam Smith's famous metaphor of the invisible hand was putatively (that is, widely assumed but not proven) intended to illustrate a robust model (a consistently accurate generalization) of how individuals pursuing their own economic interests can create broader benefits for the population. The text then emphasizes the lack of affirmative evidence for this idea by calling out the term "putatively," and explaining that, according to Gavin Kennedy, Smith used the metaphor only once in his works, in reference to specific circumstances related to the now-outdated economic view known as mercantilism, and that the metaphor didn't garner much attention until economists in the twentieth century held it up as a paradigm (a theoretical framework in the field) and thereby implied that Smith shared some of their views on economics. By emphasizing "putatively," the text implies that there is no independent reason to believe that Smith would agree with the metaphor's use outside of the specific context for which he wrote it and that, therefore, the twentieth-century economists who used it did so to support their own views without regard for the metaphor's importance to Smith's work.

Choice A is incorrect. Although the text indicates that Smith's metaphor was largely ignored until some twentieth-century economists revived it and bolstered its status, the text suggests that the later economists used Smith's metaphor to self-servingly boost their own work while ignoring the original context in which

Smith wrote it. Moreover, the statement in this choice fails to reflect the text's emphasis on Smith's limited use of the metaphor in his work. *Choice B* is incorrect. Although the text indicates that some twentieth-century economists altered the significance of Smith's metaphor, the text doesn't suggest that the metaphor is a "useful model" of how aggregate benefits arise from individuals' selfish actions, let alone that this usefulness is unaffected by taking the metaphor out of its original context. *Choice C* is incorrect. Although the text indicates that Smith's metaphor was intended as a model of how individuals acting in their own interest produce aggregate benefits and it was written within the context of the now-outdated economic theory of mercantilism, these points are subordinate to the primary idea in the text, which is that Smith's use of the metaphor was tightly constrained but twentieth-century economists ignored the original context so that they could use the metaphor to suggest, without support, that Smith would agree with their economic views.

QUESTION 14

Choice B is the best answer because it provides the most direct support from the table for the claim that two languages can convey similar amounts of information even if they're spoken at different rates. The table shows the approximate rates at which five languages are spoken and the rates at which those five languages convey information. Vietnamese is spoken at around 5.3 syllables per second, whereas Spanish is spoken at around 7.7 syllables per second, but the two languages convey information at very similar rates: Vietnamese at a rate of around 42.5 bits per second and Spanish at a rate of around 42.0 bits per second. Thus, the description of Vietnamese conveying information at around the same rate that Spanish does despite being spoken more slowly supports the claim in the text that languages can convey the same amount of information even if spoken at different rates.

Choice A is incorrect because it isn't true that Thai and Hungarian have the lowest rates of speech of the five languages shown. According to the table, Hungarian is spoken at around 5.9 syllables per second, which is faster than Vietnamese (5.3 syllables per second). Additionally, even if this statement were true, the assertion that two languages are spoken the slowest and convey information the slowest wouldn't support the claim that languages can convey the same amount of information even if they're spoken at different rates. *Choice C* is incorrect because it isn't true that the fastest-spoken language (Spanish, at 7.7 syllables per second) also conveys information the fastest: Spanish conveys information at 42.0 bits per second, which is slower than the 42.5 bits-per-second rate at which Vietnamese conveys information. Additionally, even if this statement were true, the assertion that the language spoken the fastest also conveys information the fastest has no bearing on the claim that languages can convey the same amount of information even if they're spoken at different rates. *Choice D* is incorrect because it isn't true that Serbian conveys information faster than Spanish does. According to the table, Serbian conveys information at a rate of around 39.1 bits per second, which is slower than the 42.0 bits-per-second rate at which Spanish conveys information.

QUESTION 15

Choice C is the best answer because it accurately describes data from the table that support Barrett and Rayfield's suggestion about bite force estimates. According to the text, Barrett and Rayfield believe that estimates of dinosaur bite force may be strongly influenced by the methods used to produce them—that is, that different methods may produce significantly different results. The table shows that the studies by Bates and Falkingham and by Cost et al. used the same estimation method (muscular and skeletal modeling) and produced similar bite force estimates (approximately 35,000–57,000 newtons and 35,000–63,000 newtons, respectively). The study by Meers, however, used body-mass scaling and produced a much higher bite force estimate (183,000–235,000 newtons), while the study by Gignac and Erickson used tooth-bone interaction analysis and produced a much lower bite force estimate (8,000–34,000 newtons). The fact that one method produced similar estimates in two different studies and that two different methods used in other studies produced substantially different estimates supports the idea that dinosaur bite force estimates are significantly influenced by the methodology used to produce them.

Choice A is incorrect because it inaccurately describes data from the table. The table does show that the studies by Meers and by Cost et al. used different estimation methods and produced very different ranges of estimated dinosaur bite force, which would support Barrett and Rayfield's suggestion that different methodologies may produce significantly different estimates. However, the table doesn't show that the study by Meers produced the lowest estimated maximum bite force while the study by Cost et al. produced the highest. In fact, the study by Meers estimated a maximum bite force of approximately 235,000 newtons, which is the highest of all the estimated maximums. *Choice B* is incorrect. Although the data from Gignac and Ericson's study are accurately described, a single set of findings from one study using only one methodology can't show that different methodologies may produce significantly different dinosaur bite force estimates, as Barrett and Rayfield suggest. *Choice D* is incorrect. Although the table shows that the maximum bite force estimated by Cost et al. was higher than that estimated by Bates and Falkingham, the difference is relatively small; in fact, both teams estimated a minimum bite force of approximately 35,000 newtons and a maximum bite force close to approximately 60,000 newtons. Because these findings demonstrate that a single methodology (muscular and skeletal modeling) produced similar overall results in two studies, the findings don't support Barrett and Rayfield's suggestion that different methodologies may produce significantly different dinosaur bite force estimates.

QUESTION 16

Choice A is the best answer because it presents a finding that, if true, would most strongly support the researchers' claim that they found evidence that experiencing awe can make people feel more connected to others and thus more likely to behave altruistically (with beneficial and unselfish concern for others). According to the text, the researchers tested for this effect by first having participants look at either something known to be awe-inspiring (very tall trees) or something ordinary (a plain building) and then purposely spilling pens near the

participants. The finding that participants who had looked at the trees helped pick up significantly more pens than did participants who had looked at the building would support the researchers' claim by demonstrating that the people who had experienced awe behaved more altruistically when the experimenter needed help than the other participants did.

Choice B is incorrect because a finding about helpful participants using positive words to describe the trees and the building after the experiment was over wouldn't have any bearing on the researchers' claim that experiencing awe increases altruistic behavior. The text doesn't address the use of positive words to describe things or suggest any connection between using such words and having experienced awe, so that behavior wouldn't serve as evidence that experiencing awe played a role in promoting helpful behavior. *Choice C* is incorrect because a finding that participants who didn't help the experimenter were significantly more likely than others to report having experienced awe whether they had looked at the building or the trees would weaken the researchers' claim that experiencing awe increases altruistic behavior by suggesting that the opposite might be true—that experiencing awe is in fact linked to choosing not to act in a way that benefits someone else. *Choice D* is incorrect because a finding about participants noticing that the experimenter had dropped the pens wouldn't have any bearing on the researchers' claim about people behaving altruistically. Being aware of a challenge or problem isn't necessarily beneficial on its own and isn't the same as offering help, so the finding wouldn't support the idea that experiencing awe increases altruistic behavior.

QUESTION 17

Choice C is the best answer because it most logically completes the text's discussion of the sweet potato in Polynesia. The text indicates that the sweet potato is found in Polynesia but originated in South America, and that the sweet potato was being cultivated by Native Hawaiians and other Indigenous peoples in Polynesia long before sea voyages between South America and Polynesia began. The text goes on to note that research by Muñoz-Rodríguez and colleagues has established that the Polynesian varieties of sweet potato split from South American varieties more than 100,000 years ago, which is thousands of years before humans settled in Polynesia. If Polynesian peoples were cultivating the sweet potato before sea voyages between Polynesia and South America began, and if Polynesian varieties of sweet potato diverged from South American varieties well before people were in Polynesia, it can reasonably be concluded that humans didn't play a role in bringing the sweet potato to Polynesia.

Choice A is incorrect. The text doesn't provide any information about when the sweet potato began to be cultivated in South America, so there's no support for the conclusion that cultivation began in Polynesia before it began in South America. *Choice B* is incorrect because the text indicates that the sweet potato was being cultivated in Polynesia long before sea journeys between Polynesia and South America began. Therefore, it wouldn't be reasonable to conclude that Polynesian peoples acquired the sweet potato from South American peoples. Additionally, the text indicates that the Polynesian varieties of sweet potato diverged from the South American varieties thousands of years before people

settled in Polynesia, which suggests that the sweet potato was already present in Polynesia when people arrived. *Choice D* is incorrect because the text states that the domestic sweet potato, which is found in Polynesia, descends from a wild South American plant, not from a domesticated South American plant. The only people that the text describes as cultivating the sweet potato are Native Hawaiians and other Indigenous peoples of Polynesia.

QUESTION 18

Choice D is the best answer because it most logically completes the text's discussion of the morphology (form and structure) of sea stars, a type of echinoderm. The text indicates that echinoderms have radially symmetrical body plans (symmetrical around a central point, usually in the form of a star), whereas most animals have bilaterally symmetrical body plans (symmetrical along an axis running from head to tail through a trunk). According to the text, sea stars are unusual echinoderms because, despite their radial body plan, they descended from known bilateral ancestors. This shift in body plan was thought to be a process of losing the genetic markers associated with the head region. The text explains that by comparing the genes of one sea star species (*P. miniata*) to those of a close relative, the acorn worm, researchers determined that instead, anterior (head) genes are active across the sea star's entire body, posterior (tail) genes are active in limited, peripheral locations of the body, and no trunk-related genes are active. This finding strongly suggests that, rather than becoming "headless" as they evolved from a bilateral ancestor, sea stars developed a body plan consisting almost entirely of a head region with a minimal tail region and no trunk region present.

Choice A is incorrect because the text doesn't identify how any particular region of sea stars' bodies influences the layout of sea stars' radial symmetry. Moreover, the text indicates that the radial symmetry of echinoderms is "usually starlike," not that a starlike layout distinguishes sea stars from other echinoderms. *Choice B* is incorrect because the text doesn't suggest that the idea that sea stars evolved from an ancestor with bilateral symmetry is incorrect (describing the bilateral origin as "known") and doesn't address any body plans other than those with radial or bilateral symmetry. The text strongly suggests that rather than revealing something about sea stars' origin, Formery et al.'s findings contradict the assumption that the current body plan of sea stars is "headless." *Choice C* is incorrect because the text suggests that Formery et al. were able to make determinations about *P. miniata* sea stars' body plan based on the comparability of genetic markers between *P. miniata* and *S. kowalevskii* acorn worms. The text indicates only that little or no activity was observed in certain types of genes associated with body development in *P. miniata*, not that those genes turned out to largely differ from body-development genes in *S. kowalevskii*.

QUESTION 19

Choice A is the best answer. The convention being tested is finite and nonfinite verb forms within a sentence. A main clause requires a finite verb to perform the action of the subject (in this case, "embryos"), and this choice supplies the clause with the finite present tense verb "enter" to indicate how the embryos achieve diapause.

Choice B is incorrect because the nonfinite to-infinitive "to enter" doesn't supply the main clause with a finite verb. *Choice C* is incorrect because the nonfinite participle "having entered" doesn't supply the main clause with a finite verb. *Choice D* is incorrect because the nonfinite participle "entering" doesn't supply the main clause with a finite verb.

QUESTION 20

Choice B is the best answer. The convention being tested is the use of verbs to express tense. In this choice, the past perfect verb "had doubled" properly indicates that the doubling of the organization's initial membership occurred during a specific period before the present (between the organization's founding in 1967 and the end of the 1990s).

Choice A is incorrect because the present perfect verb "has doubled" doesn't indicate that the organization's doubling of its initial membership occurred during a specific period in the past. *Choice C* is incorrect because the present tense verb "doubles" doesn't indicate that the organization's doubling of its initial membership occurred during a specific period in the past. *Choice D* is incorrect because the future tense verb "will double" doesn't indicate that the organization's doubling of its initial membership occurred during a specific period in the past.

QUESTION 21

Choice C is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period after "percent" is used correctly to mark the boundary between one sentence ("After…percent") and another ("Such… up").

Choice A is incorrect because it results in a comma splice. A comma can't be used in this way to mark the boundary between sentences. *Choice B* is incorrect. Without a comma preceding it, the conjunction "and" can't be used in this way to join sentences. *Choice D* is incorrect because it results in a run-on sentence. The sentences ("After…percent" and "Such…up") are fused without punctuation and/or a conjunction.

QUESTION 22

Choice A is the best answer. The convention being tested is finite verb use in a main clause. A main clause requires a finite verb to perform the action of the subject (in this case, Ashford's "gestures" and "habit"), and this choice supplies the finite past tense verb "helped" to indicate what Ashford's gestures and habit helped accomplish.

Choice B is incorrect because the non-finite participle "helping" doesn't supply the main clause with a finite verb. *Choice C* is incorrect because the relative clause "that helped" doesn't supply the main clause with a finite verb. *Choice D* is incorrect because the non-finite to-infinitive "to help" doesn't supply the main clause with a finite verb.

QUESTION 23

Choice C is the best answer. The convention being tested is the punctuation of a supplementary element within a sentence. The dash after "Springs" pairs with the dash after "earth" to separate the supplementary element "in this case, the porous rocks of the hills around Hot Springs" from the rest of the sentence.

Choice A is incorrect because it fails to use appropriate punctuation to separate the supplementary element from the rest of the sentence. *Choice B* is incorrect because a colon can't be paired with a dash in this way to separate the supplementary element from the rest of the sentence. *Choice D* is incorrect because a comma can't be paired with a dash in this way to separate the supplementary element from the rest of the sentence.

QUESTION 24

Choice A is the best answer. The convention being tested is the use of a colon within a sentence. In this choice, the colon is used in a conventional way to introduce the following description of how the number of jams available varied.

Choice B is incorrect because it creates a comma splice. A comma can't be used in this way to join two main clauses ("the number…varied" and "some…six"). *Choice C* is incorrect because it results in an illogical and confusing sentence. Using the conjunction "while" to join the main clause ("the number…varied") with the following clause's description of the number of jams available suggests that the variation in the number of jams is in contrast to some shoppers having twenty-four options. *Choice D* is incorrect because it results in an illogical and confusing sentence. Using "while" in this way suggests that the number of jams available varied during the time in which some shoppers had twenty-four options and others had six. The sentence makes clear, however, that what follows "varied" is a description of the variation, not a separate, simultaneous occurrence.

QUESTION 25

Choice B is the best answer. The convention being tested is the punctuation of items in a complex series (a series including internal punctuation). In this choice, the semicolon after "Lagos" is conventionally used to separate the first item ("*The Joys*…Lagos") and the second item ("*A Kind*…Nigeria") in the series. Further, the comma after "*Marriage*" correctly separates the title "*A Kind of Marriage*" from the supplementary phrase ("a television…Nigeria") that describes it.

Choice A is incorrect because the comma after "Lagos" doesn't match the semicolon used later in the series to separate the second item ("*A Kind*…Nigeria") from the third item ("and…autobiography"). *Choice C* is incorrect because the comma after "Lagos" doesn't match the semicolon used later in the series to separate the second item ("*A Kind*…Nigeria") from the third item ("and… autobiography"). Additionally, a colon can't be used in this way to separate the title "*A Kind of Marriage*" from the supplementary phrase ("a television…Nigeria") that describes it. *Choice D* is incorrect because it fails to use appropriate punctuation to separate the title "*A Kind of Marriage*" from the supplementary phrase ("a television…Nigeria") that describes it.

QUESTION 26

Choice A is the best answer. The convention being tested is the use of punctuation within a sentence. This choice correctly uses a comma to separate the supplementary adverb "though" from the preceding main clause ("Jetties can sometimes have the opposite effect") and uses a semicolon to join the next main clause ("obstructing…areas") to the rest of the sentence. Further, placing the semicolon after "though" logically indicates that the information earlier in this sentence (that jetties can sometimes cause erosion) is contrary to what might be assumed from the information in the previous sentence (that jetties are often constructed for the purpose of protecting coastlines from erosion).

Choice B is incorrect because it fails to mark the boundary between the two main clauses with appropriate punctuation. With "though…areas" functioning as a subordinate clause following the comma, this choice illogically indicates that the following information (that obstructing the natural flow of sand along the shore can sometimes lead to erosion) is contrary to the information earlier in the sentence (that jetties can sometimes cause erosion). Instead, the information following "though" supports the previous claim about the erosive effects of jetties. *Choice C* is incorrect because it's not conventional to use a semicolon in this way to separate a main clause from a dependent clause. Further, it illogically indicates that the following information (that obstructing the natural flow of sand along the shore can sometimes lead to erosion) is contrary to the information earlier in the sentence (that jetties can sometimes cause erosion). Instead, the information following "though" supports the previous claim about the erosive effects of jetties. *Choice D* is incorrect because it results in a comma splice. Commas can't be used in this way to set off a supplementary word or phrase between two main clauses.

QUESTION 27

Choice A is the best answer. "In fact" logically signals that the information in this sentence about the large number of recordings in ANLA's collection emphasizes and supports the previous claim that ANLA is known for its impressive audio collection.

Choice B is incorrect because "after" illogically signals that the information in this sentence occurs later in a sequence of events than the previous claim about ANLA's impressive audio collection. Instead, the information about the large number of recordings emphasizes and supports that claim. *Choice C* is incorrect because "regardless" illogically signals that the information in this sentence is true despite the previous claim about ANLA's impressive audio collection. Instead, the information about the large number of recordings emphasizes and supports that claim. *Choice D* is incorrect because "instead" illogically signals that the information in this sentence presents an alternative to the previous claim about ANLA's impressive audio collection. Rather, the information about the large number of recordings emphasizes and supports that claim.

QUESTION 28

Choice A is the best answer. "Currently" logically signals that the archaeologists' use of drones (a current technology) to photograph the lines is the present-day continuation of the ongoing archaeological research described in the previous sentence.

Choice B is incorrect because "in comparison" illogically signals that the action described in this sentence offers a comparison to the ongoing archaeological research described in the previous sentence. Instead, the use of drones is the present-day continuation of that research. *Choice C* is incorrect because "still" illogically signals that the action described in this sentence occurs despite the ongoing archaeological research described in the previous sentence. Instead, the use of drones is the present-day continuation of that research. *Choice D* is incorrect because "however" illogically signals that the action described in this sentence occurs either despite or in contrast to the ongoing archaeological research described in the previous sentence. Instead, the use of drones is the present-day continuation of that research.

QUESTION 29

Choice C is the best answer. "By contrast" logically signals that the information in this sentence—that dogs can see, hear, and smell by the end of two weeks—contrasts with the preceding information (that wolves can smell but not see or hear at the same age).

Choice A is incorrect because "in other words" illogically signals that the information about domesticated dogs in this sentence paraphrases the information about wolves in the previous sentence. Instead, the information about dogs contrasts with what came before. *Choice B* is incorrect because "for instance" illogically signals that the information about domesticated dogs in this sentence exemplifies the information about wolves in the previous sentence. Instead, the information about dogs contrasts with what came before. *Choice D* is incorrect because "accordingly" illogically signals that the information about domesticated dogs in this sentence is in accordance with, or results from, the information about wolves in the previous sentence. Instead, the information about dogs contrasts with what came before.

QUESTION 30

Choice B is the best answer. "On the contrary" logically signals that the information in this sentence—that *Dies Irae*'s appearance of depth is merely an illusion—contrasts with the previous statement about a viewer's possible assumption regarding the street painting.

Choice A is incorrect because "additionally" illogically signals that this sentence is simply additional information about a viewer's possible assumption regarding the street painting. Instead, the information about how Wenner achieved the illusion of depth contrasts with the previous sentence's description of the illusion. *Choice C* is incorrect because "as a result" illogically signals that the information in this sentence is a result of, or caused by, a viewer's possible assumption regarding the street painting. Instead, the information about how Wenner achieved the illusion of depth contrasts with the previous sentence's description

of the illusion. *Choice D* is incorrect because "next" illogically signals that the information in this sentence is the next step in a process. Instead, the information about how Wenner achieved the illusion of depth contrasts with the previous sentence's description of the illusion.

QUESTION 31

Choice D is the best answer. "As such" correctly signals that the claim in this sentence—that Ostrom's work is a repudiation of the "tragedy of the commons" view—follows logically from the information about Ostrom's studies in the previous sentence. According to that sentence, Ostrom's studies demonstrate that common pool resources can in fact be sustainably managed by the people who use them.

Choice A is incorrect because "by contrast" illogically signals that the information in this sentence contrasts with the information about Ostrom's studies in the previous sentence. Instead, the claim that Ostrom's work repudiates the "tragedy of the commons" view follows logically from that information. *Choice B* is incorrect because "for example" illogically signals that the claim in this sentence exemplifies the information about Ostrom's studies in the previous sentence. Instead, the claim that Ostrom's work repudiates the "tragedy of the commons" view follows logically from that information. *Choice C* is incorrect because "that said" illogically signals that the information in this sentence is an exception or caveat to the information about Ostrom's studies in the previous sentence. Instead, the claim that Ostrom's work repudiates the "tragedy of the commons" view follows logically from that information.

QUESTION 32

Choice B is the best answer. The sentence effectively explains an advantage of infilling: it's less invasive than using a power grinder.

Choice A is incorrect. The sentence identifies a disadvantage of power grinding; it doesn't explain an advantage of infilling. *Choice C* is incorrect. The sentence identifies the two techniques park rangers use; it doesn't explain an advantage of infilling. *Choice D* is incorrect. The sentence indicates that power grinding and infilling are different in one aspect; it fails to explain an advantage of infilling.

QUESTION 33

Choice D is the best answer. The sentence emphasizes the role a misconception played in the naming of a place, explaining that Spanish explorers mistook a peninsula for an island and, as a result, named the peninsula after a fictional island, California.

Choice A is incorrect. The sentence mentions a novel that featured a fictional island, California; it doesn't emphasize the role a misconception played in the naming of a place. *Choice B* is incorrect. The sentence notes that Baja California was originally named after a fictional place; it doesn't emphasize the role a misconception—specifically, the Spanish explorers' mistaken belief that the peninsula was an island—played in the naming of a place. *Choice C* is incorrect. The sentence indicates when Spanish explorers learned of the peninsula they called California; it doesn't emphasize the role a misconception played in the naming of a place.

Math

Module 1
(27 questions)

QUESTION 1

Choice C is correct. It's given that t represents the number of seconds after the bus passes the marker. Substituting 2 for t in the given equation $d=30t$ yields $d=30(2)$, or $d=60$. Therefore, the bus will be 60 feet from the marker 2 seconds after passing it.

Choice A is incorrect. This is the distance, in feet, the bus will be from the marker 1 second, not 2 seconds, after passing it. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect. This is the distance, in feet, the bus will be from the marker 3 seconds, not 2 seconds, after passing it.

QUESTION 2

Choice C is correct. It's given that 29 out of every 100 beads that the machine produces have a defect. It follows that if the machine produces k beads, then the number of beads that have a defect is $\frac{29}{100}k$, for some constant k. If a bead produced by the machine will be selected at random, the probability of selecting a bead that has a defect is given by the number of beads with a defect, $\frac{29}{100}k$, divided by the number of beads produced by the machine, k. Therefore, the probability of selecting a bead that has a defect is $\frac{\frac{29}{100}k}{k}$, or $\frac{29}{100}$.

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

QUESTION 3

Choice D is correct. The y-intercept of a graph in the xy-plane is the point at which the graph crosses the y-axis. The graph shown crosses the y-axis at the point $(0, 8)$. Therefore, the y-intercept of the graph shown is $(0, 8)$.

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 D is correct. The given expression is equivalent to $(2x^2+x+(-9))+(x^2+6x+1)$, which can be rewritten as $(2x^2+x^2)+(x+6x)+(-9+1)$. Adding like terms in this expression yields $3x^2+7x+(-8)$, or $3x^2+7x-8$.

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 5

Choice A is correct. It's given that the mean price of a carton of grape tomatoes in Utah was estimated to be \$4.23, with an associated margin of error of \$0.08. It follows that plausible values for this mean price are between $\$4.23-\$0.08$ and $\$4.23+\$0.08$. Therefore, it's plausible that the mean price of a carton of grape tomatoes for all locations that sell this product in Utah is between \$4.15 and \$4.31.

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 .2. Subtracting 2.6 from each side of the given equation yields $x=0.2$. Therefore, the value of x that's the solution to the given equation is 0.2. Note that .2 and 1/5 are examples of ways to enter a correct answer.

QUESTION 7

The correct answer is 240. It's given that 80% of the 300 seeds sprouted. Therefore, the number of seeds that sprouted can be calculated by multiplying the number of seeds that were planted by $\frac{80}{100}$, which gives $300\left(\frac{80}{100}\right)$, or 240.

QUESTION 8

Choice A is correct. For the linear function f, it's given that $f(7)=28$. Substituting 7 for x and 28 for $f(x)$ in the given function yields $28=4(7)+b$, or $28=28+b$. Subtracting 28 from each side of this equation yields $0=b$. Therefore, the value of b is 0.

Choice B is incorrect. Substituting 1 for b in the given function yields $f(x)=4x+1$. For this function, when the value of x is 7, the value of $f(x)$ is 29, not 28. *Choice C* is incorrect. Substituting 4 for b in the given function yields $f(x)=4x+4$. For this function, when the value of x is 7, the value of $f(x)$ is 32, not 28. *Choice D* is incorrect. Substituting 7 for b in the given function yields $f(x)=4x+7$. For this function, when the value of x is 7, the value of $f(x)$ is 35, not 28.

QUESTION 9

Choice B is correct. It's given that triangle LMN is similar to triangle PQR. Corresponding angles of similar triangles are congruent. Since angle M and angle Q correspond to each other, they must be congruent. Therefore, if the measure of angle M is 53°, then the measure of angle Q is also 53°.

Choice A is incorrect and may result from concluding that angle M and angle Q are complementary rather than congruent. *Choice C* is incorrect and may result from concluding that angle M and angle Q are supplementary rather than congruent. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 10

Choice B is correct. The equation of a line in the xy-plane can be written in slope-intercept form $y=mx+b$, where m is the slope of the line and $(0, b)$ is its y-intercept. It's given that the line passes through the point $(0, 5)$. Therefore, $b=5$. It's also given that the line is parallel to the graph of $y=7x+4$, which means the line has the same slope as the graph of $y=7x+4$. The slope of the graph of $y=7x+4$ is 7. Therefore, $m=7$. Substituting 7 for m and 5 for b in the equation $y=mx+b$ yields $y=7x+5$.

Choice A is incorrect. The graph of this equation passes through the point $(0, 0)$, not $(0, 5)$, and has a slope of 5, not 7. *Choice C* is incorrect. The graph of this equation passes through the point $(0, 0)$, not $(0, 5)$. *Choice D* is incorrect. The graph of this equation passes through the point $(0, 7)$, not $(0, 5)$, and has a slope of 5, not 7.

QUESTION 11

Choice B is correct. The equation representing a linear model can be written in the form $y=a+bx$, or $y=bx+a$, where b is the slope of the graph of the model and $(0, a)$ is the y-intercept of the graph of the model. The scatterplot shows that as the x-values of the data points increase, the y-values of the data points decrease, which means the graph of an appropriate linear model has a negative slope. Therefore, $b<0$. The scatterplot also shows that the data points are close to the y-axis at a positive value of y. Therefore, the y-intercept of the graph of an appropriate linear model has a positive y-coordinate, which means $a>0$. Of the given choices, only choice B, $y=-1.9x+10.1$, has a negative value for b, the slope, and a positive value for a, the y-coordinate of the y-intercept.

Choice A is incorrect. The graph of this model has a y-intercept with a negative y-coordinate, not a positive y-coordinate. *Choice C* is incorrect. The graph of this model has a positive slope, not a negative slope, and a y-intercept with a negative y-coordinate, not a positive y-coordinate. *Choice D* is incorrect. The graph of this model has a positive slope, not a negative slope.

QUESTION 12

Choice D is correct. It's given that a model predicts the population of Bergen in 2005 was 15,000. The model also predicts that each year for the next 5 years, the population increased by 4% of the previous year's population. The predicted population in one of these years can be found by multiplying the predicted population from the previous year by 1.04. Since the predicted population in 2005 was 15,000, the predicted population 1 year later is $15{,}000(1.04)$. The predicted population 2 years later is this value times 1.04, which is $15{,}000(1.04)(1.04)$, or $15{,}000(1.04)^2$. The predicted population 3 years later is this value times 1.04, or $15{,}000(1.04)^3$. More generally, the predicted population, p, x years after 2005 is represented by the equation $p=15{,}000(1.04)^x$.

Choice A is incorrect. Substituting 0 for x in this equation indicates the predicted population in 2005 was 0.96 rather than 15,000. *Choice B* is incorrect. Substituting 0 for x in this equation indicates the predicted population in 2005 was 1.04 rather than 15,000. *Choice C* is incorrect. This equation indicates the predicted population is decreasing, rather than increasing, by 4% each year.

QUESTION 13

The correct answer is 25. Subtracting the second equation from the first equation in the given system of equations yields $(2a-2a)+(8b-4b)=198-98$, which is equivalent to $0+4b=100$, or $4b=100$. Dividing each side of this equation by 4 yields $b=25$.

QUESTION 14

The correct answer is 6. Applying the distributive property to the expression $ry^4(15y-9)$ yields $15ry^5-9ry^4$. Since $90y^5-54y^4$ is equivalent to $ry^4(15y-9)$, it follows that $90y^5-54y^4$ is also equivalent to $15ry^5-9ry^4$. Since these expressions are equivalent, it follows that corresponding coefficients are equivalent. Therefore, $90=15r$ and $-54=-9r$. Solving either of these equations for r will yield the value of r. Dividing both sides of $90=15r$ by 15 yields $6=r$. Therefore, the value of r is 6.

QUESTION 15

Choice C is correct. If a value of x satisfies $f(x)=0$, the graph of $y=f(x)$ will contain a point $(x, 0)$ and thus touch the x-axis. Since there are 3 points at which this graph touches the x-axis, there are 3 values of x for which $f(x)=0$.

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 16

Choice D is correct. It's given that the expression $w(w+9)$ represents the area, in square centimeters, of a rectangular cutting board, where w is the width, in centimeters, of the cutting board. The area of a rectangle can be calculated by multiplying its length by its width. It follows that the length, in centimeters, of the cutting board is represented by the expression $(w+9)$.

Choice A is incorrect. This expression represents the area, in square centimeters, of the cutting board, not its length, in centimeters. *Choice B* is incorrect. This expression represents the width, in centimeters, of the cutting board, not its length. *Choice C* is incorrect. This is the difference between the length, in centimeters, and the width, in centimeters, of the cutting board, not its length, in centimeters.

QUESTION 17

Choice A is correct. To express $4j+9$ in terms of p and k, the given equation must be solved for $4j+9$. Since it's given that j is a positive number, $4j+9$ is not equal to zero. Therefore, multiplying both sides of the given equation by $4j+9$ yields the equivalent equation $p(4j+9)=k$. Since it's given that p is a positive number, p is not equal to zero. Therefore, dividing each side of the equation $p(4j+9)=k$ by p yields the equivalent equation $4j+9=\frac{k}{p}$.

Choice B is incorrect. This equation is equivalent to $p=\frac{4j+9}{k}$. *Choice C* is incorrect. This equation is equivalent to $p=k-4j-9$. *Choice D* is incorrect. This equation is equivalent to $p=k(4j+9)$.

QUESTION 18

Choice D is correct. The area of a circle can be found by using the formula $A=\pi r^2$, where A is the area and r is the radius of the circle. It's given that the radius of circle A is $3n$. Substituting this value for r into the formula $A=\pi r^2$ gives $A=\pi(3n)^2$, or $9\pi n^2$. It's also given that the radius of circle B is $129n$. Substituting this value for r into the formula $A=\pi r^2$ gives $A=\pi(129n)^2$, or $16{,}641\pi n^2$. Dividing the area of circle B by the area of circle A gives $\frac{16{,}641\pi n^2}{9\pi n^2}$, which simplifies to 1,849. Therefore, the area of circle B is 1,849 times the area of circle A.

Choice A is incorrect. This is how many times greater the radius of circle B is than the radius of circle A. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This is the coefficient on the term that describes the radius of circle B.

QUESTION 19

Choice C is correct. It's given that the measure of angle R is $\frac{2\pi}{3}$ radians, and the measure of angle T is $\frac{5\pi}{12}$ radians greater than the measure of angle R. Therefore, the measure of angle T is equal to $\frac{2\pi}{3}+\frac{5\pi}{12}$ radians. Multiplying $\frac{2\pi}{3}$ by $\frac{4}{4}$ to get a common denominator with $\frac{5\pi}{12}$ yields $\frac{8\pi}{12}$. Therefore, $\frac{2\pi}{3}+\frac{5\pi}{12}$ is equivalent to $\frac{8\pi}{12}+\frac{5\pi}{12}$, or $\frac{13\pi}{12}$. Therefore, the measure of angle T is $\frac{13\pi}{12}$ radians. The measure of angle T, in degrees, can be found by multiplying its measure, in radians, by $\frac{180}{\pi}$. This yields $\frac{13\pi}{12}\times\frac{180}{\pi}$, which is equivalent to 195 degrees. Therefore, the measure of angle T is 195 degrees.

Choice A is incorrect. This is the number of degrees that the measure of angle T is greater than the measure of angle R. *Choice B* is incorrect. This is the measure of angle R, in degrees. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 20

The correct answer is 7. When an equation is of the form $y=ax^2+bx+c$, where a, b, and c are constants, the value of y reaches its minimum when $x=-\frac{b}{2a}$. Since the given equation is of the form $y=ax^2+bx+c$, it follows that $a=1$, $b=-14$, and $c=22$. Therefore, the value of y reaches its minimum when $x=-\frac{(-14)}{2(1)}$, or $x=7$.

QUESTION 21

The correct answer is 182. Let s represent the number of small candles the owner can purchase, and let ℓ represent the number of large candles the owner can purchase. It's given that the owner pays \$4.90 per candle to purchase small candles and \$11.60 per candle to purchase large candles. Therefore, the owner pays $4.90s$ dollars for s small candles and 11.60ℓ dollars for ℓ large candles, which means the owner pays a total of $4.90s+11.60\ell$ dollars to purchase candles. It's given that the owner budgets \$2,200 to purchase candles. Therefore, $4.90s+11.60\ell \leq 2{,}200$. It's also given that the owner must purchase a minimum of 200 candles. Therefore, $s+\ell \geq 200$. The inequalities $4.90s+11.60\ell \leq 2{,}200$ and $s+\ell \geq 200$ can be combined into one compound inequality by rewriting the second inequality so that its left-hand side is equivalent to the left-hand side of the first inequality. Subtracting ℓ from both sides of the inequality $s+\ell \geq 200$ yields $s \geq 200-\ell$. Multiplying both sides of this inequality by 4.90 yields $4.90s \geq 4.90(200-\ell)$, or $4.90s \geq 980-4.90\ell$. Adding 11.60ℓ to both sides of this inequality yields $4.90s+11.60\ell \geq 980-4.90\ell+11.60\ell$, or $4.90s+11.60\ell \geq 980+6.70\ell$. This inequality can be combined with the inequality $4.90s+11.60\ell \leq 2{,}200$, which yields the compound inequality $980+6.70\ell \leq 4.90s+11.60\ell \leq 2{,}200$. It follows that $980+6.70\ell \leq 2{,}200$. Subtracting 980 from both sides of this inequality yields $6.70\ell \leq 1{,}220$. Dividing both sides of this inequality by 6.70 yields approximately $\ell \leq 182.09$. Since the number of large candles the owner purchases must be a whole number, the maximum number of large candles the owner can purchase is the largest whole number less than 182.09, which is 182.

QUESTION 22

Choice D is correct. A point (x, y) is a solution to a system of inequalities in the xy-plane if substituting the x-coordinate and the y-coordinate of the point for x and y, respectively, in each inequality makes both of the inequalities true. Substituting the x-coordinate and the y-coordinate of choice D, 14 and 0, for x and y, respectively, in the first inequality in the given system, $y \leq x+7$, yields $0 \leq 14+7$, or $0 \leq 21$, which is true. Substituting 14 for x and 0 for y in the second inequality in the given system, $y \geq -2x-1$, yields $0 \geq -2(14)-1$, or $0 \geq -29$, which is true. Therefore, the point $(14, 0)$ is a solution to the given system of inequalities in the xy-plane.

Choice A is incorrect. Substituting -14 for x and 0 for y in the inequality $y \leq x+7$ yields $0 \leq -14+7$, or $0 \leq -7$, which is not true. *Choice B* is incorrect. Substituting 0 for x and -14 for y in the inequality $y \geq -2x-1$ yields $-14 \geq -2(0)-1$, or $-14 \geq -1$, which is not true. *Choice C* is incorrect. Substituting 0 for x and 14 for y in the inequality $y \leq x+7$ yields $14 \leq 0+7$, or $14 \leq 7$, which is not true.

QUESTION 23

Choice B is correct. The mean of a data set is the sum of the values in the data set divided by the number of values in the data set. The new data set consists of the weights of the 71 tortoises in the original data set and one additional weight, 39. Since the additional weight, 39, is greater than any of the values in the original data set, the mean of the new data set is greater than the mean of the original data set. If a data set contains an odd number of data values, the median is represented by the middle data value in the list when the data values are listed in ascending or descending order. Since the original data set consists of the weights of 71 tortoises and is in ascending order, the median of the original data set is represented by the middle value, or the 36th value. Based on the frequencies shown in the table, the 36th value in this data set is 17. If a data set contains an even number of data values, the median is between the two middle data values when the values are listed in ascending or descending order. Since the new data set consists of the weights of 72 tortoises, the median of the new data set is between the 36th and 37th data values when the values are arranged in ascending order. To keep the data in ascending order, the additional value of 39 would be placed at the bottom of the frequency table with a frequency of 1. Therefore, based on the frequencies in the table, the 36th and 37th values in the new data set are both 17. It follows that the median of the new data set is 17, which is the same as the median of the original data set. Therefore, the mean of the new data set is greater than the mean of the original data set, and the medians of the two data sets are equal.

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 C is correct. Subtracting the expression $(x-29)$ from both sides of the given equation yields $0=(x-a)(x-29)-(x-29)$, which can be rewritten as $0=(x-a)(x-29)+(-1)(x-29)$. Since the two terms on the right-hand side of this equation have a common factor of $(x-29)$, it can be rewritten as $0=(x-29)(x-a+(-1))$, or $0=(x-29)(x-a-1)$. Since $x-a-1$ is equivalent to $x-(a+1)$, the equation $0=(x-29)(x-a-1)$ can be rewritten as $0=(x-29)(x-(a+1))$. By the zero product property, it follows that $x-29=0$ or $x-(a+1)=0$. Adding 29 to both sides of the equation $x-29=0$ yields $x=29$. Adding $a+1$ to both sides of the equation $x-(a+1)=0$ yields $x=a+1$. Therefore, the two solutions to the given equation are 29 and $a+1$. Thus, only $a+1$ and 29, not a, are solutions to the given equation.

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 25

Choice C is correct. In the *xy*-plane, the graph of the line $y=c$ is a horizontal line that crosses the *y*-axis at $y=c$ and the graph of the quadratic equation $y=-x^2+9x-100$ is a parabola. A parabola can intersect a horizontal line at exactly one point only at its vertex. Therefore, the value of c should be equal to the *y*-coordinate of the vertex of the graph of the given equation. For a quadratic equation in vertex form, $y=a(x-h)^2+k$, the vertex of its graph in the *xy*-plane is (h, k). The given quadratic equation, $y=-x^2+9x-100$, can be rewritten as $y=-\left(x^2-2\left(\frac{9}{2}\right)x+\left(\frac{9}{2}\right)^2\right)+\left(\frac{9}{2}\right)^2-100$, or $y=-\left(x-\frac{9}{2}\right)^2+\left(-\frac{319}{4}\right)$. Thus, the value of c is equal to $-\frac{319}{4}$.

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 26

Choice B is correct. For the function *f*, since the base of the exponent, 1.25, is greater than 1, the value of $(1.25)^x$ increases as x increases. Therefore, the value of $18(1.25)^x$ and the value of $18(1.25)^x+41$ also increase as x increases. Since *f* is therefore an increasing function where $x \geq 0$, the function *f* has no maximum value. For the function *g*, since the base of the exponent, 0.73, is less than 1, the value of $(0.73)^x$ decreases as x increases. Therefore, the value of $9(0.73)^x$ also decreases as x increases. It follows that the maximum value of $g(x)$ for $x \geq 0$ occurs when $x=0$. Substituting 0 for x in the function *g* yields $g(0)=9(0.73)^0$, which is equivalent to $g(0)=9(1)$, or $g(0)=9$. Therefore, the maximum value of $g(x)$ for $x \geq 0$ is 9, which appears as a coefficient in equation II. So, of the two equations given, only II displays, as a constant or coefficient, the maximum value of the function it defines, where $x \geq 0$.

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 $\frac{284}{3}$. Since the perimeter of a triangle is the sum of the lengths of its sides, and the given triangle is equilateral, the length of each side is $\frac{852}{3}$, or 284, centimeters (cm). Right triangle *AMO* can be formed, where *M* is the midpoint of one of the triangle's sides, *A* is one of this side's endpoints, and *O* is the center of the circle. It follows that *AM* is $\frac{284}{2}$, or 142, cm. Additionally, triangle *AMO* has angles measuring 30°, 60°, and 90°, where the measure of angle *OMA* is 90° and the measure of angle *OAM* is 30°. It follows that the length

of side MO is half the length of hypotenuse AO, and the length of side AM is $\sqrt{3}$ times the length of side MO. It's given that $AO = w\sqrt{3}$ cm. Therefore, $MO = \frac{w\sqrt{3}}{2}$ cm and $AM = \frac{w\sqrt{3}\sqrt{3}}{2}$ cm, which is equivalent to $AM = \frac{3w}{2}$ cm. Since $AM = 142$ cm, it follows that $\frac{3w}{2} = 142$. Multiplying both sides of this equation by 2 yields $3w = 284$. Dividing both sides of this equation by 3 yields $w = \frac{284}{3}$. Note that 284/3, 94.66, and 94.67 are examples of ways to enter a correct answer.

Math

Module 2
(27 questions)

QUESTION 1

Choice C is correct. The *y*-intercept of a graph is the point where the graph intersects the *y*-axis. The line graphed intersects the *y*-axis at the point $(0, 5)$. Therefore, the *y*-intercept of the line graphed is $(0, 5)$.

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 2

Choice C is correct. The table shows that for a certain region in 2016, the average number of store employees in warehouse stores was 365 and the average number of store employees in supermarkets was 130. Subtracting 130 from 365 yields $365 - 130$, or 235. Therefore, the average number of store employees was 235 greater in warehouse stores than in supermarkets.

Choice A is incorrect. For this region in 2016, this is how much greater the average number of store employees was in department stores than in supermarkets. *Choice B* is incorrect. For this region in 2016, this is how much greater the average number of store employees was in warehouse stores than in department stores. *Choice D* is incorrect. For this region in 2016, this is the sum of the average number of store employees in warehouse stores and in supermarkets.

QUESTION 3

Choice D is correct. It's given that line m is parallel to line n, and line t intersects both lines. It follows that line t is a transversal. When two lines are parallel and intersected by a transversal, exterior angles on the same side of the transversal are supplementary. Thus, $x + 33 = 180$. Subtracting 33 from both sides of this equation yields $x = 147$. Therefore, the value of x is 147.

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 C is correct. It's given that the cost of renting a tent is \$11 per day for d days. Multiplying the rental cost by the number of days yields $\$11d$, which represents the cost of renting the tent for d days before the insurance is added. Adding the onetime insurance fee of \$10 to the rental cost of $\$11d$ gives the total cost c, in dollars, which can be represented by the equation $c=11d+10$.

Choice A is incorrect. This equation represents the total cost to rent the tent if the insurance fee was charged every day. *Choice B* is incorrect. This equation represents the total cost to rent the tent if the daily fee was $\$(d+11)$ for 10 days. *Choice D* is incorrect. This equation represents the total cost to rent the tent if the daily fee was \$10 and the onetime fee was \$11.

QUESTION 5

Choice D is correct. By the Pythagorean theorem, if a right triangle has a hypotenuse with length c and legs with lengths a and b, then $c^2=a^2+b^2$. In the right triangle shown, the hypotenuse has length c and the legs have lengths a and b. It's given that $a=4$ and $b=5$. Substituting 4 for a and 5 for b in the Pythagorean theorem yields $c^2=4^2+5^2$. Taking the square root of both sides of this equation yields $c=\pm\sqrt{4^2+5^2}$. Since the length of a side of a triangle must be positive, the value of c is $\sqrt{4^2+5^2}$.

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 6

The correct answer is 9. It's given that $g(x)=6x$. Substituting 54 for $g(x)$ in the given function yields $54=6x$. Dividing both sides of this equation by 6 yields $x=9$. Therefore, the value of x when $g(x)=54$ is 9.

QUESTION 7

The correct answer is 68. It's given that the function f is defined by $f(x)=8x^3+4$. Substituting 2 for x in this equation yields $f(2)=8(2)^3+4$, or $f(2)=8(8)+4$, which is equivalent to $f(2)=68$. Therefore, the value of $f(2)$ is 68.

QUESTION 8

Choice B is correct. The y-intercept of the graph of a function in the xy-plane is the point on the graph where $x=0$. It's given that $f(x)=\frac{1}{10}x-2$. Substituting 0 for x in this equation yields $f(0)=\frac{1}{10}(0)-2$, or $f(0)=-2$. Since it's given that $y=f(x)$, it follows that $y=-2$ when $x=0$. Therefore, the y-intercept of the graph of $y=f(x)$ in the xy-plane is $(0,-2)$.

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 9

Choice D is correct. Since x represents the number of 1-minute segments and y represents the number of 3-minute segments, the total length of the video is $1 \cdot x + 3 \cdot y$, or $x + 3y$, minutes. Since the video is 70 minutes long, the equation $x + 3y = 70$ represents this situation.

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 10

Choice D is correct. If the graph of $y = g(x)$ is the result of shifting the graph of $y = f(x)$ down k units in the xy-plane, the function g can be defined by an equation of the form $g(x) = f(x) - k$. It's given that $f(x) = 7x^3$ and the graph of $y = g(x)$ is the result of shifting the graph of $y = f(x)$ down 2 units. Substituting $7x^3$ for $f(x)$ and 2 for k in the equation $g(x) = f(x) - k$ yields $g(x) = 7x^3 - 2$.

Choice A is incorrect and may result from conceptual errors. *Choice B* is incorrect and may result from conceptual errors. *Choice C* is incorrect. This equation defines a function g for which the graph of $y = g(x)$ is the result of shifting the graph of $y = f(x)$ up, not down, 2 units.

QUESTION 11

Choice C is correct. The given system of linear equations can be solved by the substitution method. Substituting $-3x$ for y from the first equation in the given system into the second equation yields $4x + (-3x) = 15$, or $x = 15$.

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 absolute value of y, not the value of x.

QUESTION 12

Choice B is correct. The sine of an acute angle in a right triangle is the ratio of the length of the side opposite that angle to the length of the hypotenuse. The hypotenuse of a right triangle is the side opposite the right angle. In right triangle ABC, side BC is the side opposite angle A and side AB is the hypotenuse. It's given that the length of side BC is 35 units and the length of side AB is 171 units. Therefore, the value of $\sin A$ is $\frac{35}{171}$.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This is the ratio of the length of the hypotenuse to the length of the side opposite angle A rather than the ratio of the length of the side opposite angle A to the length of the hypotenuse. *Choice D* is incorrect. This is the length of the hypotenuse rather than $\sin A$.

QUESTION 13

The correct answer is 986. The area, A, of a rectangle is given by $A=\ell w$, where ℓ is the length of the rectangle and w is its width. It's given that the length of the rectangle is 34 centimeters (cm) and the width is 29 cm. Substituting 34 for ℓ and 29 for w in the equation $A=\ell w$ yields $A=(34)(29)$, or $A=986$. Therefore, the area, in square centimeters, of this rectangle is 986.

QUESTION 14

The correct answer is 24. The equation $\frac{24x}{ny}=4$ can be rewritten as $\left(\frac{24}{n}\right)\left(\frac{x}{y}\right)=4$. It's given that $\frac{x}{y}=4$. Substituting 4 for $\frac{x}{y}$ in the equation $\left(\frac{24}{n}\right)\left(\frac{x}{y}\right)=4$ yields $\left(\frac{24}{n}\right)(4)=4$. Multiplying both sides of this equation by n yields $(24)(4)=4n$. Dividing both sides of this equation by 4 yields $24=n$. Therefore, the value of n is 24.

QUESTION 15

Choice D is correct. It's given that the bowl starts with 20 ounces of water and has 9 ounces of water remaining after a period of time has passed. The amount of water the bowl has lost during the time period can be found by subtracting the remaining amount of water from the amount of water the bowl starts with, which yields $20-9$ ounces, or 11 ounces. This means the bowl loses 11 ounces of water during that period of time. It's given that the amount of water decreases by 1 ounce every 4 days. Letting t represent the number of days the bowl has been uncovered, it follows that $\frac{1}{4}=\frac{11}{t}$. Multiplying both sides of this equation by $4t$ yields $t=44$. Therefore, the bowl has been uncovered for 44 days.

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. This is the value of t for the equation $\frac{1}{4}=\frac{9}{t}$, not $\frac{1}{4}=\frac{11}{t}$.

QUESTION 16

Choice D is correct. The value of $4-3x$ can be found by isolating this expression in the given equation. Subtracting 2 from both sides of the given equation yields $9(4-3x)=8(4-3x)+16$. Subtracting $8(4-3x)$ from both sides of this equation yields $9(4-3x)-8(4-3x)=16$, which gives $1(4-3x)=16$, or $4-3x=16$. Therefore, the value of $4-3x$ is 16.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect. This is the value of x, not $4-3x$. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 17

Choice A is correct. It's given that a certain township consists of a 5-hectare industrial park and a 24-hectare neighborhood and that the total number of trees in the township is 4,529. It's also given that the equation $5x+24y=4{,}529$ represents this situation. Since the total number of trees for a given area can be

determined by taking the size of the area, in hectares, times the average number of trees per hectare, the best interpretation of $5x$ is the number of trees in the industrial park and the best interpretation of $24y$ is the number of trees in the neighborhood. Since 5 is the size of the industrial park, in hectares, the best interpretation of x is the average number of trees per hectare in the industrial park.

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 18

Choice B is correct. Since $\frac{12}{12}=1$, multiplying the exponent of the given expression by $\frac{12}{12}$ yields an equivalent expression: $a^{\left(\frac{11}{12}\right)\left(\frac{12}{12}\right)}=a^{\left(\frac{132}{144}\right)}$. Since $\frac{132}{144}=132\left(\frac{1}{144}\right)$, the expression $a^{\frac{132}{144}}$ can be rewritten as $a^{(132)\left(\frac{1}{144}\right)}$. Applying properties of exponents, this expression can be rewritten as $(a^{132})^{\frac{1}{144}}$. An expression of the form $(m)^{\frac{1}{k}}$, where $m>0$ and $k>0$, is equivalent to $\sqrt[k]{m}$. Therefore, $(a^{132})^{\frac{1}{144}}$ is equivalent to $\sqrt[144]{a^{132}}$.

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 19

Choice A is correct. The median of a data set with an odd number of values that are in ascending or descending order is the middle value of the data set. Since the distribution of the values of both data set A and data set B form symmetric dot plots, and each data set has an odd number of values, it follows that the median is given by the middle value in each of the dot plots. Thus, the median of data set A is 13, and the median of data set B is 13. Therefore, statement I is true. Data set A and data set B have the same frequency for each of the values 11, 12, 14, and 15. Data set A has a frequency of 1 for values 10 and 16, whereas data set B has a frequency of 2 for values 10 and 16. Standard deviation is a measure of the spread of a data set; it is larger when there are more values farther from the mean, and smaller when there are more values closer to the mean. Since both distributions are symmetric with an odd number of values, the mean of each data set is equal to its median. Thus, each data set has a mean of 13. Since more of the values in data set A are closer to 13 than in data set B, it follows that data set A has a smaller standard deviation than data set B. Thus, statement II is false. Therefore, only statement I must be true.

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 20

The correct answer is 46. It's given that O is the center of a circle and that points R and S lie on the circle. Therefore, $\overline{OR}$ and $\overline{OS}$ are radii of the circle. It follows that $OR = OS$. If two sides of a triangle are congruent, then the angles opposite them are congruent. It follows that the angles $\angle RSO$ and $\angle ORS$, which are across from the sides of equal length, are congruent. Let x° represent the measure of $\angle RSO$. It follows that the measure of $\angle ORS$ is also x°. It's given that the measure of $\angle ROS$ is 88°. Because the sum of the measures of the interior angles of a triangle is 180°, the equation $x^\circ + x^\circ + 88^\circ = 180^\circ$, or $2x + 88 = 180$, can be used to find the measure of $\angle RSO$. Subtracting 88 from both sides of this equation yields $2x = 92$. Dividing both sides of this equation by 2 yields $x = 46$. Therefore, the measure of $\angle RSO$, in degrees, is 46.

QUESTION 21

The correct answer is 1.8. It's given that the regular price of a shirt at a store is \$11.70, and the sale price of the shirt is 80% less than the regular price. It follows that the sale price of the shirt is $\$11.70\left(1 - \frac{80}{100}\right)$, or $\$11.70(1 - 0.8)$, which is equivalent to \$2.34. It's also given that the sale price of the shirt is 30% greater than the store's cost for the shirt. Let x represent the store's cost for the shirt. It follows that $2.34 = \left(1 + \frac{30}{100}\right)x$, or $2.34 = 1.3x$. Dividing both sides of this equation by 1.3 yields $x = 1.80$. Therefore, the store's cost, in dollars, for the shirt is 1.80. Note that 1.8 and 9/5 are examples of ways to enter a correct answer.

QUESTION 22

Choice A is correct. The volume of a cube can be found by using the formula $V = s^3$, where V is the volume and s is the edge length of the cube. Therefore, the volume of the given cube is $V = 68^3$, or 314,432 cubic inches. The volume of a sphere can be found by using the formula $V = \frac{4}{3}\pi r^3$, where V is the volume and r is the radius of the sphere. Therefore, the volume of the given sphere is $V = \frac{4}{3}\pi(34)^3$, or approximately 164,636 cubic inches. The volume of the space in the cube not taken up by the sphere is the difference between the volume of the cube and volume of the sphere. Subtracting the approximate volume of the sphere from the volume of the cube gives $314{,}432 - 164{,}636 = 149{,}796$ cubic inches.

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 23

Choice B is correct. A system of two linear equations in two variables, x and y, has no solution if the lines represented by the equations in the xy-plane are parallel and distinct. Lines represented by equations in standard form, $Ax + By = C$ and $Dx + Ey = F$, are parallel if the coefficients for x and y in one equation are proportional to the corresponding coefficients in the other equation, meaning

$\frac{D}{A}=\frac{E}{B}$; and the lines are distinct if the constants are not proportional, meaning $\frac{F}{C}$ is not equal to $\frac{D}{A}$ or $\frac{E}{B}$. The given equation, $y=6x+18$, can be written in standard form by subtracting $6x$ from both sides of the equation to yield $-6x+y=18$. Therefore, the given equation can be written in the form $Ax+By=C$, where $A=-6$, $B=1$, and $C=18$. The equation in choice B, $-6x+y=22$, is written in the form $Dx+Ey=F$, where $D=-6$, $E=1$, and $F=22$. Therefore, $\frac{D}{A}=\frac{-6}{-6}$, which can be rewritten as $\frac{D}{A}=1$; $\frac{E}{B}=\frac{1}{1}$, which can be rewritten as $\frac{E}{B}=1$; and $\frac{F}{C}=\frac{22}{18}$, which can be rewritten as $\frac{F}{C}=\frac{11}{9}$. Since $\frac{D}{A}=1$, $\frac{E}{B}=1$, and $\frac{F}{C}$ is not equal to 1, it follows that the given equation and the equation $-6x+y=22$ are parallel and distinct. Therefore, a system of two linear equations consisting of the given equation and the equation $-6x+y=22$ has no solution. Thus, the equation in choice B could be the second equation in the system.

Choice A is incorrect. The equation $-6x+y=18$ and the given equation represent the same line in the *xy*-plane. Therefore, a system of these linear equations would have infinitely many solutions, rather than no solution. *Choice C* is incorrect. The equation $-12x+y=36$ and the given equation represent lines in the *xy*-plane that are distinct and not parallel. Therefore, a system of these linear equations would have exactly one solution, rather than no solution. *Choice D* is incorrect. The equation $-12x+y=18$ and the given equation represent lines in the *xy*-plane that are distinct and not parallel. Therefore, a system of these linear equations would have exactly one solution, rather than no solution.

QUESTION 24

Choice C is correct. Since $P=(4, 5)$ and $Q=(4, 7)$, side PQ is parallel to the *y*-axis and has a length of 2. Since $P=(4, 5)$ and $R=(6, 5)$, side PR is parallel to the *x*-axis and has a length of 2. Therefore, triangle PQR is a right isosceles triangle, where $\angle P$ has measure 90° and $\angle Q$ and $\angle R$ each have measure 45°. It follows that if the measure of $\angle Q$ is t°, then $t=45$. Since $L=(4, 5)$ and $M=(4, 7+k)$, side LM is parallel to the *y*-axis and has a length of $k+2$. Since $L=(4, 5)$ and $N=(6+k, 5)$, side LN is parallel to the *x*-axis and has a length of $k+2$. Therefore, triangle LMN is a right isosceles triangle, where $\angle L$ has measure 90° and $\angle M$ and $\angle N$ each have measure 45°. Of the given choices, only $(90-t)^\circ$ is equal to 45°, so the measure of $\angle N$ is $(90-t)^\circ$.

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 25

Choice B is correct. The two given equations are equivalent because the second equation can be obtained from the first equation by multiplying each side of the equation by 5. Thus, the graphs of the equations are coincident, so if a point lies on the graph of one of the equations, it also lies on the graph of the other equation. A point (x, y) lies on the graph of an equation in the *xy*-plane if and only

if this point represents a solution to the equation. It is sufficient, therefore, to find the point that represents a solution to the first given equation. Substituting the x- and y-coordinates of choice B, $-\frac{3r}{2}+\frac{7}{2}$ and r, for x and y, respectively, in the first equation yields $2\left(-\frac{3r}{2}+\frac{7}{2}\right)+3r=7$, which is equivalent to $-3r+7+3r=7$, or $7=7$. Therefore, the point $\left(-\frac{3r}{2}+\frac{7}{2}, r\right)$ represents a solution to the first equation and thus lies on the graph of each equation in the xy-plane for the given system.

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 26

Choice D is correct. If $x^2-c^2 \leq 0$, then neither side of the given equation is defined and there can be no solution. Therefore, $x^2-c^2>0$. Subtracting $\frac{c^2}{\sqrt{x^2-c^2}}$ from both sides of the given equation yields $\frac{x^2}{\sqrt{x^2-c^2}}-\frac{c^2}{\sqrt{x^2-c^2}}=39$, or $\frac{x^2-c^2}{\sqrt{x^2-c^2}}=39$. Squaring both sides of this equation yields $\left(\frac{x^2-c^2}{\sqrt{x^2-c^2}}\right)^2=39^2$, or $\frac{(x^2-c^2)(x^2-c^2)}{x^2-c^2}=39^2$. Since x^2-c^2 is positive and, therefore, nonzero, the expression $\frac{x^2-c^2}{x^2-c^2}$ is defined and equivalent to 1. It follows that the equation $\frac{(x^2-c^2)(x^2-c^2)}{x^2-c^2}=39^2$ can be rewritten as $\left(\frac{x^2-c^2}{x^2-c^2}\right)\left(x^2-c^2\right)=39^2$, or $(1)(x^2-c^2)=39^2$, which is equivalent to $x^2-c^2=39^2$. Adding c^2 to both sides of this equation yields $x^2=c^2+39^2$. Taking the square root of both sides of this equation yields two solutions: $x=\sqrt{c^2+39^2}$ and $x=-\sqrt{c^2+39^2}$. Therefore, of the given choices, $-\sqrt{c^2+39^2}$ is one of the solutions to the given equation.

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 27

The correct answer is 168. The quadratic function g gives the estimated depth of the seal, $g(t)$, in meters, t minutes after the seal enters the water. It's given that function g estimates that the seal reached its maximum depth of 302.4 meters 6 minutes after it entered the water. Therefore, function g can be expressed in vertex form as $g(t)=a(t-6)^2+302.4$, where a is a constant. Since it's also given that the seal reached the surface of the water after 12 minutes, $g(12)=0$. Substituting 12 for t and 0 for $g(t)$ in $g(t)=a(t-6)^2+302.4$ yields $0=a(12-6)^2+302.4$, or $36a=-302.4$. Dividing both sides of this equation by 36 gives $a=-8.4$. Substituting -8.4 for a in $g(t)=a(t-6)^2+302.4$ gives $g(t)=-8.4(t-6)^2+302.4$. Substituting 10 for t in $g(t)$ gives $g(10)=-8.4(10-6)^2+302.4$, which is equivalent to $g(10)=-8.4(4)^2+302.4$, or $g(10)=168$. Therefore, the estimated depth, to the nearest meter, of the seal 10 minutes after it entered the water was 168 meters.