The SAT®

Practice Test #2

ANSWER EXPLANATIONS

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

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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 C is the best answer because it most logically completes the text's discussion of John Ashbery's poems. As used in this context, "interpret" would mean decipher the meaning of. The text indicates that Ashbery's poems have many unusual features, that it's difficult to tell what exactly the poems' subject matter is, and that scholars strongly disagree about the poems. This context conveys the idea that it's difficult to interpret Ashbery's poems.

Choice A is incorrect because "delegate" means to assign someone as a representative of another person or to entrust something to someone else, neither of which would make sense in context. The text is focused only on the difficulty that readers have interpreting Ashbery's poems due to their many unusual features; it doesn't suggest anything about the poems being difficult to delegate. *Choice B* is incorrect because describing Ashbery's poems as difficult to "compose," or put together or produce, would make sense only if the text were about Ashbery's experience of writing the poems. It could be true that it was difficult for Ashbery to compose his poems, but the text doesn't address this; it instead discusses how readers interpret and engage with the poems. *Choice D* is incorrect because describing Ashbery's poems as being difficult to "renounce," or give up or refuse, wouldn't make sense in context. The text focuses on the idea that features of Ashbery's poems are odd or unclear and have caused heated scholarly debate. This context suggests that the poems are difficult to interpret, not that the poems are difficult to renounce.

QUESTION 3

Choice C is the best answer because it most logically and precisely completes the text's discussion of the fossil record from the Cambrian period. In this context, "abrupt" means sudden. The text explains that the fossil record reflects the unexpected appearance and rapid diversification, or increase in variety, of animal remains during the Cambrian period. This context establishes that these remains' entry into the fossil record was sudden.

Choice A is incorrect. Although the word "explosion" appears in the name of the event marked by the fossil record change, the text never suggests that the change was "catastrophic," or disastrous. In context, "explosion" refers to the rapid diversification, or the swift increase in variety, of animal remains in the fossil record—a phenomenon that the text presents in a relatively neutral manner, without commenting on whether it was negative or positive. *Choice B* is incorrect because the text never suggests that the change toward greater diversification is "elusive," or difficult to locate, in the fossil record. Rather, the text notes that the change occurred about 541 million years ago, suggesting that scientists have indeed been able to locate it. *Choice D* is incorrect because it wouldn't make sense in context to describe the change in the fossil record as "imminent," or about to occur, since the text indicates that the change already occurred millions of years ago.

QUESTION 4

Choice B is the best answer because it most logically completes the text's discussion of the significance of the 2014 archaeological finding at El Algar. In this context, "concede" means to admit something is true after first resisting that admission. The text indicates that some researchers believe "Bronze Age societies were ruled by men." But the Bronze Age burial of a woman at El Algar included "valuable objects signaling a high position of power," which would raise the possibility that "women may have also held leadership roles." Thus, the text is calling into question the notion that only men were leaders in these societies and speculating that people holding this view may reconsider their opinion.

Choice A is incorrect because "waive" means to refrain from insisting that something, such as a right or a requirement, be observed; the word isn't used, however, in contexts where someone acknowledges that an opinion they hold may be invalid, as is the case in the text. *Choice C* is incorrect. According to the text, the finding from the El Algar burial site undermines the view that Bronze Age societies were exclusively ruled by men. However, "refute" means to demonstrate that something is false and would not make sense in context. Lull and team's finding supports the view that women may have also held leadership roles, not that they did not participate in such roles. *Choice D* is incorrect because in this context, "require" means to demand or specify as mandatory. However, it would not make sense for contemporary researchers to demand that Bronze Age "women may have also held leadership roles."

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 C is the best answer because it most logically completes the text's discussion of the factors that influence peoples' decisions to move to a different state. As used in this context, "overshadowed by" means to be surpassed by or caused to seem less important than other factors affecting a move. The text indicates that, according to a US tax policy expert, when people think about an interstate move, state taxes have little effect on their decisions, while employment opportunities, housing availability, and climate have a very strong effect. This context suggests that people consider these other factors to be more important than state taxes.

Choice A is incorrect because the text indicates that state taxes aren't as important a consideration as other factors when people are thinking of moving to another state. The context doesn't suggest that state taxes are "consistent with," or in agreement with these other factors. *Choice B* is incorrect because it wouldn't make sense in context to say that state taxes are "representative of," or typical of, other factors. Taxes aren't an example of employment opportunities, housing availability, and climate, which are the other factors listed in the text. *Choice D* is incorrect because it wouldn't make sense in context to say that state taxes are "irrelevant to," or unconnected or unimportant to other factors. State taxes are irrelevant to peoples' decisions, not to other factors. In other words, although the text suggests that state taxes may be irrelevant to people considering a move to another state, the other factors mentioned in the text, such as employment opportunities, are unable to have an opinion about state taxes. Furthermore, the text indicates that significant differences in state taxes have almost no effect on peoples' choices to move, but they aren't completely unimportant.

QUESTION 7

Choice B is the best answer because it most logically completes the text's discussion of the author's claim about the relationship between Neanderthals and Homo sapiens. As used in this context, "tenuous" means lacking substance or strength. The text states that the author's claim isn't convincing because it doesn't consider certain pieces of evidence—relevant recent discoveries. The context conveys the idea that the author's claim is weak.

Choice A is incorrect because the text doesn't suggest that the author's claim is "disorienting," or confusing; rather than indicating that the claim is hard to grasp, the text focuses on the idea that it has a weakness that makes it unconvincing. *Choice C* is incorrect because describing the claim as "nuanced," or subtle, wouldn't make sense in context. The text emphasizes that the claim is unconvincing because it didn't consider certain key archaeological finds; it doesn't suggest that what's in the claim seems subtle. *Choice D* is incorrect because the text faults the claim for not considering certain key archaeological finds; it doesn't suggest that the author's claim is "unoriginal," or imitative and lacking originality.

QUESTION 8

Choice D is the best answer because it accurately states the text's main purpose. The poem begins with the speaker urging a child to "go forth" with her encouragement ("my heart's desire"). The speaker goes on to suggest that new experiences ("Great reaches, yet unknown") lie ahead for the son that "life is calling" him to seek out. Thus, the main purpose is to encourage a child to embrace the experiences available to him in his life.

Choice A is incorrect because the speaker encourages the child to pursue new experiences ("Great reaches") without knowing exactly what those experiences will be ("yet unknown") or suggesting that they should match the speaker's own accomplishments. *Choice B* is incorrect because the speaker focuses on positive possibilities for her son ("Great reaches, yet unknown") and her enthusiastic encouragement to embrace those possibilities ("life is calling you!"), while there is no mention of raising a child or associated struggles. *Choice C* is incorrect because the speaker frames the possibilities for her son in a positive light when she says that "great reaches, yet unknown" are waiting for him, and this positive outlook for the son is consistent throughout the text.

QUESTION 9

Choice D is the best answer because it best describes the function of the underlined sentence in the text's overall portrayal of how the women in Ohiyesa's tribe harvested maple syrup. The text states that the women used an axe to strike the maple trees in order to find out which ones would produce sap. The underlined sentence compares the trees to people, with the sap described as the trees' "life-blood." Some of the trees are ready to give out their sap, while others are unwilling to do so. Using personification, the sentence provides greater detail about the aspect of the maple trees—their potential to give sap—that the women are evaluating.

Choice A is incorrect because the personalities of the women are not discussed in the text. Although the underlined sentence does mention "individual characters," this reference is not to the women in the text but rather to the maple trees, which the sentence compares to people with individual character traits. *Choice B* is incorrect because the underlined sentence focuses on the trees' willingness or refusal to yield sap, not on the beneficial relationship between the women and the trees. Additionally, although the text does suggest that the women and their tribe benefit from the maple trees since the trees allow the women to harvest syrup, there is nothing in the text to suggest that the trees benefit from this relationship in turn. *Choice C* is incorrect because the underlined sentence is comparing maple trees to humans, not addressing the influence of the natural environment on how the actual humans in the text, the women, behave.

QUESTION 10

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 11

Choice A is the best answer because it presents an explanation about a helicopter that is directly supported by the text. The text states that Mars's atmosphere is much less dense than Earth's, and as a result, the air on Mars doesn't provide the resistance required to support the blades of a helicopter built for Earth and to keep the helicopter aloft. In other words, a helicopter built for Earth can't fly on Mars because of the differences in the two planets' atmospheres.

Choice B is incorrect because instead of stating that the blades of helicopters built for Earth are too large to work on Mars, the text indicates that the helicopter built to fly on Mars actually has even longer blades than a helicopter built for Earth. *Choice C* is incorrect because the text never addresses the role of gravity on Mars or on Earth; instead, it focuses on atmospheric conditions. *Choice D* is incorrect because the text doesn't indicate that helicopters built for Earth are too small to operate in the conditions on Mars. In fact, the text states that the size of the helicopter built to fly on Mars is the same size as a helicopter built for Earth, even though it has longer blades that rotate faster.

QUESTION 12

Choice A is the best answer because it best states the main idea of the text. According to the text, jalis' traditional role has been to maintain information about families' histories and significant events. The text goes on to say that although technological changes have altered jalis' role somewhat, jalis are still valued for preserving the histories of their communities.

Choice B is incorrect because the text says nothing about jalis' views of the various tasks they perform. There is no information to support the idea that many jalis prefer teaching to other tasks. *Choice C* is incorrect because the text doesn't describe jalis as being sources of entertainment. Rather, jalis are presented as valued sources of knowledge. Additionally, the text gives no indication of how long jalis have been serving their communities. *Choice D* is incorrect because the main focus of the text is on jalis' role and their continued value despite the effects of technology, not on what technology can now do. Although the text indicates that jalis' role has changed as a result of technological changes, the text doesn't present any specific information about technology performing tasks that jalis once performed.

QUESTION 13

Choice A is the best answer because it most accurately states the main idea of the text. According to the text, Eugene Wigner hypothesized that a crystal could exist that would be composed of electrons and have a honeycomb-like shape. The text goes on to say that the existence of the Wigner crystal remained unconfirmed until Feng Wang and colleagues were able to make an impression of one using two semiconductors and an ultrathin sheet of graphene. Thus, the main idea is that researchers have obtained the most definitive evidence to date of the existence of the Wigner crystal.

Choice B is incorrect because the text focuses on one kind of crystal—the Wigner crystal—and doesn't discuss crystalline structures in general. And although the text conveys that Wang and colleagues figured out a way to capture an image of a Wigner crystal, it doesn't address the idea of applying this approach to other types of crystals. *Choice C* is incorrect because the text describes in general the process Wang and colleagues followed to obtain an impression of the Wigner crystal; it doesn't address the relative importance of each component in that process. *Choice D* is incorrect because the text doesn't state that researchers had a hard time getting an impression of the Wigner crystal because of its honeycomb structure. Nothing in the text indicates why it took so long to prove the existence of this crystal or take an impression of it.

QUESTION 14

Choice D is the best answer because it describes data from the graph that support the researchers' conclusion that there is a growing interest among CEOs in connecting with more departments in their companies. The graph shows the average number of individuals reporting directly to CEOs during three different time periods: the individuals are divided into managers and department leaders. The average number of department leaders directly reporting to their CEO during the 1991–1995 period was slightly more than three, during the 1996–2001 period it was four, and during the 2001–2008 period it was almost seven. Thus, the average number of department leaders reporting directly to their CEO rose over the three periods studied, which suggests that CEOs were connecting with more departments.

Choice A is incorrect because the average number of managers and department leaders reporting directly to their CEO rose for both categories between the 1991–1995 and 2001–2008 periods; thus, it isn't true that the average numbers didn't fluctuate. *Choice B* is incorrect because the average number of managers reporting directly to their CEO was highest in the 2001–2008 period, not in the 1996–2001 period. *Choice C* is incorrect. Although it correctly describes a feature of the graph, the observation that more department leaders than managers are reporting to CEOs does not by itself address the question of whether CEOs are connecting with more departments over time—to address that question, one needs to know whether the number of department leaders reporting to CEOs is increasing over time.

QUESTION 15

Choice C is the best answer because it presents a finding that, if true, would weaken Foster's hypothesis that damage to eelgrass roots improves the health of eelgrass meadows by boosting genetic diversity. The text indicates that sea otters damage eelgrass roots but that eelgrass meadows near Vancouver Island, where there's a large otter population, are comparatively healthy. When Foster and her colleagues compared the Vancouver Island eelgrass meadows to those that don't have established otter populations, the researchers found that the Vancouver Island meadows are more genetically diverse than the other meadows are. This finding led Foster to hypothesize that damage to the eelgrass roots encourages eelgrass reproduction, thereby improving genetic diversity and the health of the meadows. If, however, other meadows not included in the study are less healthy the larger the local otter population is and the longer the otters have been in residence, that would suggest that damage to the eelgrass roots, which would be expected to increase with the size and residential duration of the otter population, isn't leading meadows to be healthier. Such a finding would therefore weaken Foster's hypothesis.

Choice A is incorrect because finding that small, recently introduced otter populations are near other eelgrass meadows in the study wouldn't weaken Foster's hypothesis. If otter populations were small and only recently established, they wouldn't be expected to have caused much damage to eelgrass roots, so even if those eelgrass meadows were less healthy than the Vancouver Island meadows, that wouldn't undermine Foster's hypothesis. In fact, it would be consistent with Foster's hypothesis since it would suggest that the greater damage caused by larger, more established otter populations is associated with healthier meadows. *Choice B* is incorrect because the existence of areas with otters but without eelgrass meadows wouldn't reveal anything about whether the damage that otters cause to eelgrass roots ultimately benefits eelgrass meadows. *Choice D* is incorrect because the health of plants other than eelgrass would have no bearing on Foster's hypothesis that damage to eelgrass roots leads to greater genetic diversity and meadow health. It would be possible for otters to have a negative effect on other plants while nevertheless improving the health of eelgrass meadows by damaging eelgrass roots.

QUESTION 16

Choice B is the best answer because it most logically completes the text's discussion of Zelda Fitzgerald's contributions to literature. The text begins by saying that many scholars view Zelda mainly in terms of her marriage to F. Scott Fitzgerald and "don't recognize Zelda as a writer in her own right." The text then mentions a novel and "numerous short stories" that she wrote and that such scholars tend to ignore. Therefore, those scholars who focus on Zelda only as an inspiration for F. Scott's writings risk misrepresenting the full range of Zelda's contributions to literature.

Choice A is incorrect. Although the text does mention that Zelda Fitzgerald "likely influenced" her husband's literary work, its focus is on Zelda's own writing, not on her husband's writing or factors that might have influenced it. *Choice C* is incorrect because the text does not discuss F. Scott and Zelda Fitzgerald's opinions of each other's works. *Choice D* is incorrect. Although the text does suggest that F. Scott Fitzgerald's works were "likely influenced in part" by his marriage to Zelda, it does not discuss autobiographical interpretations of the works of either F. Scott or Zelda.

QUESTION 17

Choice B is the best answer because it presents the conclusion that most logically completes the text's discussion of the study by Versace and colleagues. The text indicates that newborn animals of some species are attracted to faces and to stimuli that resemble faces. These species, the text says, share two characteristics: they're social and they practice parental care, meaning that parents care for their young. The text goes on to describe Versace and colleagues' experiment, which showed that although Testudo tortoises aren't social and don't practice parental care, tortoise hatchlings were attracted to a stimulus that resembles a face. Since Versace and colleagues have shown that a species that isn't social and doesn't practice parental care nevertheless has the innate characteristic of being attracted to face-like stimuli, it follows that this characteristic shouldn't be assumed to be an adaptation related to social interaction or parental care.

Choice A is incorrect because the text indicates that the tortoise hatchlings were attracted to the face-like stimuli (even though their species is solitary and doesn't practice parental care), not that they perceived the stimuli as threatening. *Choice C* is incorrect because the phenomenon discussed in the text is an attraction to faces and face-like stimuli on the part of newborn animals, which can't show any learned characteristics since they were just born. Additionally, the text tells us that the tortoises Versace and colleagues studied aren't social and don't practice parental care, so any findings about those tortoises wouldn't be relevant to the question of whether an attraction to faces in social species that practice parental care is innate or learned. *Choice D* is incorrect because the text gives no indication that adult tortoises were presented with face-like stimuli and, if adults were in fact tested, no information about how they responded is provided. Since no information about adult tortoises' responses is provided, no conclusion comparing those responses to the responses of newly hatched tortoises can be supported.

QUESTION 18

Choice A is the best answer because it most logically completes the text. The text explains that the *Cantares Mexicanos* contains poems about the Aztec Empire from before the Spanish invasion. Furthermore, it indicates that notes in the collection attest that some of these poems predate the Spanish invasion, while some customs depicted are likely Spanish in origin. The implication is that some poems were composed before the invasion but the references to Spanish customs could have come about only after the invasion, and thus that the collection includes content that predates the invasion and also content from after the invasion.

Choice B is incorrect because the text clearly indicates that the collection is in Nahuatl, not Spanish, so the compilers' unfamiliarity with Spanish is irrelevant to whether the collection contains material composed after the Spanish invasion. *Choice C* is incorrect because the text mentions only the Aztec Empire and Spain: there is no information about the relationship of Aztec literature to any traditions other than its own or Spain's. *Choice D* is incorrect because the text states that some of the poems make "inarguable references" to common Spanish customs, which conflicts with the idea that these references can reasonably be attributed to mere coincidence.

QUESTION 19

Choice A is the best answer because it presents the conclusion that most logically follows from the text's discussion of the study of capuchin monkeys' cognitive abilities. The text explains that the study failed to distinguish between outcomes for the tasks performed by the capuchin monkeys, such that simpler tasks requiring less dexterity, or skill, were judged by the same criteria as tasks that demanded more dexterity. Because the study didn't account for this discrepancy, the researchers might have assumed that observed differences in performance were due to the abilities of the monkeys rather than the complexity of the tasks. In other words, the results may suggest cognitive differences among the monkeys even though such differences may not really exist.

Choice B is incorrect because the text focuses on the fact that the tasks assigned to the capuchin monkeys in the study varied in difficulty and that the variety wasn't taken into consideration. The text doesn't suggest that the capuchin monkeys couldn't perform certain tasks, just that some tasks were more difficult to do. *Choice C* is incorrect because the text doesn't suggest that the study's results are indicative of the abilities of capuchin monkeys but not of other monkey species; in fact, the text suggests that the results may not even be an accurate reflection of capuchin monkeys' abilities. *Choice D* is incorrect because the text doesn't indicate that the researchers compared results for artificial tasks with those for tasks encountered in the wild, although the tasks described in the text—sliding a panel and putting a straw in a bottle—are presumably artificial.

QUESTION 20

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 21

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 22

Choice A is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period after "configurations" is used correctly to mark the boundary between one sentence ("The intense… configurations") and another ("TMAO…fish"). The supplementary phrase ("ensuring…configurations") modifies the main clause of the first sentence ("The chemical…effect"), and "TMAO" is the subject of the second sentence.

Choice B is incorrect because it results in a run-on sentence. The sentences ("The intense…configurations" and "TMAO…fish") are fused without punctuation and/or a conjunction. *Choice C* 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 D* is incorrect. Without a comma preceding it, the conjunction "and" can't be used in this way to join sentences.

QUESTION 23

Choice C is the best answer. The convention being tested is the use of verbs to express tense. In this choice, the present tense verb "experiences" is consistent with the other present tense verbs (e.g., "connects" and "prepares") used to describe the events in Truong's novels. Furthermore, it's conventional to use the present tense when discussing a literary work.

Choice A is incorrect because the past tense verb "experienced" isn't consistent with the other present tense verbs used to describe the events in Truong's novels. *Choice B* is incorrect because the past perfect tense verb "had experienced" isn't consistent with the other present tense verbs used to describe the events in Truong's novels. *Choice D* is incorrect because the future progressive tense verb "will be experiencing" isn't consistent with the other present tense verbs used to describe the events in Truong's novels.

QUESTION 24

Choice C is the best answer. The convention being tested is the use of plural and possessive nouns. The singular possessive noun "screw's" and the plural noun "threads" correctly indicate that there is only one screw and it has multiple threads.

Choice A is incorrect because the context requires the plural noun "threads," not the singular possessive noun "thread's." *Choice B* is incorrect because the context requires the singular possessive noun "screw's," not the plural possessive noun "screws'." *Choice D* is incorrect because the context requires the singular possessive noun "screw's" and the plural noun "threads," not the plural noun "screws" or the plural possessive noun "threads.'"

QUESTION 25

Choice C is the best answer. The convention being tested is punctuation between a main clause and a supplementary noun phrase. This choice correctly uses a comma to mark the boundary between the main clause ("scholar… materialism") and the supplementary noun phrase ("an apt assessment") that describes Waid's observation about how *The House of Mirth* depicts the upper classes of New York society.

Choice A is incorrect because a semicolon and the conjunction "and" can't be used in this way to mark the boundary between a main clause and a supplementary noun phrase. *Choice B* is incorrect. Joining the main clause ("scholar…materialism") and the following noun phrase with the conjunction "and" results in a confusing and illogical sentence that suggests that the novel depicts the upper classes of New York society as "an apt assessment," which doesn't make sense in this context. *Choice D* is incorrect because it fails to mark the boundary between the main clause and the supplementary noun phrase with appropriate punctuation.

QUESTION 26

Choice D is the best answer. The convention being tested is the coordination of main clauses within a sentence. The semicolon is correctly used to join the first main clause ("To humans…prey") and the second main clause ("rather… approach"). Further, the comma after the adverb "rather" is correctly used to separate the adverb from the main clause ("the brightly…approach") it modifies, logically indicating that the information in this clause (how the spider's behavior appears to humans) is contrary to the information in the previous clause (how the spider's behavior does not appear to humans).

Choice A is incorrect because it results in a comma splice. Without a conjunction following it, a comma can't be used in this way to join two main clauses. *Choice B* is incorrect because it results in a run-on sentence. The two main clauses are fused without appropriate punctuation and/or a conjunction. *Choice C* is incorrect. Placing the comma between the first main clause "To humans…prey" and the adverb "rather" illogically indicates that the information in the first main clause is contrary to what came before, which doesn't make sense in this context.

QUESTION 27

Choice C is the best answer. The convention being tested is the use of plural and possessive nouns. The singular possessive noun "playa's" and the plural possessive noun "rocks'" correctly indicate that the sediment is that of one playa (the Racetrack Playa) and that there are multiple rocks that have mysteriously migrated across the sediment.

Choice A is incorrect because the context requires the singular possessive noun "playa's" and the plural possessive noun "rocks'," not the plural noun "playas" and the singular possessive noun "rock's." *Choice B* is incorrect because the context requires the plural possessive noun "rocks'," not the plural noun "rocks." *Choice D* is incorrect because the context requires the singular possessive noun "playa's," not the plural possessive noun "playas'."

QUESTION 28

Choice C is the best answer. The convention being tested is punctuation between a subject and a verb. When, as in this case, a subject ("her 2019 novel *Gingerbread*") is immediately followed by a verb ("offers"), no punctuation is needed.

Choice A is incorrect because no punctuation is needed between the subject and the verb. *Choice B* is incorrect because no punctuation is needed between the subject and the verb. *Choice D* is incorrect because no punctuation is needed between the subject and the verb.

QUESTION 29

Choice B is the best answer. The sentence explains an advantage of microprobes, noting that because microprobes weigh as little as 50 milligrams, they can explore areas inaccessible to rovers.

Choice A is incorrect. The sentence indicates that rovers can land successfully on Mars despite their weight; it doesn't explain an advantage of microprobes. *Choice C* is incorrect. While the sentence mentions that microprobes have been proposed as an alternative to rovers, it doesn't explain an advantage of microprobes. *Choice D* is incorrect. The sentence emphasizes a similarity between microprobes and rovers; it doesn't explain an advantage of microprobes.

QUESTION 30

Choice C is the best answer. The sentence effectively introduces *Paradise* to an audience unfamiliar with the novel and its author, describing *Paradise* as a historical novel about colonial East Africa and its author as the winner of the 2021 Nobel Prize in Literature.

Choice A is incorrect. While the sentence introduces Abdulrazak Gurnah to an audience unfamiliar with the author, it doesn't effectively introduce *Paradise*. *Choice B* is incorrect. While the sentence provides background information about *Paradise*, it doesn't effectively introduce the novel to an audience unfamiliar with its author. *Choice D* is incorrect. While the sentence provides background information about *Paradise*, it doesn't effectively introduce the novel to an audience unfamiliar with its author.

QUESTION 31

Choice C is the best answer. The sentence emphasizes the relative sizes of the capital cities' populations, noting that even though Hanoi has more people overall, Ulaanbaatar accounts for a larger percentage of the people in its country.

Choice A is incorrect. While the sentence indicates the population size of each capital, it fails to emphasize their sizes relative to each other or to their countries' overall population sizes. *Choice B* is incorrect. While the sentence indicates the population size of each capital, it fails to emphasize their sizes relative to each other or to their countries' overall population sizes. *Choice D* is incorrect. The sentence emphasizes the population sizes of the two countries; it fails to mention the capitals.

QUESTION 32

Choice D is the best answer. The sentence explains how the House of Wisdom preserved the world's knowledge, noting that the library collected, translated, and printed writings from different countries.

Choice A is incorrect. While the sentence indicates that the House of Wisdom was known for bringing together knowledge from around the world, it doesn't explain how the library preserved this knowledge. *Choice B* is incorrect. The sentence makes a generalization about the scholars who were employed by the House of Wisdom; it doesn't explain how the library preserved the world's knowledge. *Choice C* is incorrect. The sentence identifies two authors whose writings were preserved at the House of Wisdom; it doesn't explain how the library preserved the world's knowledge.

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 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 2

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 3

Choice D is the best answer because it most logically completes the text's discussion of the economist's claim about sales of personal electronic devices. In this context, "invalidate" most nearly means nullify or make invalid. The text indicates that interruptions in the supply of microchips for personal electronics "have challenged" the economist's claim that sales of personal electronics will show strong growth in the coming months. The text goes on to clarify the effect of the delays on the economist's projection, stating that the delays are very likely to extend the time frame over which the projected growth in sales will occur. This context suggests that the delays are unlikely to invalidate the economist's projection entirely—the delays will probably alter the time frame of the projection, not nullify it or make it invalid.

Choice A is incorrect because saying that the delays are unlikely to "dispute," or argue against, the economist's projection wouldn't make sense. Since the delays are an inanimate circumstance, they couldn't argue against a prediction about the sales of personal electronics. *Choice B* is incorrect because saying that the delays are unlikely to "withdraw," or remove from consideration, the economist's projection wouldn't make sense. Although the economist could withdraw her projection because of the delays, the delays themselves couldn't withdraw her projection since they're an inanimate circumstance and thus can't choose to remove something from consideration. *Choice C* is incorrect because there's nothing in the text to suggest that the delays will "underscore," or emphasize, the economist's projection. Instead, the text suggests that the delays are likely to extend the time frame of the economist's projection but not to undermine the projection entirely.

QUESTION 4

Choice B is the best answer because it most logically completes the text's discussion of the art installation *Anthem*. In this context, "inventive" means characterized by invention and creativity. The text explains that critics' responses to the installation involved praise for Tsang's creative transformation of a space into a dynamic exhibit with huge images and lots of sound. This context conveys that the critics found the piece particularly creative.

Choice A is incorrect because the text indicates that critics praised the installation for being dynamic and including huge images and lots of sound, and it wouldn't make sense to describe such an exhibit as "restrained," or limited and not extravagant or showy. *Choice C* is incorrect because it wouldn't make sense to say that critics found the installation "inexplicable," or incapable of being explained or interpreted, since the critics were able to explain their praise for the installation's transformation of a space with huge images and lots of sound. *Choice D* is incorrect because the text focuses on the idea that critics praised Tsang for creatively transforming a space into a dynamic exhibit, not that they found the installation "mystifying," or bewildering and hard to understand. Nothing in the text suggests that the critics couldn't understand the piece.

QUESTION 5

Choice C is the best answer because it most logically completes the text's discussion of the kinds of mammals alive during the Mesozoic era. As used in this context, "diverse" means to have a significant amount of variety. The text indicates that some scientists have suggested that Mesozoic mammals can't be characterized in a certain way, then contrasts the view put forward by those scientists with Luo's research, which shows that Mesozoic mammals "weren't all ground-dwelling insectivores" and instead were "various." This context suggests that some scientists have viewed Mesozoic mammals as being all alike, or not a very diverse group.

Choice A is incorrect because it wouldn't make sense to say that some scientists have suggested that Mesozoic mammals weren't very "predatory," or that they didn't prey on other animals, since the text establishes a contrast between what some scientists have suggested and Luo's research showing that Mesozoic mammals "weren't all ground-dwelling insectivores." This context suggests that some scientists have regarded Mesozoic mammals as all being insectivores, or animals that prey on insects, not that some scientists have suggested that Mesozoic mammals didn't prey on other animals. *Choice B* is incorrect because it wouldn't make sense to say that some scientists have suggested that Mesozoic mammals weren't very "obscure," or concealed or not well known, since the text establishes a contrast between what some scientists have suggested and Luo's research showing that Mesozoic mammals were a varied group. There's no contrast between saying that the mammals weren't concealed or well known and the mammals being varied. *Choice D* is incorrect because it wouldn't make sense to say that some scientists have suggested that Mesozoic mammals weren't very "localized," or confined to a particular area, since the text establishes a contrast

between what some scientists have suggested and Luo's research showing that Mesozoic mammals were a varied group. There's no contrast between saying that the mammals weren't localized and the mammals being varied. Although the text mentions mammal fossils found in China, nothing in the discussion of Luo's research addresses the limits of Mesozoic mammal habitats.

QUESTION 6

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 7

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 8

Choice D is the best answer because it accurately describes how the underlined sentence functions in the text as a whole. The text establishes that John has a strong imagination and then goes on to describe the St. John River near John's home in the Florida woods. The underlined sentence depicts John sending twigs sailing down the river while he imagines them reaching "Jacksonville, the sea, the wide world," where he wishes he could follow. This suggests that John longs to expand his life experiences beyond the Florida woods.

Choice A is incorrect because the second and third sentences of the text provide an extended description of the riverbank where John likes to go, whereas the underlined sentence describes what John does at that location. *Choice B* is incorrect because the first sentence of the text suggests that John's behavior "was puzzling" to others around him, whereas the underlined sentence concerns the content of John's imaginings. *Choice C* is incorrect because the underlined sentence elaborates on John's imagination but doesn't mention any other children to whom John could be compared.

QUESTION 9

Choice B is the best answer because it presents a statement about Dorian that is directly supported by the text. The narrator of the text says that when Dorian sees his portrait, "his cheeks flushed for a moment with pleasure" and "a look of joy came into his eyes." The narrator goes on to say that Dorian looked at the portrait "in wonder" and presents him as being so entranced by the portrait that he doesn't notice what Hallward is saying to him. These details support the description of Dorian as being delighted by what he sees in the portrait.

Choice A is incorrect because Dorian isn't depicted as interested in Hallward's opinion of the portrait; rather, he is so enraptured by the painting that he's hardly even aware of Hallward. *Choice C* is incorrect because the portrait of Dorian is the only painting mentioned in the text. Although Dorian is depicted as being delighted with this particular portrait, there's no evidence in the text that he likes portraits better than other kinds of paintings. *Choice D* is incorrect because nothing in the text suggests that Dorian is uncertain about Hallward's talent. Instead, the text is focused on Dorian's delight with the portrait.

QUESTION 10

Choice A is the best answer because it uses data from the graph to effectively support Charles and Stephens's claim about how level of information affects voters. The graph shows the probability of voting for both high- and low-information voters in seven categories of political orientation. Charles and Stephens claim that "the more informed voters are about politics…the more likely they are to vote." This statement correctly asserts that the graph shows a higher probability of voting for high-information voters than for low-information voters at each of the seven political orientations. Thus, this statement accurately cites data from the graph that support Charles and Stephens's claim about how level of information affects voters.

Choice B is incorrect. Although this statement is correct that the only probability in the graph below 50% is for low-information voters categorized as independent (orientation 4), the claim in question is about the relative likelihood that low- and high-information voters will vote, and without some reference to high-information voters, this statement cannot help support such a comparison. *Choice C* is incorrect. Although this statement is correct that the highest probabilities of voting for low-information voters are at the ends of the orientation scale (1 and 7), the claim in question is about the relative likelihood that low- and high-information voters will vote, and without some reference to high-information voters, this statement cannot help support such a comparison. *Choice D* is incorrect because the graph does not give any information about how many people are represented in any of the categories, so this statement is not based on data from the graph. Furthermore, even if we did have this information, the claim is about how level of information affects voters' probability of voting, not whether they're likely to strongly identify with a particular political party.

QUESTION 11

Choice B is the best answer because it describes data from the graph that weaken the student's conclusion about the reduction in the spider population in the enclosure with lizards. The graph shows that the enclosure with lizards and the enclosure without lizards each began with about 85 spiders, and that the number of spiders in each enclosure fell over the 30 days of the study. The student's claim is that the reduction in spiders in the enclosure with lizards is "entirely attributable to the presence of the lizards," meaning that the spider population wouldn't have declined except for the presence of the lizards. This claim is weakened, however, by the fact that the enclosure without lizards also saw a substantial reduction in the number of spiders. Since the number of spiders fell in the enclosure without lizards as well as in the enclosure with lizards, there must be some other factor than just the presence of the lizards that contributed to the reduction in the spider population.

Choice A is incorrect because the fact that the two enclosures started with the same number of spiders is irrelevant to the claim that the reduction in spider population by day 30 in the enclosure with lizards can be entirely attributed to the lizards. *Choice C* is incorrect because the fact that the spider population in the enclosure with lizards fell more between days 1 and 10 than in other periods has nothing to do with the student's claim that the reduction in spiders in that enclosure by day 30 can be entirely attributed to the lizards. *Choice D* is incorrect. Although it's true that on day 30 the spider population was lower in the enclosure with lizards than in the enclosure without lizards, this fact doesn't weaken the student's claim that the reduction in the spider population in the enclosure with lizards can be entirely attributed to the lizards. Indeed, the lower spider population in the enclosure with lizards suggests that the lizards are contributing to the reduction in the spider population, though the fact that the spider population also fell substantially in the other enclosure means that the lizards aren't the only cause of the reduction.

QUESTION 12

Choice A is the best answer because it presents a finding that, if true, would most strongly support the team's conclusion that cattle were likely raised closer to human settlements than sheep and goats were. The text explains that Vaiglova, Liu, and their colleagues analyzed the chemical composition of sheep, goat, and cattle bones from the Bronze Age in China in order to investigate the animals' domestication, or their adaptation from a wild state to a state in which they existed in close connection with humans. According to the text, the team's analysis showed that sheep and goats of the era fed largely on wild plants, whereas cattle fed on millet—importantly, a crop cultivated by humans. If analysis of the animal bones shows that the cattle's diet also consisted of wheat, another crop cultivated by humans in China during the Bronze Age, the finding would support the team's conclusion by offering additional evidence that cattle during this era fed on human-grown crops—and, by extension, that humans raised cattle relatively close to the settlements where they grew these crops, leaving goats and sheep to roam farther away in areas with wild vegetation, uncultivated by humans.

Choice B is incorrect because if it were true that sheep's and goats' diets consisted of small portions of millet, which the text states was a crop cultivated by humans, the finding would suggest that sheep and goats were raised relatively close to human settlements, weakening the team's conclusion that cattle were likely raised closer to those settlements than sheep and goats were. *Choice C* is incorrect because the finding that cattle generally require more food and nutrients than do sheep and goats wouldn't support the team's conclusion that cattle were likely raised closer to human settlements than sheep and goats were. Nothing in the text suggests that cattle were incapable of obtaining sufficient food and nutrients without access to human-grown crops. Hence, even if cattle's diets are found to have different requirements than the diets of sheep and goats, the cattle could have met those requirements from food located far from human settlements. *Choice D* is incorrect because if it were true that the diets of sheep, goats, and cattle varied based on what the farmers in each Bronze Age settlement could grow, the finding would weaken the team's conclusion that cattle were likely raised closer to human settlements than sheep and goats were, suggesting instead that all three types of animals were raised close enough to human settlements to feed on those settlements' crops.

QUESTION 13

Choice C is the best answer because it presents the finding that, if true, would best support Suarez, Pérez-Huerta, and Harrell's claim about mosasaurs. The text states that Suarez, Pérez-Huerta, and Harrell's research on mosasaur tooth enamel led them to conclude that mosasaurs were endothermic, which means that they could live in waters at many different temperatures and still maintain a stable body temperature. The researchers claim that endothermy enabled mosasaurs to live in relatively cold waters near the poles. If several mosasaur fossils have been found in areas that were near the poles during the period when mosasaurs were alive and fossils of nonendothermic marine reptiles are rare in such locations, that would support the researchers' claim: it would show that mosasaurs inhabited polar waters but nonendothermic marine mammals tended not to, suggesting that endothermy may have been the characteristic that enabled mosasaurs to include polar waters in their range.

Choice A is incorrect because finding that it's easier to determine mosasaur body temperatures from tooth enamel data than it is to determine nonendothermic reptile body temperatures wouldn't support the researchers' claim. Whether one research process is more difficult than another indicates nothing about the results of those processes and therefore is irrelevant to the issue of where mosasaurs lived and what enabled them to live in those locations. *Choice B* is incorrect because finding roughly equal numbers of mosasaur and nonendothermic marine reptile fossils in areas that were near the poles in the Late Cretaceous would suggest that endothermy didn't give mosasaurs any particular advantage when it came to expanding their range to include relatively cold polar waters, thereby weakening the researchers' claim rather than supporting it. *Choice D* is incorrect because finding that the temperature of seawater in the Late Cretaceous was warmer than seawater today wouldn't weaken the researchers' claim. Seawater in the Late Cretaceous could have been warmer than seawater today but still cold enough for endothermy to be advantageous to mosasaurs, so this finding wouldn't provide enough information to either support or weaken the researchers' claim.

QUESTION 14

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 15

Choice C is the best answer because it presents a finding that, if true, would weaken the claim made by people who favor the traditional view of voter behavior. According to the text, people who favor that view believe that voting in an election doesn't change a voter's attitude toward the candidates in that election. If Washington and Mullainathan found that two years after an election, attitudes toward the winning candidate were significantly more polarized among subjects who had voted than among subjects who had been too young to vote, that would suggest that the act of voting did have an effect on the voters' attitudes toward the candidates, which would undermine the claim that voting doesn't change voters' attitudes.

Choice A is incorrect because a finding about links between subjects' attitudes and general political orientation, regardless of age and ability to vote, wouldn't address the presence or absence of changes in attitudes among those subjects who did actually vote. Therefore, the finding wouldn't have any bearing on the claim that voting in an election doesn't change a voter's attitude toward the candidates in that election. *Choice B* is incorrect because a finding that positive attitudes toward a winning candidate significantly increased in the two years after the election among subjects who had been too young to vote would involve only people who didn't vote; therefore, the finding wouldn't have any bearing on the claim that when people do vote, the act of voting doesn't change their attitudes toward the candidates. *Choice D* is incorrect because the finding that subjects in both groups were more likely to have negative attitudes than positive attitudes toward the winning candidate two years after an election would reflect all subjects' attitudes at one particular time whether they voted or not, rather than the presence or absence of a change in voters' attitudes after voting. Therefore, the finding would neither weaken nor strengthen the claim that voting in an election doesn't change a voter's attitude toward the candidates.

QUESTION 16

Choice B is the best answer because it describes data from the graph that support Taylor and colleagues' conclusion that spray coating holds promise for improving the power conversion efficiency of ETLs in perovskite solar cells. The text explains that perovskite solar cells' efficiency at converting light into electricity is diminished by their electron transport layer (ETL), which is applied through spin coating, but that Taylor's team devised a new spray coating method for applying the ETL that improves its power conversion efficiency. The graph displays data on the power conversion efficiency of solar cells in tests conducted by Taylor's team, with bars for both the highest- and lowest-performing ETLs in two data categories: spray coating and spin coating. According to the graph, the lowest-performing ETL applied through spray coating had a power conversion efficiency of between 14% and 16%, while the highest-performing ETL applied through spin coating had a power conversion efficiency of less than 14%. These data confirm that ETLs applied through novel spray coating are more efficient than those applied though traditional spin coating. Thus, the data support Taylor and colleagues' conclusion about spray coating's potential value.

Choice A is incorrect. Although this claim correctly describes the data in the graph by stating that both the lowest-performing ETL applied through spin coating and the lowest-performing ETL applied through spray coating had a power conversion efficiency greater than 10%, this relationship in the data doesn't support or relate to Taylor and colleagues' conclusion that spray coating promises greater efficiency for solar cells than traditional spin coating does. *Choice C* is incorrect. This claim does address the greater power conversion efficiency of the highest-performing ETL applied through spray coating, compared with the highest-performing ETL applied through spin coating. However, it also incorrectly cites the value for the efficiency of the highest-performing ETL applied through spray coating as approximately 13%, instead of a value between 14% and 16%, and the value for the efficiency of the highest-performing ETL applied through spin coating as approximately 11%, instead of a value between 12% and 14%, as shown in the graph. *Choice D* is incorrect because Taylor and colleagues' conclusion is based on the difference in the power conversion efficiency of ETLs applied through spray coating and that of ETLs applied through spin coating, not on the difference between the highest- and lowest-performing ETLs applied through just spray coating.

QUESTION 17

Choice B is the best answer because it presents a finding that, if true, would most directly support the arts journalist's claim about Enwezor's work as a curator and art historian. In the text, the arts journalist asserts that Enwezor wished not just to focus on modern African artists but also to show "how their work fits into the larger context of global modern art and art history," or how their work relates to artistic developments and work by other artists elsewhere in the world. The description of *Postwar: Art Between the Pacific and the Atlantic, 1945–1965* indicates that Enwezor and Siegel's exhibition brought works by African artists together with works by artists from other countries, thus supporting the arts journalist's claim that Enwezor sought to show works by African artists in a context of global modern art and art history.

Choice A is incorrect because it describes a retrospective that wouldn't support the arts journalist's claim that Enwezor wanted to show how works by modern African artists fit into the larger context of global modern art and art history. The description of *El Anatsui: Triumphant Scale* indicates that the retrospective focused only on the work of a single African artist, El Anatsui. The description doesn't suggest that the exhibition showed how El Anatsui's works fit into a global artistic context. *Choice C* is incorrect because it describes an exhibition that wouldn't support the arts journalist's claim that Enwezor wanted to show how works by modern African artists relate to the larger context of global modern art and art history. The description of *The Short Century: Independence and Liberation Movements in Africa, 1945–1994* indicates that the exhibition showed how African artists were influenced by movements for independence from European colonial powers following the Second World War. Although this suggests that Enwezor intended the exhibition to place works by African artists in a political context, it doesn't indicate that the works were placed in a global artistic context. *Choice D* is incorrect because it describes an exhibition that wouldn't support the arts journalist's claim that Enwezor wanted to show how works by modern African artists relate to the larger context of global modern art and art history. The description of *In/sight: African Photographers, 1940 to the Present* indicates that the exhibition was intended to reveal the broad range of approaches taken by African photographers, not that the exhibition showed how photography by African artists fits into a global artistic context.

QUESTION 18

Choice B 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, "people in the Americas"), and this choice supplies the finite past perfect tense verb "have used" to indicate what people in the Americas used the gourd for.

Choice A is incorrect because the nonfinite to-infinitive "to use" doesn't supply the main clause with a finite verb. *Choice C* is incorrect because the nonfinite participle "having used" doesn't supply the main clause with a finite verb. *Choice D* is incorrect because the nonfinite participle "using" doesn't supply the main clause with a finite verb.

QUESTION 19

Choice C is the best answer. The convention being tested is punctuation between a subordinate clause and a main clause. This choice correctly uses a comma to mark the boundary between the subordinate clause ("While…lifelike") and the main clause ("others look to the past").

Choice A is incorrect because it results in an incomplete sentence with no main clause. *Choice B* is incorrect because it fails to mark the boundary between the subordinate clause ("While…lifelike") and the main clause ("others…past"). *Choice D* is incorrect because it results in an incomplete sentence with no main clause.

QUESTION 20

Choice A is the best answer. The convention being tested is the use of verbs to express tense. In this choice, the simple past tense verb "suggested" properly indicates that Zufall offered her suggestion for the product's name in the past. This verb tense is consistent with the previous sentence's use of a simple past tense verb ("advised") to describe Zufall's advice to McVicker in the 1950s.

Choice B is incorrect because the present tense verb "suggests" doesn't indicate that Zufall offered her suggestion in the past. *Choice C* is incorrect because the past perfect verb "had suggested" isn't consistent with the previous sentence's use of the simple past tense verb "advised" to describe Zufall's advice to McVicker. *Choice D* is incorrect because the past progressive verb "was suggesting" isn't consistent with the previous sentence's use of the simple past tense verb "advised" to describe Zufall's advice to McVicker.

QUESTION 21

Choice D is the best answer. The convention being tested is punctuation use between two supplementary phrases following the coordinate clause ("but she… mycology"). This choice correctly uses a comma to mark the boundary between the supplementary noun phrase ("the study of fungi") that defines the term "mycology" and the supplementary participial phrase ("producing…London") that provides additional information about the extent to which Potter dedicated herself to mycology.

Choice A is incorrect because a semicolon can't be used in this way to join two supplementary phrases following a coordinate clause. *Choice B* is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with "producing." *Choice C* is incorrect. The lack of punctuation results in a sentence that illogically suggests that the study of fungi is producing more than 350 paintings.

QUESTION 22

Choice A is the best answer. The convention being tested is subject-modifier placement. This choice makes the noun phrase "many critics" the subject of the sentence and places it immediately after the modifying phrase "in assessing… Kurosawa." In doing so, this choice clearly establishes that it is the critics—and not another noun in the sentence—who assess Kurosawa's films.

Choice B is incorrect because it results in a dangling modifier. The placement of the noun phrase "Kurosawa's…sources" immediately after the modifying phrase illogically suggests that his use of Western literary sources is what assesses Kurosawa's films. *Choice C* is incorrect because it results in a dangling modifier. The placement of the function word "there" immediately after the modifying phrase illogically suggests that "there" is what assesses Kurosawa's films. *Choice D* is incorrect because it results in a dangling modifier. The placement of the noun phrase "the focus…critics" immediately after the modifying phrase illogically suggests that the critics' focus is what assesses Kurosawa's films.

QUESTION 23

Choice C is the best answer. The convention being tested is the punctuation of items in a complex series. It's conventional to use a semicolon to separate items in a complex series with internal punctuation, and in this choice, the semicolon after "2009" is conventionally used to separate the first item ("the world's…2009") and the second item ("an online…2010") in the series of things that Hinson helped create. Further, the comma after "Basic" correctly pairs with the comma after "app," and the comma after "network" correctly pairs with the comma after "TV" to set off the supplemental elements ("Chickasaw Basic" and "Chickasaw TV") that provide the names of the app and the TV network, respectively. Altogether, the punctuation in this choice results in a sentence that clearly indicates that Hinson helped make a language app in 2009, an online TV network in 2010, and a language course in 2015.

Choice A is incorrect because it fails to punctuate the complex series in a way that makes clear that Hinson helped make a language app in 2009, an online TV network in 2010, and a language course in 2015. *Choice B* is incorrect because it fails to punctuate the complex series in a way that makes clear that Hinson helped make a language app in 2009, an online TV network in 2010, and a language course in 2015. *Choice D* is incorrect because the comma after "2009" doesn't match the semicolon used to separate the second and third items in the complex series.

QUESTION 24

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 25

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 26

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 27

Choice A is the best answer. "Meanwhile" logically signals that the action described in this sentence (Obinze's move to London to pursue a career) is simultaneous with the action described in the previous sentence (Ifemelu's move to the United States). The first sentence establishes that the actions take place around the same time, referring to the characters' "divergent experiences" following high school.

Choice B is incorrect because "nevertheless" illogically signals that the information in this sentence about Obinze's move to London is true despite the previous information about Ifemelu's move to the United States. Instead, as the first sentence establishes, Obinze's move and Ifemelu's move are related, parallel experiences that occur around the same time. *Choice C* is incorrect because "secondly" illogically signals that the information in this sentence is a second point or reason separate from the previous information about Ifemelu's move to the United States. Instead, as the first sentence establishes, Obinze's move and Ifemelu's move are related, parallel experiences that occur around the same time. *Choice D* is incorrect because "in fact" illogically signals that the information in this sentence emphasizes, modifies, or contradicts the previous information about Ifemelu's move to the United States. Instead, as the first sentence establishes, Obinze's move and Ifemelu's move are related, parallel experiences that occur around the same time.

QUESTION 28

Choice B is the best answer. "For example" logically signals that the information in this sentence—that tadpole shrimp embryos can pause development during extended periods of drought—exemplifies the previous sentence's claim that organisms have evolved surprising adaptations to survive in adverse conditions.

Choice A is incorrect because "in contrast" illogically signals that the information in this sentence contrasts with the claim about organisms in the previous sentence. Instead, it exemplifies this claim. *Choice C* is incorrect because "meanwhile" illogically signals that the information in this sentence is separate from (while occurring simultaneously with) the claim about organisms in the previous sentence. Instead, it exemplifies this claim. *Choice D* is incorrect because "consequently" illogically signals that the information in this sentence is a consequence, or result, of the claim about organisms in the previous sentence. Instead, it exemplifies this claim.

QUESTION 29

Choice D is the best answer. "In addition" logically signals that the information in this sentence—that the Twentieth Amendment requires newly elected US senators and representatives to be sworn in on January 3 —is separate from and additional to the amendment's mandate concerning presidential inaugurations.

Choice A is incorrect because "instead" illogically signals that the information in the sentence presents an alternative to or substitute for the Twentieth Amendment's mandate concerning presidential inaugurations. Rather, the sentence presents a separate requirement in addition to that one. *Choice B* is incorrect because "for instance" illogically signals that the information in the sentence exemplifies the Twentieth Amendment's mandate concerning presidential inaugurations. Instead, the sentence presents a separate requirement in addition to that one. *Choice C* is incorrect because "specifically" illogically signals that the sentence provides specific, precise details elaborating on the Twentieth Amendment's mandate concerning presidential inaugurations. Instead, the sentence presents a separate requirement in addition to that one.

QUESTION 30

Choice D is the best answer. "Similarly" logically signals that the information in the sentence—that Dove situates Beulah's life in the context of the US Civil Rights Movement—is similar to the previous information about Thomas and the Great Migration. Both sentences support the first sentence's claim that Dove portrays her characters in the context of broader historical narratives.

Choice A is incorrect because "specifically" illogically signals that the information about Beulah in this sentence provides specific details elaborating on the previous information about Thomas. Instead, it's similar to the previous information about Thomas. *Choice B* is incorrect because "thus" illogically signals that the information about Beulah in this sentence is a result or consequence of the previous information about Thomas. Instead, it's similar to the previous information about Thomas. *Choice C* is incorrect because "regardless" illogically signals that the information about Beulah in this sentence is true despite the previous information about Thomas. Instead, it's similar to the previous information about Thomas.

QUESTION 31

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 32

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 33

Choice B is the best answer. The sentence presents both the study and its methodology (that is, the researcher's approach to the problem), explaining that Yuan used computer simulations to study the effect of the mother duck's wake on the ducklings' energy expenditure.

Choice A is incorrect. The sentence describes the findings of Yuan's study; it doesn't present the study and its methodology. *Choice C* is incorrect. While the sentence provides general information about Yuan's study, it doesn't present the study's methodology. *Choice D* is incorrect. The sentence describes the findings of Yuan's study; it doesn't present the study and its methodology.

Math

Module 1
(27 questions)

QUESTION 1

Choice C is correct. For the given line graph, the percent of cars for sale at a used car lot on a given day is represented on the vertical axis. The percent of cars for sale is the smallest when the height of the line graph is the lowest. The lowest height of the line graph occurs for cars with a model year of 2014.

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. 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. 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 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 5

Choice C is correct. It's given that $f(x)$ is the total cost, in dollars, to lease a car from this dealership with a monthly payment of x dollars. Therefore, the total cost, in dollars, to lease the car when the monthly payment is $400 is represented by the value of $f(x)$ when $x=400$. Substituting 400 for x in the equation $f(x)=36x+1{,}000$ yields $f(400)=36(400)+1{,}000$, or $f(400)=15{,}400$. Thus, when the monthly payment is $400, the total cost to lease a car is $15,400.

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 6

The correct answer is 180. The perimeter of a polygon is equal to the sum of the lengths of the sides of the polygon. It's given that each side of the square has a length of 45. Since a square is a polygon with 4 sides, the perimeter of this square is $45+45+45+45$, or 180.

QUESTION 7

The correct answer is 5. Multiplying both sides of the given equation by $x+6$ results in $55=x(x+6)$. Applying the distributive property of multiplication to the right-hand side of this equation results in $55=x^2+6x$. Subtracting 55 from both sides of this equation results in $0=x^2+6x-55$. The right-hand side of this equation can be rewritten by factoring. The two values that multiply to -55 and add to 6 are 11 and -5. It follows that the equation $0=x^2+6x-55$ can be rewritten as $0=(x+11)(x-5)$. Setting each factor equal to 0 yields two equations: $x+11=0$ and $x-5=0$. Subtracting 11 from both sides of the equation $x+11=0$ results in $x=-11$. Adding 5 to both sides of the equation $x-5=0$ results in $x=5$. Therefore, the positive solution to the given equation is 5.

QUESTION 8

Choice A is correct. If the object travels 108 centimeters at a speed of 12 centimeters per second, the time of travel can be determined by dividing the total distance by the speed. This results in $\frac{108 \text{ centimeters}}{12 \text{ centimeters/second}}$, which is 9 seconds.

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 9

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. It follows that the mean of data set X is $\frac{5+9+9+13}{4}$, or 9, and the mean of data set Y is $\frac{5+9+9+13+27}{5}$, or 12.6. Since 9 is less than 12.6, the mean of data set X is less than the mean of data set Y.

Alternate approach: Data set Y consists of the 4 values in data set X and one additional value, 27. Since the additional value, 27, is larger than any value in data set X, the mean of data set X is less than the mean of data set Y.

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 10

Choice A is correct. It's given that the rocket contained $467,000$ kilograms (kg) of propellant before launch and had $362,105$ kg remaining exactly 21 seconds after launch. Finding the difference between the amount, in kg, of propellant before launch and the remaining amount, in kg, of propellant after launch gives the amount, in kg, of propellant burned during the 21 seconds: $467,000 - 362,105 = 104,895$. Dividing the amount of propellant burned by the number of seconds yields $\frac{104,895}{21} = 4,995$. Thus, an average of $4,995$ kg of propellant burned each second after launch.

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 finding the amount of propellant burned, rather than the amount of propellant burned each second.

QUESTION 11

Choice B is correct. Multiplying both sides of the given equation by 4 yields $(4)(4x+2) = (4)(12)$, or $16x+8 = 48$. Therefore, the value of $16x+8$ is 48.

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 12

Choice D is correct. It's given that the equation $h=-4.9t^2+7t+9$ represents this situation, where h is the height, in meters, of the object t seconds after it is kicked. It follows that the height, in meters, from which the object was kicked is the value of h when $t=0$. Substituting 0 for t in the equation $h=-4.9t^2+7t+9$ yields $h=-4.9(0)^2+7(0)+9$, or $h=9$. Therefore, the object was kicked from a height of 9 meters.

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 13

The correct answer is $\frac{25}{4}$. The given equation can be rewritten in the form $f(x)=a(x-h)^2+k$, where a, h, and k are constants. When $a>0$, h is the value of x for which $f(x)$ reaches its minimum. The given equation can be rewritten as $f(x)=4\left(x^2-\frac{50}{4}x\right)+126$, which is equivalent to

$f(x)=4\left(x^2-\frac{50}{4}x+\left(\frac{50}{8}\right)^2-\left(\frac{50}{8}\right)^2\right)+126$. This equation can be rewritten as

$f(x)=4\left(\left(x-\frac{50}{8}\right)^2-\left(\frac{50}{8}\right)^2\right)+126$, or $f(x)=4\left(x-\frac{50}{8}\right)^2-4\left(\frac{50}{8}\right)^2+126$, which is

equivalent to $f(x)=4\left(x-\frac{25}{4}\right)^2-\frac{121}{4}$. Therefore, $h=\frac{25}{4}$, so the value of x for which

$f(x)$ reaches its minimum is $\frac{25}{4}$. Note that 25/4 and 6.25 are examples of ways to

enter a correct answer.

QUESTION 14

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, $4.90s+11.60\ell\leq2,200$. It's also given that the owner must purchase a minimum of 200 candles. Therefore, $s+\ell\geq200$. The inequalities $4.90s+11.60\ell\leq2,200$ and $s+\ell\geq200$ 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 $s+\ell\geq200$ yields $s\geq200-\ell$. Multiplying both sides of this inequality by 4.90 yields $4.90s\geq4.90(200-\ell)$, or $4.90s\geq980-4.90\ell$. Adding 11.60ℓ to both sides of this inequality yields $4.90s+11.60\ell\geq980-4.90\ell+11.60\ell$, or $4.90s+11.60\ell\geq980+6.70\ell$. This inequality can be combined with the inequality $4.90s+11.60\ell\leq2,200$, 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 $6.70\ell \leq 2{,}200$. 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 15

Choice D is correct. Since f is a linear function, it can be defined by an equation of the form $f(x) = ax + b$, where a and b are constants. It's given that $f(0) = 8$. Substituting 0 for x and 8 for $f(x)$ in the equation $f(x) = ax + b$ yields $8 = a(0) + b$, or $8 = b$. Substituting 8 for b in the equation $f(x) = ax + b$ yields $f(x) = ax + 8$. It's given that $f(1) = 12$. Substituting 1 for x and 12 for $f(x)$ in the equation $f(x) = ax + 8$ yields $12 = a(1) + 8$, or $12 = a + 8$. Subtracting 8 from both sides of this equation yields $a = 4$. Substituting 4 for a in the equation $f(x) = ax + 8$ yields $f(x) = 4x + 8$. Therefore, an equation that defines f is $f(x) = 4x + 8$.

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 16

Choice A is correct. The function f gives the area of the rectangle, in ft^2, if its width is w ft. Since the value of $f(14)$ is the value of $f(w)$ if $w = 14$, it follows that $f(14) = 1{,}176$ means that $f(w)$ is $1{,}176$ if $w = 14$. In the given context, this means that if the width of the rectangle is 14 ft, then the area of the rectangle is $1{,}176$ ft^2.

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 interpreting $f(w)$ as the width, in ft, of the rectangle if its area is w ft^2, rather than as the area, in ft^2, of the rectangle if its width is w ft.

QUESTION 17

Choice B is correct. Since $\overline{PR}$ and $\overline{QS}$ are diameters of the circle shown, $\overline{OS}$, $\overline{OR}$, $\overline{OP}$, and $\overline{OQ}$ are radii of the circle and are therefore congruent. Since $\angle SOP$ and $\angle ROQ$ are vertical angles, they are congruent. Therefore, arc PS and arc QR are formed by congruent radii and have the same angle measure, so they are congruent arcs. Similarly, $\angle SOR$ and $\angle POQ$ are vertical angles, so they are congruent. Therefore, arc SR and arc PQ are formed by congruent radii and have the same angle measure, so they are congruent arcs. Let x represent the length of arc SR. Since arc SR and arc PQ are congruent arcs, the length of arc PQ can also be represented by x. It's given that the length of arc PS is twice the length of arc PQ. Therefore, the length of arc PS can be represented by the expression $2x$. Since arc PS and arc QR are congruent arcs, the length of arc QR can also be represented by $2x$. This gives the expression $x + x + 2x + 2x$.

Since it's given that the circumference is 144π, the expression $x + x + 2x + 2x$ is equal to 144π. Thus $x + x + 2x + 2x = 144\pi$, or $6x = 144\pi$. Dividing both sides of this equation by 6 yields $x = 24\pi$. Therefore, the length of arc QR is $2(24\pi)$, or 48π.

Choice A is incorrect. This is the length of arc PQ, not arc QR. *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 18

Choice C is correct. Let x represent the number of children in a whale-watching tour group. Let y represent the number of adults in this group. Because it's given that 21 people are in a group and the group consists of adults and children, it must be true that $x + y = 21$. Since the company's revenue is 60 dollars per child, the total revenue from x children in this group was $60x$ dollars. Since the company's revenue is 80 dollars per adult, the total revenue from y adults in this group was $80y$ dollars. Because it's given that the total revenue for this group was $1,440$ dollars, it must be true that $60x + 80y = 1,440$. The equations $x + y = 21$ and $60x + 80y = 1,440$ form a linear system of equations that can be solved to find the value of x, which represents the number of children in the group, using the elimination method. Multiplying both sides of the equation $x + y = 21$ by 80 yields $80x + 80y = 1,680$. Subtracting $60x + 80y = 1,440$ from $80x + 80y = 1,680$ yields $(80x + 80y) - (60x + 80y) = 1,680 - 1,440$, which is equivalent to $80x - 60x + 80y - 80y = 240$, or $20x = 240$. Dividing both sides of this equation by 20 yields $x = 12$. Therefore, 12 people in the group were children.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect. This is the number of adults in the group, not the number of children in the group. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 19

Choice A is correct. The *x*-intercept of a graph in the *xy*-plane is the point on the graph where $y = 0$. It's given that function h is defined by $h(x) = 4x + 28$. Therefore, the equation representing the graph of $y = h(x)$ is $y = 4x + 28$. Substituting 0 for y in the equation $y = 4x + 28$ yields $0 = 4x + 28$. Subtracting 28 from both sides of this equation yields $-28 = 4x$. Dividing both sides of this equation by 4 yields $-7 = x$. Therefore, the *x*-intercept of the graph of $y = h(x)$ in the *xy*-plane is $(-7, 0)$. It's given that the *x*-intercept of the graph of $y = h(x)$ is $(a, 0)$. Therefore, $a = -7$. The *y*-intercept of a graph in the *xy*-plane is the point on the graph where $x = 0$. Substituting 0 for x in the equation $y = 4x + 28$ yields $y = 4(0) + 28$, or $y = 28$. Therefore, the *y*-intercept of the graph of $y = h(x)$ in the *xy*-plane is $(0, 28)$. It's given that the *y*-intercept of the graph of $y = h(x)$ is $(0, b)$. Therefore, $b = 28$. If $a = -7$ and $b = 28$, then the value of $a + b$ is $-7 + 28$, or 21.

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

QUESTION 20

The correct answer is 8. Since each term of the given expression, $2x^3+42x^2+208x$, has a factor of $2x$, the expression can be rewritten as $2x(x^2)+2x(21x)+2x(104)$, or $2x(x^2+21x+104)$. Since the values 8 and 13 have a sum of 21 and a product of 104, the expression $x^2+21x+104$ can be factored as $(x+8)(x+13)$. Therefore, the given expression can be factored as $2x(x+8)(x+13)$. It follows that the factors of the given expression are 2, x, $x+8$, and $x+13$. Of these factors, only $x+8$ and $x+13$ are of the form $x+b$, where b is a positive constant. Therefore, the possible values of b are 8 and 13. Thus, the smallest possible value of b is 8.

QUESTION 21

The correct answer is $\frac{29}{2}$. According to the first equation in the given system, the value of y is -1.5. Substituting -1.5 for y in the second equation in the given system yields $-1.5=x^2+8x+a$. Adding 1.5 to both sides of this equation yields $0=x^2+8x+a+1.5$. If the given system has exactly one distinct real solution, it follows that $0=x^2+8x+a+1.5$ has exactly one distinct real solution. A quadratic equation in the form $0=px^2+qx+r$, where p, q, and r are constants, has exactly one distinct real solution if and only if the discriminant, q^2-4pr, is equal to 0. The equation $0=x^2+8x+a+1.5$ is in this form, where $p=1$, $q=8$, and $r=a+1.5$. Therefore, the discriminant of the equation $0=x^2+8x+a+1.5$ is $(8)^2-4(1)(a+1.5)$, or $58-4a$. Setting the discriminant equal to 0 to solve for a yields $58-4a=0$. Adding $4a$ to both sides of this equation yields $58=4a$. Dividing both sides of this equation by 4 yields $\frac{58}{4}=a$, or $\frac{29}{2}=a$. Therefore, if the given system of equations has exactly one distinct real solution, the value of a is $\frac{29}{2}$. Note that 29/2 and 14.5 are examples of ways to enter a correct answer.

QUESTION 22

Choice B is correct. It's given that $f(x)=(x+6)(x+5)(x-4)$ and $y=f(x)-3$. Substituting $(x+6)(x+5)(x-4)$ for $f(x)$ in the equation $y=f(x)-3$ yields $y=(x+6)(x+5)(x-4)-3$. Substituting -6 for x in this equation yields $y=(-6+6)(-6+5)(-6-4)-3$, or $y=-3$. Substituting -5 for x in the equation $y=(x+6)(x+5)(x-4)-3$ yields $y=(-5+6)(-5+5)(-5-4)-3$, or $y=-3$. Substituting 4 for x in the equation $y=(x+6)(x+5)(x-4)-3$ yields $y=(4+6)(4+5)(4-4)-3$, or $y=-3$. Therefore, when $x=-6$ then $y=-3$, when $x=-5$ then $y=-3$, and when $x=4$ then $y=-3$. Thus, the table of values in choice B represents $y=f(x)-3$.

Choice A is incorrect. This table represents $y = x - 3$ rather than $y = f(x) - 3$.
Choice C is incorrect. This table represents $y = x + 3$ rather than $y = f(x) - 3$.
Choice D is incorrect. This table represents $y = f(x) + 3$ rather than $y = f(x) - 3$.

QUESTION 23

Choice C is correct. Since the value of $q(x)$ decreases by a fixed percentage, 45%, for every increase in the value of x by 1, the function q is a decreasing exponential function. A decreasing exponential function can be written in the form $q(x) = a\left(1 - \frac{p}{100}\right)^x$, where a is the value of $q(0)$ and the value of $q(x)$ decreases by $p\%$ for every increase in the value of x by 1. If $q(0) = 14$, then $a = 14$. Since the value of $q(x)$ decreases by 45% for every increase in the value of x by 1, $p = 45$. Substituting 14 for a and 45 for p in the equation $q(x) = a\left(1 - \frac{p}{100}\right)^x$ yields $q(x) = 14\left(1 - \frac{45}{100}\right)^x$, which is equivalent to $q(x) = 14(1 - 0.45)^x$, or $q(x) = 14(0.55)^x$.

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. For this function, the value of $q(x)$ increases, rather than decreases, by 45% for every increase in the value of x by 1.

QUESTION 24

Choice A is correct. An equation for the graph shown can be written in slope-intercept form $y = mx + b$, where m is the slope of the graph and its y-intercept is $(0, b)$. Since the y-intercept of the graph shown is $(0, 2)$, the value of b is 2. Since the graph also passes through the point $(4, 1)$, the slope can be calculated as $\frac{1-2}{4-0}$, or $-\frac{1}{4}$. Therefore, the value of m is $-\frac{1}{4}$. Substituting $-\frac{1}{4}$ for m and 2 for b in the equation $y = mx + b$ yields $y = -\frac{1}{4}x + 2$. It's given that an equation for the graph shown is $y = f(x) + 14$. Substituting $f(x) + 14$ for y in the equation $y = -\frac{1}{4}x + 2$ yields $f(x) + 14 = -\frac{1}{4}x + 2$. Subtracting 14 from both sides of this equation yields $f(x) = -\frac{1}{4}x - 12$.

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 25

Choice B is correct. It's given that right triangle RST is similar to triangle UVW, where S corresponds to V and T corresponds to W. It's given that the side lengths of the right triangle RST are $RS = 20$, $ST = 48$, and $TR = 52$. Corresponding angles in similar triangles are equal. It follows that the measure of angle T is equal to the measure of angle W. The hypotenuse of a right triangle is

the longest side. It follows that the hypotenuse of triangle RST is side TR. The hypotenuse of a right triangle is the side opposite the right angle. Therefore, angle S is a right angle. The adjacent side of an acute angle in a right triangle is the side closest to the angle that is not the hypotenuse. It follows that the adjacent side of angle T is side ST. The opposite side of an acute angle in a right triangle is the side across from the acute angle. It follows that the opposite side of angle T is side RS. The tangent of an acute angle in a right triangle is the ratio of the length of the opposite side to the length of the adjacent side. Therefore, $\tan T = \frac{RS}{ST}$. Substituting 20 for RS and 48 for ST in this equation yields $\tan T = \frac{20}{48}$, or $\tan T = \frac{5}{12}$. The tangents of two acute angles with equal measures are equal. Since the measure of angle T is equal to the measure of angle W, it follows that $\tan T = \tan W$. Substituting $\frac{5}{12}$ for $\tan T$ in this equation yields $\frac{5}{12} = \tan W$. Therefore, the value of $\tan W$ is $\frac{5}{12}$.

Choice A is incorrect. This is the value of $\sin W$. *Choice C* is incorrect. This is the value of $\cos W$. *Choice D* is incorrect. This is the value of $\frac{1}{\tan W}$.

QUESTION 26

Choice A is correct. It's given that w represents the total wall area, in square feet. Since the walls of the room will be painted twice, the amount of paint, in gallons, needs to cover $2w$ square feet. It's also given that one gallon of paint will cover 220 square feet. Dividing the total area, in square feet, of the surface to be painted by the number of square feet covered by one gallon of paint gives the number of gallons of paint that will be needed. Dividing $2w$ by 220 yields $\frac{2w}{220}$, or $\frac{w}{110}$. Therefore, the equation that represents the total amount of paint P, in gallons, needed to paint the walls of the room twice is $P = \frac{w}{110}$.

Choice B is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from finding the amount of paint needed to paint the walls once rather than twice. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 27

The correct answer is 9.87. It's given that the number a is 110% greater than the number b. It follows that $a = \left(1 + \frac{110}{100}\right)b$, or $a = 2.1b$. It's also given that the number b is 90% less than 47. It follows that $b = \left(1 - \frac{90}{100}\right)(47)$, or $b = 0.1(47)$, which yields $b = 4.7$. Substituting 4.7 for b in the equation $a = 2.1b$ yields $a = 2.1(4.7)$, which is equivalent to $a = 9.87$. Therefore, the value of a is 9.87.

Math

Module 2
(27 questions)

QUESTION 1

Choice A is correct. It's given that 20% of the students surveyed responded that they intend to enroll in the study program. Therefore, the proportion of students in Spanish club who intend to enroll in the study program, based on the survey, is 0.20. Since there are 55 total students in Spanish club, the best estimate for the total number of these students who intend to enroll in the study program is $55(0.20)$, or 11.

Choice B is incorrect. This is the best estimate for the percentage, rather than the total number, of students in Spanish club who intend to enroll in the study program. *Choice C* is incorrect. This is the best estimate for the total number of Spanish club students who do not intend to enroll in the study program. *Choice D* is incorrect. This is the total number of students in Spanish club.

QUESTION 2

Choice A is correct. Since Jay walks at a speed of 3 miles per hour for w hours, Jay walks a total of $3w$ miles. Since Jay runs at a speed of 5 miles per hour for r hours, Jay runs a total of $5r$ miles. Therefore, the total number of miles Jay travels can be represented by $3w + 5r$. Since the combined total number of miles is 14, the equation $3w + 5r = 14$ represents this situation.

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 3

Choice A is correct. The line of best fit shown intersects the *y*-axis at a positive *y*-value and has a positive slope. The graph of an equation of the form $y = a + bx$, where a and b are constants, intersects the *y*-axis at a *y*-value of a and has a

slope of b. Of the given choices, only choice A represents a line that intersects the y-axis at a positive y-value, 2.8, and has a positive slope, 1.7.

Choice B is incorrect. This equation represents a line that has a negative slope, not a positive slope. *Choice C* is incorrect. This equation represents a line that intersects the y-axis at a negative y-value, not a positive y-value. *Choice D* is incorrect. This equation represents a line that intersects the y-axis at a negative y-value, not a positive y-value, and has a negative slope, not a positive slope.

QUESTION 4

Choice D is correct. Because the graph of $y = f(x)$ is shown, the value of $f(0)$ is the value of y on the graph that corresponds with $x = 0$. When $x = 0$, the corresponding value of y is 3. Therefore, the value of $f(0)$ is 3.

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 5

Choice B is correct. Applying the commutative property of multiplication, the expression $(m^4 q^4 z^{-1})(mq^5 z^3)$ can be rewritten as $(m^4 m)(q^4 q^5)(z^{-1} z^3)$. For positive values of x, $(x^a)(x^b) = x^{a+b}$. Therefore, the expression $(m^4 m)(q^4 q^5)(z^{-1} z^3)$ can be rewritten as $(m^{4+1})(q^{4+5})(z^{-1+3})$, or $m^5 q^9 z^2$.

Choice A is incorrect and may result from multiplying, not adding, the exponents. *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 79. The median of a data set with an odd number of values is the middle value of the set when the values are ordered from least to greatest. Because the given data set consists of nine values that are ordered from least to greatest, the median is the fifth value in the data set. Therefore, the median of the data shown is 79.

QUESTION 7

The correct answer is 55. Subtracting 40 from both sides of the given equation yields $x = 55$. Therefore, the value of x is 55.

QUESTION 8

Choice C is correct. Adding the second equation of the given system to the first equation yields $5x + (-4x + y) = 15 + (-2)$, which is equivalent to $x + y = 13$. So the value of $x + y$ is 13.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect. This is the value of $-(x+y)$. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 9

Choice A is correct. It's given that the function g models the number of gallons that remain from a full gas tank in a car after driving m miles. In the given function $g(m)=-0.05m+12.1$, the coefficient of m is -0.05. This means that for every increase in the value of m by 1, the value of $g(m)$ decreases by 0.05. It follows that for each mile driven, there is a decrease of 0.05 gallons of gasoline. Therefore, 0.05 gallons of gasoline are used to drive each mile.

Choice B is incorrect and represents the number of gallons of gasoline in a full gas tank. *Choice C* is incorrect and may result from conceptual errors. *Choice D* is incorrect and may result from conceptual errors.

QUESTION 10

Choice C is correct. Multiplying each side of the given equation by y yields the equivalent equation $\frac{y}{7b}=11x$. Dividing each side of this equation by 11 yields $\frac{y}{77b}=x$, or $x=\frac{y}{77b}$.

Choice A is incorrect. This equation is not equivalent to the given equation. *Choice B* is incorrect. This equation is not equivalent to the given equation. *Choice D* is incorrect. This equation is not equivalent to the given equation.

QUESTION 11

Choice B is correct. Since the point (x, y) is an intersection point of the graphs of the given equations in the *xy*-plane, the pair (x, y) should satisfy both equations, and thus is a solution of the given system. According to the first equation, $y=76$. Substituting 76 in place of y in the second equation yields $x^2-5=76$. Adding 5 to both sides of this equation yields $x^2=81$. Taking the square root of both sides of this equation yields two solutions: $x=9$ and $x=-9$. Of these two solutions, only -9 is given as a choice.

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. This is the value of coordinate y, rather than x, of the intersection point (x, y).

QUESTION 12

Choice A is correct. It's given that the point $(x, 53)$ is a solution to the given system of inequalities in the *xy*-plane. This means that the coordinates of the point, when substituted for the variables x and y, make both of the inequalities in the system true. Substituting 53 for y in the inequality $y>14$ yields $53>14$, which is true. Substituting 53 for y in the inequality $4x+y<18$ yields $4x+53<18$. Subtracting 53 from both sides of this inequality yields $4x<-35$.

Dividing both sides of this inequality by 4 yields $x < -8.75$. Therefore, x must be a value less than -8.75. Of the given choices, only -9 is less than -8.75.

Choice B is incorrect. Substituting -5 for x and 53 for y in the inequality $4x + y < 18$ yields $4(-5) + 53 < 18$, or $33 < 18$, which is not true. *Choice C* is incorrect. Substituting 5 for x and 53 for y in the inequality $4x + y < 18$ yields $4(5) + 53 < 18$, or $73 < 18$, which is not true. *Choice D* is incorrect. Substituting 9 for x and 53 for y in the inequality $4x + y < 18$ yields $4(9) + 53 < 18$, or $89 < 18$, which is not true.

QUESTION 13

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 14

The correct answer is 2. Substituting 8 for $f(x)$ in the given equation yields $8 = 4x$. Dividing the left- and right-hand sides of this equation by 4 yields $x = 2$. Therefore, the value of x is 2 when $f(x) = 8$.

QUESTION 15

Choice B is correct. The given expression has a common factor of 2 in the denominator, so the expression can be rewritten as $\frac{8x(x-7)-3(x-7)}{2(x-7)}$. The three terms in this expression have a common factor of $(x-7)$. Since it's given that $x > 7$, x can't be equal to 7, which means $(x-7)$ can't be equal to 0. Therefore, each term in the expression, $\frac{8x(x-7)-3(x-7)}{2(x-7)}$, can be divided by $(x-7)$, which gives $\frac{8x-3}{2}$.

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 16

Choice C is correct. It's given that line r is perpendicular to line p in the xy-plane. This means that the slope of line r is the negative reciprocal of the slope of line p. If the equation for line p is rewritten in slope-intercept form $y = mx + b$, where m and b are constants, then m is the slope of the line and $(0, b)$ is its y-intercept. Subtracting $18x$ from both sides of the equation $2y + 18x = 9$ yields $2y = -18x + 9$. Dividing both sides of this equation by 2 yields $y = -9x + \frac{9}{2}$. It follows that the slope of line p is -9. The negative reciprocal of a number is -1 divided by the number. Therefore, the negative reciprocal of -9 is $\frac{-1}{-9}$, or $\frac{1}{9}$. Thus, the slope of line r is $\frac{1}{9}$.

Choice A is incorrect. This is the slope of line p, not line r. *Choice B* is incorrect. This is the reciprocal, not the negative reciprocal, of the slope of line p. *Choice D* is incorrect. This is the negative, not the negative reciprocal, of the slope of line p.

QUESTION 17

Choice D is correct. The *y*-intercept of a graph in the *ty*-plane is the point where $t = 0$. For the given function f, the *y*-intercept of the graph of $y = f(t)$ in the *ty*-plane can be found by substituting 0 for t in the equation $y = 8{,}000(0.65)^t$, which gives $y = 8{,}000(0.65)^0$. This is equivalent to $y = 8{,}000(1)$, or $y = 8{,}000$. Therefore, the *y*-intercept of the graph of $y = f(t)$ is $(0, 8{,}000)$. It's given that the function f models the number of coupons a company sent to their customers at the end of each year. Therefore, $f(t)$ represents the estimated number of coupons the company sent to their customers at the end of each year. It's also given that t represents the number of years since the end of 1998. Therefore, $t = 0$ represents 0 years since the end of 1998, or the end of 1998. Thus, the best interpretation of the *y*-intercept of the graph of $y = f(t)$ is that the estimated number of coupons the company sent to their customers at the end of 1998 was 8,000.

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 18

Choice C is correct. It's given that triangle XYZ is similar to triangle RST, such that X, Y, and Z correspond to R, S, and T, respectively. Since corresponding angles of similar triangles are congruent, it follows that the measure of $\angle Z$ is congruent to the measure of $\angle T$. It's given that the measure of $\angle Z$ is 20°. Therefore, the measure of $\angle T$ is 20°.

Choice A is incorrect and may result from a conceptual error. *Choice B* is incorrect. This is half the measure of $\angle Z$. *Choice D* is incorrect. This is twice the measure of $\angle Z$.

QUESTION 19

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 20

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 21

The correct answer is 35. The first equation in the given system of equations defines y as $4x+1$. Substituting $4x+1$ for y in the second equation in the given system of equations yields $4(4x+1)=15x-8$. Applying the distributive property on the left-hand side of this equation yields $16x+4=15x-8$. Subtracting $15x$ from each side of this equation yields $x+4=-8$. Subtracting 4 from each side of this equation yields $x=-12$. Substituting -12 for x in the first equation of the given system of equations yields $y=4(-12)+1$, or $y=-47$. Substituting -12 for x and -47 for y into the expression $x-y$ yields $-12-(-47)$, or 35.

QUESTION 22

Choice D is correct. The number of solutions of a quadratic equation of the form $ax^2+bx+c=0$, where a, b, and c are constants, can be determined by the value of the discriminant, b^2-4ac. If the value of the discriminant is positive, then the quadratic equation has exactly two distinct real solutions. If the value of the discriminant is equal to zero, then the quadratic equation has exactly one real solution. If the value of the discriminant is negative, then the quadratic equation

has zero real solutions. In the given equation, $5x^2 + 10x + 16 = 0$, $a = 5$, $b = 10$, and $c = 16$. Substituting these values for a, b, and c in $b^2 - 4ac$ yields $(10)^2 - 4(5)(16)$, or -220. Since the value of its discriminant is negative, the given equation has zero real solutions. Therefore, the number of distinct real solutions the given equation has is zero.

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 23

Choice B is correct. Since 1 mile is equal to $1{,}760$ yards, 1 square mile is equal to $1{,}760^2$, or $3{,}097{,}600$, square yards. It's given that the park has an area of $11{,}863{,}808$ square yards. Therefore, the park has an area of

$(11{,}863{,}808 \text{ square yards})\left(\frac{1 \text{ square mile}}{3{,}097{,}600 \text{ square yards}}\right)$, or $\frac{11{,}863{,}808}{3{,}097{,}600}$ square miles. Thus,

the area, in square miles, of the park is 3.83.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This is the square root of the area of the park in square yards, not the area of the park in square miles. *Choice D* is incorrect and may result from converting $11{,}863{,}808$ yards to miles, rather than converting $11{,}863{,}808$ square yards to square miles.

QUESTION 24

Choice C is correct. The graph of the equation $(x-h)^2 + (y-k)^2 = r^2$ in the xy-plane is a circle with center (h,k) and a radius of length r. The radius of a circle is the distance from the center of the circle to any point on the circle. If a circle in the xy-plane intersects the y-axis at exactly one point, then the perpendicular distance from the center of the circle to this point on the y-axis must be equal to the length of the circle's radius. It follows that the x-coordinate of the circle's center must be equivalent to the length of the circle's radius. In other words, if the graph of $(x-h)^2 + (y-k)^2 = r^2$ is a circle that intersects the y-axis at exactly one point, then $r = |h|$ must be true. The equation in choice C is $(x-4)^2 + (y-9)^2 = 16$, or $(x-4)^2 + (y-9)^2 = 4^2$. This equation is in the form $(x-h)^2 + (y-k)^2 = r^2$, where $h = 4$, $k = 9$, and $r = 4$, and represents a circle in the xy-plane with center $(4,9)$ and radius of length 4. Substituting 4 for r and 4 for h in the equation $r = |h|$ yields $4 = |4|$, or $4 = 4$, which is true. Therefore, the equation in choice C represents a circle in the xy-plane that intersects the y-axis at exactly one point.

Choice A is incorrect. This is the equation of a circle that does not intersect the y-axis at any point. *Choice B* is incorrect. This is an equation of a circle that intersects the x-axis, not the y-axis, at exactly one point. *Choice D* is incorrect. This is the equation of a circle with the center located on the y-axis and thus intersects the y-axis at exactly two points, not exactly one point.

QUESTION 25

Choice C is correct. Since angles B and E each have the same measure and angles C and F each have the same measure, triangles ABC and DEF are similar, where side BC corresponds to side EF. To determine whether two similar triangles are congruent, it is sufficient to determine whether one pair of corresponding sides are congruent. Therefore, to determine whether triangles ABC and DEF are congruent, it is sufficient to determine whether sides BC and EF have equal length. Thus, knowing the lengths of BC and EF is sufficient to determine whether triangle ABC is congruent to triangle DEF.

Choice A is incorrect and may result from conceptual errors. *Choice B* is incorrect and may result from conceptual errors. *Choice D* is incorrect. The given information is sufficient to determine that triangles ABC and DEF are similar, but not whether they are congruent.

QUESTION 26

Choice B is correct. The histograms shown have the same shape, but data set A contains values between 20 and 60 and data set B contains values between 10 and 50. Thus, the mean of data set A is greater than the mean of data set B. Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is the difference between the smallest possible mean of data set A and the greatest possible mean of data set B. In data set A, since there are 3 integers in the interval greater than or equal to 20 but less than 30, 4 integers greater than or equal to 30 but less than 40, 7 integers greater than or equal to 40 but less than 50, and 9 integers greater than or equal to 50 but less than 60, the smallest possible mean for data set A is $\frac{(3 \cdot 20)+(4 \cdot 30)+(7 \cdot 40)+(9 \cdot 50)}{23}$. In data set B, since there are 3 integers greater than or equal to 10 but less than 20, 4 integers greater than or equal to 20 but less than 30, 7 integers greater than or equal to 30 but less than 40, and 9 integers greater than or equal to 40 but less than 50, the largest possible mean for data set B is $\frac{(3 \cdot 19)+(4 \cdot 29)+(7 \cdot 39)+(9 \cdot 49)}{23}$. Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is $\frac{(3 \cdot 20)+(4 \cdot 30)+(7 \cdot 40)+(9 \cdot 50)}{23} - \frac{(3 \cdot 19)+(4 \cdot 29)+(7 \cdot 39)+(9 \cdot 49)}{23}$, which is equivalent to $\frac{(3 \cdot 20)-(3 \cdot 19)+(4 \cdot 30)-(4 \cdot 29)+(7 \cdot 40)-(7 \cdot 39)+(9 \cdot 50)-(9 \cdot 49)}{23}$. This expression can be rewritten as $\frac{3(20-19)+4(30-29)+7(40-39)+9(50-49)}{23}$, or $\frac{23}{23}$, which is equal to 1. Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is 1.

Choice A is incorrect. This is the smallest possible difference between the ranges, not the means, of the data sets. *Choice C* is incorrect. This is the difference between the greatest possible mean, not the smallest possible mean, of data set A and the greatest possible mean of data set B. *Choice D* is incorrect. This is the smallest possible difference between the sum of the values in data set A and

the sum of the values in data set B, not the smallest possible difference between the means.

QUESTION 27

The correct answer is 113. It's given that the legs of a right triangle have lengths 24 centimeters and 21 centimeters. In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the two legs. It follows that if h represents the length, in centimeters, of the hypotenuse of the right triangle, $h^2 = 24^2 + 21^2$. This equation is equivalent to $h^2 = 1{,}017$. Taking the square root of each side of this equation yields $h = \sqrt{1{,}017}$. This equation can be rewritten as $h = \sqrt{9 \cdot 113}$, or $h = \sqrt{9} \cdot \sqrt{113}$. This equation is equivalent to $h = 3\sqrt{113}$. It's given that the length of the triangle's hypotenuse, in centimeters, can be written in the form $3\sqrt{d}$. It follows that the value of d is 113.