The SAT®

Practice Test #10

ANSWER EXPLANATIONS

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

Reading and Writing

Module 1
(33 questions)

QUESTION 1

Choice A is the best answer because it most logically completes the text's discussion of the role of the general store in US rural communities during the 1800s. In this context, "source" means a place where something originates or is obtained. The text states that people would share news while socializing at the general store. This context supports the idea that the store served as a source of information in rural communities.

Choice B is incorrect because "rival" would mean competitor or opponent. The text doesn't indicate that the general store was a rival of anything. Instead, the text describes the general store as a place that enabled the sharing of information within rural communities. *Choice C* is incorrect because in this context, "condition" would mean state, circumstance, or requirement. Although the text implies that visiting the store was helpful for acquiring information since people shared news there, it wouldn't make sense to say that the general store was a condition of information. *Choice D* is incorrect because "waste" would mean something that is unused, discarded, or spent unnecessarily, which would not make sense in context. The text describes the general store as an essential part of daily life and a place for socializing and information sharing. The store was therefore a source, not a waste, of information.

QUESTION 2

Choice B is the best answer because it most logically completes the text's discussion of Jacob Lawrence's artistic process. In this context, "observant" means watchful and perceptive. The text emphasizes that the "close attention" Lawrence paid to "all the details" of his neighborhood allowed him to reflect subtle elements of "the beauty and vitality of the Black experience" in his artwork. This context indicates that being observant of his surroundings was an important part of Lawrence's work as an artist.

Choice A is incorrect because the text gives no indication that Lawrence was "skeptical," or had an attitude of doubt in general or about particular things, let alone that skepticism was important to him as an artist. Rather than indicating that he was skeptical, the text focuses on how Lawrence paid careful attention to everything around him and reflected his observations in his artwork. *Choice C* is incorrect because the text gives no indication that Lawrence was "critical," which in this context would mean inclined to criticize harshly or unfairly. Rather than indicating that Lawrence found fault in things, the text suggests that he paid careful attention to everything around him and that his artwork reflects this careful attention. *Choice D* is incorrect because the text doesn't suggest that Lawrence was "confident," or self-assured. Rather than addressing how Lawrence felt about himself and how that feeling affected his artistic process, the text emphasizes the careful attention Lawrence paid to everything around him—attention that allowed him to capture subtle elements of a particular place and time in his artwork.

QUESTION 3

Choice B is the best answer because it most logically completes the text's discussion of Ochoa's prediction that humans will one day need to live in places other than Earth. As used in this context, "speculates" would mean puts forward an idea without firm evidence. The text states that Ochoa "doesn't have a definite idea" about when humans might need to live in other environments and characterizes Ochoa's prediction as a "conjecture," or a conclusion presented without convincing evidence. This context indicates that Ochoa speculates when she makes this prediction.

Choice A is incorrect because saying that Ochoa "demands," or insists or requires, that humans will one day need to live in other environments than Earth's would not make sense in context. The text indicates that she's unsure about the timing but hypothesizes that it will someday happen. *Choice C* is incorrect because saying that Ochoa "doubts," or questions or disbelieves, that humans will one day need to live in other environments than Earth's would not make sense in context. The text indicates that although Ochoa is unsure about the timing, she hypothesizes that humans will need to live in places other than Earth and encourages research into future travel to the moon. *Choice D* is incorrect because saying that Ochoa "establishes," or proves, that humans will one day need to live in other environments than Earth's would not make sense in context. Rather than stating that Ochoa discusses her idea with certainty and supports it with evidence, the text indicates that Ochoa is unsure about when humans might need to live in other environments.

QUESTION 4

Choice A is the best answer because it most logically completes the text's discussion of a relationship between the dodder plant and its host plant. As used in this context, "synchronization" means the act of things happening at the same time. The text indicates that the dodder and its host plant flower in unison and that this synchronization occurs because the dodder makes use of a protein produced by the host shortly before flowering.

Choice B is incorrect because referring to "hibernation," or the state of being dormant or inactive, wouldn't make sense in context. The text focuses on something the dodder plant actively engages in—making use of a protein and producing flowers. *Choice C* is incorrect because stating that the dodder plant and its host engage together in "prediction," or the act of declaring or indicating something in advance, wouldn't make sense in context. Rather than indicating that the dodder plant and its host plant make a prediction about flowering activity, the text suggests that the host produces a protein as part of its regular flowering process and that the dodder then absorbs and uses that protein to flower at the same time. *Choice D* is incorrect because referring to "moderation," or the act of causing something to become less intense or extreme, wouldn't make sense in context. Although the text states that the dodder plant absorbs and uses a protein made by its host plant, it doesn't suggest that the dodder lessens the host plant's flowering activity; the two plants simply flower in unison.

QUESTION 5

Choice C is the best answer because it most logically completes the text's discussion of historical evidence about ancient Egypt under the reign of the pharaoh Hatshepsut. In this context, "an exhaustive" account would be a thorough one. The text states that much of the evidence from her reign was purposely destroyed—in other words, there is a lack of surviving records. This context conveys that unless there are major new archaeological discoveries, an exhaustive account of Hatshepsut's reign is unlikely.

Choice A is incorrect because in this context, "an imaginative" account would be an account based on imagination, or ideas and speculation, rather than facts. The text indicates that much of the evidence of Hatshepsut's reign was deliberately destroyed, and a lack of evidence actually makes it more likely that accounts will be imaginative to some degree and not strictly factual. *Choice B* is incorrect because in this context, "a superficial" account would be one that is lacking in depth or concerned only with what is obvious. The text indicates that most evidence of Hatshepsut's reign was purposely destroyed, which suggests that accounts of that time are likely already somewhat superficial, since there is little information available to support deeper knowledge. Further, it would be illogical to suggest that discovering major new evidence would make it more likely that accounts would be superficial. *Choice D* is incorrect because "a questionable" account would be one likely to be challenged or doubted, and since the text suggests that little evidence of Hatshepsut's reign has survived, accounts of that time probably involve some speculation and thus may already be open to doubt. Further, it would be illogical to suggest that discovering major new evidence would make it more likely that accounts would be questionable.

QUESTION 6

Choice B is the best answer because it best describes the main purpose of the text. The text indicates where and when jazz tap first developed (in African American communities in the 1920s) and what influenced it (the quick rhythms and improvisations in jazz music) and then explains that it evolved alongside jazz music in the 1930s and 1940s, resulting in a very different form of tap dance than had existed before. Therefore, the main purpose of the text is to discuss jazz tap's development.

Choice A is incorrect. Although the text indicates that jazz music became widely popular in the US in the 1920s and describes some of jazz music's qualities, the text never explains why audiences prefer some kinds of music—jazz or otherwise—over others. *Choice C* is incorrect because the text never mentions any musical instruments and doesn't describe how to play one. *Choice D* is incorrect because the text discusses jazz tap generally and never identifies a particular dancer, famous or otherwise.

QUESTION 7

Choice D is the best answer because it accurately describes the overall structure of the text. The text begins by pointing out an obstacle to observing the astronomical phenomenon of the NCP: the NCP is visible only at night. The text then indicates that, inspired by the ability of some insects and birds to navigate using visualizations of polarized sunlight, researchers devised a way to locate the NCP during daylight. The text then indicates that the researchers mimicked the insects' and birds' polarized-light visualization capabilities using a polarimetric camera. Thus, the text notes an obstacle to observing an astronomical phenomenon, mentions a navigational ability of certain animals that inspired a solution to that obstacle, and then explains how researchers used an optical device to mimic that ability.

Choice A is incorrect. Although it's reasonable to conjecture that humans have used the NCP for navigation, the text doesn't indicate this is the case, let alone that the NCP is relevant to a majority of navigational tools. Furthermore, the text doesn't state that researchers discovered that insects and birds navigate without the NCP; rather, it indicates that it's known that some animals navigate by using skylight polarization to locate the NCP during the day and that this knowledge inspired the method the researchers devised. *Choice B* is incorrect. Although it's reasonable to conjecture that humans have used the NCP for navigation, the text doesn't state that this is the case. Furthermore, the text discusses how some animals' use of navigational strategies based on the same celestial occurrence served as the inspiration for the researchers' polarized-light approach, not as the basis for a comparison of the relative effectiveness of animal and human methods of navigation. *Choice C* is incorrect. Although the text implies that humans have typically been able to locate the NCP visually at night and indicates that some animals use the NCP to navigate, the text doesn't state that humans use the NCP for navigation. The text therefore doesn't emphasize a difference between how humans and animals use the NCP for this purpose. Furthermore, the text doesn't suggest that existing navigational instruments will be augmented with polarimetric technologies.

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 C is the best answer because it best describes how the second sentence functions in the text as a whole. The first sentence establishes something astronomers believe with some certainty: that Betelgeuse will explode in a supernova. The second sentence then introduces a problem: astronomers aren't certain when Betelgeuse will explode because they don't have enough information about the star's internal characteristics. Finally, the third sentence indicates that researcher Sarafina El-Badry Nance and colleagues investigated a possible method of obtaining the necessary information about Betelgeuse's internal characteristics, though they found that the method wouldn't be sufficient. Thus, the function of the second sentence is to identify the problem that Nance and colleagues attempted to solve but didn't.

Choice A is incorrect because the second sentence introduces the general problem Nance and colleagues hoped to solve, not a serious limitation of how Nance and colleagues tried to solve it. It is the third sentence that introduces Nance and colleagues, but no serious limitation of their approach to studying a method of determining internal stellar states is described. *Choice B* is incorrect because the second sentence introduces the general problem Nance and colleagues hoped to solve, not the central finding they ultimately reported. It is the third sentence that presents Nance and colleagues' conclusion that a potential method for determining internal stellar states would be insufficient. *Choice D* is incorrect because the second sentence doesn't indicate how other astronomers or astrophysicists responded to the work done by Nance and colleagues; the text doesn't address this information at all.

QUESTION 10

Choice C is the best answer because it reflects how Putirka and Xu (Text 2) would likely characterize the conclusion presented in Text 1. Text 1 discusses a study by Mark Holland and colleagues in which they detected traces of lithium and sodium in the atmospheres of four white dwarf stars. The team claims that this supports the idea that exoplanets with continental crusts like Earth's once orbited these stars. Text 2 introduces Putirka and Xu, who indicate that sodium and lithium are present in several different minerals and that some of those minerals might exist in types of rock that are not found on Earth. Therefore, Putirka and Xu would likely describe the conclusion in Text 1 as questionable because it does not consider that lithium and sodium are also found in rocks that are not like Earth's continental crust.

Choice A is incorrect because the texts do not indicate how widely held any of the viewpoints described are. *Choice B* is incorrect because neither text discusses how new this area of study is. *Choice D* is incorrect because neither text discusses how likely lithium and sodium are to be detected by analyzing wavelengths of light.

QUESTION 11

Choice C is the best answer because it most accurately states how the narrator feels about being at summer camp. In the text, the narrator states that after arriving at the camp, he found it to be different than he'd expected and that as a result, he felt "scared, but also excited."

Choice A is incorrect. In the text, the narrator describes himself as "excited." Although excitement is a positive emotion, it isn't as intensely positive as feeling overjoyed is. Moreover, the narrator also notes that he felt "scared." In other words, his excitement (a positive emotion) is balanced with fear (a negative emotion). Given this mixture of positive and negative emotions, it would be inaccurate to characterize the narrator as overjoyed. *Choice B* is incorrect because in the text, the narrator describes himself as having felt both fear and excitement. Neither of these emotions can be thought of as peaceful and, in fact, are almost the opposite of a sense of peace. *Choice D* is incorrect because in the text, the narrator describes himself as both "scared" and "excited," not angry and jealous.

QUESTION 12

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. All 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 but rather as 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 that is mentioned in the text, so there's no evidence that Dorian prefers portraits to other types of paintings. Although Dorian is depicted as delighted with this particular portrait, there's no way of knowing from the text whether 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 13

Choice A is the best answer because it most accurately describes Gibson's approach to art. As the text explains, Gibson, who is Cherokee and Choctaw, transforms punching bags into art pieces by applying (or attaching) to them

beadwork and elements of Native dressmaking, including leather fringe and the jingles of the jingle dress. The text goes on to say that in most Native communities, the art forms of beadwork and dressmaking are traditionally practiced by women. Therefore, Gibson's approach to art consists of creating original works by drawing from traditional Native art forms.

Choice B is incorrect. Because Gibson incorporates Native art forms into his own original artwork, it can be inferred that he has been influenced by other Native artists, but the text never suggests that non-Native artists have influenced him. *Choice C* is incorrect because the text doesn't indicate that Gibson designs dresses influenced by boxing but instead that he turns punching bags, which are used in boxing, into works of art by applying elements of Native dressmaking to them. *Choice D* is incorrect. Although Gibson does incorporate beadwork into his art, the text never mentions the colors or patterns that he uses or suggests that his art defies the expectations that people might have about color and pattern in beadwork.

QUESTION 14

Choice A is the best answer because it presents the quotation that most directly illustrates the claim that Cather portrays Alexandra as having a deep emotional connection to her natural surroundings. This quotation states that the country meant a great deal to Alexandra and then goes on to detail several ways in which her natural surroundings affect her emotionally: the insects sound like "the sweetest music," she feels as though "her heart were hiding" in the grass "with the quail and the plover," and near the ridges she feels "the future stirring."

Choice B is incorrect because the quotation doesn't suggest that Alexandra had a deep emotional connection to her natural surroundings but instead describes how she interacts with the people around her to learn more about crops, poultry, and experiments with clover hay. *Choice C* is incorrect because the quotation doesn't suggest that Alexandra has a deep emotional connection to her natural surroundings but instead describes her nighttime departure in a wagon. The quotation says nothing about Alexandra's emotional state. *Choice D* is incorrect because the quotation doesn't convey Alexandra's deep emotional connection to her natural surroundings; instead, this quotation describes how well she understands the markets and livestock.

QUESTION 15

Choice A is the best answer because it presents a finding that, if true, would support the scholar's claim about Toni Morrison's likely goal of strengthening the presence of Black writers on Random House's list of published authors. The text explains that Morrison was the first Black woman to be an editor for Random House and that she was an editor there from 1967 to 1983. If it were true that Random House published a higher percentage of works by Black authors throughout the 1970s—during most of Morrison's time working there—than it had previously published, that would suggest that Morrison may have made a deliberate effort to strengthen the presence of Black authors on the list of Random House's published authors, thus supporting the scholar's claim.

Choice B is incorrect because the scholar's claim is about Morrison's work as an editor at a publishing company and her likely effort to strengthen the presence of Black writers on that company's list of published authors. It might be true that Black authors interviewed in the 1980s and 1990s often cited Morrison's novels as an influence on their work, but that finding would simply suggest something about how those authors approached their work; it wouldn't show that Morrison intended to increase the number of Black writers among the published authors specifically at Random House. *Choice C* is incorrect because the scholar's claim is about Morrison's work as an editor at a publishing company, not about her work as a novelist. Therefore, a finding that Morrison's novels published after 1983 sold more copies and were more widely acclaimed than her earlier novels would have no bearing on the claim that as an editor Morrison made an effort to ensure that more Black writers were present on Random House's list of published authors. *Choice D* is incorrect. Although the text discusses Morrison's work as an editor at Random House, the scholar's claim focuses on Morrison's likely effort in that role to increase the number of Black writers present on Random House's list of published authors, not on the influence she may have had on the content of the works she edited. Without knowing whether Morrison's stylistic influence led to more publications or if Morrison applied her influence specifically to works by Black writers, the finding that works edited by Morrison could be identified by stylistic characteristics would have no bearing on the claim that Morrison intended to strengthen the presence of Black writers among the published authors at Random House.

QUESTION 16

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 17

Choice C is the best answer because it most logically completes the text based on supporting data in the graph. The text indicates that in the fly *D. melanogaster*, *DptA* and *DptB* are genes that encode peptides that both fight pathogens and promote beneficial microbes. Researchers tested *D. melanogaster*'s resistance to *P. rettgeri* and *A. sicerae* bacteria based on which variation of the peptide-encoding gene the flies exhibit: *DptA* silenced (referred to as type A), *DptB* silenced (type B), or both silenced (type AB). The text also indicates that resistance to *P. rettgeri* correlates with *DptA* activity but not with *DptB* activity (which would manifest as type B flies surviving at a higher rate than other fly types when exposed to *P. rettgeri*). The graph shows the post–*A. sicerae* infection results, which indicate that *DptB* activity was most strongly associated with survival, whereas *DptA* activity was not (manifesting in the graph as the type A flies having greater survival rates than the other fly types). In other words, when *DptA* activity was silenced, the flies showed relatively high survival rates, but when *DptB* activity was silenced, whether on its own or in conjunction with *DptA* activity being silenced, survival rates were low, suggesting that *DptB* may have developed as a specific defense against *A. sicerae*.

Choice A is incorrect. The graph suggests that *DptA* activity is associated with a low rate of survival, not a high one. Furthermore, the graph shows results for flies where *DptA* alone was silenced, *DptB* alone was silenced, and both were silenced and thus does not show any flies with activity in both *DptA* and *DptB*, which would be necessary to determine whether *DptA* conferred defense against *A. sicerae* in the presence of *DptB*. *Choice B* is incorrect. Only two bacteria species were considered in the text: *P. rettgeri* and *A. sicerae*. The text and graph taken together suggest that activity in *DptA* is associated with resistance to *P. rettgeri* while *DptB* activity is not, and that *DptB* activity is associated with resistance to *A. sicerae* while *DptA* is not. There is no further information to suggest one genetic type confers resistance to a greater number of pathogens than the other. *Choice D* is incorrect. The graph does not address flies with activity in both *DptA* and *DptB*. All flies represented in the graph had one or both of *DptA* and *DptB* silenced, or inactive.

QUESTION 18

Choice D is the best answer because it presents the conclusion that most logically follows from the text's discussion of leafy spurge and engineered DNA. The text establishes that using chemical herbicides to control leafy spurge in North America can also harm other plants nearby. The text then indicates that it might be possible to use engineered DNA to prevent plants from reproducing, which would be useful for "exclusively targeting" leafy spurge. If it's possible to exclusively target leafy spurge with engineered DNA—meaning that only leafy spurge is affected by the engineered DNA—and prevent the plant from reproducing, then leafy spurge numbers could be reduced "without harming other organisms."

Choice A is incorrect because the text raises the possibility of using engineered DNA to prevent leafy spurge from reproducing, not to make individual leafy spurge plants more vulnerable to chemical herbicides that already exist. *Choice B* is incorrect because the text doesn't describe any ecological benefits of leafy spurge in North America; instead, the text is focused on using engineered DNA to prevent leafy spurge from reproducing and thereby reduce its numbers. The only ecological effects of leafy spurge in North America that are described in the text are harmful. *Choice C* is incorrect because the text describes the possibility of using engineered DNA to prevent leafy spurge from reproducing; it doesn't offer a way to enable cattle to eat leafy spurge without becoming sick.

QUESTION 19

Choice C is the best answer because it most logically completes the text's discussion of accelerated flowering in *A. thaliana* plants. The text indicates that *A. thaliana* plants show accelerated flowering at high temperatures. To investigate the mechanism for this accelerated flowering, biologists replaced the ELF3 protein in one group of *A. thaliana* plants with a similar protein found in another plant species that doesn't show accelerated flowering. The team then compared these modified plants to *A. thaliana* plants that retained their original ELF3 protein. The text states that the two samples of plants showed no difference in flowering at 22° Celsius, but at 27° Celsius the unaltered plants with ELF3 showed accelerated flowering while the plants without ELF3 didn't. If accelerated flowering at the higher temperature occurred in the *A. thaliana* plants with ELF3 but not in the plants without the protein, then ELF3 likely enables *A. thaliana* to respond to increased temperatures.

Choice A is incorrect because the text doesn't mention whether any plants other than *A. thaliana* and stiff brome show temperature-sensitive flowering, so there is no support for the idea that this type of flowering is unique to *A. thaliana*. *Choice B* is incorrect because the text discusses the effects of ELF3 and not the production of it. There's nothing in the text to suggest that the amount of ELF3 in *A. thaliana* varies with temperature. *Choice D* is incorrect. While the text states that there was no difference in the flowering of modified and unmodified *A. thaliana* plants at 22° Celsius, there's no suggestion that *A. thaliana* only begins to flower at 22° Celsius; the text doesn't mention a specific temperature threshold required for *A. thaliana* flowering.

QUESTION 20

Choice B is the best answer. The convention being tested is the coordination of main clauses within a sentence. This choice correctly uses a comma and the coordinating conjunction "but" to join the first main clause ("the Alvarez…out") and the second main clause ("it left…extinctions").

Choice A is incorrect because when coordinating two longer main clauses such as these, it's conventional to use a comma before the coordinating conjunction. *Choice C* is incorrect because it results in a run-on sentence. The two main clauses are fused without punctuation and/or a conjunction. *Choice D* is incorrect because it results in a comma splice. Without a conjunction following it, a comma can't be used in this way to join two main clauses.

QUESTION 21

Choice A is the best answer. The convention being tested is the coordination of independent clauses within a sentence. An independent clause is a phrase containing a subject and a verb that can stand on its own as a sentence. This choice uses a comma and the coordinating conjunction "but" to join the first independent clause ("underlines…lower a book's value") and the second independent clause ("such markings…can be a gold mine to scholars") to create a compound sentence.

Choice B is incorrect because it results in a run-on sentence. The two independent clauses 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 two independent clauses. *Choice D* is incorrect because a comma is needed to mark the boundary between two coordinated independent clauses.

QUESTION 22

Choice C is the best answer. The convention being tested is the use of finite and nonfinite verb forms within a sentence. The nonfinite present participle "forcing" is correctly used to form a participial phrase that supplements the main clause "those...cover," describing the effects on monkeys of the lack of food sources.

Choice A is incorrect because the finite present tense verb "forces" can't be used in this way to supplement the main clause ("those...cover"). *Choice B* is incorrect. While the nonfinite to-infinitive "to force" could be used to form a subordinate clause that supplements the main clause ("those...cover"), to-infinitives conventionally express purpose, and nothing in the sentence suggests that the food sources become unavailable for the purpose of forcing monkeys to hunt marine animals. *Choice D* is incorrect because the finite past tense verb "forced" can't be used in this way to supplement the main clause ("those...cover").

QUESTION 23

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 24

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 25

Choice C is the best answer. The convention being tested is the use of punctuation in a sentence. In this choice, a colon is correctly used to mark the boundary between one main clause ("Along with…photosynthesis") and another main clause ("as light…oxygen") and to introduce the following explanation of how light intensity affects photosynthesis.

Choice A is incorrect because when coordinating two longer main clauses such as these, it's conventional to use a comma before the coordinating conjunction ("and"). *Choice B* is incorrect because it results in a comma splice. Without a coordinating conjunction following it, a comma can't be used in this way to join two main clauses ("Along with…photosynthesis" and "as light…oxygen"). *Choice D* is incorrect because it results in a run-on sentence. The two main clauses ("Along with…photosynthesis" and "as light…oxygen") are fused without punctuation and/or a conjunction.

QUESTION 26

Choice C is the best answer. The convention being tested is the use of possessive determiners. The plural possessive determiner "their" agrees in number with the plural noun "types" and thus indicates that the more personal subject matter of Marisol's 1968 sculpture takes the place of those types of pop culture references that made Marisol a star.

Choice A is incorrect because the singular possessive determiner "its" doesn't agree in number with the plural noun "types." *Choice B* is incorrect because "they're" is the contraction for "they are," not a possessive determiner. *Choice D* is incorrect because "it's" is the contraction for "it is" or "it has," not a possessive determiner.

QUESTION 27

Choice A is the best answer. The convention being tested is the use of verb forms within a sentence. The singular verb "is" agrees in number with the singular subject "each one of a ghazal's couplets." While the prepositional phrase "of a ghazal's couplets" within the subject contains a plural noun, the head of the subject ("each one") is singular, indicating that each individual couplet (not the couplets as a group) is "thematically and logically autonomous," or self-standing.

Choice B is incorrect because the plural verb "were" doesn't agree in number with the singular subject "each one of a ghazal's couplets." *Choice C* is incorrect because the plural verb "have been" doesn't agree in number with the singular subject "each one of a ghazal's couplets." *Choice D* is incorrect because the plural verb "are" doesn't agree in number with the singular subject "each one of a ghazal's couplets."

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 B is the best answer. "Previously" logically signals that the event described in this sentence—Bigelow being named best director—occurred before Zhao's win. The fact that only one other woman had won the award before puts Zhao's win in perspective.

Choice A is incorrect because "as a result" illogically signals that the event described in this sentence occurred as a result or consequence of Zhao's win. Instead, it occurred before Zhao was named best director and puts Zhao's win in perspective. *Choice C* is incorrect because "however" illogically signals that the event described in this sentence occurred in spite of or in contrast to Zhao's win.

Instead, it occurred before Zhao was named best director and puts Zhao's win in perspective. *Choice D* is incorrect because "likewise" illogically signals that this sentence merely adds a second, similar piece of information to the information about Zhao's win. Instead, the fact that only one other woman had won the award before puts Zhao's win in perspective.

QUESTION 30

Choice B is the best answer. "Hence" correctly signals that the claim in this sentence regarding extraterrestrial material follows logically from the information in the previous sentences. The previous sentences establish that siderophile elements in the mantle are more abundant than predicted in the core-differentiation model. This sentence claims, logically, that these elements came from extraterrestrial material that accreted to Earth after core differentiation.

Choice A is incorrect because "that said" illogically signals that the information in this sentence regarding extraterrestrial material is an exception to the previous information about siderophiles' abundance in the mantle. Instead, it is a new claim that follows logically from the previous information. *Choice C* is incorrect because "for example" illogically signals that the information in this sentence regarding extraterrestrial material exemplifies the previous information about siderophiles' abundance in the mantle. Instead, it is a new claim that follows logically from the previous information. *Choice D* is incorrect because "likewise" illogically signals that the information in this sentence regarding extraterrestrial material is merely similar to the previous information about siderophiles' abundance in the mantle. Instead, it is a new claim that follows logically from the previous information.

QUESTION 31

Choice B is the best answer. The sentence presents the study, describing it as a 2013 analysis of Quanhucun cat bone fragments, and its conclusions, indicating what the analysis suggests about cat domestication in Quanhucun.

Choice A is incorrect because the sentence focuses on the study's methodology; it doesn't present conclusions from the study. *Choice C* is incorrect. While the sentence provides a general overview of the study, it doesn't present conclusions from the study. *Choice D* is incorrect. The sentence describes a finding from the study; it doesn't present conclusions from the study.

QUESTION 32

Choice C is the best answer. The sentence emphasizes a difference between the portraits, noting that one is a painting and the other is a drawing.

Choice A is incorrect. The sentence emphasizes a similarity between the two portraits rather than a difference. *Choice B* is incorrect. The sentence makes a generalization about Enriquez's portraits; it doesn't emphasize a difference between the portraits of Jimenez and Anaya. *Choice D* is incorrect. While the sentence notes a difference between Jimenez and Anaya, it doesn't emphasize a difference between, or even mention, their portraits.

QUESTION 33

Choice C is the best answer. The sentence emphasizes both the duration (the length of time) and the purpose of Cohen's and Rodrigues's work by noting that the women have been working since 2003 to preserve Gullah culture.

Choice A is incorrect. While the sentence emphasizes what visitors to Cohen's and Rodrigues's museums can learn, it doesn't mention the duration or purpose of the women's work. *Choice B* is incorrect. While the sentence emphasizes the purpose of Cohen's and Rodrigues's work, it doesn't mention the duration of that work (the length of time the women have been working to preserve Gullah culture). *Choice D* is incorrect. While the sentence emphasizes where and when Gullah culture developed, it doesn't mention the duration or purpose of Cohen's and Rodrigues's work.

Reading and Writing

Module 2

(33 questions)

QUESTION 1

Choice A is the best answer because it most logically completes the text's discussion of the writing system created by Sequoyah. In this context, "widespread" means widely accepted or practiced. The text indicates that because Sequoyah's script accurately represented the spoken sounds of the Cherokee language and was easy to learn, nearly all Cherokee people were able to read and write it soon after it was created. This context demonstrates that the script was widely used by the Cherokee people.

Choice B is incorrect. In this context, "careful" would mean exercised with care and attentive concern. Although the work of creating a writing system likely involved great care, the text indicates that the system was "easy to learn," which conflicts with the idea that using this system requires a noteworthy amount of care. *Choice C* is incorrect because in this context "unintended" means not deliberate. The idea that using Sequoyah's script was unintentional conflicts directly with the claim that it was easy to learn and used by "over 90% of the Cherokee people" by 1830. In fact, because one had to learn this system, it's not clear how one could use it unintentionally. *Choice D* is incorrect because in this context "infrequent" means rare or not occurring often, which conflicts directly with the claim that "over 90% of the Cherokee people" were using Sequoyah's script by 1830.

QUESTION 2

Choice A is the best answer because it most logically completes the text's discussion of diaphragm contractions and hiccups. In this context, "involuntarily" means done without any control, or by reflex. The text explains that when a person's diaphragm contracts and results in hiccups (which may be important for infants), those muscle contractions are "uncontrollable." This context indicates that the diaphragm contractions occur without the person's control.

Choice B is incorrect because the text indicates that researchers haven't determined exactly why people hiccup, suggesting that it isn't known that the uncontrollable muscle contractions generally occur "beneficially," or with a good or helpful effect—even if one neuroscientist has found that it's possible hiccups play an important positive role for a specific group of people (infants). *Choice C* is incorrect because the text describes the diaphragm contractions that result in hiccups as "uncontrollable," or happening without the person's control, so it wouldn't make sense to describe them as occurring "strenuously," or in a way that requires great effort or energy. *Choice D* is incorrect because nothing in the text indicates that the diaphragm contractions resulting in hiccups occur "smoothly," or evenly and continuously. The text doesn't describe the quality of the muscle contractions beyond stating that they are "uncontrollable."

QUESTION 3

Choice D is the best answer because it most logically completes the text's discussion of the location of the province of Xoconochco within the Aztec Empire. As used in this context, "peripheral" means situated toward the outer bounds rather than the center. The text indicates that Xoconochco was located on a coast, hundreds of kilometers away from the capital of the Aztec Empire. The text also states that trade between the province and the capital required "a long overland journey." This context suggests that Xoconochco was situated toward an edge of the empire's territory rather than near its center.

Choice A is incorrect because it wouldn't make sense in context to refer to Xoconochco's location within the Aztec Empire as "unobtrusive," or not blatant or undesirably prominent; it's not clear how a province's physical location would or wouldn't be blatant. Instead of focusing on how noticeable Xoconochco's location was, the text emphasizes the province's distance from the capital of the empire, pointing out that because of this distance trade between the two required "a long overland journey." *Choice B* is incorrect because the text indicates that the province of Xoconochco was located on a coast far from the capital of the Aztec Empire, not that it was "concealed," or kept out of sight or hidden from view. Nothing in the text suggests that Xoconochco was actually hidden such that people couldn't see it, and being hidden wouldn't necessarily result in trade between the province and the capital requiring "a long overland journey." *Choice C* is incorrect because to say that Xoconochco's location within the Aztec Empire was "approximate" would mean that the location either wasn't precisely correct or was close to some other location. Neither of these meanings would make sense in context because the text indicates that Xoconochco's location is known and that it was far from the empire's capital, so there's no reason to characterize the location as either not precisely correct or close to another location.

QUESTION 4

Choice A is the best answer because it most logically completes the text's discussion of the consequences of raising the age at which retirees begin receiving government funds. The text indicates that raising the age for these funds is usually discussed in terms of effects on fund recipients but that Andria Smythe is instead considering the effects on working family members who care

for retirees. Smythe notes that raising the age for the funds would increase the length of time retirees are dependent on financial assistance from working family members. This is suggested to have an effect on wealth creation for those workers, and most logically, that effect would be disadvantageous. Thus, "stymie," which means to prevent or greatly hinder, is the most logical choice in context.

Choice B is incorrect because in this context, "compound" would most nearly mean multiply or greatly enhance. The text indicates that raising the age at which retirees are eligible for government funds will increase the amount of time retirees are dependent on working family members for financial support. This would likely have a negative rather than a positive effect on wealth creation. *Choice C* is incorrect because in this context, "disparage" would most nearly mean criticize or defame. Nothing in the text suggests that raising the age at which retirees are eligible for government funds would defame wealth creation among working adults. *Choice D* is incorrect because in this context, "outstrip" would most nearly mean to exceed, and nothing in the text indicates that the financial support provided to retirees would exceed the amount of wealth these workers can create. The text does suggest that workers providing funds to retirees works against those workers' wealth accumulation, but not that the support to retirees exceeds the workers' accumulated wealth.

QUESTION 5

Choice A is the best answer because it most logically completes the text's discussion of political blogs. In this context, "sanguine" means optimistic. The text begins by noting the rise of political blogs with readily identifiable ideological alignments in the early 2000s. The text then indicates that some commentators saw this as a positive development, citing a reason why (their difference from traditional news). Finally, the text goes on to contrast those commentators with others who have a negative opinion of the rise of political blogs (because they increase political polarization among their readers). This context supports the idea that the second group of commentators is less positive than the first: thus, the second group of commentators is less optimistic, or sanguine.

Choice B is incorrect because it would not make sense in this context to describe those commentators who have a negative opinion of political blogs as less "recalcitrant," or obstinately uncooperative, than those commentators who supported political blogs. *Choice C* is incorrect because the text gives no indication that those commentators who have a negative opinion of political blogs are less "misanthropic," or less contemptuous of humankind, than those commentators who have a positive opinion of political blogs— there is no indication in the text that those commentators who like political blogs would be contemptuous of humankind at all. *Choice D* is incorrect because there is no evidence that those commentators who have a negative opinion of political blogs are less "earnest," or sincere, than those who have a positive opinion of such blogs—presumably, both groups of commentators hold their beliefs with equal conviction.

QUESTION 6

Choice D is the best answer because it most accurately describes the overall purpose of the text. The text indicates that "for as long as he could remember," Max had "begged" his father to take him to La Reina. This point is later emphasized in the text by indicating that "this summer" his father might "finally take" Max to visit La Reina. Thus, the purpose of the text as a whole is to show how much Max wants to visit La Reina.

Choice A is incorrect. The text does not discuss Papa's feelings toward Max. Rather, it mentions that Max has long wanted Papa to take him to La Reina and that, unlike Max and some other children, Papa does not believe that La Reina is haunted. *Choice B* is incorrect. The text mentions that Max is "almost twelve" at the time, which suggests anticipation of growing up rather than refusal to. *Choice C* is incorrect. The text indicates that Max hopes to visit La Reina during the current summer, but nothing suggests that Max dislikes summer.

QUESTION 7

Choice B is the best answer because it most accurately states the main purpose of the text, which is to show that Henry's mother, Mrs. Higgins, wants Henry to leave her house. In the text, Mrs. Higgins complains that Henry offends all her friends and that they stop coming when he's also visiting. She then tells him directly, "you mustn't stay." The overall exchange conveys Mrs. Higgins's intention for Henry to leave so as not to drive away her friends with his behavior.

Choice A is incorrect because the text doesn't indicate what Henry's mother does when she's out with her friends. Instead, it focuses on what goes on when Henry and her friends visit her at the same time, indicating that since her friends find Henry's company disagreeable, she wishes him to leave before they arrive. *Choice C* is incorrect because the text doesn't contain an account of what Henry's home looks like. The setting is established as the house of Henry's mother, and the dialogue focuses solely on her wish that Henry should depart before her friends arrive. *Choice D* is incorrect because the text doesn't mention how often Henry visits his mother nor does it provide any explanation for why he visits his mother. Instead, it indicates that she thinks her friends dislike Henry and that she therefore wants him to depart before they arrive.

QUESTION 8

Choice B is the best answer because it most accurately describes how the underlined portion functions in the text as a whole. The text presents the speaker's experience of viewing the sea. In the underlined portion, the speaker focuses on the idea that the waves hitting rocks on the shore are a relentless and enduring force: they are constantly pushed back ("ever repulsed") but always return ("ever rushing on"), as though they have an energy that can't be overcome ("a life that will not know defeat").

Choice A is incorrect. Although the underlined portion characterizes the waves as a relentless force (always "repulsed" but still "rushing on" and never being defeated), the speaker doesn't suggest that the surroundings are intimidating.

Instead, the speaker presents the scene in a positive way, describing the "deep delight" of the "gladsome," or cheerful, waves and feeling "the heart / Leap joyous" while viewing the sea. *Choice C* is incorrect because the underlined portion doesn't suggest that the speaker is ambivalent, or has mixed feelings about, the natural world. Instead, it presents a single view of one part of the immediate surroundings: the speaker characterizes the sea's waves as an unstoppable force, since they are constantly pushed back but always return ("ever repulsed, yet ever rushing on"). *Choice D* is incorrect. Although the text later suggests the speaker's view of her own thoughts by referring to a "clouded brain" and a heart that leaps joyously, this reference neither occurs within the underlined portion nor establishes a clear contrast with the relentless determination of the waves. The underlined portion addresses only the speaker's view of the waves and doesn't suggest what her own thoughts might be.

QUESTION 9

Choice D is the best answer because it most accurately states the main idea of the text. According to the text, conceptual artists Gins and Arakawa have designed an apartment building that is disorienting because of several unconventional elements, such as uneven kitchen counters and "a door to nowhere." The text goes on to suggest that there may be benefits to this kind of design because filmmaker Yamaoka lived in the apartment building for four years and reported health benefits. Thus, although the design is impractical, it may improve the well-being of the apartment building's residents.

Choice A is incorrect. Although the text mentions that Yamaoka lived in the apartment for four years, it doesn't address how long someone can beneficially live in a home surrounded by fanciful features or whether doing so can be sustained. *Choice B* is incorrect. Although the text mentions the potential benefits of living in a home with disorienting design features, it doesn't suggest that this is the most effective method to create a physically stimulating environment. *Choice C* is incorrect because the text refers to Yamaoka to support the claim that Gins and Arakawa's apartment building design may be beneficial, but the text doesn't indicate that Yamaoka supports the designs of other conceptual artists.

QUESTION 10

Choice D is the best answer because it presents a statement about how the Lord Chancellor responds to the crowd that is supported by the text. The text indicates that the people in the crowd are roaring and shouting "Bread!" or "Taxes!" and presents them as not knowing what they really want. The Lord Chancellor's response is to ask what their shouting means but also to observe that they're shouting with "unanimity," or total agreement. Clearly, this isn't the case, which supports the statement that the Lord Chancellor describes the crowd as being united even though it's not.

Choice A is incorrect because it isn't supported by the text. Although the text indicates that the Lord Chancellor asks about the meaning of the crowd's shouting, it doesn't suggest that he knows what the crowd really wants. *Choice B* is incorrect because the text doesn't suggest that the Lord Chancellor wants to

speak to the crowd. Furthermore, the text doesn't indicate that the crowd wants to hear from the Sub-Warden. Although the crowd roars when asked "Who roar for the Sub-Warden?" it's unclear what the roaring means. *Choice C* is incorrect because the text doesn't suggest that the Lord Chancellor knows of or sympathizes with the crowd's demands. In addition, the text doesn't indicate that the crowd's shouting annoys the Lord Chancellor, just that it causes him to keep repeating "What can it all mean?"

QUESTION 11

Choice D is the best answer because it accurately identifies the species with the highest global biomass, the white-tailed deer at approximately 2.7 million metric tons. The graph shows the global biomass for four wild land mammal species with the highest global biomass. The graph indicates that the African bush elephant's global biomass is about 1.3 million metric tons, the eastern gray kangaroo's is about 0.6 million metric tons, and the wild boar's is about 1.9 million metric tons. These values are all lower than the global biomass for the white-tailed deer's approximately 2.7 million metric tons. Thus, the white-tailed deer is the species with the highest global biomass.

Choice A is incorrect because although the graph indicates that the wild boar has a relatively high global biomass of about 1.9 million metric tons, it is not the species with the highest value. The white-tailed deer is the species with the highest global biomass at about 2.7 million metric tons. *Choice B* is incorrect because the eastern gray kangaroo has the lowest global biomass value shown on the graph at about 0.6 million metric tons, not the highest global biomass. The white-tailed deer has the highest at about 2.7 million metric tons. *Choice C* is incorrect because although the African bush elephant has a substantial global biomass of about 1.3 million metric tons, it is not the species with the highest value according to the graph. The white-tailed deer has the highest global biomass at about 2.7 million metric tons.

QUESTION 12

Choice A is the best answer because it most effectively uses data from the table to support the researchers' conclusion about the harvesting of clamshells by Neanderthals for use as tools. The text explains that Neanderthals used clamshells to make tools and that the sturdiest, and therefore the most desirable, shells for this purpose are found on the seafloor, not on the beach. However, the researchers also concluded that the clamshell tools made from shells from the seafloor are rarer than those made from shells from the beach. Meanwhile the table shows that at each depth, the number of tools made from shells from the beach exceeds the number made from the more desirable shells from the seafloor. The fact that the more desirable shells are less common suggests that it was significantly more difficult to harvest shells from the seafloor than from the beach.

Choice B is incorrect because knowing which depth represents the period of time with the highest Neanderthal population does not help answer the question of why the Neanderthals consistently made more tools from the less desirable shells

from the beach than they made from the more desirable shells from the seafloor. *Choice C* is incorrect because it claims that the beach shells are more durable than the seafloor shells, which contradicts the text's description of shells from the seafloor as smoother and sturdier than shells from the beach. *Choice D* is incorrect because knowing which depth has the most artifacts or whether the clam population fluctuated does not help explain why tools made from the less desirable shells from the beach outnumber tools made from the more desirable shells from the seafloor.

QUESTION 13

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 14

Choice A is the best answer because it presents data from the table that most effectively complete the statement about the rates at which employment shifted in France and the United States. The text states that over the last two hundred years employment in the agricultural sector has declined while employment in the service sector has risen in both France and the US, and the data from the table reflect these trends. The text asserts, however, that the transition from agriculture to services "happened at very different rates in the two countries." This assertion is best supported by a comparison of data from 1900 and 1950: the table shows that in those years, employment in agriculture went from 43% to 32% in France (a decline of 11 percentage points) and from 41% to 14% in the US (a decline of 27 percentage points), and that employment in services went from 28% to 35% in France (an increase of 7 percentage points) and from 31% to 53% in the US (an increase of 22 percentage points). In other words, the rate of change was greater in the US than in France for both sectors.

Choice B is incorrect because comparing the data for 1800 and 2012 would suggest a similar rate of change in the two countries, not very different rates: employment in agriculture went from 64% in 1800 to 3% in 2012 in France, which is close to the change from 68% in 1800 to 2% in 2012 in the US, while employment in services went from 14% in 1800 to 76% in 2012 in France, which is close to the change from 13% in 1800 to 80% in 2012 in the US. *Choice C* is incorrect because comparing the data for 1900 and 2012 would suggest a similar rate of change in the two countries rather than very different rates: employment in agriculture went from 43% in 1900 to 3% in 2012 in France, which is close to the change from 41% in 1900 to 2% in 2012 in the US, while employment in services went from 28% in 1900 to 76% in 2012 in France, which is close to the change from 31% in 1900 to 80% in 2012 in the US. *Choice D* is incorrect because comparing the data for 1800 and 1900 would suggest a similar rate of change in the two countries, not very different rates: employment in agriculture went from 64% in 1800 to 43% in 1900 in France, which is fairly close to the change from 68% in 1800 to 41% in 1900 in the US, while employment in services went from 14% in 1800 to 28% in 1900 in France, which is close to the change from 13% in 1800 to 31% in 1900 in the US.

QUESTION 15

Choice D is the best answer because it presents a finding that, if true, would support Shcherbakova and colleagues' claim that the outcome of their study is inconsistent with the linguistic niche hypothesis (LNH). The text explains that the LNH holds that there is an inverse relationship between the prevalence of non-native speakers of a language (exotericity) and the grammatical complexity of that language—that is, that as the number of non-native speakers increases, grammatical complexity decreases, and vice versa. According to the text, Shcherbakova and colleagues focused on two positive indications of grammatical complexity—fusion and informativity—and analyzed their occurrence in over 1,300 languages. If the researchers found a slightly positive correlation between fusion and exotericity and between informativity and exotericity—meaning that to some extent, grammatical complexity increases as the number of non-native

speakers of a language increases—their outcome would not be consistent with the assumption that exotericity and grammatical complexity are inversely related (the LNH).

Choice A is incorrect because it wouldn't be possible to say that a finding of a slightly negative correlation between grammatical complexity and both fusion and informativity is inconsistent or consistent with the LNH, since the finding would address only grammatical complexity (given that fusion and informativity are aspects of grammatical complexity) and wouldn't move beyond that factor to address its relationship to the prevalence of non-native speakers of a language (exotericity), which is the relationship the LNH focuses on. *Choice B* is incorrect because a finding of a slightly negative correlation between grammatical complexity and the prevalence of non-native speakers of a language (exotericity)—meaning that as the number of non-native speakers increases, grammatical complexity somewhat decreases, and vice versa—would be consistent, not inconsistent, with the LNH, since the text indicates that according to the LNH, there is an inverse relationship between grammatical complexity and exotericity; a negative correlation reflects an inverse relationship. *Choice C* is incorrect because it wouldn't be possible to say that a finding of a slightly positive correlation between grammatical complexity and fusion is inconsistent or consistent with the LNH, since the finding would address only grammatical complexity (given that fusion is a positive indication of grammatical complexity) and wouldn't move beyond that factor to address its relationship to the prevalence of non-native speakers of a language (exotericity), which is the relationship the LNH focuses on.

QUESTION 16

Choice A is the best answer because it most logically completes the text's discussion of the evidence found in Queen Merneith's tomb. The text begins by mentioning archaeologists' efforts to excavate the tomb of Queen Merneith, the wife of a pharaoh who some scholars think was actually the first female pharaoh. The text states that a tablet discovered in her tomb suggests she "was in charge of the country's treasury and other central offices," which supports the idea that she had an important role in Egypt's government.

Choice B is incorrect because since the text explicitly states that Merneith's husband was a First Dynasty pharaoh, it can be inferred that she lived during the First Dynasty, not after it. *Choice C* is incorrect because the text does not provide any evidence that Merneith traveled beyond Egypt's borders often. The text is focused on the archaeological discovery in her tomb and the implications about her potential role as a ruler in Egypt but does not mention anything about her traveling habits. *Choice D* is incorrect because the text does not mention anything about Merneith creating a new form of writing in Egypt. The text discusses the discovery of a tablet with writing suggesting her governmental role but does not imply that this writing represented a new form created by Merneith.

QUESTION 17

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 18

Choice A is the best answer. The convention being tested is pronoun-antecedent agreement. The plural pronoun "they" agrees in number with the plural antecedent "customers."

Choice B is incorrect because the singular pronoun "one" doesn't agree in number with the plural antecedent "customers." *Choice C* is incorrect because the second person pronoun "you" isn't conventional as a substitute for "customers." It suggests that the audience ("you") is the customer. *Choice D* is incorrect because the singular pronoun "it" doesn't agree in number with the plural antecedent "customers."

QUESTION 19

Choice D is the best answer. The convention being tested is end-of-sentence punctuation. This choice correctly uses a question mark to punctuate the interrogative clause "could the blueberries thrive," which asks a direct question at the end of the sentence.

Choice A is incorrect because a period can't be used in this way to punctuate an interrogative clause, such as "could the blueberries thrive," at the end of a sentence. *Choice B* is incorrect because the context requires an interrogative clause. The declarative clause "the blueberries could thrive" incorrectly indicates that it was known that the blueberries could thrive in alkaline soil, whereas Michel had yet to find this out. *Choice C* is incorrect because a question mark can't be used in this way to punctuate a declarative clause, such as "the blueberries could thrive," at the end of a sentence.

QUESTION 20

Choice B is the best answer. The convention being tested is the use of verbs to express tense in a sentence. In this choice, the present tense verb "reach" is consistent with the present tense verbs "travel" and "are diverted" used to describe how atoms move through the synchrotron.

Choice A is incorrect because the future tense verb "will reach" is inconsistent with the present tense verbs used to describe how atoms move through the synchrotron. Though the atoms' movement is a recurring action and "will reach" can also be used to indicate a habitual or recurring action, it creates a logical inconsistency in this sentence when paired with the present tense verbs "travel" and "are diverted." *Choice C* is incorrect because the past perfect tense verb "had reached" is inconsistent with the present tense verbs used to describe how atoms move through the synchrotron. *Choice D* is incorrect because the present progressive tense verb "are reaching" is inconsistent with the present tense verbs used to describe how atoms move through the synchrotron. While both verbs occur in the present, the present progressive tense suggests that the action is currently in progress. This creates a logical inconsistency when paired with the present tense verbs "travel" and "are diverted," which offer a general description of the tendencies of the atoms' movement, rather than a description of an action that is currently in progress.

QUESTION 21

Choice D is the best answer. The convention being tested is the use of verbs to express tense. In this choice, the present tense verb "is," used in conjunction with the word "today," correctly indicates that Paik is currently considered the first video artist.

Choice A is incorrect because the future tense verb "will be" doesn't indicate that Paik is currently considered the first video artist. *Choice B* is incorrect because the past perfect tense verb "had been" doesn't indicate that Paik is currently considered the first video artist. *Choice C* is incorrect because the past tense verb "was" doesn't indicate that Paik is currently considered the first video artist.

QUESTION 22

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

Choice A is incorrect because the plural verb "have outlined" doesn't agree in number with the singular subject "document." *Choice B* is incorrect because the plural verb "were outlining" doesn't agree in number with the singular subject "document." *Choice D* is incorrect because the plural verb "outline" doesn't agree in number with the singular subject "document."

QUESTION 23

Choice A is the best answer. The convention being tested is the use of punctuation within a sentence. In this choice, the colon correctly introduces the series of goals held by the 1919 Inter-Allied Women's Conference.

Choice B is incorrect because placing a period after "threefold" results in a rhetorically unacceptable sentence fragment beginning with "To." *Choice C* is incorrect because it results in a run-on sentence. The main clause ("The conference's goals were threefold") and the series supplement ("to…rights") are fused without punctuation. *Choice D* is incorrect because a semicolon can't be used in this way to introduce a series. A semicolon is conventionally used to join two main clauses, whereas a colon is conventionally used to introduce a series, making the colon the better choice in this context.

QUESTION 24

Choice D is the best answer. The convention being tested is subject-verb agreement. The singular verb "is credited" agrees in number with the singular subject "mathematician Grigori Perelman."

Choice A is incorrect because the plural verb "are credited" doesn't agree in number with the singular subject "mathematician Grigori Perelman." *Choice B* is incorrect because the plural verb "have been credited" doesn't agree in number with the singular subject "mathematician Grigori Perelman." *Choice C* is incorrect because the plural verb "are being credited" doesn't agree in number with the singular subject "mathematician Grigori Perelman."

QUESTION 25

Choice A is the best answer. The convention being tested is colon use within a sentence. A colon used in this way introduces information that illustrates or explains information that has come before it. In this case, the colon introduces the following explanation of why some roundworms in the Southern Hemisphere move in the opposite direction of Earth's magnetic field.

Choice B is incorrect because it results in a comma splice. A comma can't be used in this way to join two long independent clauses ("Researchers…food" and "in… sources") such as these. *Choice C* is incorrect because it results in a run-on sentence. The two clauses ("Researchers…food" and "in…sources") are fused without punctuation. Furthermore, the conjunction "while" fails to indicate that what follows is an explanation of why some roundworms in the Southern Hemisphere move in the opposite direction of Earth's magnetic field. *Choice D* is incorrect because it results in a run-on sentence. The two clauses ("Researchers… food" and "in…sources") are fused without punctuation and/or a conjunction.

QUESTION 26

Choice A is the best answer. "For instance" logically signals that the information in this sentence—that larch trees lose their needles every fall—is an example supporting the claim in the previous sentence (that not all conifer species keep their leaves or needles year-round).

Choice B is incorrect because "nevertheless" illogically signals that the information in this sentence is true in spite of the claim about conifer species in the previous sentence. Instead, it's an example supporting that 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 conifer species in the previous sentence. Instead, it's an example supporting that claim. *Choice D* is incorrect because "in addition" illogically signals that the information in this sentence is merely an additional fact related to the claim about conifer species in the previous sentence. Instead, it's an example supporting that claim.

QUESTION 27

Choice B is the best answer. "Next" logically signals that the action described in this sentence—Konkoly recording participants' eye movements—is the next step in Konkoly's experiment.

Choice A is incorrect because "specifically" illogically signals that this sentence specifies or elaborates on an aspect of the action described in the previous sentence. Instead, it describes the next step in Konkoly's experiment. *Choice C* is incorrect because "for instance" illogically signals that the action described in this sentence is an example of the action described in the previous sentence. Instead, it is the next step in Konkoly's experiment. *Choice D* is incorrect because "in sum" illogically signals that this sentence summarizes or concludes the action described in the previous sentence. Instead, it describes the next step in Konkoly's experiment.

QUESTION 28

Choice D is the best answer. "Specifically" logically signals that the information in this sentence about Sauer's argument—that, according to Sauer, cultures play a role in their own development, as opposed to being shaped solely by natural surroundings—provides specific, precise details elaborating on the more general information in the previous sentence about how Sauer challenged prevailing views about how natural landscapes influence human cultures.

Choice A is incorrect because "similarly" illogically signals that the information in this sentence about Sauer's argument is similar to, but separate from, the more general information in the previous sentence. Instead, it provides specific, precise details elaborating on that information. *Choice B* is incorrect because "finally" illogically signals that the information in this sentence about Sauer's argument indicates a last step in a process or a concluding summary. Instead, it provides specific, precise details elaborating on the general information in the previous sentence. *Choice C* is incorrect because "therefore" illogically signals that the

information in this sentence about Sauer's argument is a result of the more general information in the previous sentence. Instead, it provides specific, precise details elaborating on that information.

QUESTION 29

Choice A is the best answer. "Fittingly" logically signals that the naming of an unprecedented radiocarbon surge for Fusa Miyake is appropriate to the situation, since Miyake is the person who identified the surge (through her Yaku Island tree-ring analysis).

Choice B is incorrect because "similarly" illogically signals that the information in this sentence is similar to the previous information about Miyake's identification of a massive radiation burst through tree-ring analysis. Instead, the naming of the event for its discoverer is a fitting and appropriate outcome. *Choice C* is incorrect because "however" illogically signals that the information in this sentence contrasts with the previous information about Miyake's identification of a massive radiation burst through tree-ring analysis. Instead, the naming of the event for its discoverer is a fitting and appropriate outcome. *Choice D* is incorrect because "in other words" illogically signals that the information in this sentence is a paraphrase or restatement of the previous information about Miyake's identification of a massive radiation burst through tree-ring analysis. Instead, the naming of the event for its discoverer is a fitting and appropriate outcome.

QUESTION 30

Choice D is the best answer. "Increasingly" logically signals that the claim in this sentence— that mathematicians are collaborating with their peers—marks a change relative to what was traditionally done. As the previous sentence explains, while mathematicians may have traditionally worked alone, evidence points to a shift in the opposite direction. The claim describes the shift: a rise in collaboration.

Choice A is incorrect because "similarly" illogically signals that the claim in this sentence is similar to, but separate from, the previous claim about the shift away from mathematicians working alone. Instead, the claim about the rise in collaboration elaborates on the previous claim, describing the shift. *Choice B* is incorrect because "for this reason" illogically signals that the claim in this sentence is caused by the previous claim about the shift away from mathematicians working alone. Instead, the claim about the rise in collaboration elaborates on the previous claim, describing the shift. *Choice C* is incorrect because "furthermore" illogically signals that the claim in this sentence is in addition to the previous claim about the shift away from mathematicians working alone. Instead, the claim about the rise in collaboration elaborates on the previous claim, describing the shift.

QUESTION 31

Choice D is the best answer. The sentence uses "both" to emphasize a thematic similarity between Tan's two books, noting that both *Tales from Outer Suburbia* and *Tales from the Inner City* describe surreal events occurring in otherwise ordinary places.

Choice A is incorrect. The sentence emphasizes a difference (one contains fewer stories than the other), not a similarity, between the two books. *Choice B* is incorrect. The sentence indicates that Tan's books were published ten years apart; it doesn't emphasize a similarity between the two books. *Choice C* is incorrect. The sentence uses "unlike" to emphasize a difference between *Tales from Outer Suburbia* and *Tales from the Inner City*; it doesn't emphasize a similarity between the two books.

QUESTION 32

Choice A is the best answer. Noting that "guerdon" is of Anglo-French origin and "Laodicean" is of ancient Greek origin, the sentence uses "while" to emphasize a difference in the origins of the two words.

Choice B is incorrect. While the sentence emphasizes two words used in the Scripps National Spelling Bee, it doesn't emphasize (or mention) the words' linguistic origins. *Choice C* is incorrect. While the sentence specifies the linguistic origin of one word used in the Scripps National Spelling Bee, it doesn't mention the other word or emphasize a difference in the two words' origins. *Choice D* is incorrect. While the sentence makes a generalization about words used in the Scripps National Spelling Bee, it doesn't emphasize a difference in the words' origins.

QUESTION 33

Choice C is the best answer. The sentence emphasizes a similarity between the two paintings, noting that Leutze's painting (which measures 149 × 255 inches) and Monkman's painting (which measures 132 × 264 inches) are both very large.

Choice A is incorrect. The sentence mentions that Monkman's painting was completed in 2019 and Leutze's was completed in 1851; it doesn't emphasize a similarity between the two paintings. *Choice B* is incorrect. While the sentence acknowledges that one painting was inspired by the other, it emphasizes differences between the two paintings; it doesn't emphasize a similarity between them. *Choice D* is incorrect. The sentence mentions a difference between the two paintings; it doesn't emphasize a similarity between them.

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 A is correct. The solution to this system of linear equations is represented by the point that lies on both lines shown, or the point of intersection of the two lines. According to the graph, the point of intersection occurs when $x = 4$ and $y = -5$, or at the point $(4, -5)$. Therefore, the solution (x, y) to the system is $(4, -5)$.

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

QUESTION 3

Choice D is correct. The cost of the rental fee depends on the number of hours the surfboard is rented. Multiplying t hours by 10 dollars per hour yields a rental fee of $10t$ dollars. The total cost of the rental consists of the rental fee plus the 25 dollar service fee, which yields a total cost of $25 + 10t$ dollars. Since the person intends to spend a maximum of 75 dollars to rent the surfboard, the total cost must be at most 75 dollars. Therefore, the inequality $25 + 10t \leq 75$ represents this situation.

Choice A is incorrect. This represents a situation where the rental fee, not the total cost, is at most 75 dollars. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 4

Choice A is correct. When a graph is translated up 4 units, each point on the resulting graph is 4 units above the point on the original graph. In other words, the y-value of each point on the graph increases by 4. The graph shown passes through the points $(1, -1)$, $(2, -2)$, and $(3, -1)$. It follows that when the graph shown is translated up 4 units, the resulting graph will pass through the points $(1, -1+4)$, $(2, -2+4)$, and $(3, -1+4)$. These points are $(1, 3)$, $(2, 2)$, and $(3, 3)$, respectively. Of the given choices, only the graph in choice A passes through the points $(1, 3)$, $(2, 2)$, and $(3, 3)$.

Choice B is incorrect. This is the result of translating the graph down, rather than up, 4 units. *Choice C* is incorrect. This is the result of translating the graph left, rather than up, 4 units. *Choice D* is incorrect. This is the result of translating the graph right, rather than up, 4 units.

QUESTION 5

Choice D is correct. In the given equation, s is the speed, in miles per hour, of a certain car t seconds after it began to accelerate. Therefore, the speed of the car, in miles per hour, 5 seconds after it began to accelerate can be found by substituting 5 for t in the given equation, which yields $s = 40 + 3(5)$, or $s = 55$. Thus, the speed of the car 5 seconds after it began to accelerate is 55 miles per hour.

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

QUESTION 6

The correct answer is 77. It's given that the function f is defined by $f(x) = x^2 + x + 71$. Substituting 2 for x in function f yields $f(2) = (2)^2 + 2 + 71$, which is equivalent to $f(2) = 4 + 2 + 71$, or $f(2) = 77$. Therefore, the value of $f(2)$ is 77.

QUESTION 7

The correct answer is 25. The total cost of the party is found by adding the onetime fee of the venue to the cost per attendee times the number of attendees. Let x be the number of attendees. The expression $35 + 10.25x$ thus represents the total cost of the party. It's given that the budget is $300, so this situation can be represented by the inequality $35 + 10.25x \leq 300$. Subtracting 35 from both sides of this inequality gives $10.25x \leq 265$. Dividing both sides of this inequality by 10.25 results in approximately $x \leq 25.854$. Since the question is stated in terms of attendees, rounding 25.854 down to the greatest whole number gives the greatest number of attendees possible, which is 25.

QUESTION 8

Choice C is correct. If one of these students is selected at random, the probability of selecting a student whose vote for the new mascot was for a lion is given by the number of votes for a lion divided by the total number of votes. The given table indicates that the number of votes for a lion is 20 votes, and the total number of votes is 80 votes. The table gives the distribution of votes for 80 students, and the table shows a total of 80 votes were counted. It follows that each of the 80 students voted exactly once. Thus, the probability of selecting a student whose vote for the new mascot was for a lion is $\frac{20}{80}$, or $\frac{1}{4}$.

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 9

Choice B is correct. It's given that triangle ABC is congruent to triangle DEF. Corresponding angles of congruent triangles are congruent and, therefore, have equal measure. It's given that angle A corresponds to angle D, and that the measure of angle A is 18°. It's also given that the measures of angles B and E are 90°. Since these angles have equal measure, they are corresponding angles. It follows that angle C corresponds to angle F. Let $x°$ represent the measure of angle C. Since the sum of the measures of the interior angles of a triangle is 180°, it follows that $18° + 90° + x° = 180°$, or $108° + x° = 180°$. Subtracting 108° from both sides of this equation yields $x° = 72°$. Therefore, the measure of angle C is 72°. Since angle C corresponds to angle F, it follows that the measure of angle F is also 72°.

Choice A is incorrect. This is the measure of angle D, not the measure of angle F.
Choice C is incorrect. This is the measure of angle E, not the measure of angle F.
Choice D is incorrect. This is the sum of the measures of angles E and F, not the measure of angle F.

QUESTION 10

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 11

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

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 12

Choice B is correct. It's given that the airplane descends at a constant rate of 400 feet per minute. Since the altitude decreases by a constant amount during each fixed time period, the relationship between the airplane's altitude and time is linear. Since the airplane descends from an altitude of 9,500 feet to 5,000 feet, the airplane's altitude is decreasing with time. Thus, the relationship is best modeled by a decreasing linear function.

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 13

The correct answer is 1. Subtracting the second equation from the first equation in the given system of equations yields $(3x-3x)+(6-4)=4y-2y$, which is equivalent to $0+2=2y$, or $2=2y$. Dividing each side of this equation by 2 yields $1=y$.

QUESTION 14

The correct answer is 76. It's given that the graph of $y=g(x)$ is the result of translating the graph of $y=f(x)$ up 4 units in the xy-plane. It follows that the graph of $y=g(x)$ is the same as the graph of $y=f(x)+4$. Substituting $g(x)$ for y in the equation $y=f(x)+4$ yields $g(x)=f(x)+4$. It's given that $f(x)=(x-6)(x-2)(x+6)$. Substituting $(x-6)(x-2)(x+6)$ for $f(x)$ in the equation $g(x)=f(x)+4$ yields $g(x)=(x-6)(x-2)(x+6)+4$. Substituting 0 for x in this equation yields $g(0)=(0-6)(0-2)(0+6)+4$, or $g(0)=76$. Thus, the value of $g(0)$ is 76.

QUESTION 15

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 16

Choice D is correct. Since the number of bacteria doubles every day, the relationship between t and y can be represented by an exponential equation of the form $y=a(b)^t$, where a is the number of bacteria at the start of the observation and the number of bacteria increases by a factor of b every day. It's given that there are 44,000 bacteria at the start of the observation. Therefore, $a=44{,}000$. It's also given that the number of bacteria doubles, or increases by a factor of 2, every day. Therefore, $b=2$. Substituting 44,000 for a and 2 for b in the equation $y=a(b)^t$ yields $y=44{,}000(2)^t$.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This equation represents a situation where the number of bacteria is decreasing by half, not doubling, every day.

QUESTION 17

Choice D is correct. The table shows an increasing exponential relationship between the number of years, x, since Hana started training in pole vault and the estimated height $h(x)$, in meters, of her best pole vault for that year. The relationship can be written as $h(x)=Ca^x$, where C and a are positive constants. It's given that when $x=0$, $h(x)=1.23$. Substituting 0 for x and 1.23 for $h(x)$ in $h(x)=Ca^x$ yields $1.23=Ca^0$, or $1.23=C$. Substituting 1.23 for C in $h(x)=Ca^x$ yields $h(x)=1.23a^x$. It's also given that when $x=2$, $h(x)=1.54$. Substituting 2 for x and 1.54 for $h(x)$ in $h(x)=1.23a^x$ yields $1.54=1.23a^2$. Dividing each side of this equation by 1.23 yields $\frac{1.54}{1.23}=\frac{1.23a^2}{1.23}$, or a^2 is approximately equal to 1.252. Since a is positive, a is approximately equal to $\sqrt{1.252}$, or 1.12. Substituting 1.12 for a in $h(x)=1.23a^x$ yields $h(x)=1.23(1.12)^x$.

Choice A is incorrect. When $x=0$, the value of $h(x)$ in this function is equal to 1.12 rather than 1.23, and it is decreasing rather than increasing. *Choice B* is incorrect. When $x=0$, the value of $h(x)$ in this function is equal to 1.12 rather than 1.23. *Choice C* is incorrect. This function is decreasing rather than increasing.

QUESTION 18

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 19

Choice A is correct. Substituting 3 for x in the given inequality yields $y<5(3)+6$, or $y<21$. Therefore, when $x=3$, the corresponding value of y is less than 21. Substituting 5 for x in the given inequality yields $y<5(5)+6$, or $y<31$. Therefore, when $x=5$, the corresponding value of y is less than 31. Substituting 7 for x in

the given inequality yields $y<5(7)+6$, or $y<41$. Therefore, when $x=7$, the corresponding value of y is less than 41. For the table in choice A, when $x=3$, the corresponding value of y is 17, which is less than 21; when $x=5$, the corresponding value of y is 27, which is less than 31; and when $x=7$, the corresponding value of y is 37, which is less than 41. Therefore, the table in choice A gives values of x and their corresponding values of y that are all solutions to the given inequality.

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

QUESTION 20

The correct answer is 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 21

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.

QUESTION 22

Choice A is correct. It's given that the length of each side of a scale model is $\frac{1}{10}$ times the length of the corresponding side of the actual floor of a ballroom. Therefore, the area of the scale model is $\left(\frac{1}{10}\right)^2$, or $\frac{1}{100}$, times the area of the actual floor of the ballroom. It's given that the area of the floor of the ballroom is 600 square meters. Therefore, the area, in square meters, of the scale model is $\left(\frac{1}{100}\right)(600)$, or 6.

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

QUESTION 23

Choice 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 24

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, the lengths of *BC* and *EF* are 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 25

Choice D is correct. It's given that the result of increasing the quantity x by 1,800% is 684. It follows that $x+\left(\frac{1,800}{100}\right)x=684$, which is equivalent to $x+18x=684$, or $19x=684$. Dividing each side of this equation by 19 yields $x=36$. Therefore, the value of x is 36.

Choice A is incorrect. The result of increasing the quantity 12,996 by 1,800% is 246,924, not 684. *Choice B* is incorrect. The result of increasing the quantity 12,312 by 1,800% is 233,928, not 684. *Choice C* is incorrect. The result of increasing the quantity 38 by 1,800% is 722, not 684.

QUESTION 26

Choice A is correct. It's given that the window repair specialist charges $220 for the first two hours of repair plus an hourly fee for each additional hour. Let n represent the hourly fee for each additional hour after the first two hours. Since it's given that x is the number of hours of repair, it follows that the charge generated by the hourly fee after the first two hours can be represented by the expression $n(x-2)$. Therefore, the total cost, in dollars, for x hours of repair is $f(x)=220+n(x-2)$. It's given that the total cost for 5 hours of repair is $400. Substituting 5 for x and 400 for $f(x)$ into the equation $f(x)=220+n(x-2)$ yields $400=220+n(5-2)$, or $400=220+3n$. Subtracting 220 from both sides of this equation yields $180=3n$. Dividing both sides of this equation by 3 yields $n=60$. Substituting 60 for n in the equation $f(x)=220+n(x-2)$ yields $f(x)=220+60(x-2)$, which is equivalent to $f(x)=220+60x-120$, or $f(x)=60x+100$. Therefore, the total cost, in dollars, for x hours of repair is $f(x)=60x+100$.

Choice B is incorrect. This function represents the total cost, in dollars, for x hours of repair where the specialist charges $340, rather than $220, for the first two hours of repair. *Choice C* is incorrect. This function represents the total cost, in dollars, for x hours of repair where the specialist charges $160, rather than $220, for the first two hours of repair, and an hourly fee of $80, rather than $60, after the first two hours. *Choice D* is incorrect. This function represents the total cost, in dollars, for x hours of repair where the specialist charges $380, rather than $220, for the first two hours of repair, and an hourly fee of $80, rather than $60, after the first two hours.

QUESTION 27

The correct answer is $\frac{29}{3}$. Applying the distributive property to the left-hand side of the given equation, $x(x+1)-56$, yields x^2+x-56. Applying the distributive property to the right-hand side of the given equation, $4x(x-7)$, yields $4x^2-28x$. Thus, the equation becomes $x^2+x-56=4x^2-28x$. Combining like terms on the left- and right-hand sides of this equation yields $0=(4x^2-x^2)+(-28x-x)+56$, or $3x^2-29x+56=0$. For a quadratic equation in the form $ax^2+bx+c=0$, where a, b, and c are constants, the quadratic formula gives the solutions to the equation in the form $x=\frac{(-b\pm\sqrt{b^2-4ac})}{2a}$. Substituting 3 for a, -29 for b, and 56 for c from the equation $3x^2-29x+56=0$ into the quadratic formula yields $x=\frac{(29\pm\sqrt{(-29)^2-4(3)(56)})}{2(3)}$, or $x=\frac{29}{6}\pm\frac{13}{6}$. It follows that the solutions to the given equation are $\frac{29}{6}+\frac{13}{6}$ and $\frac{29}{6}-\frac{13}{6}$. Adding these two solutions gives the sum of the solutions: $\frac{29}{6}+\frac{13}{6}+\frac{29}{6}-\frac{13}{6}$, which is equivalent to $\frac{29}{6}+\frac{29}{6}$, or $\frac{29}{3}$. Note that 29/3, 9.666, and 9.667 are examples of ways to enter a correct answer.

Math

Module 2
(27 questions)

QUESTION 1

Choice D is correct. Since 1 yard is equal to 3 feet, 64 yards is equal to $64 \text{ yards}\left(\frac{3 \text{ feet}}{1 \text{ yard}}\right)$, or 192 feet. It follows that 64 yards per second is equivalent to 192 feet per second. Therefore, the object's speed is 192 feet per second.

Choice A is incorrect. A speed of 61 feet per second is equivalent to $\frac{61}{3}$, not 64, yards per second. *Choice B* is incorrect. A speed of 67 feet per second is equivalent to $\frac{67}{3}$, not 64, yards per second. *Choice C* is incorrect. A speed of 94 feet per second is equivalent to $\frac{94}{3}$, not 64, yards per second.

QUESTION 2

Choice A is correct. The line of best fit shown has a positive slope and intersects the y-axis at a positive y-value. The graph of an equation of the form $y = mx + b$, where m and b are constants, has a slope of m and intersects the y-axis at a y-value of b. Of the given choices, only $y = x + 3.4$ represents a line that has a positive slope, 1, and intersects the y-axis at a positive y-value, 3.4.

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

QUESTION 3

Choice D is correct. It's given that the graph shows the linear relationship between x and y. The given graph passes through the points $(0, -5)$, $(1, -3)$, and $(2, -1)$. It follows that when $x = 0$, the corresponding value of y is -5, when $x = 1$, the corresponding value of y is -3, and when $x = 2$, the corresponding value of y is -1. Of the given choices, only the table in choice D gives these three values of x and their corresponding values of y for the relationship shown in the graph.

Choice A is incorrect. This table represents a relationship between x and y such that the graph passes through the points $(0, 0)$, $(1, -7)$, and $(2, -9)$. *Choice B* is incorrect. This table represents a relationship between x and y such that the graph passes through the points $(0, 0)$, $(1, -3)$, and $(2, -1)$. *Choice C* is incorrect. This table represents a linear relationship between x and y such that the graph passes through the points $(0, -5)$, $(1, -7)$, and $(2, -9)$.

QUESTION 4

Choice D is correct. The perimeter of a figure is equal to the sum of the measurements of the sides of the figure. It's given that the rectangle has a length of 4 inches and a width of 9 inches. Since a rectangle has 4 sides, of which opposite sides are parallel and equal, it follows that the rectangle has two sides with a length of 4 inches and two sides with a width of 9 inches. Therefore, the perimeter of this rectangle is $4 + 4 + 9 + 9$, or 26 inches.

Choice A is incorrect. This is the sum, in inches, of the length and the width of the rectangle. *Choice B* is incorrect. This is the sum, in inches, of the two lengths and the width of the rectangle. *Choice C* is incorrect. This is the sum, in inches, of the length and the two widths of the rectangle.

QUESTION 5

Choice A is correct. Dividing each side of the given equation by 7 yields $m = \frac{2(n+p)}{7}$.

Choice B is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect. This equation is equivalent to $7 + m = 2(n + p)$, not $7m = 2(n + p)$. *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 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 8

Choice D is correct. The proportion of the paper clips that are size large can be written as $\frac{234{,}000}{300{,}000}$, or 0.78. Therefore, the percentage of the paper clips that are size large is $0.78(100)$, or 78%.

Choice A is incorrect. This is the percentage of the paper clips that are not size large. *Choice B* is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 9

Choice D is correct. It's given that the function $f(x)=8x+4$ gives the estimated height, in feet, of a willow tree x years after its height was first measured. For a function defined by an equation of the form $f(x)=mx+b$, where m and b are constants, b represents the value of $f(x)$ when $x=0$. It follows that in the given function, 4 represents the value of $f(x)$ when $x=0$. Therefore, the best interpretation of 4 in this context is that the estimated height of the tree was 4 feet when it was first measured.

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

QUESTION 10

Choice 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 11

Choice A is correct. It's given that each side of equilateral triangle S is multiplied by a scale factor of k to create equilateral triangle T. Since the length of each side of triangle T is greater than the length of each side of triangle S, the scale factor of k must be greater than 1. Of the given choices, only $\frac{29}{28}$ is greater than 1.

Choice B is incorrect. If each side of equilateral triangle S is multiplied by a scale factor of 1, the length of each side of triangle T would be equal to the length of each side of triangle S. *Choice C* is incorrect. If each side of equilateral triangle S is multiplied by a scale factor of $\frac{28}{29}$, the length of each side of triangle T would be less than the length of each side of triangle S. *Choice D* is incorrect and may result from conceptual or calculation errors.

QUESTION 12

Choice C is correct. If the two sides of a linear equation are equivalent, then the equation is true for any value. If an equation is true for any value, it has infinitely many solutions. Since the two sides of the given linear equation $66x = 66x$ are equivalent, the given equation has infinitely many solutions.

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 13

The correct answer is 41. The number of cupcakes Vivian bought can be found by first finding the amount Vivian spent on cupcakes. The amount Vivian spent on cupcakes can be found by subtracting the amount Vivian spent on party hats from the total amount Vivian spent. The amount Vivian spent on party hats can be found by multiplying the cost per package of party hats by the number of packages of party hats, which yields $\$3 \cdot 10$, or \$30. Subtracting the amount Vivian spent on party hats, \$30, from the total amount Vivian spent, \$71, yields $\$71 - \$30$, or \$41. Since the amount Vivian spent on cupcakes was \$41 and each cupcake cost \$1, it follows that Vivian bought 41 cupcakes.

QUESTION 14

The correct answer is 11,875. It's given that the exponential function g is defined by $g(x) = 19 \cdot a^x$, where a is a positive constant, and $g(3) = 2{,}375$. It follows that when $x = 3$, $g(x) = 2{,}375$. Substituting 3 for x and 2,375 for $g(x)$ in the given equation yields $2{,}375 = 19 \cdot a^3$. Dividing each side of this equation by 19 yields $125 = a^3$. Taking the cube root of both sides of this equation gives $a = 5$. Substituting 4 for x and 5 for a in the equation $g(x) = 19 \cdot a^x$ yields $g(4) = 19 \cdot 5^4$, or $g(4) = 11{,}875$. Therefore, the value of $g(4)$ is 11,875.

QUESTION 15

Choice B is correct. The sine of any acute angle is equal to the cosine of its complement. It's given that in right triangle RST, the sum of the measures of angle R and angle S is 90 degrees. Therefore, angle R and angle S are complementary, and the value of $\sin R$ is equal to the value of $\cos S$. It's given that the value of $\sin R$ is $\frac{\sqrt{15}}{4}$, so the value of $\cos S$ is also $\frac{\sqrt{15}}{4}$.

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

QUESTION 16

Choice B is correct. The graph shown is a line passing through the points $(0, 40)$ and $(60, 0)$. Since the relationship between x and y is linear, if two points on the graph make a linear equation true, then the equation represents the relationship. Substituting 0 for x and 40 for y in the equation in choice B,

$8x+12y=480$, yields $8(0)+12(40)=480$, or $480=480$, which is true. Substituting 60 for x and 0 for y in the equation $8x+12y=480$ yields $8(60)+12(0)=480$, or $480=480$, which is true. Therefore, the equation $8x+12y=480$ represents the relationship between x and y.

Choice A is incorrect. The point $(0, 40)$ is not on the graph of this equation, since $40=8(0)+12$, or $40=12$, is not true. *Choice C* is incorrect. The point $(0, 40)$ is not on the graph of this equation, since $40=12(0)+8$, or $40=8$, is not true. *Choice D* is incorrect. The point $(0, 40)$ is not on the graph of this equation, since $12(0)+8(40)=480$, or $320=480$, is not true.

QUESTION 17

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 18

Choice A is correct. The y-intercept of the graph of $y=f(x)$ in the xy-plane occurs at the point on the graph where $x=0$. In other words, when $x=0$, the corresponding value of $f(x)$ is the y-coordinate of the y-intercept. Substituting 0 for x in the given equation yields $f(0)=(-8)(2)^0+22$, which is equivalent to $f(0)=(-8)(1)+22$, or $f(0)=14$. Thus, when $x=0$, the corresponding value of $f(x)$ is 14. Therefore, the y-intercept of the graph of $y=f(x)$ in the xy-plane is $(0, 14)$.

Choice B is incorrect and may result from conceptual or calculation errors. *Choice C* is incorrect and may result from conceptual or calculation errors. *Choice D* is incorrect. This could be the y-intercept for $f(x)=(-8)(2)^x$, not $f(x)=(-8)(2)^x+22$.

QUESTION 19

Choice C is correct. It's given that the equation $3x+5y=32$ represents the situation where Keenan filled x small jars and y large jars with all the vegetable broth he made, which was 32 cups. Therefore, $3x$ represents the total number of cups of vegetable broth in the small jars and $5y$ represents the total number of cups of vegetable broth in the large jars.

Choice A is incorrect. The number of large jars Keenan filled is represented by y, not $5y$. *Choice B* is incorrect. The number of small jars Keenan filled is represented by x, not $5y$. *Choice D* is incorrect. The total number of cups of vegetable broth in the small jars is represented by $3x$, not $5y$.

QUESTION 20

The correct answer is 5. The standard form of an equation of a circle in the xy-plane is $(x-h)^2+(y-k)^2=r^2$, where h, k, and r are constants, the coordinates of the center of the circle are (h, k), and the length of the radius of the circle is r. It's given that an equation of the circle is $(x-2)^2+(y-9)^2=r^2$. Therefore, the center of this circle is $(2, 9)$. It's given that the endpoints of a diameter of the circle are $(2, 4)$ and $(2, 14)$. The length of the radius is the distance from the center of the circle to an endpoint of a diameter of the circle, which can be found using the distance formula, $\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$. Substituting the center of the circle $(2, 9)$ and one endpoint of the diameter $(2, 4)$ in this formula gives a distance of $\sqrt{(2-2)^2+(9-4)^2}$, or $\sqrt{0^2+5^2}$, which is equivalent to 5. Since the distance from the center of the circle to an endpoint of a diameter is 5, the value of r is 5.

QUESTION 21

The correct answer is $\frac{1}{4}$. For an equation in slope-intercept form $y=mx+b$, m represents the slope of the line in the xy-plane defined by this equation. It's given that line ℓ is defined by $3y+12x=5$. Subtracting $12x$ from both sides of this equation yields $3y=-12x+5$. Dividing both sides of this equation by 3 yields $y=-\frac{12}{3}x+\frac{5}{3}$, or $y=-4x+\frac{5}{3}$. Thus, the slope of line ℓ in the xy-plane is -4. Since line n is perpendicular to line ℓ in the xy-plane, the slope of line n is the negative reciprocal of the slope of line ℓ. The negative reciprocal of -4 is $-\frac{1}{(-4)}=\frac{1}{4}$. Note that 1/4 and .25 are examples of ways to enter a correct answer.

QUESTION 22

Choice D is correct. By the definition of absolute value, if $|-5x+13|=73$, then $-5x+13=73$ or $-5x+13=-73$. Subtracting 13 from both sides of the equation $-5x+13=73$ yields $-5x=60$. Dividing both sides of this equation by -5 yields $x=-12$. Subtracting 13 from both sides of the equation $-5x+13=-73$ yields $-5x=-86$. Dividing both sides of this equation by -5 yields $x=\frac{86}{5}$. Therefore, the solutions to the given equation are -12 and $\frac{86}{5}$, and it follows that the sum of the solutions to the given equation is $-12+\frac{86}{5}$, or $\frac{26}{5}$.

Choice A is incorrect and may result from conceptual or calculation errors. *Choice B* is incorrect. This is a solution, not the sum of the solutions, to the given equation. *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 23

Choice C is correct. For the form of the function in choice C, $f(x)=128(1.6)^{x-1}$, the value of $f(1)$ can be found as $128(1.6)^{1-1}$, which is equivalent to $128(1.6)^0$, or 128. Therefore, $k=128$, which is shown in $f(x)=128(1.6)^{x-1}$ as the coefficient.

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 24

Choice C is correct. It's given that the equation $-9x^2+30x+c=0$ has exactly one solution. A quadratic equation of the form $ax^2+bx+c=0$ has exactly one solution if and only if its discriminant, $-4ac+b^2$, is equal to zero. It follows that for the given equation, $a=-9$ and $b=30$. Substituting -9 for a and 30 for b into b^2-4ac yields $30^2-4(-9)(c)$, or $900+36c$. Since the discriminant must equal zero, $900+36c=0$. Subtracting $36c$ from both sides of this equation yields $900=-36c$. Dividing each side of this equation by -36 yields $-25=c$. Therefore, the value of c is -25.

Choice A is incorrect. If the value of c is 3, this would yield a discriminant that is greater than zero. Therefore, the given equation would have two solutions, rather than exactly one solution. *Choice B* is incorrect. If the value of c is 0, this would yield a discriminant that is greater than zero. Therefore, the given equation would have two solutions, rather than exactly one solution. *Choice D* is incorrect. If the value of c is -53, this would yield a discriminant that is less than zero. Therefore, the given equation would have no real solutions, rather than exactly one solution.

QUESTION 25

Choice D is correct. Since each choice has a term of $3x^2$, which can be written as $(3x)(x)$, and each choice has a term of $14b$, which can be written as $(7)(2b)$, the expression that has a factor of $x+2b$, where b is a positive integer constant, can be represented as $(3x+7)(x+2b)$. Using the distributive property of multiplication, this expression is equivalent to $3x(x+2b)+7(x+2b)$, or $3x^2+6xb+7x+14b$. Combining the x-terms in this expression yields $3x^2+(7+6b)x+14b$. It follows that the coefficient of the x-term is equal to $7+6b$. Thus, from the given choices, $7+6b$ must be equal to 7, 28, 42, or 49. Therefore, $6b$ must be equal to 0, 21, 35, or 42, respectively, and b must be equal to $\frac{0}{6}$, $\frac{21}{6}$, $\frac{35}{6}$, or $\frac{42}{6}$, respectively. Of these four values of b, only $\frac{42}{6}$, or 7, is a positive integer. It follows that $7+6b$ must be equal to 49 because this is the only choice for which the value of b is a positive integer constant. Therefore, the expression that has a factor of $x+2b$ is $3x^2+49x+14b$.

Choice A is incorrect. If this expression has a factor of $x+2b$, then the value of b is 0, which isn't positive. *Choice B* is incorrect. If this expression has a factor of $x+2b$, then the value of b is $\frac{21}{6}$, which isn't an integer. *Choice C* is incorrect. If this expression has a factor of $x+2b$, then the value of b is $\frac{35}{6}$, which isn't an integer.

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 104. An equilateral triangle is a triangle in which all three sides have the same length and all three angles have a measure of 60°. The height of the triangle, $k\sqrt{3}$, is the length of the altitude from one vertex. The altitude divides the equilateral triangle into two congruent 30-60-90 right triangles, where the altitude is the side across from the 60° angle in each 30-60-90 right triangle. Since the altitude has a length of $k\sqrt{3}$, it follows from the properties of 30-60-90 right triangles that the side across from each 30° angle has a length of k and each hypotenuse has a length of $2k$. In this case, the hypotenuse of each 30-60-90 right triangle is a side of the equilateral triangle; therefore, each side length of the equilateral triangle is $2k$. The perimeter of a triangle is the sum of the lengths of each side. It's given that the perimeter of the equilateral triangle is 624; therefore, $2k+2k+2k=624$, or $6k=624$. Dividing both sides of this equation by 6 yields $k=104$.