

PSAT/NMSQT®

Preliminary SAT/National Merit Scholarship Qualifying Test

Practice Test #2



ANSWER EXPLANATIONS

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PSAT/NMSQT®

 CollegeBoard

 NATIONAL MERIT
SCHOLARSHIP CORPORATION

Reading and Writing

Module 1

(33 questions)

QUESTION 1

Choice C is the best answer because it most logically completes the text's discussion of novelist Leon Forrest's admiration of William Faulkner's writing style. In this context, "imitation" means something that resembles or reproduces something else. The text states that Forrest admired Faulkner's style and that anyone familiar with Faulkner's style would be able to see the stylistic similarities between a particular passage in Forrest's novel *Divine Days* and Faulkner's writing, a fact that supports the idea that Forrest's novel pays tribute to Faulkner by reproducing, or imitating, Faulkner's style.

Choice A is incorrect because in this context, a "forgetting" would mean an instance in which something is overlooked or not remembered. The text emphasizes Forrest's admiration for Faulkner's style and the fact that Forrest's writing in some instances closely resembles Faulkner's stylistically. It therefore wouldn't make sense to say that in trying to pay tribute to Faulkner's style, Forrest failed to remember it. **Choice B** is incorrect because in this context, a "rejection" would mean a dismissal of something as unworthy. The text emphasizes Forrest's admiration for Faulkner's writing style, stating that parts of Forrest's writings indicate efforts to copy that style. It wouldn't make sense therefore to suggest that Forrest had rejected or dismissed Faulkner's style as unworthy. **Choice D** is incorrect because in this context, an "opinion" would mean a view or judgment. Although the text focuses on Forrest's admiration of Faulkner, which suggests that Forrest had formed a positive judgment of Faulkner's style, the word opinion wouldn't make sense in this sentence: the sentence doesn't say that the passage from Forrest's novel expresses his view of Faulkner's style; rather, it suggests that stylistically, the passage closely resembles, or imitates, Faulkner's writing.

QUESTION 2

Choice A is the best answer because it most logically completes the text's discussion of programs that encourage money to cycle within a community. In this context, "instituting" means initiating. The text indicates that making purchases at small local businesses can help keep money cycling within a community. The text goes on to state that some cities are establishing incentives to promote small business shopping. This context supports the idea that some cities are instituting programs to encourage this consumer behavior.

Choice B is incorrect because saying that some cities are "occupying," or forcibly holding possession or control of, programs that encourage shoppers to make purchases at small local businesses wouldn't make sense in context. The text doesn't discuss who controls these programs but instead indicates that some cities are establishing incentives that encourage shoppers to make purchases at small local businesses. Furthermore, it wouldn't make sense to say that a city is occupying a program. *Choice C* is incorrect because nothing in the text suggests that cities are "underestimating," or failing to understand the value of, programs that encourage consumers to shop at small local businesses. The text indicates that some cities are establishing incentives to encourage small business shopping, which suggests that these cities understand the value of such programs. *Choice D* is incorrect because saying that some cities are "encountering," or coming into contact with, programs that encourage consumers to shop at small local businesses wouldn't make sense in context. The text indicates that some cities are already establishing incentives to encourage shoppers to make purchases at small businesses. This context suggests that the cities are instituting the programs, not that they are encountering them.

QUESTION 3

Choice B is the best answer because it most logically completes the text's discussion of solar energy collection and storage. In this context, "fluctuations in" means irregular changes in. The text notes that economists recommend that countries that want to rely more on solar energy (energy captured from sunlight) should attempt to expand their storage capacity. The text goes on to explain that having a large amount of stored solar energy can lessen the negative effect of "unpredictable shifts in cloud cover and haze"—that is, unpredictable changes in environmental conditions that at times limit sunlight. This context suggests that having ample solar energy stored and ready to use can mitigate the issue of fluctuations in solar energy collection caused by irregular patterns of sunlight availability.

Choice A is incorrect because in this context, "developments of solar energy collection" would most clearly refer to the creation of ways to collect solar energy (energy captured from sunlight). The text focuses on collection and the idea that having stored energy can mitigate, or make less bad, the effects of a problem caused by unpredictable changes that affect sunlight ("cloud cover and haze"); there's no reason to think that the creation of new collection methods would be viewed as a problem that would need to be mitigated. *Choice C* is incorrect because in this context, "calibrations with" would most clearly refer to precise adjustments for a particular purpose. The text focuses on the collection of solar energy (energy captured from sunlight) and the idea that having stored energy

can mitigate, or make less bad, the effects of a problem caused by unpredictable changes that affect sunlight (“cloud cover and haze”); there’s no reason to think that precision in something related to solar energy collection would be viewed as a problem that would need to be mitigated. *Choice D* is incorrect. The text focuses on the collection of solar energy (energy captured from sunlight) and the idea that having stored energy can mitigate, or make less bad, the effects of a problem caused by unpredictable changes that affect sunlight (“cloud cover and haze”); nothing in the text suggests that “incentives for,” or rewards for, solar energy collection would be viewed as a problem that would need to be mitigated, especially in countries that want to rely more on solar energy than they already do.

QUESTION 4

Choice A is the best answer because it most logically completes the text’s discussion of artworks that were produced for exhibition on the internet. In this context, “defunct” means no longer existing or functioning. According to the text, many artworks that were produced in the mid-1990s to the early 2000s for exhibition on the internet have become inaccessible due to their reliance on certain software. As an example, the text cites Sinae Kim’s *Genesis*, which relied on software that was discontinued in 2021. This context supports the idea that the software is defunct.

Choice B is incorrect because the text indicates that viewing artworks produced in the mid-1990s to the early 2000s for exhibition on the internet requires the use of software. Artists generally want their works to be seen by many people, so it wouldn’t make sense for creators of internet art to require the use of software that is “arcane,” or known or knowable to only a few people. Moreover, the text states that a prominent example of software used to view these artworks is Adobe Flash, which was discontinued in 2021, meaning it’s now defunct. *Choice C* is incorrect because “ubiquitous” would mean found everywhere, which wouldn’t make sense in this context. The text indicates that the reason why many artworks that were produced in the mid-1990s to the early 2000s for exhibition on the internet have become inaccessible has to do with the software required for viewing them. According to the text, one example of such software is Adobe Flash, which was discontinued in 2021, meaning it’s now defunct. *Choice D* is incorrect because nothing in the text suggests that the software used to view artworks produced in the mid-1990s to the early 2000s for exhibition on the internet is “extraneous,” or irrelevant. Instead, the text indicates that use of specific software is required to view certain artworks from this period and that the discontinuation of the software renders the works inaccessible.

QUESTION 5

Choice B is the best answer because as used in the text “determine” most nearly means “dictate.” The text describes the relationship between the main character and those who exhibit, praise, and purchase his artwork. The text states that the main character is often asked to change his art or himself based on outside influences, and he usually acquiesces. Because the main character admits that those who support his work often shape it based on their demands, it follows

that those outside influences dictate, or guide or dominate, the direction his work takes.

Choice A is incorrect because the text doesn't suggest that outside influences "conclude," or end, the main character's work. The text states that many supporters of the main character's art "demand its proliferation," not its conclusion. *Choice C* is incorrect because the text doesn't suggest that outside influences are "evaluating," or judging the main character's work. According to the text, the main character's art has already achieved great commercial success, with many people exhibiting, purchasing, and praising his work. Thus, outsiders have already supported the main character's work and are not questioning or evaluating its success or worth. They are instead influencing its initial direction. *Choice D* is incorrect because the text doesn't suggest that outside influences "select," or choose the main character's work. According to the text, the main character's art has already achieved great commercial success, with many people exhibiting, purchasing, and praising his work. Thus, outsiders have already supported the main character's work and are not selecting it. They are instead influencing its initial direction.

QUESTION 6

Choice A is the best answer because it describes how the underlined portion of the sentence functions in the text as a whole. The text begins by discussing ordinary soap bubbles, objects that usually exist for less than a minute before popping due to either evaporation or gravity-induced drainage. The text then goes on to mention work by researchers Aymeric Roux and colleagues, who have discovered how to increase the longevity of bubbles by altering their chemical composition. Finally, the underlined portion of the text describes how this process works: since the bubble contains both water and glycerol, it can draw water molecules from the surrounding air to replace those lost to evaporation. Therefore, the underlined portion of the sentence describes the effects of a process devised by researchers that increases the longevity of an object described in the text.

Choice B is incorrect because the circumstance that prompted the research is discussed in the first sentence of the text, not the underlined portion. *Choice C* is incorrect because the underlined portion of the text does not address why soap bubbles must eventually rupture. Rather, it explains how the longevity of soap bubbles can be extended. *Choice D* is incorrect because the underlined portion of the text does not mention any future experiments.

QUESTION 7

Choice C is the best answer because it best states how the underlined portion functions in the text as a whole. The first sentence states that Tule geese typically take four days to migrate south. Then in the next sentence, which contains the underlined portion, the text describes the first part of that journey, which begins with the geese flying over the Gulf of Alaska while keeping about 100 miles from the Canadian shore. The rest of the text details the remainder of the geese's typical journey and then mentions circumstances in 2020 that resulted in the

geese taking an unusually long time to complete it. Thus, the underlined portion describes part of the Tule geese's typical winter migration journey.

Choice A is incorrect. Although the text concludes by stating that in 2020, Tule geese took twice as long to complete their typical migration, which suggests a change in their usual flight behavior, the underlined portion doesn't discuss this. Instead, the underlined portion describes the first part of the Tule geese's typical winter migration journey over the Gulf of Alaska. *Choice B* is incorrect. Although the sentence containing the underlined portion mentions that Tule geese breed in Alaska, the underlined portion doesn't explain why the geese breed in that location. Rather, the text mentions Alaska to explain that it's the starting point of the Tule geese's typical winter migration. *Choice D* is incorrect because the underlined portion doesn't discuss any other birds that migrate south for the winter. In fact, the text is only concerned with the migration of Tule geese.

QUESTION 8

Choice C is the best answer because it most accurately states the main purpose of the text, which is to describe a collection of medieval maps and how it was created. The text begins by mentioning Muhammad al-Idrisi's collection of maps of lands known to medieval Arabic and European scholars. It then states that the Norman king Roger II hired al-Idrisi to create the collection and details al-Idrisi's methods of creation: consulting Arabic and Greek maps and interviewing travelers. In short, the text presents a collection of medieval maps and then goes on to describe how that collection came to be.

Choice A is incorrect because the text describes a collection of maps and the process of creating that collection but does not discuss the benefits of studying mapmaking in general. *Choice B* is incorrect because though the text mentions that al-Idrisi interviewed travelers, the text does not describe how those travelers created maps. *Choice D* is incorrect because though the text mentions that al-Idrisi consulted Arabic and Greek maps, the text does not offer a comparison of Arabic and Greek mapmaking techniques.

QUESTION 9

Choice D is the best answer because it most accurately describes the main purpose of the text, which is to explain a study's conclusion and how researchers involved in the study arrived at that conclusion. The text begins by summarizing the main conclusion of the study conducted by Paul Hanel and colleagues: when confronted with ideas they disagree with in discussions about controversial topics, people are more likely to respond politely if they think about their personal values before engaging in such discussions. The text then goes on to describe the design of Hanel and colleagues' experiment. By comparing interactions between members of an experimental group (who had been prompted to write about their personal values beforehand) to those between members of a control group (who had been prompted to write about a beverage), the team found that people in the experimental group behaved more civilly, or politely, than people in the control group did during discussions about a controversial topic. This finding led to the conclusion described at the beginning of the text.

Choice A is incorrect. Although the text discusses the results of a study, it doesn't provide any indication that the conclusion the study supported—that when facing disagreement, people behave more politely when they have thought about their values—is a belief that is widely held. *Choice B* is incorrect because the text doesn't indicate that the researchers found the results of their study to be surprising, or contrary to what they expected. In fact, there's no indication provided in the text about how the researchers felt about the study's results or that the results should be considered surprising. *Choice C* is incorrect. Although the text discusses the experimental design of a study, it doesn't suggest any improvements to that design; instead, it focuses on how the design enabled the researchers to draw a particular conclusion.

QUESTION 10

Choice D is the best answer because it accurately describes an aspect of Chavela Vargas that the text indicates is unusual among ranchera artists. According to the text, Vargas differed from other ranchera singers by slowing the tempo of classic songs, which allowed her to express the emotional quality of the lyrics more fully.

Choice A is incorrect because the text states that Vargas possessed an unusually raspy voice for a ranchera singer, not a clear and polished voice. *Choice B* is incorrect because the text indicates that Vargas was known to perform songs written from a male point of view, not that she avoided such songs. *Choice C* is incorrect because nothing in the text suggests that Vargas disliked performing classic songs. Rather, it suggests that she found innovative ways of performing them to emphasize their emotional content, which seems to suggest an affinity for such songs, not dislike.

QUESTION 11

Choice B is the best answer because it most accurately states the main topic of the text. The text begins by stating that archaeologists in Norway have discovered what may be the oldest known runestone (a stone with an inscription in the runic alphabets used in the region in ancient times). According to the text, the object was created between 1 and 250 CE. The text then mentions a researcher who comments on the runestone's significance to the study of runic alphabets. Thus, the main focus throughout the text is a runestone found in Norway.

Choice A is incorrect because the text mentions the Iron Age only to indicate the era when the runestone was created and when runic alphabets were in use; there's no discussion of battles during this era. *Choice C* is incorrect because the text mentions the carbon dating method just once and does so only to indicate the age of the runestone; moreover, the text doesn't suggest that this method is new. *Choice D* is incorrect. Although the text indicates that Zilmer is a runologist, or a scholar of runestones, it does so in a single sentence, so Zilmer's scholarly interests are therefore not a primary focus of the text.

QUESTION 12

Choice C is the best answer because it describes the songs sung by Gertrude “Ma” Rainey and Bessie Smith in a way the text implies is accurate. The text describes Angela Y. Davis’s research on Rainey and Smith for her book *Blues Legacies and Black Feminism*, focusing on her efforts to transcribe the improvised lyrics in Rainey’s and Smith’s songs. The text calls Davis’s transcription process “labor intensive” since the lack of clarity in the recordings required her to listen to each repeatedly to verify the accuracy of her transcripts. The fact that Davis undertook a painstaking transcription process using only fairly low-fidelity recordings suggests that reliable transcriptions were otherwise unavailable to her.

Choice A is incorrect. The text doesn’t discuss the popularity of Rainey’s and Smith’s songs either in the 1920s or after. Although it is plausible that the music of Rainey and Smith is more widely enjoyed than it was in the 1920s, this isn’t supported by the text. **Choice B** is incorrect. The text doesn’t discuss which of Rainey and Smith was the more prolific recording artist and so provides no support for such a claim. **Choice D** is incorrect. The text discusses the creativity of both Rainey and Smith, but it does so only to note similarities between them in terms of improvisation and wit, not to emphasize differences between them or Davis’s relative views of the artists’ inventiveness.

QUESTION 13

Choice A is the best answer because it most effectively uses a quotation from *Happy House* to illustrate the claim that the young woman is unimpressed with the house she is visiting. In the quotation, it says the young woman’s “first feeling was of disappointment” and that “there was little claim to beauty” when referring to the house. This disappointment and the overall lack of beauty in the house suggest that the young woman isn’t impressed by the house she is visiting.

Choice B is incorrect because the quotation doesn’t describe what the young woman thinks about the house. Instead, it indicates that there is more light because window blinds have been opened. **Choice C** is incorrect because the quotation describes a door and a path outside of the house but doesn’t include anything to indicate the young woman’s feelings about the house. **Choice D** is incorrect because the quotation states what the young woman did in the house (“tip-toed through the hall” and “opened the door”), but it doesn’t show what she thinks about it.

QUESTION 14

Choice B is the best answer because it presents a finding that, if true, would support Garza and Robles’s hypothesis that a layer of fresh water forms a barrier to ochre sea stars. The text explains that the sea stars tend to move to higher shore levels at night in search of prey, but after a heavy rain, the sea stars stay at lower shore levels. Garza and Robles hypothesize that rainfall results in a layer of fresh water that the sea stars don’t cross. To determine whether fresh water forms a barrier to sea stars, Garza and Robles observed how sea stars behaved in a tank of only seawater and in a tank of seawater with a layer of fresh water on top. If the sea stars climbed to the top of the tank with only seawater but stopped climbing

just below the layer of fresh water in the other tank, that would suggest that fresh water does indeed serve as a barrier to the sea stars, thereby supporting Garza and Robles's hypothesis.

Choice A is incorrect because finding that sea stars in the tank with only seawater moved around the bottom of the tank more than sea stars in the other tank did but that none of the stars in either tank climbed to the top would be irrelevant to Garza and Robles's hypothesis. Such a finding would reveal nothing about whether fresh water serves as a barrier to sea stars. *Choice C* is incorrect because finding that sea stars climbed to the top of both tanks would weaken, not support, Garza and Robles's hypothesis, since it would indicate that the layer of fresh water wasn't a barrier to the sea stars. *Choice D* is incorrect because finding that sea stars in the tank with only seawater mostly stayed near the bottom of the tank but sea stars in the other tank climbed into the layer of fresh water wouldn't support Garza and Robles's hypothesis. Instead, such a finding would suggest that the layer of fresh water wasn't a barrier to the sea stars, thereby weakening Garza and Robles's hypothesis.

QUESTION 15

Choice B is the best answer because it uses data from the graph to effectively complete the statement regarding what the student notices about the number of jobs in computer services in 2010. The graph shows that in 2010, the number of computer services jobs was approximately 6,000, which is the same approximate number of jobs in engineering services. Additionally, the graph shows that in 2019, the number of jobs in technical consulting services and the number of jobs in computer services were about the same, at approximately 5,000.

Choice A is incorrect. While the graph shows that in 2010 the number of computer services jobs (about 6,000) was higher than the number of technical consulting services jobs (about 4,000), in 2019 the number of computer services jobs (about 5,000) was not about the same as the number of engineering services jobs (about 6,000). *Choice C* is incorrect because according to the graph, the number of jobs in computer services was lower than the number of jobs in engineering services in 2019, not 2010. Additionally, the graph shows that in 2019, the number of computer services jobs (about 5,000) was not higher than the number of jobs in engineering services (about 6,000). *Choice D* is incorrect because the graph shows that the number of computer services jobs was about the same as the number of technical consulting services jobs in 2019, not 2010. This also means the number of computer services jobs could not have been lower than the technical consulting services jobs in 2019 if they were about the same.

QUESTION 16

Choice C is the best answer because it describes data in the graph that support the researchers' conclusion that their hypothesis about workplace leaders and humility was correct. According to the text, Jia Hu and colleagues "hypothesized that workplace leaders who reflect on lessons learned from past mistakes are likely to exhibit more humility than leaders who don't engage in such reflection." The bar graph shows the humility scores for managers who participated in Jia

Hu and colleagues' study. It shows average humility scores for managers who reflected on a past mistake that they learned from, managers who reflected on a past mistake that they didn't learn from, and managers who were in the control group that, according to the text, simply reflected on their daily routines. The graph shows that managers who reflected on a past mistake they learned from received an average humility score between 3.0 and 3.5. Both the control group and managers who reflected on a mistake they didn't learn from received a lower average humility score of between 2.5 and 3.0. Thus, the managers who reflected on a past mistake that resulted in learning exhibited more humility on average than the managers in the other two groups did. This supports the researchers' conclusion that their initial hypothesis that workplace leaders who reflect on past mistakes they learned from exercise greater humility was correct.

Choice A is incorrect. Although according to the graph it's true that none of the group's humility scores exceeded 3.5, this idea does not support the researchers' conclusion that their initial hypothesis was correct. The statement that none of the three groups' average humility scores exceeded 3.5 does not distinguish between those leaders who reflected on lessons learned from past mistakes and those who didn't, so it would not support Hu and colleagues' hypothesis that workplace leaders who reflect on past mistakes they learned from exercise greater humility. *Choice B* is incorrect. While the graph shows that managers in the control group did exhibit less humility than the experimental group of managers who reflected on a mistake they learned from, the graph also shows that the control group exhibited more (not less) humility than the experimental group that reflected on a mistake they didn't learn from. Furthermore, the idea that the managers in the control group exhibited only slightly less humility on average than the managers in the two experimental groups did would not support the researchers' conclusion that their initial hypothesis that workplace leaders who reflect on past mistakes they learned from exercise greater humility was correct. *Choice D* is incorrect because there is no indication in the graph that all three groups of participants exhibited less humility on average than the researchers expected. The graph and text don't cite any specific expectations that the researchers had with regard to the humility scores for each group.

QUESTION 17

Choice B is the best answer because it most logically completes the text's discussion of a hypothesis by one group of scientists about how to determine the colors of a long-extinct animal. The text explains that the scientists found melanosomes in the fossilized feather of an extinct bird and that melanosomes are responsible for producing color inside cells. The text also explains that melanosomes have different shapes depending on the colors they produce. Given this information, it follows that the scientists hypothesized that they could determine the colors of the extinct bird by examining the shapes of the melanosomes in the feather.

Choice A is incorrect because the text never suggests that the scientists were seeking to show how melanosomes can be found in fossils belonging to animals from other extinct species. Rather, the text indicates that the scientists were seeking to identify an extinct bird's colors, and the text strongly suggests that

the scientists hypothesized that they could achieve their goal by examining the shapes of the melanosomes in the bird's fossilized feather. *Choice C* is incorrect because the text never suggests that the scientists were seeking to explain why the melanosomes in the feather were so well preserved. Rather, the text indicates that the scientists were seeking to identify an extinct bird's colors, and the text strongly suggests that the scientists hypothesized that they could achieve their goal by examining the shapes of the melanosomes in the bird's fossilized feather. *Choice D* is incorrect because the text suggests only one method of identifying the colors of extinct animals: by examining the shapes of melanosomes found in fossils. The text doesn't discuss other methods for learning the colors of extinct animals and therefore provides no support for the idea that the scientists could identify the colors of extinct animals whose fossils lack melanosomes.

QUESTION 18

Choice A is the best answer because it presents the conclusion that most logically completes the text's discussion of the efficiency of various photovoltaic cells. The text indicates that Miranda-Pérez and her team found that adding a layer of perovskite to silicon-based cells increased the percentage of sunlight converted to usable electricity relative to the percentage converted to electricity by silicon-based cells. Using cells with only perovskite and no silicon, however, resulted in no improvement in efficiency over silicon-based cells. The text also states that perovskite captures light in the blue range of the solar spectrum and silicon captures light in the red range of the spectrum. If perovskite and silicon capture different parts of the solar spectrum and the combination of perovskite and silicon results in greater efficiency than the use of either perovskite or silicon alone does, then it is reasonable to infer that the improved efficiency of perovskite-silicon cells could be attributable to their making use of more of the solar spectrum than perovskite-based or silicon-based cells do.

Choice B is incorrect because it is directly contradicted by the text, which says that silicon-based cells convert 18%–22% of the sunlight that reaches them to electricity and that cells with only perovskite are no more efficient than silicon-based cells are. Perovskite-only cells thus must convert 22% or less—not more than 29.5%—of the sunlight that reaches them to electricity. *Choice C* is incorrect because the text focuses on a possible improvement to photovoltaic cells and makes no mention of any alternatives to those cells, so there is no reason to conclude that photovoltaic cells must be replaced with some other technology. Additionally, the text presents solar power as something that currently exists, so it wouldn't make sense to conclude that solar power will remain elusive. *Choice D* is incorrect because nothing in the text suggests that there is a need to evaluate the effectiveness of other minerals than perovskite. In fact, the text gives no indication that it is even possible to use other minerals than silicon and perovskite in photovoltaic cells. Instead, the text is focused on the effect of combining perovskite and silicon and the different parts of the solar spectrum that perovskite and silicon capture.

QUESTION 19

Choice B is the best answer. The convention being tested is punctuation use between a verb and its object. No punctuation is needed between the verb “preferred” and its object “the sound of a bent bell over that of a straight one.” The object helps complete the idea of the verb—in this case, it explains what type of sound Gillespie preferred—and any punctuation between the two results in an ungrammatical sentence.

Choice A is incorrect because no punctuation is needed between the verb and its object. *Choice C* is incorrect because no punctuation is needed between the verb and its object. *Choice D* is incorrect because no punctuation is needed between the verb and its object.

QUESTION 20

Choice B is the best answer. The conventions being tested are the use of verbs to express tense and the use of verb forms within a sentence. In this choice, the past tense verb “became” is consistent with the other past tense verbs (“owned,” “operated,” and “was”) used to indicate that, at a period of time in the past, Bass’s leadership resulted in her newspaper becoming one of the most influential Black-owned newspapers in the US. In addition, “became” supplies the main clause with a finite (tensed) verb, which is required to perform the action of the subject (in this case, “*The Eagle*”).

Choice A is incorrect because the future tense verb “will become” isn’t consistent with the other past tense verbs used to discuss Bass and her newspaper. *Choice C* is incorrect because the present progressive verb “is becoming” isn’t consistent with the other past tense verbs used to discuss Bass and her newspaper. *Choice D* is incorrect because it results in an ungrammatical sentence. The nonfinite to-infinitive “to become” doesn’t supply the main clause with a finite verb.

QUESTION 21

Choice D is the best answer. The convention being tested is the use of plural nouns and possessive determiners. The plural noun “jugglers” and the plural possessive determiner “their” correctly indicate that there are multiple jugglers whose motion is being discussed.

Choice A is incorrect because the context requires the plural noun “jugglers” and the plural possessive determiner “their,” not the plural possessive noun “jugglers” and the contraction “they’re.” *Choice B* is incorrect because the context requires the plural possessive determiner “their,” not the word “there,” which means “in that place.” *Choice C* is incorrect because the context requires the plural noun “jugglers,” not the singular possessive noun “juggler’s.”

QUESTION 22

Choice C is the best answer. The convention being tested is the use of punctuation within a sentence. This choice uses a semicolon in a conventional way to join the first main clause ("The measurement...moved") and the second main clause ("for example...second").

Choice A is incorrect because it results in a comma splice. Without a coordinating conjunction, a comma can't be used in this way to join the two main clauses ("The measurement...moved" and "for example...second"). *Choice B* 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 the two main clauses ("The measurement...moved" and "one unit...second"). *Choice D* is incorrect because it results in a run-on sentence. The two main clauses ("The measurement...moved" and "one unit...second") are fused without punctuation and/or a conjunction.

QUESTION 23

Choice C is the best answer. The convention being tested is subject-verb agreement. The singular verb "powers" agrees in number with the singular subject "an artificial intelligence."

Choice A is incorrect because the plural verb "have been powering" doesn't agree in number with the singular subject "an artificial intelligence." *Choice B* is incorrect because the plural verb "power" doesn't agree in number with the singular subject "an artificial intelligence." *Choice D* is incorrect because the plural verb "are powering" doesn't agree in number with the singular subject "an artificial intelligence."

QUESTION 24

Choice B is the best answer. The convention being tested is the use of a colon within a sentence. In this choice, the colon correctly introduces the following description of how the painting makes use of the entire visual light spectrum by depicting a rainbow-hued swimmer.

Choice A is incorrect because it results in a run-on sentence. The main clauses ("Like...spectrum" and "sporting...water") are fused without punctuation and/or a conjunction. *Choice C* is incorrect because it results in a run-on sentence. The main clauses ("Like...spectrum" and "while...water") are fused without punctuation. Furthermore, the conjunction "while" fails to indicate that what follows is a description of how the painting makes use of the entire visual light spectrum. *Choice D* is incorrect because it results in a logically confusing sentence. The conjunction "while," which suggests that what follows is occurring at the same time as or despite what came before, fails to indicate that what follows is a description of how the painting makes use of the entire visual light spectrum.

QUESTION 25

Choice D is the best answer. The convention being tested is the use of a colon within a sentence. In this choice, the colon correctly introduces the following explanation of the different functions of genomes and epigenomes.

Choice A is incorrect because it results in a run-on sentence. The two main clauses (“The relationship...functions” and “whereas...expressed”) are fused without punctuation and/or a conjunction. *Choice B* is incorrect because it results in a comma splice. A comma can’t be used in this way to join two main clauses (“The relationship...functions” and “whereas...expressed”). *Choice C* is incorrect. Without a comma preceding it, the conjunction “and” can’t be used in this way to join two main clauses. Furthermore, “and” fails to indicate that what follows is an explanation of how cells with identical DNA develop different functions.

QUESTION 26

Choice A is the best answer. “Ultimately” logically signals that West’s completion of the computer program was the conclusion of the process described in the previous sentence, in which scientists working on GPS sought to develop a mathematical model of Earth.

Choice B is incorrect because “in other words” illogically signals that the information about West’s program is a restatement of the information about the scientists’ efforts to develop a mathematical model of Earth. Instead, West’s program was the conclusion of those efforts. *Choice C* is incorrect because “secondly” illogically signals that West’s completion of the computer program was merely the next step in the scientists’ efforts to develop a mathematical model of Earth. Instead, West’s program was the conclusion of those efforts. *Choice D* is incorrect because “in addition” illogically signals that West’s completion of the computer program was merely additional information related to the scientists’ work on GPS. Instead, West’s program was the conclusion of the scientists’ efforts to develop a mathematical model of Earth.

QUESTION 27

Choice B is the best answer. “Then” logically signals that the event described in this sentence—lawmakers’ 2017 declaration of Alaska Highway Day—is part of a chronological sequence of events, occurring after the decades-long period in which the soldiers’ contribution was overlooked.

Choice A is incorrect because “lastly” illogically signals that this sentence presents the last of a series of points or reasons. Instead, it describes a later event occurring in a chronological sequence of events. *Choice C* is incorrect because “similarly” illogically signals that the information in this sentence is similar to the previous information about the soldiers’ contribution being overlooked for decades. Instead, it describes an event occurring after that decades-long period. *Choice D* is incorrect because “for example” illogically signals that this sentence provides an example illustrating the previous information about the soldiers’ contribution being overlooked for decades. Instead, it describes an event occurring after that decades-long period.

QUESTION 28

Choice D is the best answer. “Thus” logically signals that the information in this clause—that listeners can “hear” carbon levels increasing—is a result of the previous information about the audio distorting as carbon levels increase.

Choice A is incorrect because “furthermore” illogically signals that the information in this clause merely adds to the previous information about the audio distorting as carbon levels rise. Instead, the listeners’ ability to “hear” carbon levels increasing is a result of that distortion. *Choice B* is incorrect because “by comparison” illogically signals that the information in this clause is being compared to the information about the audio distorting as carbon levels rise. Instead, the listeners’ ability to “hear” carbon levels increasing is a result of that distortion. *Choice C* is incorrect because “for instance” illogically signals that the information in this clause is an example of how the audio distorts as carbon levels rise. Instead, the audio was distorted for the express purpose of representing ecological data; the listeners’ ability to “hear” carbon levels increasing is a direct, intended result of the distortion, not merely an example of it.

QUESTION 29

Choice B is the best answer. “For this reason” logically signals that the reason Joseph Priestley termed oxygen “dephlogisticated air” was that he accepted the theory mentioned in the previous sentence—that the presence of phlogiston, rather than the absence of oxygen, causes fire in a closed container to go out.

Choice A is incorrect because “in other words” illogically signals that the information about Priestley terming oxygen “dephlogisticated air” is a restatement of the previous theory concerning phlogiston. Instead, Priestley chose the term as a result of this theory. *Choice C* is incorrect because “alternatively” illogically signals that Priestley termed oxygen “dephlogisticated air” as an alternative to the previous theory concerning phlogiston. Instead, Priestley chose the term as a result of this theory. *Choice D* is incorrect because “nevertheless” illogically signals that Priestley termed oxygen “dephlogisticated air” despite the previous theory concerning phlogiston. Instead, Priestley chose the term as a result of this theory.

QUESTION 30

Choice C is the best answer. The sentence emphasizes the number of islands in Komodo National Park that have Komodo dragons living on them, noting that four of the park’s twenty-nine islands have Komodo dragons.

Choice A is incorrect. While the sentence does explain that Komodo dragons live on the islands of Komodo National Park, it doesn’t emphasize how many of those islands Komodo dragons live on. *Choice B* is incorrect. The sentence explains that Komodo National Park contains the world’s largest lizards; it doesn’t identify these lizards as Komodo dragons or emphasize how many of the park’s islands the lizards live on. *Choice D* is incorrect. The sentence specifies the total number of islands in Komodo National Park; it doesn’t emphasize how many of those islands have Komodo dragons.

QUESTION 31

Choice A is the best answer. The sentence provides Acquah's quotation about pointillism's "illusion of movement" to explain that she used pointillism to create the illusion of movement in her painting of women dancing.

Choice B is incorrect. The sentence explains pointillism and indicates that Acquah used the technique in her painting, but it doesn't provide a quotation or explain why. **Choice C** is incorrect. While the sentence provides a quotation from Acquah about pointillism, the quotation merely describes a specific aspect of the technique; the sentence doesn't explain why Acquah used pointillism in her painting. **Choice D** is incorrect. While the sentence provides a quotation from Acquah, the quotation illustrates Acquah's views on Ghanaian women; the sentence doesn't explain why Acquah used pointillism in her painting.

QUESTION 32

Choice C is the best answer. The sentence emphasizes whose point of view the novel *Kaikeyi* is told from: the character Kaikeyi's.

Choice A is incorrect. While the sentence does discuss point of view, it focuses on that of the epic poem rather than the novel. **Choice B** is incorrect. While the sentence seems to be referring to Patel's novel, it doesn't establish whose point of view the novel is told from. **Choice D** is incorrect. The sentence discusses the character Kaikeyi in the context of the epic poem; it doesn't discuss the novel's point of view.

QUESTION 33

Choice B is the best answer. The sentence describes the 2018 exhibition Guerrero curated, noting that the exhibition, which was titled *Pacha, Llaqta, Wasichay: Indigenous Space, Modern Architecture, New Art*, featured the works of seven emerging Latino artists.

Choice A is incorrect. The sentence describes the exhibition Guerrero curated in 2020; it doesn't describe her 2018 exhibition. **Choice C** is incorrect. The sentence emphasizes a similarity between the two exhibitions Guerrero curated; it doesn't describe her 2018 exhibition. **Choice D** is incorrect. The sentence emphasizes a difference between the two exhibitions Guerrero curated; it doesn't describe her 2018 exhibition.

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 origins of the unique dialect of Spanish spoken in Puerto Rico. In this context, "traced" means tracked back to. The text notes that the regional variety of Spanish spoken in Puerto Rico has its roots in the language of the Taínos and in the West African language of Yoruba. This context supports the idea that the way certain vowel sounds are pronounced in the Puerto Rican dialect can be traced back to Yoruba.

Choice B is incorrect because the text presents the statement about the relationship between vowel pronunciation in the Puerto Rican dialect of Spanish and in Yoruba as an example to support the claim that African languages have contributed to the Puerto Rican dialect. It therefore wouldn't make sense to say that the pronunciation of certain vowel sounds in the Puerto Rican dialect can be "surrendered," or handed over on demand, to the pronunciation in Yoruba. *Choice C* is incorrect because the text gives no indication that the way certain vowel sounds are pronounced in the Puerto Rican dialect of Spanish has been "announced," or officially declared or proclaimed. According to the text, elements of the dialect have been inherited or borrowed from African languages, and the relationship between the pronunciation of certain vowels in the Puerto Rican dialect and in Yoruba is an example of this inheritance, suggesting that the pronunciation in the Puerto Rican dialect can be traced to Yoruba. *Choice D* is incorrect because the text presents the statement about the relationship between vowel pronunciation in the Puerto Rican dialect of Spanish and in Yoruba as an example to support the claim that African languages have contributed to the Puerto Rican dialect. It therefore wouldn't make sense to say that the pronunciation of certain vowel sounds in the Puerto Rican dialect can be "offered," or presented as a gift, to the pronunciation in Yoruba.

QUESTION 2

Choice B is the best answer because it most logically completes the text's discussion of wild rice. As used in this context, "sensitive" means vulnerable or easily affected. The text indicates that climate change is causing the lakes to get deeper, which consequently threatens the wild rice that grows in the area. The text goes on to state that deep water can cause young wild-rice plants to uproot from the bottom of the lake. This context supports the idea that the plants are sensitive to water depth during early stages of development.

Choice A is incorrect because "immune" means protected or shielded, which wouldn't make sense in this context. The text explains that deep water can cause young wild-rice plants to become uprooted and destroyed, indicating that these plants are harmed by deep water, not protected from it. *Choice C* is incorrect because "limited" means confined or restrained, which wouldn't make sense in this context. The text explains that water depth can negatively affect young wild-rice plants but doesn't suggest that water depth limits or restrains the plants. *Choice D* is incorrect because "receptive" means open or tolerant, which wouldn't make sense in this context. The text doesn't indicate that the wild-rice plants are open to or tolerant of an increase in water depth but rather the opposite: an increase in water depth can harm young wild-rice plants.

QUESTION 3

Choice D is the best answer because it most logically completes the text's discussion of the invention of the integrated circuit. As used in this context, "transformed" means substantially changed in some way. The text states that the invention radically altered the semiconductor industry, with some historians claiming that it had a fundamental effect on the industry by allowing for mass production for the first time. This context conveys that the invention of the integrated circuit transformed the semiconductor industry.

Choice A is incorrect. Although the text indicates that the invention of the integrated circuit significantly affected ("radically altered") the semiconductor industry, it doesn't indicate that the invention "overwhelmed" the industry, which in this context would mean that it overcame the industry such that the industry struggled or was defeated. Instead, the text conveys that the invention's effect was positive, since it allowed the semiconductor industry to begin making use of mass production methods. *Choice B* is incorrect because it wouldn't make sense in context to say that the invention of the integrated circuit "bypassed" the semiconductor industry, which would mean it intentionally avoided the industry. The text indicates that the invention directly affected the semiconductor industry, since it made it possible for the industry to begin engaging in mass production methods. *Choice C* is incorrect because the text doesn't indicate that the invention of the integrated circuit "obstructed" the semiconductor industry, which would mean that it blocked or hindered the industry in some way. Instead, the text indicates that the invention's effect was positive, since it made it possible for the semiconductor industry to begin engaging in mass production methods.

QUESTION 4

Choice C is the best answer because it most logically completes the text's discussion of the early British postal system. In this context, "reforms" most nearly means attempts at improving something. The text indicates that the pay-upon-delivery postage method led to fee avoidance on the part of recipients. It then says that action was taken to improve the postal system, giving examples such as the move to having the sender pay and affixing stamps to indicate payment had been received. These represent revisions to the system intended to improve its functioning; therefore, "reforms" most logically completes the text.

Choice A is incorrect. In this context, "investigations" most nearly means attempts to understand something. And although it is plausible that an attempt to improve the postal system would involve investigations, nothing in the text provides a logical basis for understanding the example of changes like affixing stamps to letters as an investigation. *Choice B* is incorrect. In this context, "expansions" most nearly means additions to something. Although the text indicates that some new policies were adopted, nothing in the text suggests that the overall number of policies increased, which expansions would seem to entail. *Choice D* is incorrect. In this context, "possessions" most nearly means items of personal property or things that otherwise belong to, or are part of, something. The text provides no logical context for understanding changes like affixing stamps to letters as possessions.

QUESTION 5

Choice A is the best answer because it logically completes the text's discussion of imported goods and consumer prices. In this context, "nullify" most nearly means negate or undermine. The text indicates that importing goods to a country can reduce consumer prices in that country, then cautions that the costs of transporting goods within the country is also a factor. These transportation costs likely raise the prices that must be paid by people who live far from the ports of entry. Therefore, the intranational transportation costs could nullify the price advantages to consumers of importing goods.

Choice B is incorrect. In this context, "denigrate" would most nearly mean disparage or deny the importance of. Since transportation costs would not be capable of denying the importance of price advantages, it would not make sense to state that intranational transportation costs denigrate the price advantages of importing goods. *Choice C* is incorrect. In this context, "underestimate" would most nearly mean predict a lower value for, or to undervalue, someone or something. Though transportation costs might be undervalued, they cannot themselves undervalue something else, so it would not make sense to state that intranational transportation costs underestimate the price advantages of importing goods. *Choice D* is incorrect. In this context, "misconstrue" would most nearly mean misunderstand. Since transport costs are not capable of understanding, it would not make sense to claim that intranational transportation costs misconstrue the price advantages of importing goods.

QUESTION 6

Choice B is the best answer because it best describes the overall structure of the text. The text first establishes the setting, a “still lagoon,” and then goes on to provide more details about the lagoon by presenting several descriptive images of nature, including a lizard that “shrills his tune,” “oozing lichens,” and “thick, grey and humid” vapors.

Choice A is incorrect. Instead of simply naming species, the text presents descriptive images of nature; further, instead of naming animals and then moving on to name plants, the text refers first to a plant (“the wild rice”), then to two animals (“the lizard,” “the wild goose”), then to another plant (“rushes”), and so on. *Choice C* is incorrect because the text does not draw any comparison between nature and human emotions; it does not refer to human emotions at all. *Choice D* is incorrect. While the text does begin by identifying a specific location, a “still lagoon,” it makes no mention of a person living there.

QUESTION 7

Choice B is the best answer because it accurately describes how the underlined portion functions in the text as a whole. In the text, the narrator explains that she walks around her neighborhood, making a “mental map” of the area that she imagines herself navigating through. She then states that she rehearses “the small world’s scheme”—that is, imagines moving through her mental map—and challenges herself to use the map in her mind while lying in bed at night. The underlined portion presents two such challenges (getting to the store through backyards and traveling from school to a friend’s house) and thus provides examples of what the narrator thinks about at night.

Choice A is incorrect because the underlined portion makes no mention of memorizing a telephone number. Although the narrator mentions that she had to learn the home telephone number before her mother would give her permission to walk around the neighborhood, there is nothing in the underlined portion or the rest of the text about memorizing the telephone number. *Choice C* is incorrect. Although the underlined portion refers to navigation tasks like finding a route to a store only through backyards, the text contains no specific directions to any store, nor is any store identified as the narrator’s favorite. *Choice D* is incorrect because the underlined portion makes no mention of the narrator’s mother and doesn’t address the narrator’s relationship with her. Although the narrator mentions that her mother gave her permission as a child to walk around the neighborhood, there is nothing in the underlined portion or the rest of the text about the mother or her relationship to her child.

QUESTION 8

Choice C is the best answer because it most accurately describes the overall structure of the text. The text begins by introducing the natural phenomenon of intermittent mass loss with regard to Asteroid 6478 Gault and notes that it curiously has not lost mass at its perihelion like other asteroids typically do. The text then refutes “solar energy-driven ice vaporization” and “the singular nature of impact ejection” as two possible explanations for Asteroid 6478 Gault’s

intermittent mass loss. Finally, the text presents Luu et al.'s explanation that "6478 Gault is shedding mass due to rotational instability," which the author says is "likely correct." Thus, the overall structure of the text is that it introduces a natural phenomenon, refutes two potential explanations for that phenomenon, and then presents a third explanation for that phenomenon that the author regards as plausible.

Choice A is incorrect because the text doesn't distinguish between multiple observations. It focuses on the single observation that Asteroid 6478 Gault is losing mass and evaluates multiple explanations for the phenomenon. The text also asserts that Luu et al.'s explanation is credible and "likely correct." *Choice B* is incorrect because the text describes a natural phenomenon, not a specific astronomical finding. In addition, although the text does note flawed reasons for Asteroid 6478 Gault's intermittent mass loss, it doesn't mention that Asteroid 6478 Gault's intermittent mass loss is based on new evidence. *Choice D* is incorrect. Although the text does evaluate explanations for the cause of Asteroid 6478 Gault's intermittent mass loss, the text also asserts that Luu et al.'s explanation that they have put forth is persuasive and "likely correct."

QUESTION 9

Choice B is the best answer because it reflects how the author of Text 1 would most likely respond to the study findings described in Text 2. The author of Text 2 discusses a study by Florian Humpeöder and his colleagues that found that deforestation would be reduced by half over the next thirty years if 20% of the beef consumed worldwide were replaced with mycoprotein. The author of Text 1 points out that mycoprotein is not widely available because of its high production cost, but goes on to note that this problem could be addressed by the creation of a cheaper substrate to feed mycoprotein. This suggests that the author of Text 1 would assert that the development of a less expensive mycoprotein substrate would contribute to the reduction in deforestation described in the study findings discussed in Text 2: if reducing the cost of mycoprotein increases people's access to it, then mycoprotein may be able to replace beef in more people's diets, thereby reducing the deforestation associated with beef production.

Choice A is incorrect because the author of Text 1 indicates that the environmental impact of mycoprotein production is close to that of chicken or pork production, so there is no reason to think that the author would assert that replacing chicken or pork with mycoprotein would be environmentally beneficial: such a replacement would not lessen the total environmental impact of food manufacture. Additionally, the specific issue of agricultural water consumption is never mentioned in Text 1, so there is no evidence indicating what the author of Text 1 would say about that issue. *Choice C* is incorrect. Although Text 1 does compare the environmental effects of producing mycoprotein to those of producing chicken or pork, nothing in Text 1 suggests that the author believes that people are more likely to replace chicken or pork with mycoprotein than they are to replace beef with mycoprotein. *Choice D* is incorrect because Text 1 makes no mention of countries' varying contributions to deforestation, so there is no evidence that the author of Text 1 would respond to the finding described in Text 2 by saying that some countries will have to replace more than 20% of their beef consumption with mycoprotein.

QUESTION 10

Choice B is the best answer because it presents the most likely consequence if New had not begun using sewing machines. The text states that New gained new customers and that sewing machines allowed him to make bags more efficiently, or in less time than he could when sewing by hand. It's reasonable to conclude that if New hadn't reduced the time it took to make each bag by starting to use sewing machines, it would have been hard for him to keep up with the increased demand.

Choice A is incorrect because the text indicates that New added unique, handcrafted details to his bags before he started using sewing machines and continued to do so after he started using them. *Choice C* is incorrect because the text doesn't suggest that individually designing each bag would have been a consequence of not using sewing machines, since New was already designing unique details for each bag before he started using sewing machines and continued to do so after he started using them. *Choice D* is incorrect because the text indicates that people were already interested in New's bags before he started using sewing machines. Rather than allowing New to generate more interest in his bags, sewing machines helped New keep up with the interest that had already grown.

QUESTION 11

Choice B is the best answer because it presents a statement about the Turkins that is suggested by the text. The text explains that while many pleasant families live in the city of S., inhabitants of the city consider the Turkins to be "the most accomplished and most enlightened family of all." Thus, by indicating that they are seen as more accomplished and more enlightened than all the other families in the city of S., the text suggests that the Turkins have a unique status there.

Choice A is incorrect because the text doesn't indicate that the Turkins have recently moved to the city of S.; it provides no information about when the Turkins arrived. *Choice C* is incorrect because the text explains how the Turkins are viewed by others in the city of S. but gives no indication of how the Turkins feel about living there. *Choice D* is incorrect because the text explains how the Turkins are viewed by other residents of the city of S. but gives no indication of how the Turkins view the other residents.

QUESTION 12

Choice A is the best answer because it most accurately states the main idea of the text. The text begins by stating that Tomas and Tereza's dog Karenin felt disrupted by a recent move because of his dislike of change. The text then goes on to suggest that this is because the way a dog experiences time differs from the way humans experience time: time for a dog doesn't move linearly, going "on and on, from one thing to the next," but instead moves circularly, "like the hands of a clock." That is, time for a dog is experienced as a cyclical pattern characterized by routine and predictability, with each day "following the same path." The text then concludes by providing examples of seemingly insignificant changes in routine that profoundly "disturbed [Karenin's] sense of time," causing him to feel

displeasure. Thus, the main idea of the text is that Karenin's sense of time as a dog involves a strong preference for predictability and an aversion to disruption.

Choice B is incorrect. Although the text emphasizes Karenin's displeasure with the recent move to a new home, it doesn't suggest that the move has made his negative responses more pronounced than they once were. Rather, in accounting for Karenin's displeasure with the move to Switzerland, the text explains that Karenin generally has a negative response to any kind of change. *Choice C* is incorrect because the text doesn't suggest that Karenin comprehends time similarly to how Tomas and Tereza comprehend it. On the contrary, the text strongly implies a contrast between dogs' circular experience of time with the way humans experience time as a straightforward progression that can be "plotted on a straight line." *Choice D* is incorrect because the text provides no indication that a change in the places and objects surrounding Karenin causes him to feel as though time is accelerating. Although the text does use the language of "dash[ing] madly ahead" in relation to time, the phrase appears in the context of a comparison illustrating how dogs experience time: time for a dog moves just as the hands of a clock do, in a circle and "unwilling to dash madly ahead"—that is, always in a regular and predictable way.

QUESTION 13

Choice D is the best answer because it most effectively uses data from the table to complete the text. The text discusses self-employed workers in the US, and the table shows the US incorporated and unincorporated self-employment rates in four occupational fields in 2015. According to the table, the incorporated self-employment rate was 8.9% for the management, business, and financial services occupational field, which is higher than the incorporated self-employment rate shown for any other occupational field.

Choice A is incorrect because according to the table, the incorporated self-employment rate was 5.8% for the sales and related occupational field, which is lower than the 8.9% for the management, business, and financial services occupational field. *Choice B* is incorrect because according to the table, the incorporated self-employment rate was 2.7% for the installation, maintenance, and repair occupational field, which is lower than the 8.9% for the management, business, and financial services occupational field. *Choice C* is incorrect because according to the table, the incorporated self-employment rate was 4.4% for the construction and resource extraction occupational field, which is lower than the 8.9% for the management, business, and financial services occupational field.

QUESTION 14

Choice A is the best answer because it most effectively presents a quotation from *There Is Confusion* that illustrates the claim that the narrator portrays Joanna as admiring the quality of ambition, or the determination to achieve something, and no other qualities in other people. By describing Joanna as not being interested in people unless they have "a 'purpose' in life"—that is, a goal they are determined to achieve—in which case she is very interested in them, the quotation reveals that Joanna cares only about others' ambition.

Choice B is incorrect because this quotation indicates only that Joanna has a preference for her father, without giving a reason for that preference; therefore, it doesn't illustrate the claim that Joanna cares only about others' ambition. *Choice C* is incorrect because this quotation doesn't illustrate that Joanna greatly admires the quality of ambition in others; it refers to Joanna's similarity to her father "so far as ambition was concerned" but doesn't reveal how she (or her father) views that quality. *Choice D* is incorrect because this quotation describes qualities Joanna possesses—praising her logic, concentration, and memory—instead of Joanna's interest in other people's qualities.

QUESTION 15

Choice C is the best answer because it most effectively uses data from the graph to complete the text about the effect of messaging on participative pricing. The graph shows mean ticket prices chosen by participants in response to three messages across two studies: Study 1, which the text indicates was conducted with an age-diverse group recruited online, and Study 2, which was conducted with student participants. The graph indicates that in the "pay what you think it's worth" condition, the mean price of the concert tickets in Study 2 was about \$74, which is greater than the mean price of about \$55 in Study 1. In other words, when participants were asked to consider their valuation of the tickets, the response was heterogeneous, or mixed. Moreover, according to the graph, both Study 1 and Study 2 show higher prices for the tickets under the "pay what you think it's worth" condition than they do under both the "pay what you can" and the "pay what you want" conditions. That is, the data suggest that both groups of participants named higher prices when considering the value of the tickets than when considering either what they could afford or wanted to pay, a finding that supports the idea that sellers can benefit when prompting consumers to consider their own valuations when they choose prices.

Choice A is incorrect because it contradicts information in the graph. Although the graph shows that students in Study 2 assigned a higher value to the tickets than did the age-diverse group in Study 1, which would support the idea that consumer valuations were heterogeneous, the graph shows that in the "pay what you can" (i.e., what you can afford) condition, the students in Study 2 assigned a higher price (about \$40), not a lower price, than the age-diverse group in Study 1 did (about \$30). Moreover, even if it were true that the students had assigned a lower price in this condition, it wouldn't support the result described in the text, only that the participants across the two studies had different ideas of what they can afford to pay. *Choice B* is incorrect. Although a finding that participants tended to choose prices that were closest to the actual ticket costs in the "pay what you think it's worth" condition would support the idea that sellers benefit by prompting consumers to think about their own valuations (since it's implied that sellers would lose money in the other conditions, where chosen prices were lower than the participants' valuations), neither the text nor the graph addresses how any of the prices chosen by the study participants relate to the tickets' actual market price. *Choice D* is incorrect. Although the wide variation in participant valuations would support the idea that consumer valuations tend to be heterogeneous, neither the text nor the graph provides any information from which to discern the relative levels of variance among the responses from participants in either study.

QUESTION 16

Choice D is the best answer because it presents findings that, if true, would support the claim made by Bergner and colleagues that the nongravitational acceleration of 'Oumuamua is due to the expulsion of entrapped hydrogen. The text first introduces the observation of a unique interstellar object named 'Oumuamua and goes on to explain that the object exhibited nongravitational acceleration that could not be fully attributed to the expected cause: gravitational pull of nearby celestial bodies. The text concludes by stating that Bergner and colleagues claim that the nongravitational acceleration is caused by expulsion of hydrogen gas from 'Oumuamua's water-rich icy body. To support this claim requires evidence that hydrogen gas could be present within 'Oumuamua at all, which this answer choice presents: cosmic radiation can result in embedded pockets of hydrogen gas in water ice. Additionally, evidence that this gas can be released from such a body is required to fully support the claim, which this answer choice goes on to provide: 'Oumuamua experienced sufficient warming as it traveled through the solar system to alter its icy structure and release the hydrogen gas. Thus, this answer choice provides the best evidence to support Bergner and colleagues' claim.

Choice A is incorrect because this answer choice concerns faults with previous models of outgassing from 'Oumuamua of carbon monoxide and nitrogen, which would not support a claim regarding hydrogen outgassing. Furthermore, inconsistencies in other models would not provide evidence in support of a different model or explanation. *Choice B* is incorrect. The evidence presented in this answer choice would weaken the claim proposed by Bergner and colleagues that the nongravitational acceleration of 'Oumuamua is caused by the expulsion of hydrogen gas because this answer choice suggests that there is evidence that refutes this claim: 'Oumuamua's trajectory is inconsistent with a nongravitational acceleration caused by the release of hydrogen gas. Furthermore, the remaining portion of this answer choice is unrelated to the claim. *Choice C* is incorrect because the claim being made by Bergner and colleagues concerns the expulsion of entrapped hydrogen gas, but this answer choice is concerned solely with the differences in magnitude of gravitational and nongravitational acceleration, which would not support Bergner's claim. Furthermore, this answer choice discusses interstellar objects similar to 'Oumuamua, but the text states that 'Oumuamua is the first observed object of its kind in our solar system, so evidence from other, similar bodies would not be available.

QUESTION 17

Choice B is the best answer because it presents the conclusion that most logically follows from the text's discussion of the relationship between the AACM's use of mentors to support young Black musicians and similar support that other organizations offer their young artists. According to the text, in service of AACM's goal to support new works by Black musicians, AACM mentors provide beneficial training and guidance to young artists. The text goes on to say that many other art organizations support new artists in similar ways, suggesting that these organizations recognize the importance of providing opportunities for young artists to learn from mentors who are established in their field.

Choice A is incorrect because the text gives no indication that technical training is more beneficial than creative guidance. The text states that AACM mentors offer both technical training and creative guidance to young artists and that other arts organizations offer similar kinds of support; however, nothing in the text suggests that young artists, or artists of any age, benefit more from technical training. *Choice C* is incorrect because the text is mainly concerned with the fact that established artists are mentoring young artists through AACM and other arts organizations. The text states that young musicians benefit from AACM mentors but does not address what mentors gain from the relationship, so there is no reason to conclude that most established artists could improve as artists by serving as mentors. *Choice D* is incorrect. Although the text indicates that mentors are beneficial to young musicians and that young people pursuing other kinds of art (including painting and writing) can also find mentors through arts organizations, the text gives no indication that mentors are more important for musicians than for other types of artists.

QUESTION 18

Choice D is the best answer because it presents the conclusion that most logically follows from the text's discussion of the researchers' findings about purple sea urchins and sunflower sea stars. The text explains that urchin barrens are areas that used to be kelp forests but are now covered by purple sea urchins. The text suggests that because there is no more vegetation to be consumed in those areas, the urchins exist in a state of starvation that makes them less nutritional for many predators. The text goes on to explain that in a study with a choice between two purple sea urchins, sunflower sea stars (a predator species that has been substantially declining) consumed a nutritionally rich urchin 42.7% of the time and a nutritionally poor urchin 37.5% of the time. Because the sunflower sea stars didn't always avoid consuming nutritionally poor urchins, even when nutritionally rich ones were available, it follows that helping sunflower sea star populations to grow could help control urchin barrens by increasing the number of sea stars that may consume and thus remove nutritionally poor purple sea urchins from barrens.

Choice A is incorrect because the text indicates only that when presented with purple sea urchins, the sunflower sea stars in the study consumed both nutritionally rich and nutritionally poor ones. It doesn't suggest that sunflower sea stars generally prefer other marine animals that are more nutritious; there's no mention of other marine animals. *Choice B* is incorrect because the text doesn't suggest that sunflower sea stars are generally reluctant to feed on sea urchins. In fact, the text indicates that the sunflower sea stars in the study did consume sea urchins, feeding on both nutritionally poor and nutritionally rich ones. *Choice C* is incorrect because the text addresses only the willingness of sunflower sea stars to consume the type of sea urchins found in barrens (nutritionally poor sea urchins), not how likely other species of sea stars are to consume them.

QUESTION 19

Choice D is the best answer. The convention being tested is subject-verb agreement. The singular verb "is" agrees in number with the singular subject "the country's name."

Choice A is incorrect because the plural verb "are" doesn't agree in number with the singular subject "the country's name." *Choice B* is incorrect because the plural verb "have been" doesn't agree in number with the singular subject "the country's name." *Choice C* is incorrect because the plural verb "are being" doesn't agree in number with the singular subject "the country's name."

QUESTION 20

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

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

QUESTION 21

Choice D is the best answer. The convention being tested is the use of punctuation within a sentence. This choice correctly uses a comma to mark the boundary between the main clause ("The short...*Stars*") and the supplementary element ("an anthology...descent") that provides additional information about what *Reclaim the Stars* is.

Choice A is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with "an anthology." *Choice B* is incorrect. Joining the main clause and the following supplementary element with the conjunction "while" results in a confusing and ungrammatical sentence. *Choice C* is incorrect because it fails to mark the boundary between the main clause and the supplementary element with appropriate punctuation.

QUESTION 22

Choice A is the best answer. The convention being tested is the use of plural and possessive nouns. The singular possessive proper noun "Austen's" and the plural noun "novels" correctly indicates that Austen wrote multiple novels that were famous.

Choice B is incorrect because the context requires the singular possessive proper noun "Austen's" and the plural noun "novels," not the plural possessive nouns "Austens'" and "novels'." *Choice C* is incorrect because the context requires the singular possessive proper noun "Austen's," not the plural proper noun "Austens." *Choice D* is incorrect because the context requires the plural noun "novels," not the singular possessive noun "novel's."

QUESTION 23

Choice C 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 “and” to join the first main clause (“This idea...paradox”) and the second main clause (“research...retention”).

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

QUESTION 24

Choice A is the best answer. The convention being tested is the use of plural nouns. The plural nouns “terms” and “presidents” correctly indicate that the amendment involves multiple terms and applies to presidents in general.

Choice B is incorrect because the context requires the plural noun “terms,” not the singular possessive noun “term’s.” *Choice C* is incorrect because the context requires the plural nouns “terms” and “presidents,” not the singular possessive nouns “term’s” and “president’s.” *Choice D* is incorrect because the context requires the plural noun “presidents,” not the singular possessive noun “president’s.”

QUESTION 25

Choice A 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 “goes” is consistent with the other present tense verbs (“appears” and “symbolizes”) used to describe the tortoise in Stoppard’s play. Furthermore, it’s conventional to use the present tense when discussing a literary work.

Choice B is incorrect because the future perfect tense verb “will have gone” isn’t consistent with the other present tense verbs used to describe the tortoise in Stoppard’s play. *Choice C* is incorrect because the past tense verb “went” isn’t consistent with the other present tense verbs used to describe the tortoise in Stoppard’s play. *Choice D* is incorrect because the past perfect tense verb “had gone” isn’t consistent with the other present tense verbs used to describe the tortoise in Stoppard’s play.

QUESTION 26

Choice A is the best answer. The convention being tested is the use of punctuation within a sentence. The dash after “stratigraphy” pairs with the dash after “(strata)” to separate the supplementary element “the analysis of Earth’s sediment layers (strata)” from the rest of the sentence. This supplementary element functions to define the term “stratigraphy,” and the pair of dashes indicates that this element could be removed without affecting the grammatical coherence of the sentence.

Choice B is incorrect because a parenthesis can't be paired with a dash in this way to separate the supplementary element from the rest of the sentence. *Choice C* is incorrect because a colon can't be paired with a dash in this way to separate the supplementary element from the rest of the sentence. *Choice D* is incorrect because a comma can't be paired with a dash in this way to separate the supplementary element from the rest of the sentence.

QUESTION 27

Choice C is the best answer. The convention being tested is punctuation use between sentences. In this choice, the period is used correctly to mark the boundary between one sentence ("In modern...audience") and another ("To do...performance").

Choice A is incorrect because it results in a rhetorically unacceptable sentence fragment beginning with "as." *Choice B* is incorrect because it results in a run-on sentence. The sentences ("In modern...audience" and "To do...performance") are fused without punctuation and/or a conjunction. *Choice D* is incorrect because it results in a comma splice. A comma can't be used in this way to mark the boundary between sentences.

QUESTION 28

Choice B is the best answer. "In comparison" logically signals that the description of savannas in this sentence—that they are drier and their trees are spaced further apart—forms a comparison with the description of tropical forests in the previous sentence.

Choice A is incorrect because "for instance" illogically signals that the description of savannas in this sentence exemplifies the description of tropical forests in the previous sentence. Instead, this description forms a comparison with the description of tropical forests. *Choice C* is incorrect because "firstly" illogically signals that the description of savannas in this sentence indicates the first in a series of things. Instead, this description forms a comparison with the description of tropical forests in the previous sentence. *Choice D* is incorrect because "in conclusion" illogically signals that the description of savannas in this sentence concludes or summarizes information in the previous sentences. Instead, this description forms a comparison with the description of tropical forests in the previous sentence.

QUESTION 29

Choice B is the best answer. "Instead" logically signals that the information in this sentence—that Bartholdi decided to slim and tilt out the arm of the Statue of Liberty—contrasts with Eiffel's design suggestions for the statue.

Choice A is incorrect because "additionally" illogically suggests that the information in this sentence is merely an additional fact related to Eiffel's design suggestions in the previous sentence. Instead, it contrasts with those suggestions. *Choice C* is incorrect because "thus" illogically signals that the information that follows is a result of Eiffel's design suggestions in the previous

sentence. Instead, it contrasts with those suggestions. *Choice D* is incorrect because “for example” illogically signals that the information about Bartholdi’s design decisions in this sentence exemplifies Eiffel’s design suggestions in the previous sentence. Instead, it contrasts with those suggestions.

QUESTION 30

Choice A is the best answer. The sentence emphasizes the thickness of lead-208’s neutron skin, noting that it is about 0.28 trillionths of a millimeter thick.

Choice B is incorrect. The sentence makes a generalization about atoms, stating that atoms with excess neutrons will often acquire a neutron skin; it doesn’t emphasize the thickness of lead-208’s neutron skin. *Choice C* is incorrect. The sentence states that lead-208 has a neutron skin; it doesn’t emphasize the thickness of that skin. *Choice D* is incorrect. The sentence indicates that lead-208 is surrounded by neutrons; it doesn’t emphasize the thickness of lead-208’s neutron skin.

QUESTION 31

Choice C is the best answer. The sentence uses “unlike” to emphasize a difference in how katydids and crab spiders use mimicry, noting that crab spiders use mimicry to ambush prey while katydids use it to hide from predators.

Choice A is incorrect. While the sentence does contrast katydids and crab spiders, it misrepresents the information in the notes. Katydids mimic the appearance of leaves (not flowers), whereas crab spiders mimic the appearance of flowers (not leaves). *Choice B* is incorrect. While the sentence indicates that katydids and crab spiders use mimicry, it doesn’t emphasize a difference in how they use it. *Choice D* is incorrect. The sentence describes what mimicry is; it doesn’t emphasize a difference in how katydids and crab spiders specifically use mimicry.

QUESTION 32

Choice B is the best answer. The sentence uses a quotation from Guirguis to explain what *Here I Have Returned* represents, noting that Guirguis said the sculpture symbolizes “women who have lifted and supported Egyptian society and culture.”

Choice A is incorrect. The sentence explains what Guirguis says she wants her work to achieve and provides an example of her work; it doesn’t use a quotation to explain what the sculpture represents. *Choice C* is incorrect. The sentence mentions the instrument whose shape inspired the sculpture but doesn’t use a quotation to explain what the sculpture represents. *Choice D* is incorrect. While the sentence does use a quotation from Guirguis, the quotation explains what she hopes her works in general achieve, not what the sculpture in particular represents.

QUESTION 33

Choice B is the best answer. The sentence uses the poem “Towards Autumn” to illustrate the form of a sestina, explaining that a sestina’s thirty-nine lines all end in one of six alternating words and showcasing that poem’s specific end words.

Choice A is incorrect. The sentence identifies both of Hacker’s poems as sestinas; it doesn’t use one of the poems to illustrate the form of a sestina.

Choice C is incorrect. While the sentence appears to use the poem “Forage Sestina” to illustrate a feature of the sestina form, it misrepresents the information in the notes. According to the notes, “Forage Sestina” doesn’t use these six end words; it uses six other words instead. *Choice D* is incorrect. While the sentence uses the poem “Towards Autumn” as an example of one of Hacker’s sestinas, it misrepresents the information in the notes. According to the notes, “Towards Autumn” doesn’t use these six end words; it uses six other words instead.

Math

Module 1

(27 questions)

QUESTION 1

Choice A is correct. The given absolute value equation can be rewritten as two linear equations: $x + 45 = 48$ and $-(x + 45) = 48$, or $x + 45 = -48$. Subtracting 45 from both sides of the equation $x + 45 = 48$ yields $x = 3$. Subtracting 45 from both sides of the equation $x + 45 = -48$ yields $x = -93$. Thus, the given equation has two possible solutions, 3 and -93 . Therefore, the positive solution to the given equation is 3.

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 2

Choice A is correct. The first equation in the given system of equations is $x = 4$. Substituting 4 for x in the second equation in the given system of equations yields $y = 5 - 4$, or $y = 1$.

Choice B is incorrect. This is the value of x in the solution to the given system of equations, not the value of y . *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 C is correct. Let d represent the mass, in grams, of vitamin D in the mixture, and let c represent the mass, in grams, of calcium in the mixture. It's given that the mixture consists of only vitamin D and calcium and that the total mass of the mixture is 150 grams. Therefore, the equation $d + c = 150$ represents this situation. It's also given that the mass of vitamin D in the mixture is 50 grams. Substituting 50 for d in the equation $d + c = 150$ yields $50 + c = 150$. Subtracting

50 from both sides of this equation yields $c = 100$. Therefore, the mass of calcium in the mixture is 100 grams.

Choice A is incorrect and may result from conceptual or calculation errors.
Choice B is incorrect. This is the total mass, in grams, of the mixture, not the mass, in grams, of calcium in the mixture. *Choice D* is incorrect. This is the mass, in grams, of vitamin D in the mixture, not the mass, in grams, of calcium in the mixture.

QUESTION 4

Choice C is correct. It's given that this service contract requires a monthly cost of \$23. A monthly cost of \$23 for t months results in a cost of $\$23t$. It's also given that this service contract requires a onetime activation cost of \$35. Adding the onetime activation cost to the monthly cost of the service contract for t months yields the total cost c , in dollars, of this service contract for t months. Therefore, this situation can be represented by the equation $c = 23t + 35$.

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 5

Choice B is correct. It's given that the function f is defined by $f(x) = 3x - 8$. The value of $f(7)$ is the value of $f(x)$ when $x = 7$. Substituting 7 for x in the given equation yields $f(7) = 3(7) - 8$, which is equivalent to $f(7) = 21 - 8$, or $f(7) = 13$.

Choice A is incorrect. This is the value of $f(7)$ when $f(x) = 3x + 8$, rather than $f(x) = 3x - 8$. *Choice C* is incorrect. This is the value of $f(1)$, rather than $f(7)$. *Choice D* is incorrect. This is the value of $f(-7)$, rather than $f(7)$.

QUESTION 6

The correct answer is 40. The y -intercept of a graph in the xy -plane is the point (x, y) on the graph where $x = 0$. The y -intercept of the graph shown is $(0, 40)$. Therefore, the value of y is 40.

QUESTION 7

The correct answer is 130. It's given that $8x - 7x + 130 = 260$. Combining like terms on the left-hand side of this equation yields $x + 130 = 260$. Subtracting 130 from each side of this equation yields $x = 130$. Therefore, the value of x that's the solution to the given equation is 130.

QUESTION 8

Choice C is correct. It's given that the geologist has already collected 63 samples from the volcano. Let x represent the number of additional samples the geologist needs to collect. After collecting x additional samples, the geologist will have collected a total of $63 + x$ samples. It's given that the geologist needs to collect

at least 67 samples. Therefore, $63 + x \geq 67$. Subtracting 63 from each side of this inequality yields the inequality $x \geq 4$. Thus, the geologist needs to collect a minimum of 4 additional samples.

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

Choice B is incorrect. This is the number of samples the geologist has already collected, rather than the minimum number of additional samples the geologist needs to collect. *Choice D* is incorrect. If the geologist collects 0 additional samples, the geologist will have collected a total of 63 samples, which is less than 67 samples.

QUESTION 9

Choice A is correct. If one of the gemstones is selected at random, the probability of selecting a gemstone of color Y is equal to the number of gemstones of color Y divided by the total number of gemstones. According to the table, there are 3 gemstones of color Y, and it's given that the total number of gemstones is 157. Therefore, if one of the gemstones is selected at random, the probability of selecting a gemstone of color Y is $\frac{3}{157}$.

Choice B is incorrect. This is the probability of selecting a gemstone of color Z.

Choice C is incorrect. This is the probability of selecting a gemstone of color X.

Choice D is incorrect. This is the probability of selecting a gemstone that's not of color Y.

QUESTION 10

Choice A is correct. The equation for the line representing the boundary of the shaded region can be written in slope-intercept form $y = mx + b$, where m is the slope and $(0, b)$ is the y -intercept of the line. For the graph shown, the boundary line passes through the points $(0, -6)$ and $(9, 0)$. Given two points on a line, (x_1, y_1) and (x_2, y_2) , the slope of the line can be calculated using the equation $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting the points $(0, -6)$ and $(9, 0)$ for (x_1, y_1) and (x_2, y_2) , respectively, in this equation yields $m = \frac{0 - (-6)}{9 - 0}$, which is equivalent to $m = \frac{6}{9}$, or $m = \frac{2}{3}$. Since the point $(0, -6)$ represents the y -intercept, it follows that $b = -6$. Substituting $\frac{2}{3}$ for m and -6 for b in the equation $y = mx + b$ yields $y = \frac{2}{3}x - 6$ as the equation of the boundary line. Since the shaded region represents all the points on and above this boundary line, it follows that the shaded region shown represents the solutions to the inequality $y \geq \frac{2}{3}x - 6$.

Choice B is incorrect. This inequality represents a region whose boundary line has a y -intercept of $(0, 6)$, not $(0, -6)$. *Choice C* is incorrect. This inequality represents a region whose boundary line has a y -intercept of $(0, -9)$, not $(0, -6)$. *Choice D* is incorrect. This inequality represents a region whose boundary line has a y -intercept of $(0, 9)$, not $(0, -6)$.

QUESTION 11

Choice A is correct. In an equilateral triangle, all three sides have the same length. It's given that in triangle ABC , $AB = 4,680$ mm and $BC = 4,680$ mm. Therefore, if $AC = 4,680$ mm, then all three sides of triangle ABC have the same length, so triangle ABC is equilateral. Therefore, $AC = 4,680$ mm is sufficient to prove that triangle ABC is equilateral.

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 12

Choice C is correct. The function P gives the predicted population, in millions, of a certain country for the period from 1984 to 2018, where t is the number of years after 1984. Since the value of $P(8)$ is the value of $P(t)$ when $t = 8$, it follows that " $P(8)$ is approximately equal to 32.91" means that the value of $P(t)$ is approximately equal to 32.91 when $t = 8$. Therefore, the best interpretation of the statement " $P(8)$ is approximately equal to 32.91" is that 8 years after 1984, the predicted population of this country was approximately 32.91 million.

Choice A is incorrect. In 1984, the predicted population of this country was 24.8 million, not approximately 8 million. *Choice B* is incorrect. In 1984, the predicted population of this country was 24.8 million, not approximately 32.91 million. *Choice D* is incorrect. 32.91 years after 1984, the predicted population of this country was $24.8(1.036)^{32.91}$ million, or approximately 79.42 million, not approximately 8 million.

QUESTION 13

The correct answer is 29. The volume, V , of a right circular cylinder is given by the formula $V = \pi r^2 h$, where r is the radius of the base of the cylinder and h is the height of the cylinder. Since the base of the cylinder is a circle with radius r , the area of the base of the cylinder is πr^2 . It's given that a right circular cylinder has a volume of 377 cubic centimeters; therefore, $V = 377$. It's also given that the area of the base of the cylinder is 13 square centimeters; therefore, $\pi r^2 = 13$.

Substituting 377 for V and 13 for πr^2 in the formula $V = \pi r^2 h$ yields $377 = 13h$. Dividing both sides of this equation by 13 yields $29 = h$. Therefore, the height of the cylinder, in centimeters, is 29.

QUESTION 14

The correct answer is 3,630. The mean of a data set is the sum of the values in the data set divided by the number of values in the data set. The sum of the masses, in grams, of these alpine marmots is $4,010 + 4,010 + 3,030 + 4,050 + 3,050$, or 18,150 grams. The number of alpine marmots in the data set is 5. Therefore, the mean mass, in grams, of these 5 alpine marmots is $\frac{18,150}{5}$, or 3,630.

QUESTION 15

Choice A is correct. The first equation in the given system of equations is $x = 3$. Substituting 3 for x in the second equation in the given system of equations yields $y = (15 - 3)^2$, or $y = 144$. Substituting 3 for x and 144 for y in the expression xy yields $(3)(144)$, or 432. Therefore, the value of xy is 432.

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 16

Choice B is correct. The cosine of an acute angle in a right triangle is defined as the ratio of the length of the leg adjacent to the angle to the length of the hypotenuse. In the triangle shown, the length of the leg adjacent to angle A is 41, and the length of the hypotenuse is 42. Therefore, $\cos A = \frac{41}{42}$.

Choice A is incorrect. This is the value of $\frac{1}{\cos A}$. *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 17

Choice D is correct. The area, A , of a circle is given by the formula $A = \pi r^2$, where r is the radius of the circle. It's given that the circle has a radius of 43 meters. Substituting 43 for r in the formula $A = \pi r^2$ yields $A = \pi(43)^2$, or $A = 1,849\pi$. Therefore, the area, in square meters, of the circle is $1,849\pi$.

Choice A is incorrect. This is the area, in square meters, of a circle with a radius of $\sqrt{\frac{43}{2}}$ meters. *Choice B* is incorrect. This is the area, in square meters, of a circle with a radius of $\sqrt{43}$ meters. *Choice C* is incorrect. This is the circumference, in meters, of the circle.

QUESTION 18

Choice A is correct. It's given that the object has a mass of 168 grams and a volume of 24 cubic centimeters. Dividing the mass, in grams, of the object by the volume, in cubic centimeters, of the object gives the density, in grams per cubic centimeter, of the object. It follows that the density of the object is

$\frac{168 \text{ grams}}{24 \text{ cubic centimeters}}$, which is equivalent to $\frac{168}{24}$ grams per cubic centimeter, or

7 grams per cubic centimeter.

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 19

Choice B is correct. It's given that in January 2018, there were 1,300 customers subscribed to a company's newsletter and for the next 24 months after January 2018, the total number of customers subscribed to the newsletter each month was 7% greater than the total number subscribed the previous month. It follows that this situation can be represented by the equation $c = a\left(1 + \frac{r}{100}\right)^m$, where c is the total number of customers subscribed to the company's newsletter m months after January 2018, a is the number of customers subscribed to the newsletter in January 2018, and the total number of customers subscribed to the newsletter each month was $r\%$ greater than the total number subscribed the previous month. Substituting 1,300 for a and 7 for r in this equation yields $c = 1,300\left(1 + \frac{7}{100}\right)^m$, or $c = 1,300(1.07)^m$.

Choice A is incorrect. This equation represents a situation where the total number of customers subscribed each month was 93% less, not 7% greater, than the total number subscribed the previous month. **Choice C** is incorrect. This equation represents a situation where the total number of customers subscribed each month was 70%, not 7%, greater than the total number subscribed the previous month. **Choice D** is incorrect. This equation represents a situation where the total number of customers subscribed each month was 600%, not 7%, greater than the total number subscribed the previous month.

QUESTION 20

The correct answer is 6. The line of best fit predicts a greater y -value than the actual y -value for any data point that's located below the line of best fit. For the scatterplot shown, 6 of the data points are below the line of best fit. Therefore, the line of best fit predicts a greater y -value than the actual y -value for 6 of the data points.

QUESTION 21

The correct answer is 156. In the figure shown, the sum of the measures of angle UVS and angle RVS is 180° . It's given that the measure of angle RVS is 41° . Therefore, the measure of angle UVS is $(180 - 41)^\circ$, or 139° . The sum of the measures of the interior angles of a triangle is 180° . In triangle UVS , the measure of angle UVS is 139° and it's given that the measure of angle VST is 29° . Thus, the measure of angle VUS is $(180 - 139 - 29)^\circ$, or 12° . It's given that $RT = TU$. Therefore, triangle TUR is an isosceles triangle and the measure of VUS is equal to the measure of angle TRU . In triangle TUR , the measure of angle VUS is 12° and the measure of angle TRU is 12° . Thus, the measure of angle UTR is $(180 - 12 - 12)^\circ$, or 156° . The figure shows that the measure of angle UTR is x° , so the value of x is 156.

QUESTION 22

Choice D is correct. A system of two linear equations in two variables, x and y , has zero solutions if the lines representing the equations in the xy -plane are distinct and parallel. Two lines are distinct and parallel if they have the same slope

but different y -intercepts. Each equation in the given system can be written in slope-intercept form $y = mx + b$, where m is the slope of the line representing the equation in the xy -plane and $(0, b)$ is the y -intercept. Adding $12x$ to both sides of the first equation in the given system of equations, $-12x + 14y = 36$, yields $14y = 12x + 36$. Dividing both sides of this equation by 14 yields $y = \frac{6}{7}x + \frac{18}{7}$. It follows that the first equation in the given system of equations has a slope of $\frac{6}{7}$ and a y -intercept of $(0, \frac{18}{7})$. Adding $6x$ to both sides of the second equation in the given system of equations, $-6x + 7y = -18$, yields $7y = 6x - 18$. Dividing both sides of this equation by 7 yields $y = \frac{6}{7}x - \frac{18}{7}$. It follows that the second equation in the given system of equations has a slope of $\frac{6}{7}$ and a y -intercept of $(0, -\frac{18}{7})$. Since the slopes of these lines are the same and the y -intercepts are different, it follows that the given system of equations has zero solutions.

Alternate approach: To solve the system by elimination, multiplying the second equation in the given system of equations, $-6x + 7y = -18$, by -2 yields $12x - 14y = 36$. Adding this equation to the first equation in the given system of equations, $-12x + 14y = 36$, yields $(-12x + 12x) + (-14y + 14y) = 36 + 36$, or $0 = 72$. Since this equation isn't true, the given system of equations has zero 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 C is incorrect and may result from conceptual or calculation errors.

QUESTION 23

Choice D is correct. Let $n\%$ represent the percent by which the positive quantity x is decreased to result in $0.35x$. The value of n can be found by solving the equation $x - (\frac{n}{100})x = 0.35x$. Since x is a common factor of each of the terms on the left-hand side of this equation, the equation can be rewritten as

$$x(1 - \frac{n}{100}) = 0.35x. \text{ Dividing each side of this equation by } x \text{ yields } 1 - \frac{n}{100} = 0.35.$$

Multiplying each side of this equation by 100 yields $100 - n = 35$. Subtracting 100 from each side of this equation yields $-n = -65$. Dividing each side of this equation by -1 yields $n = 65$. Therefore, the expression $0.35x$ represents the result of decreasing the positive quantity x by 65% .

Choice A is incorrect. Decreasing the quantity x by 3.5% yields $x - 0.035x$, or $0.965x$, not $0.35x$. *Choice B* is incorrect. Decreasing the quantity x by 35% yields $x - 0.35x$, or $0.65x$, not $0.35x$. *Choice C* is incorrect. Decreasing the quantity x by 6.5% yields $x - 0.065x$, or $0.935x$, not $0.35x$.

QUESTION 24

Choice B is correct. It's given that object R travels a distance of $4x$ inches in y seconds. This speed can be written as $\frac{4x \text{ inches}}{y \text{ seconds}}$. It's given that the speed of object R is half the speed of object S. It follows that the speed of object S is twice the speed of object R, which is $2(\frac{4x \text{ inches}}{y \text{ seconds}})$, or $\frac{8x \text{ inches}}{y \text{ seconds}}$. Let n represent the time,

in seconds, it takes object S to travel a distance of $24x$ inches. The value of n can be found by solving the equation $\frac{8x \text{ inches}}{y \text{ seconds}} = \frac{24x \text{ inches}}{n \text{ seconds}}$, which can be written as $\frac{8x}{y} = \frac{24x}{n}$. Multiplying each side of this equation by ny yields $8xn = 24xy$. Dividing each side of this equation by $8x$ yields $n = 3y$. Therefore, the expression $3y$ represents the time, in seconds, it takes object S to travel a distance of $24x$ inches.

Choice A is incorrect. This expression represents the time, in seconds, it would take object S to travel a distance of $24x$ inches if the speed of object R were twice, not half, the speed of object S. *Choice C* is incorrect. This expression represents the time, in seconds, it takes object S to travel a distance of $128x$ inches, not $24x$ inches. *Choice D* is incorrect. This expression represents the time, in seconds, it takes object R, not object S, to travel a distance of $24x$ inches.

QUESTION 25

Choice C is correct. The equation representing the linear relationship shown can be written in slope-intercept form $y = mx + b$, where m is the slope and $(0, b)$ is the y -intercept of the line. The line shown passes through the points $(0, 6)$ and $(2, 0)$. Given two points on a line, (x_1, y_1) and (x_2, y_2) , the slope of the line can be calculated using the equation $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting $(0, 6)$ and $(2, 0)$ for (x_1, y_1) and (x_2, y_2) , respectively, in this equation yields $m = \frac{0 - 6}{2 - 0}$, which is equivalent to $m = -\frac{6}{2}$, or $m = -3$. Since $(0, 6)$ is the y -intercept, it follows that $b = 6$.

Substituting -3 for m and 6 for b in the equation $y = mx + b$ yields $y = -3x + 6$. Adding $3x$ to both sides of this equation yields $3x + y = 6$. Multiplying this equation by 6 yields $18x + 6y = 36$. It follows that the equation $18x + Ry = 36$, where R is a positive constant, represents this relationship.

Choice A is incorrect. The graph of this relationship passes through the point $(0, 2)$, not $(0, 6)$. *Choice B* is incorrect. The graph of this relationship passes through the point $(0, 2)$, not $(0, 6)$. *Choice D* is incorrect. The graph of this relationship passes through the point $(-2, 0)$, not $(2, 0)$.

QUESTION 26

Choice B is correct. Let x represent the total mass, in grams, of the first piece, and let y represent the total mass, in grams, of the second piece. It's given that the sample has a total mass of 50.0 grams. Therefore, the equation $x + y = 50.0$ represents this situation. It's also given that the sample is 50.0% silicon by mass. Therefore, the total mass of the silicon in the sample is $0.500(50.0)$, or 25.0 , grams. It's also given that the first piece was 30.0% silicon by mass and the second piece was 80.0% silicon by mass. Therefore, the masses, in grams, of the silicon in the first and second pieces can be represented by the expressions $0.300x$ and $0.800y$, respectively. Since the sample was created by combining the first and second pieces, and the total mass of the silicon in the sample is 25.0 grams, the equation $0.300x + 0.800y = 25.0$ represents this situation.

Subtracting y from both sides of the equation $x + y = 50.0$ yields $x = 50.0 - y$. Substituting $50.0 - y$ for x in the equation $0.300x + 0.800y = 25.0$ yields $0.300(50.0 - y) + 0.800y = 25.0$. Distributing 0.300 on the left-hand side of this equation yields $15.0 - 0.300y + 0.800y = 25.0$. Combining like terms on the left-hand side of this equation yields $15.0 + 0.500y = 25.0$. Subtracting 15.0 from both sides of this equation yields $0.500y = 10.0$. Dividing both sides of this equation by 0.500 yields $y = 20.0$. Substituting 20.0 for y in the expression representing the mass, in grams, of the silicon in the second piece, $0.800y$, yields $0.800(20.0)$, or 16.0 . Therefore, the mass, in grams, of the silicon in the second piece is 16.0 .

Choice A is incorrect. This is the mass, in grams, of the silicon in the first piece, not the second piece. *Choice C* is incorrect. This is the total mass, in grams, of the second piece, not the mass, in grams, of the silicon in the second piece. *Choice D* is incorrect. This is the total mass, in grams, of the first piece, not the mass, in grams, of the silicon in the second piece.

QUESTION 27

The correct answer is 14. Let x represent the first integer and y represent the second integer. If the first integer is 5 greater than twice the second integer, then $x = 2y + 5$. It's given that the product of the two integers is 462; therefore $xy = 462$. Substituting $2y + 5$ for x in this equation yields $(2y + 5)(y) = 462$, which can be written as $2y^2 + 5y = 462$. Subtracting 462 from each side of this equation yields $2y^2 + 5y - 462 = 0$. The left-hand side of this equation can be factored by finding two values whose product is $2(-462)$, or -924 , and whose sum is 5. The two values whose product is -924 and whose sum is 5 are 33 and -28 . Thus, the equation $2y^2 + 5y - 462 = 0$ can be rewritten as $2y^2 - 28y + 33y - 462 = 0$, which is equivalent to $2y(y - 14) + 33(y - 14) = 0$, or $(2y + 33)(y - 14) = 0$. By the zero product property, it follows that $2y + 33 = 0$ or $y - 14 = 0$. Subtracting 33 from both sides of the equation $2y + 33 = 0$ yields $2y = -33$. Dividing both sides of this equation by 2 yields $y = -\frac{33}{2}$. Since y is a positive integer, the value of y isn't $-\frac{33}{2}$. Adding 14 to both sides of the equation $y - 14 = 0$ yields $y = 14$.

Substituting 14 for y in the equation $xy = 462$ yields $x(14) = 462$. Dividing both sides of this equation by 14 yields $x = 33$. Therefore, the two integers are 14 and 33, so the smaller of the two integers is 14.

Math

Module 2

(27 questions)

QUESTION 1

Choice B is correct. The height of each bar in the graph shown represents the number of containers that contain the number of walnuts specified at the bottom of the bar. The bar for 78 walnuts has a height of 7. Therefore, 7 of these containers of walnuts contain exactly 78 walnuts.

Choice A is incorrect. This is the number of containers that contain exactly 75 walnuts, not 78 walnuts. *Choice C* is incorrect. This is the total number of containers of walnuts represented in the bar graph, not the number that contain exactly 78 walnuts. *Choice D* is incorrect. This is the number of walnuts in a container that contains exactly 78 walnuts, not the number of containers that contain exactly 78 walnuts.

QUESTION 2

Choice C is correct. For the line graph shown, the probability of snow, as a percent, is represented on the vertical axis. According to the line graph, during this four-day period, the probability of snow is 30% for Thursday.

Choice A is incorrect. The probability of snow on Tuesday is 60%. *Choice B* is incorrect. The probability of snow on Wednesday is 90%. *Choice D* is incorrect. The probability of snow on Friday is 70%.

QUESTION 3

Choice B is correct. The solution (x, y) to the system of two equations corresponds to the point where the graphs of the equations intersect in the xy -plane. The graphs of the linear equation and the nonlinear equation shown intersect at the point $(-2, 6)$. Thus, the solution (x, y) to this system is $(-2, 6)$.

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

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

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

QUESTION 4

Choice D is correct. In the figure shown, the angles with measures w° and z° are vertical angles. Since vertical angles are congruent, $w = z$. Therefore, if $w = 136$, the value of z is 136.

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

Choice B is incorrect. This is the measure, in degrees, of an angle that's supplementary, not congruent, to the angle with measure w° . *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 5

Choice A is correct. The expression $19(x^2 - 7)$ can be rewritten as $19(x^2) - 19(7)$, which is equivalent to $19x^2 - 133$.

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

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

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

QUESTION 6

The correct answer is 7. It's given that the parabola intersects the y -axis at the point (x, y) . The graph shows that the parabola intersects the y -axis at the point $(0, 7)$. Therefore, the value of y is 7.

QUESTION 7

The correct answer is 17. It's given that $2x + 3 = 9$. Multiplying each side of this equation by 3 yields $3(2x + 3) = 3(9)$, or $6x + 9 = 27$. Subtracting 10 from each side of this equation yields $6x + 9 - 10 = 27 - 10$, or $6x - 1 = 17$. Therefore, the value of $6x - 1$ is 17.

QUESTION 8

Choice D is correct. A linear model can be written in the form $y = mx + b$, where m is the slope of the graph of the model in the xy -plane and $(0, b)$ is the y -intercept. The graph of an appropriate linear model for this relationship passes near the points $(1, 3)$ and $(9, 10)$ in the xy -plane. Two points on a line, (x_1, y_1) and (x_2, y_2) , can be used to find the slope of the line using the slope formula,

$m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting the points $(1, 3)$ and $(9, 10)$ for (x_1, y_1) and (x_2, y_2) ,

respectively, in the slope formula yields $m = \frac{10 - 3}{9 - 1}$, or $m = 0.875$. Therefore, the

value of m for an appropriate linear model is approximately 0.875. Substituting

0.875 for m in $y = mx + b$ yields $y = 0.875x + b$. Since an appropriate linear

model passes near the point $(1, 3)$, the approximate value of b can be found by

substituting 1 for x and 3 for y in the equation $y = 0.875x + b$, which yields

$3 = (0.875)(1) + b$, or $3 = 0.875 + b$. Subtracting 0.875 from both sides of this

equation yields $2.125 = b$. Therefore, the value of b for an appropriate linear

model is approximately 2.125. Thus, of the given choices, $y = 0.9x + 2.2$ is the

most appropriate linear model for this relationship.

Alternate approach: A linear model can be written in the form $y = mx + b$, where m is the slope of the graph of the model in the xy -plane and $(0, b)$ is the y -intercept. The scatterplot shows that as the x -values of the data points increase, the y -values of the data points increase, which means the graph of an appropriate linear model has a positive slope. Of the given choices, $y = 0.9x + 2.2$ is the only linear model whose graph has a positive slope.

Choice A is incorrect. The graph of this model has a negative slope, not a positive slope. *Choice B* is incorrect. The graph of this model has a negative slope, not a positive slope. *Choice C* is incorrect. The graph of this model has a negative slope, not a positive slope.

QUESTION 9

Choice B is correct. It's given that the equation $d = 16 - \frac{x}{30}$ gives the estimated amount of diesel d , in gallons, that remains in the gas tank of the truck after being driven x miles. Substituting 300 for x in the given equation yields $d = 16 - \frac{300}{30}$, which is equivalent to $d = 16 - 10$, or $d = 6$. Therefore, the estimated amount of diesel that remains in the gas tank of the truck when $x = 300$ is 6 gallons.

Choice A is incorrect. This is the estimated amount of diesel, in gallons, that will remain in the gas tank of the truck when $x = 480$, not when $x = 300$. *Choice C* is incorrect. This is the estimated amount of diesel, in gallons, that will remain in the gas tank of the truck when $x = 60$, not when $x = 300$. *Choice D* is incorrect. This is the estimated amount of diesel, in gallons, that will remain in the gas tank of the truck when $x = 0$, not when $x = 300$.

QUESTION 10

Choice C is correct. Each of the tables shows the same three values of x : -1 , 0 , and 1 . Substituting -1 for x in the given function yields $g(-1) = 11(-1) + 4$, or $g(-1) = -7$. Therefore, when $x = -1$, the corresponding value of $g(x)$ is -7 . Substituting 0 for x in the given function yields $g(0) = 11(0) + 4$, or $g(0) = 4$. Therefore, when $x = 0$, the corresponding value of $g(x)$ is 4 . Substituting 1 for x in the given function yields $g(1) = 11(1) + 4$, or $g(1) = 15$. Therefore, when $x = 1$, the corresponding value of $g(x)$ is 15 . The table in choice C shows -7 , 4 , and 15 as the corresponding value of $g(x)$ for x -values of -1 , 0 , and 1 , respectively. Therefore, the table in choice C shows three values of x and their corresponding values of $g(x)$.

Choice A is incorrect. This table shows three values of x and their corresponding values of $g(x)$ for the linear function $g(x) = 4x + 11$. *Choice B* is incorrect. This table shows three values of x and their corresponding values of $g(x)$ for the linear function $g(x) = 4x$. *Choice D* is incorrect. This table shows three values of x and their corresponding values of $g(x)$ for the linear function $g(x) = 11x$.

QUESTION 11

Choice A is correct. It's given that the pressure exerted on a scuba diver at sea level is 14.70 pounds per square inch (psi). It's also given that for each foot the scuba diver descends below sea level, the pressure exerted on the scuba diver increases by 0.44 psi. The total pressure, in psi, exerted on the scuba diver at x feet below sea level can be represented by the expression $0.44x + 14.70$. Substituting 105 for x in this expression yields $0.44(105) + 14.70$, or 60.90. Therefore, the total pressure exerted on the scuba diver at 105 feet below sea level is 60.90 psi.

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

Choice C is incorrect. This is the pressure, in psi, exerted on the scuba diver at sea level, not at 105 feet below sea level. *Choice D* is incorrect. This is the rate by which the pressure, in psi, exerted on the scuba diver increases for each foot the scuba diver descends below sea level.

QUESTION 12

Choice C is correct. It's given that function f is defined by the equation $f(x) = 4x^{-1}$. The value of $f(21)$ is the value of $f(x)$ when $x = 21$. Substituting 21 for x in the given equation yields $f(21) = 4(21)^{-1}$, which is equivalent to $f(21) = 4\left(\frac{1}{21}\right)$, or $f(21) = \frac{4}{21}$.

Choice A is incorrect. This is the value of $f(21)$ when $f(x) = -4x$, rather than $f(x) = 4x^{-1}$. *Choice B* is incorrect. This is the value of $f(21)$ when $f(x) = (4x)^{-1}$, rather than $f(x) = 4x^{-1}$. *Choice D* is incorrect. This is the value of $f(21)$ when $f(x) = (4^{-1})x$, rather than $f(x) = 4x^{-1}$.

QUESTION 13

The correct answer is 3. The area of a rectangle can be calculated by multiplying the length of its longest side by the length of its shortest side. It's given that the area of the rectangle is 57 square inches and the length of the longest side of the rectangle is 19 inches. Let x represent the length, in inches, of the shortest side of this rectangle. It follows that $57 = 19x$. Dividing both sides of this equation by 19 yields $3 = x$. Therefore, the length, in inches, of the shortest side of the rectangle is 3.

QUESTION 14

The correct answer is 423.5. It's given that 5.5 yards = 1 rod. Therefore, 77 rods is equivalent to $(77 \text{ rods})\left(\frac{5.5 \text{ yards}}{1 \text{ rod}}\right)$, or 423.5 yards. Note that 423.5 and $847/2$ are examples of ways to enter a correct answer.

QUESTION 15

Choice A is correct. The number of solutions of a quadratic equation of the form $ax^2 + bx + c = 0$, where a , b , and c are constants, can be determined by the value of the discriminant, $b^2 - 4ac$. If the value of the discriminant is positive, then the

quadratic equation has exactly two distinct real solutions. If the value of the discriminant is equal to zero, then the quadratic equation has exactly one real solution. If the value of the discriminant is negative, then the quadratic equation has zero real solutions. In the given equation, $x^2 - 12x + 27 = 0$, $a = 1$, $b = -12$, and $c = 27$. Substituting these values for a , b , and c in $b^2 - 4ac$ yields $(-12)^2 - 4(1)(27)$, or 36. Since the value of its discriminant is positive, the given equation has exactly two distinct real solutions.

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 16

Choice C is correct. An equation defining a linear function can be written in the form $g(x) = mx + b$, where m is the slope and $(0, b)$ is the y -intercept of the graph of $y = g(x)$ in the xy -plane. It's given that the graph of $y = g(x)$ has a slope of 2. Therefore, $m = 2$. It's also given that the graph of $y = g(x)$ passes through the point $(1, 14)$. It follows that when $x = 1$, $g(x) = 14$. Substituting 1 for x , 14 for $g(x)$, and 2 for m in the equation $g(x) = mx + b$ yields $14 = 2(1) + b$, or $14 = 2 + b$. Subtracting 2 from each side of this equation yields $12 = b$. Therefore, $b = 12$. Substituting 2 for m and 12 for b in the equation $g(x) = mx + b$ yields $g(x) = 2x + 12$. Therefore, the equation that defines g is $g(x) = 2x + 12$.

Choice A is incorrect. For this function, the graph of $y = g(x)$ in the xy -plane passes through the point $(1, 2)$, not $(1, 14)$. *Choice B* is incorrect. For this function, the graph of $y = g(x)$ in the xy -plane passes through the point $(1, 4)$, not $(1, 14)$.

Choice D is incorrect. For this function, the graph of $y = g(x)$ in the xy -plane passes through the point $(1, 16)$, not $(1, 14)$.

QUESTION 17

Choice B is correct. On the graph shown, the y -axis represents estimated population, in thousands. The graph shows that when $x = 0$, the y -coordinate is 6. Therefore, the estimated population at $x = 0$ is 6 thousand. The graph also shows that when $x = 1$, the y -coordinate is 9. Therefore, the estimated population at $x = 1$ is 9 thousand. Dividing 9 thousand by 6 thousand yields 1.5; therefore, 9 thousand is 1.5 times 6 thousand. It follows that the estimated population at $x = 1$ is 1.5 times the estimated population at $x = 0$.

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

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

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

QUESTION 18

Choice C is correct. It's given that the price of the collectible card was \$15.50 in March and \$17.36 in April. It's also given that the price of the collectible card in April was $p\%$ of the price in March. It follows that \$17.36 is $p\%$ of \$15.50. Therefore, the value of p can be calculated by solving the equation

$17.36 = \left(\frac{p}{100}\right)(15.50)$, or $17.36 = \frac{15.50p}{100}$. Multiplying each side of this equation by

100 yields $1,736 = 15.50p$. Dividing each side of this equation by 15.50 yields $112 = p$. Therefore, the value of p is 112.

Choice A is incorrect. 12% is the percent increase in the price of the collectible card from March to April. *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 19

Choice B is correct. To express a in terms of b and x , the given equation can be rewritten such that a is isolated on one side of the equation. Since it's given that b is a positive number, $b + 9$ is not equal to zero. Therefore, dividing both sides of the given equation by $8(b + 9)$ yields the equivalent equation $\frac{x}{8(b+9)} = a$, or $a = \frac{x}{8(b+9)}$.

Choice A is incorrect. This equation is equivalent to $x = 8(a + (b + 9))$. *Choice C* is incorrect. This equation is equivalent to $x = \frac{8(b+9)}{a}$. *Choice D* is incorrect. This equation is equivalent to $x = \frac{a}{8(b+9)}$.

QUESTION 20

The correct answer is 4. It's given that line k is parallel to line j . It follows that the slope of line k is equal to the slope of line j . Given two points on a line in the xy -plane, (x_1, y_1) and (x_2, y_2) , the slope of the line can be calculated as $\frac{y_2 - y_1}{x_2 - x_1}$. In the xy -plane shown, the points $(0, 5)$ and $(1, 9)$ are on line j . It follows that the slope of line j is $\frac{9-5}{1-0}$, or 4. Since the slope of line j is equal to the slope of line k , the slope of line k is also 4.

QUESTION 21

The correct answer is 34. It's given that a line segment has a length of 115 cm and is divided into three parts, where one part is 47 cm long and the other two parts have lengths that are equal. If x represents the length, in cm, of each of the two parts of equal length, then the equation $47 + x + x = 115$, or $47 + 2x = 115$, represents this situation. Subtracting 47 from each side of this equation yields $2x = 68$. Dividing each side of this equation by 2 yields $x = 34$. Therefore, the length, in cm, of one of the two parts of equal length is 34.

QUESTION 22

Choice B is correct. For a quadratic function defined by an equation of the form $p(x) = a(x - h)^2 + k$, where a , h , and k are constants and $a > 0$, the minimum value of the function is k . Subtracting 57 from both sides of the given equation yields $p(x) = x^2 - 57$. This function is in the form $p(x) = a(x - h)^2 + k$, where $a = 1$, $h = 0$, and $k = -57$. Therefore, the minimum value of the function p is -57 .

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 23

Choice D is correct. The linear relationship between x and y can be represented by the equation $y = mx + b$, where m is the slope of the graph of this equation in the xy -plane and b is the y -coordinate of the y -intercept. The slope of a line between any two points (x_1, y_1) and (x_2, y_2) on the line can be calculated using the

slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. Based on the table, the graph contains the points $(-18, -48)$ and $(7, 52)$. Substituting $(-18, -48)$ and $(7, 52)$ for (x_1, y_1) and (x_2, y_2) , respectively, in the slope formula yields $m = \frac{52 - (-48)}{7 - (-18)}$, which is equivalent to $m = \frac{100}{25}$, or $m = 4$. Substituting 4 for m , -18 for x , and -48 for y in the equation $y = mx + b$ yields $-48 = 4(-18) + b$, or $-48 = -72 + b$. Adding 72 to both sides of this equation yields $24 = b$. Therefore, $m = 4$ and $b = 24$.

Substituting 4 for m and 24 for b in the equation $y = mx + b$ yields $y = 4x + 24$. Thus, the equation $y = 4x + 24$ represents the linear relationship between x and y . It's also given that the graph of the linear equation representing this relationship in the xy -plane passes through the point $(\frac{1}{7}, a)$. Substituting $\frac{1}{7}$ for x and a for y in the equation $y = 4x + 24$ yields $a = 4(\frac{1}{7}) + 24$, which is equivalent to $a = \frac{4}{7} + \frac{168}{7}$, or $a = \frac{172}{7}$.

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 24

Choice A is correct. The y -intercept of a graph in the xy -plane is the point where $x = 0$. Substituting 0 for x in the given equation, $y = 576^{(2x+2)}$, yields $y = 576^{(2(0)+2)}$, which is equivalent to $y = 576^2$, or $y = 331,776$. Therefore, the graph of the given equation in the xy -plane has a y -intercept of $(0, 331,776)$. It follows that $r = 0$ and $s = 331,776$. Thus, the equivalent equation $y = 331,776^{(x+1)}$ displays the value of s as the base.

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

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

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

QUESTION 25

Choice D is correct. If $k - x$ is a factor of the expression $-x^2 + (\frac{1}{29})nk^2$, then the expression can be written as $(k - x)(ax + b)$, where a and b are constants. This expression can be rewritten as $akx + bk - ax^2 - bx$, or $-ax^2 + (ak - b)x + bk$.

Since this expression is equivalent to $-x^2 + (\frac{1}{29})nk^2$, it follows that $-a = -1$,

$ak - b = 0$, and $bk = \left(\frac{1}{29}\right)nk^2$. Dividing each side of the equation $-a = -1$ by -1 yields $a = 1$. Substituting 1 for a in the equation $ak - b = 0$ yields $k - b = 0$. Adding b to each side of this equation yields $k = b$. Substituting k for b in the equation $bk = \left(\frac{1}{29}\right)nk^2$ yields $k^2 = \left(\frac{1}{29}\right)nk^2$. Since k is positive, dividing each side of this equation by k^2 yields $1 = \left(\frac{1}{29}\right)n$. Multiplying each side of this equation by 29 yields $29 = n$.

Alternate approach: The expression $x^2 - y^2$ can be written as $(x - y)(x + y)$, which is a difference of two squares. It follows that $\left(\frac{1}{29}\right)nk^2 - x^2$ is equivalent to $\left(\left(\sqrt{\frac{1}{29}n}\right)k - x\right)\left(\left(\sqrt{\frac{1}{29}n}\right)k + x\right)$. It's given that $k - x$ is a factor of $-x^2 + \left(\frac{1}{29}\right)nk^2$, so the factor $\left(\sqrt{\frac{1}{29}n}\right)k - x$ is equal to $k - x$. Adding x to both sides of the equation $\left(\sqrt{\frac{1}{29}n}\right)k - x = k - x$ yields $\left(\sqrt{\frac{1}{29}n}\right)k = k$. Since k is positive, dividing both sides of this equation by k yields $\sqrt{\frac{1}{29}n} = 1$. Squaring both sides of this equation yields $\frac{1}{29}n = 1$. Multiplying both sides of this equation by 29 yields $n = 29$.

Choice A is incorrect. This value of n gives the expression $-x^2 + \left(\frac{1}{29}\right)(-29)k^2$, or $-x^2 - k^2$. This expression doesn't have $k - x$ as a factor. *Choice B* is incorrect. This value of n gives the expression $-x^2 + \left(\frac{1}{29}\right)\left(-\frac{1}{29}\right)k^2$, or $-x^2 + \left(-\frac{1}{841}\right)k^2$. This expression doesn't have $k - x$ as a factor. *Choice C* is incorrect. This value of n gives the expression $-x^2 + \left(\frac{1}{29}\right)\left(\frac{1}{29}\right)k^2$, or $-x^2 + \left(\frac{1}{841}\right)k^2$. This expression doesn't have $k - x$ as a factor.

QUESTION 26

Choice D is correct. The figure shows that angle MRL and angle PRQ are vertical angles. Since vertical angles are congruent, angle MRL and angle PRQ are congruent. It's given that \overline{LM} is parallel to \overline{PQ} . The figure also shows that \overline{LQ} intersects \overline{LM} and \overline{PQ} . If two parallel segments are intersected by a third segment, alternate interior angles are congruent. Thus, alternate interior angles MLR and PQR are congruent. Since triangles LMR and PQR have two pairs of congruent angles, the triangles are similar. Sides LR and MR in triangle LMR correspond to sides RQ and RP , respectively, in triangle PQR . Since the lengths of corresponding sides in similar triangles are proportional, it follows that $\frac{RQ}{LR} = \frac{RP}{MR}$. It's given that the lengths of \overline{MR} , \overline{LR} , and \overline{RP} are 6, 7, and 11, respectively.

Substituting 6 for MR , 7 for LR , and 11 for RP in the equation $\frac{RQ}{LR} = \frac{RP}{MR}$ yields $\frac{RQ}{7} = \frac{11}{6}$. Multiplying each side of this equation by 7 yields $RQ = \left(\frac{11}{6}\right)(7)$, or $RQ = \frac{77}{6}$. It's given that \overline{LQ} intersects \overline{MP} at point R , so $LQ = LR + RQ$. Substituting 7 for LR and $\frac{77}{6}$ for RQ in this equation yields $LQ = 7 + \frac{77}{6}$, or $LQ = \frac{119}{6}$. Therefore, the length of \overline{LQ} is $\frac{119}{6}$.

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

Choice B is incorrect. This is the length of \overline{RQ} , not \overline{LQ} . *Choice C* is incorrect and may result from conceptual or calculation errors.

QUESTION 27

The correct answer is $\frac{31}{3}$. Subtracting $5(x + 7)$ from each side of the given equation yields $0 = 15(x - 17)(x + 7) - 5(x + 7)$. Since $5(x + 7)$ is a common factor of each of the terms on the right-hand side of this equation, it can be rewritten as $0 = 5(x + 7)(3(x - 17) - 1)$. This is equivalent to $0 = 5(x + 7)(3x - 51 - 1)$, or $0 = 5(x + 7)(3x - 52)$. Dividing both sides of this equation by 5 yields $0 = (x + 7)(3x - 52)$. Since a product of two factors is equal to 0 if and only if at least one of the factors is 0, either $x + 7 = 0$ or $3x - 52 = 0$. Subtracting 7 from both sides of the equation $x + 7 = 0$ yields $x = -7$. Adding 52 to both sides of the equation $3x - 52 = 0$ yields $3x = 52$. Dividing both sides of this equation by 3 yields $x = \frac{52}{3}$. Therefore, the solutions to the given equation are -7 and $\frac{52}{3}$. It follows that the sum of the solutions to the given equation is $-7 + \frac{52}{3}$, which is equivalent to $-\frac{21}{3} + \frac{52}{3}$, or $\frac{31}{3}$. Note that $31/3$ and 10.33 are examples of ways to enter a correct answer.