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5 Ways to Increase Score Gains Using Cambridge's *Navigator Plus*

Navigator Plus is Cambridge's complete explanation guide to a previously administered test. It includes explanations for each item on the test, categorization for each item, an answer key, and more.

The following list provides suggestions for implementing the Navigator into your program to increase score gains.

- 1. Simulate test day as much as possible when proctoring tests.** Students will benefit from a testing experience that closely simulates what they will experience on test day. They will feel more confident if they know what to expect.
- 2. Follow up when you receive your data.** Use the reports you receive from Cambridge to cover the items your class struggled as a group to answer (see the Error Analysis report). Taking this step within two weeks of administering the test will ensure that your students haven't forgotten the items you cover and will be able to learn from their testing experiences.
- 3. Use the Pre-Assessment Item references in the *Victory* lesson to illustrate key points.** Your teacher's guide includes references to items on your pre-assessment that you can use as additional examples. Keep a copy of your pre-assessment test booklet handy so that you can cover these items with your students. Using pre-assessment items as additional examples helps students connect the concepts you are teaching with their test-day experiences.
- 4. Don't forget to review the wrong answers.** Many explanations in this Navigator packet include references to each wrong answer choice. Students will benefit from reviewing why each wrong answer is wrong so that they can recognize what makes the right answer correct and use the process of elimination to eliminate similar wrong answers in the future.
- 5. Pay attention to item categories.** Each item in this Navigator packet includes a category path that corresponds to the course concept outline in your *Victory* text as well as the categories listed in the Item Index of your *Victory* text. Use the Item Index to identify items students can use for further practice.


TEST 1: ENGLISH
1. (B) *English/Usage and Mechanics/Punctuation/Commas*. CCRS: COP 16–19b. CC: ELA-Literacy.L.9–10.2.

The underlined portion is wrong because the comma that follows “trek” is superfluous and disrupts the logical flow of the sentence. As written, the third underlined comma orphans the prepositional phrase “to...ballpark” from the rest of the sentence, illogically suggesting that it has some independent status when it is in fact an integral part of the main clause. (B) makes the necessary correction. As for (C), while it eliminates the superfluous comma, it fails to include the necessary comma between the two modifiers “five-hour” and “once-a-summer.” In this case, the comma following “five-hour” makes it clear that the “trek” was both a “five-hour” ordeal and a “once-a-summer” event. Finally, (D) is wrong for three reasons. First, it fails to address the problem of the original. Second, it fails to include the necessary comma between the two modifiers. Third, it fails to include the necessary comma between “child” and “it.” This comma signals an appropriate pause between the introductory dependent clause (“when...child”) and the independent clause (“it was...ballpark”).

TIP When two or more adjectives are intended to modify the same noun, the adjectives should be separated by a comma. Without this comma, the word the first adjective is intended to modify is ambiguous—the first adjective could be modifying the second adjective or the noun.

2. (G) *English/Rhetorical Skills/Style/Conciseness* and *Idiomatic Expression*. CCRS: COP 24–27a. CC: ELA-Literacy.L.11–12.2.

The underlined portion is wrong because the phrase “needless to say” is considered low-level usage and awkward. In general, this phrase should be avoided; specifically, its meaning (“obviously”) is inappropriate in this context. (G) solves the problem of the original by omitting the phrase altogether. As for (H), while setting off the phrase with commas would be useful for the sake of clarity, it fails to address the problem of the original. Finally, (J) is unnecessarily wordy.

3. (D) *English/Usage and Mechanics/Sentence Structure/Misplaced Modifiers*. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1.

The underlined portion is wrong because it results in a misplaced modifier. As written, the introductory phrase “domed and bowl-shaped” incorrectly modifies “sons” since that is the first noun that follows it. (D) solves the problem of the original by making it clear that “domed” and “bowl-shaped” are intended to modify “park.” As for (B) and (C), they illogically suggest that “domed” and “bowl-shaped” explain how the sons are sitting in the park.

TIP Generally, a modifier should be placed as close as possible to what it modifies.

4. (J) *English/Rhetorical Skills/Style/Conciseness*. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.

The underlined portion is wrong because it is redundant. Since “artificial” means “not natural,” the underlined portion can safely be eliminated without sacrificing anything in terms of meaning or style. So, (J) is the correct answer choice. (G) and (H) fail to make the needed correction.

5. (C) *English/Usage and Mechanics/Grammar and Usage/Verb Tense*. CCRS: SSF 13–15b. CC: ELA-Literacy.L.8.1.

The underlined portion is wrong because it results in a shift of verb tense. The past tense “sat” is inconsistent with the present tense verbs that appear throughout the sentence (“sit,” “meander,” and “appears”). (C) solves the problem of the original by replacing the past tense “sat” with the present tense “sit.” As for (B), “would set” implies a past action rather than a present action. Additionally, while the two words can be confused with one another, the verb “set” is not the same word as the verb “sit.” Finally, (D) is wrong because “were sitting” is a past tense verb.

6. (H) *English/Usage and Mechanics/Punctuation/End-Stop Punctuation*. CCRS: COP 16–19a. CC: ELA-Literacy.L.9–10.1.

The underlined portion is wrong because the question mark is inappropriate in this context. A question mark is used to signal an interrogative sentence; however, the related sentence does not ask a direct question but instead makes a statement. So, for this reason, (G) too is wrong. Instead of the question mark, either a period or an exclamation point would be acceptable end-stop punctuation. While the phrase “should not have to endure” might suggest the use of an exclamation point, (J) is wrong because the comma that follows “in” fragments the sentence, separating the preposition from its object. So, (H) must be the correct answer choice.

7. **(A) English/Rhetorical Skills/No Change. CCRS: ORG 24–27a. CC: ELA-Literacy.L.11–12.3.** The underlined portion is correct as written. “When” properly introduces a dependent clause that describes an action in the present tense, which is the same time frame as that of the main clause and the rest of the paragraph. The remaining answer choices incorrectly place the action of the sentence some time after the time frame of the rest of the paragraph, introducing logical errors in the process. As for (B), “afterwards” incorrectly suggests that the narrator and his sons visit the ballpark *after* the turf is removed. (C) is wrong for two reasons. First, “then” might incorrectly suggest the same idea suggested by “afterwards.” Second, “then” might also be misinterpreted as part of the overall sequence described in the passage. The related paragraph begins with “first” and the following paragraph begins with “second.” Without reading ahead to the following paragraph, “then” might be confused with “second.” Finally, as for (D), “thus” incorrectly suggests a causal relationship between the action described and some previous action.
8. **(J) English/Usage and Mechanics/Grammar and Usage/Adjectives versus Adverbs. CCRS: COU 16–19a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because the adjective “essential” cannot be used to modify the plural verb “are.” Instead, the adverb “essentially” is required. (J) makes the necessary correction. (G) is simply not idiomatic. Finally, (H) is wrong for two reasons. First, the preposition “to” changes the intended meaning of the sentence. Second, the adjective “essential” modifies the subject “we,” illogically suggesting that the narrator and his sons are essential to a picnic.
9. **(C) English/Rhetorical Skills/Style/Clarity of Meaning. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because the phrase “in which” includes both a preposition and a relative pronoun as its object. As a result, the sentence illogically suggests that the narrator and his sons are inside the carpet. Instead, the relative pronoun “which” should be used to refer to “gather[ing] around a carpet.” (C) solves the problem of the original by simply eliminating the preposition “in.” (B) fails to solve the problem of the original. Additionally, “being” is considered low-level usage and has no logical connection to the main part of the sentence. Finally, (D) is wrong because it results in a comma splice, joining together two independent clauses with only a comma.
10. **(J) English/Rhetorical Skills/Strategy/Effective Concluding Sentence. CCRS: TOD 28–32b. CC: ELA-Literacy.L.11–12.3.** The main point made in this paragraph is that the narrator objects to the use of artificial turf instead of natural grass. So, a sentence that illustrates the advantage of natural grass over artificial turf would best complete the development of the paragraph. (J) best captures this idea. As for (F), while the topic of the essay is the baseball park, the main topic of this paragraph is not the virtues of baseball. (G) and (H) are wrong for similar reasons to that of (F). While it might be inferred from the paragraph that the narrator prefers to “get outside more” and loves hot dogs, respectively, neither of these topics are central to the paragraph.
11. **(A) English/Usage and Mechanics/No Change. CCRS: WC 20–23c. CC: ELA-Literacy.L.9–10.5.** The underlined portion is correct as written. The subordinate conjunction “while” can be used to mean either “during the same time frame” (e.g., While we washed and dried the dishes, the other campers made a fire.) or “though,” as it does in this case. As for (B) and (C), they distort the intended meaning of the original sentence, incorrectly suggesting that there is a causal relationship between blocking out the rain and blocking out the sun and sky. Finally, (D) is wrong because it results in a comma splice. Without the conjunction “while” to introduce the subordinate clause, what remains are two independent clauses joined together with only a comma.
12. **(H) English/Rhetorical Skills/Organization/Paragraph-Level Structure and Strategy/Effective Transitional Sentence. CCRS: TOD 24–27b. CC: ELA-Literacy.L.11–12.3.** Notice that the second paragraph begins with “first” and the third paragraph begins with “second,” which signal to the reader that the author intends to outline a series of points, each in its own paragraph. So, a new paragraph beginning with “finally” would correctly introduce the third point. As for (G), “thus” signals a logical transition that is not appropriate in this context. As for (J), although this option does begin a new paragraph, “for example” makes the third point a subsidiary issue (an example) rather than an independent point as the author intends.
13. **(D) English/Usage and Mechanics/Punctuation/Commas. CCRS: COP 16–19b. CC: ELA-Literacy.L.9–10.2.** The underlined portion is wrong because the first comma is superfluous and disrupts the logical flow of the sentence. The prepositional phrase “of a bowled stadium” should not be set off with commas since it is integral to

the meaning of the sentence. In fact, there is no comma usage rule that authorizes setting off a prepositional phrase. (D) solves the problem of the original by eliminating the first comma. As a result, the analogy that begins with “like,” which is not an essential part of the sentence, is signaled by a comma. As for (B), “like” should not be set off with commas because it is necessary to introduce the analogy that follows. (C) is wrong for a similar reason to that of (B); the comma interrupts the analogy introduced by the word “like.”

14. **(G) *English/Usage and Mechanics/Punctuation/Apostrophes*. CCRS: COP 24–27c. CC: ELA-Literacy.L.11–12.2.** The underlined portion is wrong because the plural noun “outfielders” does not agree with the indefinite article “an.” Instead, the singular noun “outfielder” should be used. (G) is the only answer choice that satisfies this condition. The singular possessive “outfielder’s” appropriately refers to the singular noun “face.” As for (H) and (J), as already suggested, these versions include variations on the plural form of the noun.
15. **(D) *English/Usage and Mechanics/Sentence Structure/Fragments*. CCRS: SSF 28–32a. CC: ELA-Literacy.L.11–12.2.** The underlined portion is wrong because it results in a sentence fragment. As written, the word grouping that begins with “when” lacks a conjugated verb. Since “when” is a subordinate conjunction used to signal a subordinate clause, that clause should be connected to the independent clause that precedes it. (D) solves the problem of the original by replacing the end-stop punctuation (period) with a comma. (B) fails to address the problem of the original; an exclamation point is just another form of end-stop punctuation. Finally, (C) is wrong because a semicolon, which is used to join together two independent clauses, cannot be used to signal a subordinate clause.
16. **(F) *English/Usage and Mechanics/No Change*. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.** The underlined portion is correct as written. The preposition “except” appropriately expresses the idea of exclusion. As for (G) and (H), these versions are much more wordy and awkward than the original; additionally, they are not idiomatic English. As for (J), while the phrase “yet for” is appropriate in certain situations (e.g., There is no buyer yet for the car.), it should not be confused with the idiom “except for,” which would be acceptable in this context.
17. **(B) *English/Usage and Mechanics/Sentence Structure/Fragments* and *Grammar and Usage/Verb Tense*. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.** The underlined portion is wrong for two reasons. First, it results in a sentence fragment. The subjunctive verb tense, which is used to show contrary-to-fact conditions or to describe merely possible future events, is not a conjugated verb and therefore cannot function as the main verb of the sentence. As written, it seems that another clause should follow that describes what would happen if the narrator’s friend *were* to walk with him to the post office. Second, the subjunctive is inconsistent with the past tense verbs that appear throughout the paragraph (“discovered,” “had bought,” and “wanted”). (B) solves the problems of the original by replacing the subjunctive with the past tense “walked,” which functions as the main verb of the sentence. (C) fails to address either of the problems with the original. Finally, (D) is wrong because the present progressive tense “is walking” is inconsistent with the past tense of the paragraph.
18. **(G) *English/Rhetorical Skills/Style/Clarity of Meaning*. CCRS: WC 13–15a. CC: ELA-Literacy.L.8.3.** The underlined portion is wrong because it illogically implies that the oxen were found in the traffic by virtue of their pulling carts. What the sentence intends to say is that the oxen, in fact, pulled the carts amidst the traffic. (G) best expresses this idea. As for (H), the comma obscures the intended meaning of the sentence and “being” is considered low-level usage. Finally, (J) is wrong because the order of its elements presents a problem of clarity. Note that in (G) and (H), the conjugated verb “pulled” should not be misread as part of an adjective modifying “carts.” First of all, such an adjective would be hyphenated in order to signal the relationship between the two terms (“oxen-pulled”). Additionally, the use of such a modifier in this context would result in a sentence fragment.
19. **(A) *English/Rhetorical Skills/Strategy/Effective Opening Sentence*. CCRS: ORG 20–23c. CC: ELA-Literacy.L.9–10.3.** This item asks for a sentence that would most effectively introduce Paragraph 2. In this paragraph, the narrator describes the many different activities that he and his friend witnessed in the streets of Bombay: the merchants, the oxen-pulled carts, the rickshaws, and the various people. All four of these ideas illustrate the general point that things were very busy. (A) best captures this idea. As for (B), the post office is discussed in Paragraph 1, not Paragraph 2. (C) and (D) are wrong because oxen-pulled carts and rickshaw drivers,

respectively, are specific activities (specific details) described in Paragraph 2, so neither sufficiently captures the main idea.

20. **(J) English/Rhetorical Skills/Style/Conciseness. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.** The underlined portion is wrong because the phrase “of some size” is redundant of the word “large.” (J) solves the problem of the original by eliminating the extra verbiage. (G) and (H) fail to address the issue of redundancy.
21. **(B) English/Usage and Mechanics/Grammar and Usage/Adjectives versus Adverbs. CCRS: COU 16–19a. CC: ELA-Literacy.L.9–10.1.** As written, the adverb “carefully” correctly modifies the verb “cut.” An adverb does not, however, need to immediately precede the verb that it modifies; it could just as easily appear immediately after the verb (“she cut carefully”) or even after the object of the verb (“she cut...cloth carefully”). (C), for example, resembles the original, reversing only the order of its elements. In this version, the adverb “carefully” still modifies the verb “cut.” (D), too, is an acceptable version because it is also possible to replace an adverb with a prepositional phrase (“with care”) to modify the verb. (B), however, is not an acceptable version because the adjective “careful” cannot be used to modify the verb “cut.” Remember that adjectives are used to modify nouns, not verbs.

TIP Notice that this item is a thought reverser. The item inverts the typical structure of an English item, asking for the wrong version, rather than the correct version, of the underlined material.

22. **(J) English/Rhetorical Skills/Style/Conciseness and Usage and Mechanics/Grammar and Usage/Nouns and Noun Clauses and Punctuation/Commas. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.** The underlined portion is wrong for several reasons. First, the phrase “which I wanted to mail” is unnecessary since it is already made clear from the context of the passage that the package is the one that the narrator intended to mail; there is no other package mentioned with which it might be confused. Second, if it were indeed necessary to distinguish between more than one package in such a way, then the information would be essential to the meaning of the sentence. “Which,” however, seems to introduce a non-restrictive, or non-essential, clause. So, instead, “that” should be used to introduce the phrase “I wanted to mail.” Third, the comma that follows “mail” orphans the prepositional phrase (“to the first person in line”) from the rest of the sentence. (J) addresses all of these problems by simply removing both the unnecessary clause and the obtrusive comma, leaving a clear and concise sentence. (G) is wrong because it distorts the intended meaning of the sentence, incorrectly suggesting that the narrator wanted to mail the package to the postal worker. Finally, (H) fail to address the initial issue of unnecessary information.
23. **(C) English/Rhetorical Skills/Organization/Sentence-Level Structure. CCRS: ORG 24–27b. CC: ELA-Literacy.L.11–12.3.** Note that the development of Paragraph 3 does not correspond with the following chronological order of events: the narrator arrives at the post office (Sentence 1), approaches the line of postal workers (Sentence 2), hands the package to a worker (Sentence 5), watches the worker prepare the wrapping (Sentence 3), and then watches her wrap the package (Sentence 4). So, for the sake of unity and coherence, Sentence 5 should be placed between Sentences 2 and 3, or after Sentence 2.
24. **(H) English/Rhetorical Skills/Strategy/Appropriate Supporting Material. CCRS: TOD 20–23b. CC: ELA-Literacy.L.9–10.3.** The item stem asks for a statement that further exemplifies the care and attention taken with the package. (H) is the best answer choice, describing how the worker “took the time” to perform very detailed work. (F) is wrong because it suggests that the worker was easily distracted, a characteristic that does not lend itself to care and attention. (G) is wrong because leaving “a very noticeable seam” suggests that the job was poorly done. Finally, while (J) is consistent with the tenor of (H), the statement is too general. The item stem asks for a statement that specifically illustrates the care taken by the worker, not his general sense of pride in his work.
25. **(D) English/Usage and Mechanics/Grammar and Usage/Pronoun Usage and Sentence Structure/Comma Splices. CCRS: SSF 28–32a. CC: ELA-Literacy.L.11–12.2.** The underlined portion is wrong because the superfluous subject “he” results in a comma splice. “Who” is a relative pronoun that refers to “person” and necessarily connects the relative clause that it introduces to the main part of the sentence (“my package...in line”). As written, however, the verb “sealed” has two subjects: “who” and “he.” So, “he” must be eliminated. (D) makes



the necessary correction. As for (B) and (C), while “who” is clearly the subject of the clause, the clause does not contain a conjugated verb. The infinitive “to seal” and the present participle “sealing,” respectively, are not conjugated verbs.

26. **(F) English/Rhetorical Skills/Organization/Sentence-Level Structure. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1.** Since the author intends for the phrase “to their satisfaction” to describe the pride that the workers took in wrapping the package, it would most effectively be placed immediately after “prepared.” So, (F) is the correct answer choice. As for (G) and (H), in each of these cases, the idea of satisfaction would seem to describe the way the package was taken to the next step. Finally, as for (J), in this case, the idea of satisfaction would seem to describe the weighing, stamping, and shipping of the package.

TIP Remember that, in general, a modifier should be placed as close as possible to what it modifies.

27. **(C) English/Usage and Mechanics/Sentence Structure/Fragments. CCRS: SSF 24–27a. CC: ELA-Literacy.L.11–12.3.** The underlined portion is wrong because it results in a sentence fragment. The conjunction “as” seems to introduce a subordinate clause; however, there is no independent clause to anchor the sentence. (C) solves the problem of the original by eliminating the conjunction “as,” thereby creating the necessary independent clause (“I talked to the workers”). (B) fails to address the issue, merely replacing “as” with “when.” Finally, (D) is wrong because it turns the word group into a relative clause introduced by “that.”
28. **(F) English/Usage and Mechanics/No Change. CCRS: COP 24–27c. CC: ELA-Literacy.L.11–12.2.** The underlined portion is correct as written. The singular possessive “friend’s” correctly refers to the narrator’s friend, and the dash appropriately closes the prepositional phrase. (G) and (H) are wrong because they replace the necessary singular possessive with a plural noun. Additionally, (G) fails to demonstrate the possessive case. Finally, (J) is wrong because it eliminates the closing dash. The prepositional phrase “with my friend’s help” should be set off with two dashes.
29. **(B) English/Usage and Mechanics/Punctuation/Commas. CCRS: COP 13–15a. CC: ELA-Literacy.L.8.2.** The underlined portion is wrong because the pair of commas that set off the phrase “and said” serve no logical function and result in disrupting the flow of the sentence. So, they should simply be eliminated. (B) makes the necessary correction. As for (C), not only does the semicolon disrupt the logical flow of the sentence, but the material that follows it is not an independent clause. Finally, (D) attempts to solve the problem of the original but fails to eliminate the comma that disrupts the phrase “said to me.”
30. **(F) English/Rhetorical Skills/Strategy/Appropriate Supporting Material. CCRS: TOD 20–23b. CC: ELA-Literacy.L.9–10.3.** The item stem asks for a sentence that shows that the postal workers do not really believe that the narrator can prepare a package. In what would be the preceding sentence, one of the workers says that he is sure the narrator could learn with a little practice. So, if the worker truly doubted the narrator’s capacity to do the work, then this statement would be one of sarcasm. (F) best captures this tone. As for the remaining answer choices, they all indicate that the workers sincerely believed that the narrator could be taught to do the job.
31. **(D) English/Rhetorical Skills/Strategy/Appropriate Supporting Material. CCRS: TOD 20–23b. CC: ELA-Literacy.L.9–10.3.** The item stem asks for a sentence that will both support the claim that actors who perform in commercials are very fortunate and remain consistent with the idea that commercials are such a big business that an actor could live for a year on the wages earned from one performance. (D) satisfies both of these conditions, stating that advertisement actors are generally paid more than movie actors. As for the existing sentence, that actors in commercials are not well known may or may not be considered fortunate, but this lack of popularity is not consistent with the focus of the paragraph. Additionally, the conjunction “but” incorrectly suggests that the idea expressed in the second sentence will contrast the idea expressed in the first. (B) is wrong because actors who move from commercials to film would most likely earn less money and therefore be less fortunate. Finally, (C) is wrong because having to work as hard as other actors would not be considered fortunate. Additionally, as with the original, the conjunction “but” confuses the logic of the sentence.

32. **(J) English/Usage and Mechanics/Grammar and Usage/Subject-Verb Agreement and Verb Tense. CCRS: SSF 16–19b. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong for two reasons. First, the plural verb “have” does not agree with the singular subject of the sentence (“competition”). Second, since the first paragraph establishes present tense conditions (“are,” “act,” “has,” “live”), the present perfect progressive tense (“have been”) is not appropriate in this context. (J) is the only answer choice that provides a singular present tense verb (“is”).
33. **(C) English/Rhetorical Skills/Style/Clarity of Meaning. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1.** The underlined sentence is wrong because the modifier “while auditioning” seems to limit the description applied to the performers strictly to the time of the audition. What the author intends to say is that everyone at the audition tends to share certain physical characteristics with the other actors. The conjunction “so” properly indicates that this idea is connected to the previous sentence (“Each role requires a certain physical type. So,...”). (C) is the correct answer choice because it eliminates the ambiguity of the original. As for (B), this version illogically suggests that performers audition for roles because they have the same characteristics as other performers. Finally, (D) is hopelessly wordy and awkward.
34. **(H) English/Rhetorical Skills/Strategy/Effective Transitional Sentence. CCRS: ORG 24–27a. CC: ELA-Literacy.L.11–12.3.** The underlined portion is wrong because the transitional word “meanwhile” has a meaning that is simply not appropriate in this sentence. “Meanwhile” is used to introduce an action that is taking place at the same time as some other event(s). In this sentence, however, the author does not intend to say that the performer stands in front of the camera and then smiles in a different location. In fact, since “standing in front of the camera” and “smiling for the camera” occur contemporaneously, the position of the sentence is sufficient and a transitional word at the beginning of the sentence is unnecessary. (H) makes the necessary correction. As for (G) and (J), these versions include transitional words that signal logical connection and contrast, respectively.
35. **(B) English/Rhetorical Skills/Strategy/Main Idea and Effective Opening Sentence. CCRS: WC 24–27c. CC: ELA-Literacy.L.11–12.6.** This item asks for a choice of words that would improve the topic sentence of the paragraph. In Paragraph 4, the author uses terms such as “average,” “proportion,” and “lucky,” which characterize the nature of getting cast for a part as a gamble. So, “a day at the beach,” which suggests a carefree outing, does not create the appropriate impression. (B), “lottery,” is the best answer choice. (C) is wrong because the author does not portray the auditioning process in such a negative light. Finally, as for (D), someone is chosen for each part, so the audition process is a “sometimes-win” situation.
36. **(G) English/Usage and Mechanics/Grammar and Usage/Verb Tense. CCRS: SSF 16–19b. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because the active voice (“is casting”) distorts the intended meaning of the sentence. What the author intends to say is that the performer is chosen from among other performers (presumably by a casting director), not that the performer is the one who is doing the choosing. So, the passive voice is required. With the passive voice, the action is done *to* the subject, rather than *by* the subject. (G) makes the necessary correction. As for (H) and (J), these versions are also in the active voice, so they fail to solve the problem of the original.

TIP Note that the passive voice is generally considered weak, and in most cases, is replaced with the stronger active voice. This item, however, is an exception to the rule since the meaning of the sentence is affected.

37. **(C) English/Usage and Mechanics/Grammar and Usage/Verb Tense. CCRS: SSF 16–19b. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because the present participle “auditioning,” which is used to modify “commercials,” incorrectly gives the impression that the commercials themselves are doing the auditioning. This ambiguity can be avoided by using the past participle “auditioned.” (C) makes the necessary correction. As for (B), the infinitive “to audition” seems to suggest that the average performer is cast in only a tiny proportion of *all* the commercials requiring an audition. While this idea is most likely true, it is certainly not the author’s intended meaning. Finally, (D) is wrong because the present tense “auditions” has no logical connection to any part of the sentence.

TIP Note the parallel passive voice forms: “is cast” and “auditioned for.”



38. (J) *English/Rhetorical Skills/Strategy/Effective Transitional Sentence*. CCRS: WC 20–23c. CC: ELA-Literacy.L.9–10.5. The underlined portion is wrong because the conjunction “although” has a meaning that is not appropriate in this context. The conjunction “although” provides a contrast, suggesting that being picked for *only* one commercial each year is not lucky. However, the author intends to say that performers are lucky to be picked for even one commercial each year. (J) solves the problem of the original by using “if” to express the appropriate sense of contingency (if-then). As for (G), “since” suggests that performers are considered lucky people *because* they are picked for one commercial each year. Finally, (H) is wrong for two reasons. First, “so” has a meaning that is inappropriate in this context. Second, it results in a comma splice.
39. (A) *English/Usage and Mechanics/No Change*. CCRS: COP 16–19b. CC: ELA-Literacy.L.9–10.2. The underlined portion is correct as written. “Though” functions in the same manner as would the term “however” and therefore should be set off with commas. (B) is wrong because it eliminates the necessary punctuation. As for (C) and (D), the use of a semicolon disrupts the logical flow of the sentence. Additionally, in both cases, the semicolon does not connect two independent clauses.
40. (J) *English/Usage and Mechanics/Punctuation/Commas and Colons*. CCRS: COP 16–19b. CC: ELA-Literacy.L.9–10.2. The underlined portion is wrong because both the comma and colon are used inappropriately. The comma simply disrupts the logical flow of the sentence, and the colon incorrectly suggests that either a list of pay rates or a point of clarification is to follow. Instead, the phrase “\$600 per day of shooting” is the objective complement of the verb “paid” and is therefore an integral part of the sentence. (J) solves the problems of the original by eliminating both instances of punctuation. (G) is wrong because the two commas interrupt the flow of the sentence, obscuring its meaning. Finally, (H) fails to eliminate the colon.
41. (C) *English/Usage and Mechanics/Sentence Structure/Misplaced Modifiers*. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1. The underlined portion is wrong because it results in a misplaced modifier. As written, “again” seems to modify the verb “comes.” However, up until this point in the passage, there has been no mention of real money coming in the form of “residuals.” Instead, the author intends to say that each time a performer’s commercial is used, he or she is paid again. So, “again” should modify “each.” (C) makes the necessary correction. As for (B) and (D), “again” is not intended to modify “performers” or “television,” respectively.
- TIP** Remember that, in general, a modifier should be placed as close as possible to what it modifies.
42. (H) *English/Rhetorical Skills/Style/Clarity of Meaning*. CCRS: WC 13–15a. CC: ELA-Literacy.L.9–10.3. The underlined sentence is wrong because the order of its parts results in an illogical statement. As written, the sentence says that the commercial could earn money if the performer runs for a year. What the author intends to say is that the performer could earn money if the commercial runs for a year. (H) best captures this idea. As for (G) and (J), while the parts are rearranged, they say the same thing as the original.
43. (A) *English/Rhetorical Skills/Strategy/Effective Concluding Sentence*. CCRS: TOD 28–32a. CC: ELA-Literacy.L.11–12.3. This item asks for a statement that would best reinforce the main point made in Paragraph 5. In this paragraph, the author explains that while the frustrations of a commercial actor are great, persistence and luck can lead to great financial rewards. (A) effectively reinforces this point. As for (B), while this detail is found elsewhere in the essay, it is not relevant to Paragraph 5. (C) is wrong because Paragraph 5 says that the reward for those actually chosen for commercials is often very large. Finally, as for (D), “typically” does not accurately describe the contingencies upon which a commercial actor would earn a large sum of money. Commercial actors only earn large sums of money provided that they are cast for a role, which occurs very rarely. Then, even if they are cast in a commercial, they only earn residual income from that commercial if it airs multiple times on television.
44. (G) *English/Rhetorical Skills/Organization/Sentence-Level Structure*. CCRS: ORG 20–23b. CC: ELA-Literacy.L.9–10.3. Since the given sentence is related to the casting process, it would most logically be placed after the last sentence in Paragraph 3. So, (G) is the correct answer choice.

45. **(A) English/Rhetorical Skills/Strategy/Main Idea. CCRS: TOD 24–27a. CC: ELA-Literacy.L.11–12.3.** This item asks whether the essay fulfills the assignment of illustrating the advantages and disadvantages of being an actor in television commercials. The author introduces the idea of acting in commercials rather than films and describes the auditioning process. Then, the author discusses the financial side of the business, including the difficulty in getting work as offset by the tremendous financial rewards for those who are successful. So, the essay does indeed fulfill the given assignment, and (A) best summarizes the development of the essay. As for (B), the author never discusses training. (C) is wrong because the author is very clear that performing for commercials is not an easy way to earn a living. Finally, (D) is wrong because the essay does not discuss different types of actors.
46. **(G) English/Usage and Mechanics/Sentence Structure/Fragments. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because it results in a sentence fragment. As written, the sentence consists of an introductory modifier (“according to...Mankiller”) and a relative clause (“whose job was...company”), neither of which functions as an independent clause. To solve this problem, the relative clause should be changed into an independent clause. (G) makes the necessary correction. As for (H), “who’s job” is not idiomatic. Finally, (J) substitutes a non-conjugated verb (“being”) for the main verb (“was”).
47. **(B) English/Rhetorical Skills/Strategy/Appropriate Supporting Material. CCRS: TOD 20–23b. CC: ELA-Literacy.L.9–10.3.** The underlined sentence is wrong because it incorrectly indicates to the reader that the passage will discuss a sequence of events, the first of which is running a large company. Instead, the author’s intention at this juncture in the passage is to ask a question that introduces a description of Mankiller’s professional responsibilities. (B) provides the appropriate question. (C) makes an error similar to that of the original; it incorrectly suggests a sequence of events. Finally, (D) is more of a rhetorical question that suggests the difficulty of Mankiller’s job, which is not the author’s intended purpose.
48. **(H) English/Rhetorical Skills/Style/Conciseness. CCRS: WC 13–15a. CC: ELA-Literacy.L.8.3.** The underlined sentence, although technically accurate, is wrong because it is awkward and indirect. Rather than beginning a sentence with two modifying prepositional phrases, the author should, in this case, begin with the word modified (“Mankiller”). (H) is the best version because it is the most direct. As for (G), not only is “being” considered low-level usage, but the order of elements results in an awkward sentence. Finally, while (J) does begin with the word modified, it is both awkward and illogical, suggesting that the derivation of Mankiller’s name is logically connected to when and where she was born.
49. **(D) English/Rhetorical Skills/Style/Conciseness. CCRS: WC 33–36a. CC: ELA-Literacy.L.11–12.4.** The underlined sentence is wrong because it is redundant of the idea expressed in the previous sentence that American Indian demonstrators protested the government’s treatment of their people. So, it should simply be omitted, as (D) suggests. (B) and (C) fail to address the issue of redundancy.
50. **(F) English/Rhetorical Skills/Strategy/Effective Opening Sentence. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.** This item asks for an effective opening sentence to the third paragraph. The paragraph details some of the projects on which Mankiller worked to improve the living conditions of the Cherokee Nation. (F) most effectively summarizes this idea in general terms. Beginning the paragraph with a general idea makes it easier to understand the significance of the specifics that follow. (G) is too specific to serve as a general topic sentence for the third paragraph. Additionally, it seems to be a misreading of the statement made about Mankiller’s “teen years.” As for (H), this sentence does not effectively introduce the details mentioned in the third paragraph. Instead, it might serve better as a concluding sentence to the second paragraph. Finally, (J) is wrong because it is not really relevant to the development of the passage. Though, if it were relevant, it would most likely be included at the end of the second paragraph rather than at the beginning of the third paragraph.
51. **(A) English/Usage and Mechanics/No Change. CCRS: SSF 16–19b. CC: ELA-Literacy.L.9–10.1.** The underlined portion is correct as written. In this case, the infinitive “to bring” correctly parallels the infinitive “to build” since they are joined together by the conjunction “and.” As for (B) and (C), they destroy the parallelism of the original. As for (D), omitting the underlined portion results in an illogical construction: “to build...running water.”



TIP Remember that elements in a sentence that are similar in function should also be similar in form, making it easier to understand that they are related.

52. **(G) English/Usage and Mechanics/Grammar and Usage/Diction. English/Usage and Mechanics/Grammar and Usage/Diction. CCRS: SSF 13–15b. CC: ELA-Literacy.L.8.1.** The underlined portion is wrong because it is not a proper English verb form. The past tense form of the verb “to seek” is “sought,” not “seeked.” So, (G) is the correct answer choice. (H) is wrong for a similar reason to that of the original; the past perfect is “had sought,” not “had seeked.” Finally, (J) is wrong because the present tense verb “seeks” is not consistent with the past tense verbs throughout the passage (“was,” “led,” “created,” and so on).
53. **(D) English/Usage and Mechanics/Grammar and Usage/Diction and Rhetorical Skills/Style/Idiomatic Expression. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because “being” is considered low-level usage and should therefore be avoided. Instead, the Cherokee Gardens should be described using an appositive. By replacing “being” with a comma, the material that follows functions as an appositive structure, which provides the reader with further details or information that may be useful but are not essential to the development of the sentence. (D) makes the necessary correction. (B) is wrong because “that” presents the material in a relative clause, which would be regarded as essential, rather than incidental, to the meaning of the sentence. Finally, (C) is wrong because it results in a comma splice.
54. **(F) English/Usage and Mechanics/No Change. CCRS: COP 20–23a. CC: ELA-Literacy.L.9–10.2.** The underlined sentence is correct as written. While it might be possible to improve on the original, it is better than the versions given in the answer choices. (G) is considerably less direct than the original. As for (H), “her election...was resulting from” is awkward. Finally, (J) uses an introductory modifier (“in 1983”) that does not clearly attach to another idea.
55. **(C) English/Rhetorical Skills/Style/Conciseness. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.** The underlined portion is wrong because it is unnecessarily wordy. The idea “in order to get more” is redundant of “a route.” (C) solves the problem of the original by eliminating the former. As for (B), the verb “to route” means “to defeat.” The author does not, however, intend to say that self-help defeats self-esteem. Finally, (D) is wrong because it too is needlessly wordy.
56. **(G) English/Usage and Mechanics/Grammar and Usage/Pronoun Usage. CCRS: SSF 24–27a. CC: ELA-Literacy.L.11–12.3.** The underlined portion is wrong because the first instance of “her” cannot be used to function as the subject of the sentence since it is not a subjective (nominative) case pronoun. Instead, it functions as an objective case pronoun, as in “gave the book to her,” or a possessive case pronoun, as in “her book,” depending on context. (G) solves the problem of the original by replacing the first instance of “her” with the noun “Mankiller.” (H) uses the weak passive voice and is very awkward when compared with (G). Finally, (J) fails to address the problem of the original. In this case, the objective “her” should be replaced with the subjective “she.”
57. **(A) English/Usage and Mechanics/No Change. CCRS: COU 16–19a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is correct as written. The plural verb “encourage” functions as the verb for “that,” which refers to the plural noun “programs.” The remaining answer choices are wrong because they are all singular verb forms.
58. **(H) English/Rhetorical Skills/Style/Idiomatic Expression. CCRS: WC 16–19b. CC: ELA-Literacy.L.9–10.3.** The underlined portion is wrong because the phrase “hack it” is slang and therefore considered low-level usage. Additionally, the singular pronoun “it” does not have a clear referent. (H) solves the problem of the original by using an idiomatic expression that captures the author’s intended meaning (“fit to lead”). (G) is wrong for similar reasons to those of the original; “had what it took” is slang and “it” does not have a clear referent. Finally, as for (J), “call the shots” is less formal than “fit to lead” and is therefore not appropriate in this context.
59. **(C) English/Rhetorical Skills/Strategy/Appropriate Supporting Material. CCRS: TOD 24–27c. CC: ELA-Literacy.L.11–12.3.** This item asks whether the given sentence is a relevant addition at this point in the essay. The problem with the suggested addition is that the sentence deals with the more general topic of women in corporate positions rather than the more specific topic of the 1987 Cherokee election, which is the focus of the last

paragraph. So, (C) is the correct answer choice. (A) and (B) are wrong because the suggested sentence explains neither the margin of victory nor the comparison (which is in fact made at the beginning of the passage), respectively. Finally, as for (D), even if it could be argued that the suggested sentence sufficiently explains the benefits of the women’s rights movement for professional women, this subject matter is irrelevant to the focus of the paragraph.

60. **(F) English/Rhetorical Skills/Strategy/Main Idea. CCRS: TOD 24–27a. CC: ELA-Literacy.L.11–12.3.** This item asks whether the essay would successfully fulfill the goal of discussing the role of women in an American tribe. As (F) correctly points out, the focus of the essay is Mankiller, not a group of women and their contributions to a tribe. As for (G), even if it is true that most tribes are led by men, this fact does not explain why the essay is not about the role of Cherokee women in general. (H) is wrong because the fact that Mankiller had a difficult time winning the election does not mean that the essay is less about Mankiller and more about Cherokee women. Finally, (J) is wrong because the essay does not discuss Mankiller as an example of a Cherokee woman among many others.
61. **(B) English/Usage and Mechanics/Sentence Structure/Fragments. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because it results in a sentence fragment. As written, the word group introduced by “but” does not contain a verb. (B) solves the problem of the original by incorporating the fragment into the preceding material, thereby completing the comparison (“not this nor this but that”) intended by the author. (C) and (D) both attempt to solve the problem, but the comma and the colon, respectively, are unnecessary; they only serve to isolate the second part of the sentence from the first, disrupting the comparison.
62. **(F) English/Usage and Mechanics/No Change. CCRS: SSF 16–19a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is correct as written because it results in two well-formed sentences. As for (G) and (H), they join the two sentences together without proper coordination and punctuation. (G) results in a run-on sentence, and (H) results in a comma splice. Finally, (J) is wrong because the material that begins with “for” should not be signaled by a colon since it does not provide further explanation of the material that precedes it.
63. **(D) English/Usage and Mechanics/Grammar and Usage/Subject-Verb Agreement and Diction. CCRS: COU 20–23a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong for two reasons. First, the singular verb “effects” does not agree with the compound subject (“both the extremes...and the...day length”). Second, the verb “to effect” does not provide the appropriate meaning in this context. “To effect” means “to bring about or to cause to happen.” (e.g., The legislation effects badly needed changes in the criminal law.) Therefore, the plural verb “affect,” which means “alter,” should be used. (D) makes the necessary correction. (B) suffers from a lack of agreement, and (C) provides the wrong meaning.
64. **(G) English/Rhetorical Skills/Strategy/Effective Opening Sentence. CCRS: ORG 20–23c. CC: ELA-Literacy.L.9–10.3.** This item asks for an effective topic sentence to begin the second paragraph. The paragraph provides details about the ways that people react to the long hours of daylight during the Alaskan summer. Some people try to trick their children while others let their children play all night. (G) provides a good introductory statement to this effect because it emphasizes the length (“endless”) of the summer day. (F) is wrong because the second paragraph discusses the peculiar days, not the average days, of an Alaskan summer. As for (H), while the author might choose to develop this idea, it does not have any relationship to the development that follows. Finally, (J) is wrong because the second paragraph does not provide a general description of Alaska.
65. **(C) English/Usage and Mechanics/Grammar and Usage/Verb Tense. CCRS: SSF 13–15b. CC: ELA-Literacy.L.8.1.** The underlined portion is wrong because the verb “has seemed” is inconsistent with the present tense verbs that appear throughout the second paragraph (“want,” “line,” “give up,” “take”). (C) solves the problem of the original by replacing “has seemed” with the present tense verb “seems.” (B) and (D) are wrong because they provide past tense verbs.
66. **(H) English/Usage and Mechanics/Grammar and Usage/Subject-Verb Agreement. CCRS: WC 13–15b. CC: ELA-Literacy.L.8.3.** The underlined portion is wrong because it results in a lack of subject-verb agreement. The



singular subject “one” does not agree with the plural verb “want.” Since “everyone” is a singular form similar to “one,” (G) can be eliminated. As for (H) and (J), they both provide plural subjects, but the ubiquitous “they” does not have a referent. So, (H) must be the correct answer choice. Additionally, (H) is correct because “people,” referring to more than one person, is consistent with the pronoun “their” that appears in the next sentence.

67. **(B) English/Usage and Mechanics/Punctuation/Apostrophes. CCRS: COP 28–32c. CC: ELA-Literacy.L.11–12.2.** The underlined portion is wrong for two reasons. First, the plural “children” should show possession (“children’s”). Second, the plural “windows” should be the object of possession. (B) makes the necessary corrections. (C) and (D) are wrong because “childrens” is not a word in standard written English.
68. **(J) English/Rhetorical Skills/Style/Conciseness. CCRS: WC 16–19a. CC: ELA-Literacy.L.9–10.3.** The underlined portion is wrong because the phrase “and not inside” is superfluous. Since the author intends no contrast between outside and inside, the use of the phrase does not make sense in this context. So, the phrase should simply be omitted. (J) makes the necessary correction. While (G) and (H) solve the problem of the original, they are needlessly wordy when compared with (J).
69. **(A) English/Rhetorical Skills/No Change. CCRS: WC 24–27c. CC: ELA-Literacy.L.11–12.6.** The underlined portion is correct as written. During the Alaskan summer, some parents take their children to playgrounds in the middle of the night because the sun is shining. As for (B) and (C), while a playground’s popularity or proximity, respectively, might be a good reason for visiting it, these reasons are not relevant to the nature of an Alaskan summer day. Finally, as for (D), while sunlight at night might be considered “unusual,” the playgrounds themselves would not be considered so.
70. **English/Usage and Mechanics/Sentence Structure/Unintended Meanings. CCRS: ORG 24–27a. CC: ELA-Literacy.L.11–12.3.** The underlined portion is wrong because the phrase “on the other hand,” which is intended to signal a contrast between summer and winter, cannot do so in its current position. Consider the following: “Summer days never seem to end. On the other hand, winter days never seem to begin.” This construction is a perfectly acceptable use of the phrase. However, this item does not give the option of relocating the underlined portion, so the phrase should be replaced with a subordinate conjunction that creates a contrast. (H) makes the necessary correction. As for (G) and (J), neither of these options provide the necessary contrast.
71. **(C) English/Usage and Mechanics/Grammar and Usage/Diction. CCRS: COU 16–19a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because “initiation” is simply the wrong word in this context. An “initiation” is a formal ceremony. What the author intends to say is that many people’s “initiative,” or “readiness to act,” lowers as the sun rises later and later in the day. So, (C) is the correct answer choice. As for (B) and (D), the nouns “initiate” and “initiator,” respectively, are related to “initiation.”
72. **(J) English/Rhetorical Skills/Strategy/Effective Transitional Sentence. CCRS: ORG 24–27a. CC: ELA-Literacy.L.11–12.3.** The underlined portion is wrong because “however” suggests a contrast where no contrast is intended. The idea of this sentence is merely a continuation of the idea expressed in the previous sentence. So, the relationship between the two ideas would be clearest if the development is allowed to proceed without a transitional word. (J) makes the necessary correction. As for (G) and (H), “nevertheless” and “still,” respectively, imply a contrast.
73. **(B) English/Usage and Mechanics/Grammar and Usage/Subject-Verb Agreement. CCRS: COU 16–19a. CC: ELA-Literacy.L.9–10.1.** The underlined portion is wrong because the singular noun “survival” does not agree with the plural verb “seem.” The singular verb “seems” is required to provide subject-verb agreement. (B) makes the necessary correction. The reflexive pronoun “itself” modifies “survival,” and “often” is included for the sake of parallelism (“depression *often* sets in and survival itself *often* seems...”). As for (C), while it provides the necessary singular form, the pronoun “it” does not function in the same way as does the reflexive form. Additionally, the comma disrupts the logical flow of the sentence. (D) is wrong because it eliminates the conjugated verb.

74. (J) *English/Usage and Mechanics/Sentence Structure/Fragments*. CCRS: SSF 20–23a. CC: ELA-Literacy.L.9–10.1. The underlined portion is wrong because “having lived” is not a conjugated verb and as such the first part of the sentence cannot function as an independent clause. (J) provides the conjugated verb “live,” which is consistent with the other present tense verbs in the paragraph (“are,” “is,” “decrease,” “comment,” “realize,” “think”) and makes the independent clause truly independent (“now I live in central Michigan..., but the rate of change....”). As for (H), “living” is not a conjugated verb form and so cannot function as the main verb. (G) provides a main verb (“live”), but the conjunction “while” illogically subordinates the first clause to the second.
75. (A) *English/Usage and Mechanics/No Change*. CCRS: COP 33–36a. CC: ELA-Literacy.L.11–12.2. The underlined portion is correct as written. The colon appropriately signals an example of a relative perception held by the narrator. (B) is wrong because it results in a run-on sentence, joining together two independent clauses without the appropriate form of punctuation or punctuation and conjunction. (C) is wrong because it results in a comma splice, joining together two independent clauses with only a comma. As for (D), this version would be correct if it were not for the conjunction “because.” A semicolon is used to join together two independent clauses; “because,” however, changes the second clause into a subordinate clause.



The following tables list the descriptions for all the Common Core State Standards and the College and Career Readiness Standards that are referenced in this *Navigator Plus*.

English — Common Core State Standards

Standard	Description
ELA-Literacy.L.8.1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
ELA-Literacy.L.8.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
ELA-Literacy.L.8.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
ELA-Literacy.L.9–10.1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
ELA-Literacy.L.9–10.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
ELA-Literacy.L.9–10.3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
ELA-Literacy.L.9–10.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
ELA-Literacy.L.11–12.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
ELA-Literacy.L.11–12.3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
ELA-Literacy.L.11–12.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies.
ELA-Literacy.L.11–12.6	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

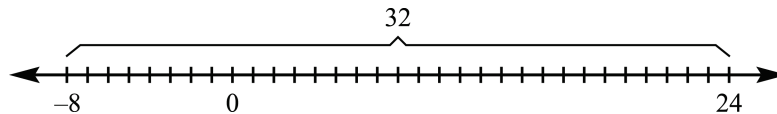
English — College Readiness Standards

Standard	Description
Topic Development in Terms of Purpose and Focus	
TOD 20–23b	Determine the relevancy of a variety of sentence-level details.
TOD 24–27a	Apply knowledge of the focus of a simple essay to add a sentence that sharpens that focus or to determine if an essay has met a specified goal.
TOD 24–27b	Delete material that disturbs the flow and development of the paragraph.
TOD 24–27c	Add a sentence to accomplish a fairly straightforward purpose.
TOD 28–32a	Determine the suitability of a phrase or sentence and its rhetorical effect by applying an awareness of the focus and purpose of a fairly involved essay.
TOD 28–32b	Accomplish a subtle rhetorical purpose such as to emphasize, to add detail, or express a meaning by adding a sentence.
Organization, Unity, and Coherence	
ORG 20–23b	Identify the most logical place to add a sentence in an essay.
ORG 20–23c	Add a sentence to introduce a simple paragraph.

ORG 24-27a	Decide if conjunctive adverbs or phrases are needed to create subtle logical connections between sentences (e.g., <i>therefore</i> , <i>however</i> , <i>in addition</i>).
ORG 24-27b	Rearrange the sentences in a fairly uncomplicated paragraph for the sake of logic.
Word Choice	
WC 13-15a	Revise sentences to correct confusing and awkward arrangements of the sentence elements.
WC 13-15b	Identify and revise vague nouns and pronouns that create obvious problems.
WC 16-19a	Delete material in a sentence that is synonymous and wordy.
WC 16-19b	Revise expressions that do not match the style of an essay.
WC 20-23c	Determine the clearest and most logical conjunction to link clauses.
WC 24-27c	Determine the word or phrase that is most appropriate in terms of the content of the sentence and tone of the essay.
WC 33-36a	Delete subtly redundant material or material that is redundant in terms of the paragraph as a whole.
Sentence Structure and Formation	
SSF 13-15b	Revise shifts in verb tense between simple adjoining sentences or between simple clauses in a sentence.
SSF 16-19a	Use punctuation and conjunctions to avoid awkward-sounding sentences.
SSF 16-19b	Decide the appropriate verb tense and voice by using knowledge of the meaning of the entire sentence.
SSF 20-23a	Identify and correct disturbances of sentence flow and structure (e.g., participial phrase fragments, missing or incorrect relative pronouns, dangling or misplaced modifiers).
SSF 24-27a	Revise to avoid faulty coordination and subordination of clauses and faulty placement of phrases in sentences with structural problems.
SSF 28-32a	Use sentence-combining techniques, especially in sentences containing compound subjects or verbs, to effectively avoid comma splices, run-on sentences, and sentence fragments.
Conventions and Usage	
COU 16-19a	Solve grammatical problems such as whether to use an adverb or adjective form, how to ensure straightforward subject-verb and pronoun-antecedent agreement, and determine which preposition to use in simple contexts.
COU 20-23a	Select prepositions, especially in combination with verbs, to create idiomatic phrases (e.g., long for, appeal to).
Conventions of Punctuation	
COP 13-15a	Delete commas that create problems such as separating a verb and a direct object.
COP 16-19a	Use appropriate punctuation in straightforward situations (e.g., items in a series).
COP 16-19b	Delete commas that disturb the sentence flow such as between a modifier and the modified element.
COP 20-23a	Use commas to set off simple parenthetical phrases.
COP 24-27a	Use punctuation to set off a complex parenthetical phrase.
COP 24-27c	Indicate simple possessive nouns by using apostrophes.
COP 28-32c	Show possession, especially with irregular plural nouns, using an apostrophe.
COP 33-36a	Introduce an example or an elaboration using a colon.


TEST 2: MATHEMATICS

1. **(E) Mathematics/Arithmetic/Simple Manipulations. CCRS: BOA 13–15a. CC: 4.OA.A.3.** One way to conceptualize the solution to this item is to sketch a number line:



So, (E) is the correct answer choice.

Another approach is to treat the item as that of subtracting a negative number from a positive number:

$$24 - (-8) = 24 + 8 = 32.$$

Finally, a third approach is to treat this item as an absolute value: $24 + |-8| = 24 + 8 = 32$.

2. **(H) Mathematics/Arithmetic/Common Arithmetic Items/Percents. CCRS: BOA 16–19a. CC: 6.RP.A.3c.** Use a calculator to solve this one-step percent item: $\$11 \cdot 25\% = \$11 \cdot 0.25 = \$2.75$. So, (H) is the correct answer choice.

Another approach is to reason informally, performing the calculations without a calculator: one-fourth of \$10 is \$2.50, one-fourth of \$1 is \$0.25, and their sum is \$2.75.

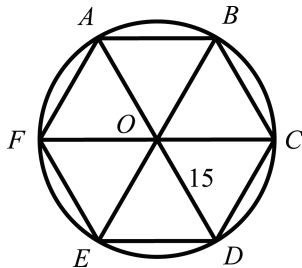
Finally, a third approach is to recognize that since (J) would be correct only if the price were \$12 ($\frac{1}{4}$ of 12 = 3), the correct answer must be a little less than \$3.

TIP In this item, using a calculator is quick way to solve the problem. However, a calculator is not always faster than mental math or paper and pencil calculations. Before solving each item, take a few seconds to determine what mathematical process is best.

3. **(C) Mathematics/Statistics and Probability/Averages. CCRS: PSD 16–19a. CC: 6.SP.B.5c.** For this item, use a calculator to find the average of the four given prices: $\text{average} = \frac{\$3.50 + \$3.40 + \$3.50 + \$3.00}{4} = \frac{\$13.40}{4} = \3.35 . So, (C) is the correct answer choice.

Alternatively, recognize that two of the values are \$3.50 and that the other two values are \$0.10 and \$0.50 less than \$3.50. So, the average of all four values is $\frac{\$0.60}{4} = \0.15 less than \$3.50, or $\$3.50 - \$0.15 = \$3.35$.

4. **(J) Mathematics/Geometry/Lines and Angles. CCRS: PPF 20–23a. CC: 7.G.B.5.** Since $\angle CAB$ and $\angle ACB$ are opposite to congruent sides of a triangle, the measures of the two angles must also be equal. So: $110^\circ + \angle CAB = 180^\circ \Rightarrow \angle CAB = \angle ACB = 70^\circ$. So, (J) is the correct answer choice.
5. **(A) Mathematics/Geometry/Complex Figures and Circles and Triangles/Working with Triangles. CCRS: MEA 13–15a. CC: 4.G.A.1.** For this item, recognize that a regular hexagon can be divided into six triangles and then reason as follows:



Each side of a regular hexagon has the same length and intercepts an arc of the same number of degrees ($\frac{360}{6} = 60$). Therefore, each angle at the center of the figure has a degree measure of 60. Then, since all the radii of the circle have the same length, and the angles opposite them are equal ($\frac{180 - 120}{2} = 60$), each of the six triangles is an equilateral triangle with three equal sides and three angles of 60° . Therefore, each side of each of these triangles has a length of 15. So, (A) is the correct answer choice.

Another approach is to abbreviate the above reasoning by simply recognizing that a regular hexagon with six sides of equal length can be divided into six equal triangles.

TIP A third approach is to compare the lengths of \overline{AB} and \overline{OD} . Take a measurement using a pencil and a thumbnail mark. They appear to be the same length, so $\overline{AB} = 15$.

6. **(J) Mathematics/Arithmetic/Common Arithmetic Items/Proportions and Direct-Inverse Variation. CCRS: BOA 20–23a. CC: 6.RP.A.3b.** For this item, set up a direct proportion, as suggested in the item stem and solve for the missing quantity:

$$\frac{\text{weight}_{\text{heavier pumpkin}}}{\text{weight}_{\text{lighter pumpkin}}} = \frac{\text{price}_{\text{heavier pumpkin}}}{\text{price}_{\text{lighter pumpkin}}} \Rightarrow \frac{15.0}{11.4} = \frac{\$3.25}{x} \Rightarrow 15x = 11.4(3.25) \Rightarrow x = \$2.47. \text{ So, (J) is the correct answer choice.}$$

Another approach is to calculate the price per pound of a pumpkin. Since the 15-pound pumpkin costs \$3.25, the price per pound is: $\frac{\$3.25}{15 \text{ lbs.}} = \frac{\$0.22}{\text{pound}}$. Therefore: $\text{price}_{\text{lighter pumpkin}} = 11.4 \text{ lbs.} \cdot \frac{\$0.22}{\text{pound}} = \$2.47$.

TIP Use a calculator to facilitate these calculations.

7. **(A) Mathematics/Geometry/Lines and Angles. CCRS: PPF 28–32a. CC: HSG-SRT.B.5.** The item stem provides that \overline{CD} is perpendicular to \overline{AB} . Therefore, it can be concluded that $\angle CDA$ and $\angle CDB$ are both equal to 90° . So, (A) is the correct answer choice. As for (B), this statement is directly contradicted by the previous reasoning. Finally, at a glance, it can be determined that (C), (D), and (E) are not necessarily true.
8. **(K) Mathematics/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Simple Equations. CCRS: XEI 20–23c. CC: 6.EE.A.3.** Solve for x by manipulating the given equation:
 $3x - 7 = 4x - 16 \Rightarrow 4x - 3x = -7 + 16 \Rightarrow x = 9$. So, (K) is the correct answer choice.

TIP You could also substitute answer choices for x until finding the one that works in the given equation. Note, however, that solving for x is a much easier and less time-consuming process.

9. **(C) Mathematics/Algebra/Manipulating Algebraic Expressions/Basic Algebraic Manipulations. CCRS: XEI 20–23b. CC: 6.EE.A.3.** Simply do the indicated operations: $a(5 - a) - 6(a + 4) = 5a - a^2 - 6a - 24 = -a^2 - a - 24$. So, (C) is the correct answer choice.



Alternatively, assume a value for a (e.g., $a = 1$) and plug it into the given expression: $a(5 - a) - 6(a + 4) \Rightarrow 1(5 - 1) - 6(1 + 4) = -26$. So, the correct answer will yield a value of -26 when $a = 1$:

- A. $-2a - 24 \Rightarrow -2(1) - 24 = -26$ ✓
- B. $-2a + 4 \Rightarrow -2(1) + 4 = 2$ ✗
- C. $-a^2 - a - 24 \Rightarrow -(1)^2 - 1 - 24 = -26$ ✓
- D. $-a^2 - a + 4 \Rightarrow -(1)^2 - 1 + 4 = 2$ ✗
- E. $-2a^3 - 24 \Rightarrow -2(1)^3 - 24 = -2 - 24 = -26$ ✓

Since (A), (C), and (E) all yield a value of -26 when $a = 1$, assume another value (e.g., $a = 2$) and plug it into each of these expressions: $a(5 - a) - 6(a + 4) \Rightarrow 2(5 - 2) - 6(2 + 4) = -30$. So, the correct answer will yield a value of -30 when $a = 2$:

- A. $-2a - 24 \Rightarrow -2(2) - 24 = -28$ ✗
- C. $-a^2 - a - 24 \Rightarrow -(2)^2 - 2 - 24 = -30$ ✓
- E. $-2a^3 - 24 \Rightarrow -2(2)^3 - 24 = -40$ ✗

10. **(H) Mathematics/Statistics and Probability/Probability. CCRS: PSD 20–23c. CC: 7.SP.C.5.** For this item, calculating probability is simply a matter of expressing as a fraction the ratio of the number of non-blue marbles in the bag to the total number of marbles in the bag: $\frac{\# \text{ of non-blue marbles}}{\text{total } \# \text{ of marbles}} = \frac{3 + 4}{3 + 2 + 4} = \frac{7}{9}$. So, (H) is the correct answer choice.

Alternatively, the probability of something not happening is equal to 1 minus the probability that it does happen.

Since 2 of the $3 + 2 + 4 = 9$ marbles are blue, the probability of choosing a blue marble is $\frac{2}{9}$. Therefore, the

probability of *not* choosing a blue marble is $1 - \frac{2}{9} = \frac{7}{9}$.

11. **(A) Mathematics/Algebra/Expressing and Evaluating Algebraic Functions/Functions as Models and Coordinate Geometry/Slope-Intercept Form of a Linear Equation. CCRS: FUN 24–27a. CC: HSF-IF.A.2.** One way to conceptualize this item is to interpret it as asking for the slope-intercept equation form $y = mx + b$, where m is the slope and b is the y -intercept. Since there is only one line that can be drawn to include both points $(6, 2)$ and $(12, 4)$, the slope is: $\frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 2}{12 - 6} = \frac{2}{6} = \frac{1}{3}$. So: $y = \frac{1}{3}x + b$. Then, choose one pair of values that will satisfy the equation: $2 = \frac{1}{3}(6) + b = 2 + b \Rightarrow b = 0$. The complete equation is: $y = \frac{x}{3}$. So, (A) is the correct answer choice.

TIP You can also use the answer choices to help you solve this item. Simply substitute either of the two values for n from the item stem into each of the answer choices until finding the expression that yields the appropriate value. For example, when $n = 6$, the value of the function would be 2:

- A. $\frac{n}{3} = \frac{6}{3} = 2$ ✓
- B. $n - 4 = 6 - 4 = 2$ ✓
- C. $n - 8 = 6 - 8 = -2$ ✗
- D. $2n - 10 = 2(6) - 10 = 2$ ✓

E. $2n - 20 = 2(6) - 20 = -8$ ✗

Since (A), (B), and (D) all yield a value of 2 when $n = 6$, test each of these answer choices with the other value given for n . In this case, when $n = 12$, the value of the function would be 4:

A. $\frac{n}{3} = \frac{12}{3} = 4$ ✓

B. $n - 4 = 12 - 4 = 8$ ✗

D. $2n - 10 = 2(12) - 10 = 14$ ✗

12. (F) **Mathematics/Geometry/Lines and Angles and Arithmetic/Common Arithmetic Items/Ratios. CCRS: GRE 20–23b. CC: 6.NS.C.8.** A ratio is the relationship between two similar magnitudes. (The same question could just as easily have been asked about the weight of a certain chemical mixture.) In this case, the length of XY is 1 and the length of YZ is 3, as described in the given ratio, so the length of XZ (total length of line segment) is $3 + 1 = 4$. Therefore, the ratio of XY to XZ is $1 : 4$. So, (F) is the correct answer choice.

TIP Although this item refers to a line segment, it is not a geometry item; instead, it deals with the ratio of parts.

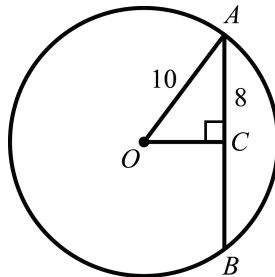
13. (C) **Mathematics/Arithmetic/Solving Complicated Arithmetic Application Items. CCRS: BOA 24–27a. CC: 6.RP.A.3d.** One way to solve this item is to first convert the total length of the board from feet to inches: $(7 \cdot 12) + 10 = 94$ inches. Then, divide that value by 2 to determine the length of the unknown part: $94 \div 2 = 47$ inches. Finally, convert inches back to feet: $47 \div 12 = 3$, with a remainder of 11, or 3 feet, 11 inches. So, (C) is the correct answer choice.

Alternatively, there are at least two ways to reason informally to determine the length of the unknown part. One way is to recognize that since half of 7 feet is $3\frac{1}{2}$ feet = 3 feet 6 inches and half of 10 inches is 5 inches, the total length of the board is 3 feet 6 inches + 5 inches = 3 feet 11 inches. Another way is to recognize that since 7 feet 10 inches is 2 inches short of 8 feet, half of the board is 1 inch short of 4 feet, or 3 feet 11 inches.

14. (K) **Mathematics/Algebra/Manipulating Algebraic Expressions/Creating Algebraic Expressions. CCRS: XEI 20–23d. CC: 6.EE.B.6.** For this item, set up an equation based on the given information. If r is the speed of the slower train, and the faster train exceeds twice that speed ($2r$) by 30 mph, then: speed of faster train = $2r + 30$. So, (K) is the correct answer choice.

TIP You could also use the process of *elimination* to solve this item. Since the speed of the faster train *exceeds* another speed by 30 mph, the correct expression should involve the addition of 30. So, (F), (G), and (J) can be eliminated. Then, since the item stem states that the faster train exceeds the other by at least *twice* its speed, the correct expression should involve an unknown value multiplied by 2. So, (H) can be eliminated.

15. (B) **Mathematics/Geometry/Complex Figures and Circles and Triangles/Pythagorean Theorem. CCRS: MEA 13–15a. CC: 4.G.A.1.** Use the given information to make some deductions about the circle:





If the circle has a radius of 10 meters, then $\overline{OA} = 10$. Since \overline{OC} is perpendicular to \overline{AB} , \overline{OC} bisects \overline{AB} , and $\triangle OCA$ is a right triangle such that: $\overline{OA}^2 = \overline{OC}^2 + \overline{AC}^2 \Rightarrow 10^2 = \overline{OC}^2 + 8^2 \Rightarrow \overline{OC}^2 = 36 \Rightarrow \overline{OC} = 6$.

Alternatively, recognize that $\overline{CA} = 8$ and $\overline{OA} = 10$ fit the ratio for a 3-4-5 right triangle. Therefore, $\overline{OC} = 2(3) = 6$.

16. **(K) Mathematics/Algebra/Manipulating Algebraic Expressions/Evaluating Expressions.** CCRS: XEI 20–23a. CC: 6.EE.A.2c. Simply substitute -2 for x in the given expression and perform the indicated operations:

$x^3 - 2x^2 + 4x + 4 \Rightarrow (-2)^3 - 2(-2)^2 + 4(-2) + 4 = -8 - 8 - 8 + 4 = -20$. So, (K) is the correct answer choice. Use a calculator to facilitate these calculations.

17. **(C) Mathematics/Algebra/Evaluating Sequences Involving Exponential Growth.** CCRS: NUM 33–36b. CC: HSF-BF.B.5. Determining an unknown term in a geometric sequence requires understanding the relationship between adjacent terms throughout the sequence. So, for 16 and -4 , recognize that dividing the former by -4 results in the latter. Then, recognize that dividing -4 by itself results in 1 (the next term) and dividing 1 by -4

results in $-\frac{1}{4}$ (the next term). So, simply divide $-\frac{1}{4}$ by -4 to find the unknown term in the given sequence:

$$-\frac{1}{4} \div -4 = -\frac{1}{4} \cdot -\frac{1}{4} = \frac{1}{16}.$$

18. **(J) Mathematics/Geometry/Rectangles and Squares and Arithmetic/Common Arithmetic Items/Proportions and Direct-Inverse Variation.** CCRS: MEA 24–27a. CC: 7.G.A.1. For this item, set up a proportion to

systematize the approach: $\frac{\text{blueprint}_1}{\text{blueprint}_2} = \frac{\text{house}_1}{\text{house}_2}$. Now, find one of the actual dimensions of the room:

$$\frac{\frac{1}{4} \text{ inch}}{2\frac{1}{2} \text{ inches}} = \frac{1 \text{ foot}}{x} \Rightarrow \frac{\frac{1}{4}}{\frac{5}{2}} = \frac{1}{x} \Rightarrow \frac{1}{4} \cdot \frac{2}{5} = \frac{1}{x} \Rightarrow \frac{1}{10} = \frac{1}{x} \Rightarrow x = 10 \text{ feet. Next, find the other actual dimension:}$$

$\frac{\frac{1}{4} \text{ inch}}{3 \text{ inches}} = \frac{1 \text{ foot}}{x} \Rightarrow 3 = \frac{1}{4}x \Rightarrow x = 12 \text{ feet. So, if the actual dimensions of the rectangular bedroom are 10 feet by 12 feet, then the area is } 10 \cdot 12 = 120 \text{ square feet.}$

19. **(E) Mathematics/Arithmetic/Common Arithmetic Items/Properties of Numbers.** CCRS: XEI 24–27f. CC: HSA-CED.A.4. One way to approach this item is to reason informally about the given information. According to the inequalities, a is positive and b is negative. However, since there are no other restrictions on a and b , their sum could be any real number. So, (E) is the correct answer choice.

TIP You could also use the process of *elimination* to solve this item. You just need to find some values for a and b that will eliminate wrong answer choices. To eliminate (B) and (C), assume two values whose sum is a positive value (e.g., $a = 10$ and $b = -1$). Then, to eliminate (A) and (D), assume two values whose sum is 0 (e.g., $a = 1$ and $b = -1$). With (A), (B), (C), and (D) eliminated by process of elimination, (E) must be the correct answer choice.

20. **(K) Mathematics/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Simple Equations.** CCRS: BOA 16–19a. CC: 5.NF.A.1. For this item, first find the common denominator and then solve for x :

$$x + \frac{3}{4} = \frac{1}{28} \Rightarrow x + \frac{21}{28} = \frac{1}{28} \Rightarrow x = \frac{1}{28} - \frac{21}{28} = -\frac{20}{28} = -\frac{5}{7}. \text{ So, (K) is the correct answer choice.}$$

A second way to solve this item is to multiply both sides of the equation by the common denominator (28), which results in the equation $28x + 21 = 1 \Rightarrow 28x = -20 \Rightarrow x = -\frac{20}{28} = -\frac{5}{7}$. (Use a calculator to facilitate these calculations.)

Finally, a third way to solve this item is to substitute each of the answer choices back into the given equation until finding the one that works. Note, however, that this approach is quite time-consuming when compared to solving for x .

21. (C) *Mathematics/Coordinate Geometry/Slope of a Line and Slope-Intercept Form of a Linear Equation.* CCRS: GRE 20–23c. CC: 6.NS.C.6c. Manipulate the given equation into standard point-slope form

$$(y = mx + b): 3x + 5y = -15 \Rightarrow 5y = -3x - 15 \Rightarrow y = \frac{-3x - 15}{5} = -\frac{3}{5}x - 3. \text{ So, the slope is } -\frac{3}{5}, \text{ (C).}$$

22. (F) *Mathematics/Algebra/Manipulating Algebraic Expressions/Basic Algebraic Manipulations and Geometry/Rectangles and Squares.* CCRS: MEA 20–23a. CC: 7.EE.B.4. The area of a square is equal to the square of one of its sides. So, the area of the given square is $(2x - 3)^2$. When multiplying terms, remember to do so in the appropriate order, using the FOIL method (first two terms, outside two terms, inside two terms, and last two terms) as a guide: $(2x - 3)(2x - 3) = 4x^2 - 6x - 6x + 9 = 4x^2 - 12x + 9$. So, (F) is the correct answer choice.

TIP Review the FOIL method (First two terms, Outside two terms, Inside two terms, and Last two terms).

23. (C) *Mathematics/Algebra/Manipulating Algebraic Expressions/Factoring Expressions.* CCRS: XEI 24–27e. CC: HSA-REI.B.4. Factor the given expression to find its two constituent polynomials. Two factors of the last term (–15) must equal the coefficient of the middle term (–2) when added together. –5 and 3 satisfy these conditions: $-5 \cdot 3 = -15$ and $-5 + 3 = -2$. So, the polynomial factors of the given expression are $(x - 5)$ and $(x + 3)$.

TIP You can also test the answer choices. Since one of the answer choices is a polynomial factor of the given expression, test each of them until finding the one that works as a factor.

24. (F) *Mathematics/Algebra/Expressing and Evaluating Algebraic Functions/Concepts of Domain and Range.* CCRS: XEI 28–32a. CC: HSA-CED.A.4. Simply assume some values for q , and then evaluate the resulting characteristics of m :

$$q = 1: m = \frac{3}{1+1} = \frac{3}{2}, \text{ or } 1\frac{1}{2}$$

$$q = 2: m = \frac{3}{1+2} = \frac{3}{3} = 1$$

$$q = 3: m = \frac{3}{1+3} = \frac{3}{4}$$

$$q = 10: m = \frac{3}{1+10} = \frac{3}{11}$$

$$q = 1,000: m = \frac{3}{1+1,000} = \frac{3}{1,001}$$

As q gets larger, m gets smaller, approaching but never reaching 0. So, (F) is the correct answer choice.

25. (B) *Mathematics/Algebra/Expressing and Evaluating Algebraic Functions/Function Notation.* CCRS: BOA 16–19a. CC: 6.RP.A.3d. Simply use the given formula to convert 451°F to its Celsius equivalent:



$C = \frac{5}{9}(F - 32) = \frac{5}{9}(451 - 32) = \frac{5}{9}(419) = 233$. So, the equivalent title for Ray Bradbury's book *Fahrenheit 451* would be *Celsius 233*, (B). Note that using a calculator would facilitate the above calculations.

TIP Since this item is #25 on the Mathematics Test and not #25 on either the English or Reading Tests, there is no need to be concerned with the literary aspects of Ray Bradbury's book.

26. **(G) Mathematics/Geometry/Rectangles and Squares. CCRS: MEA 13–15a. CC: 6.RP.A.3d.** The most direct way to solve this item is to set up an equation based on the given information. Let w represent the width of the rectangle, and let $w + 6$ represent its length: $w + w + (w + 6) + (w + 6) = 48 \Rightarrow 4w + 12 = 48 \Rightarrow 4w = 36 \Rightarrow w = 9$. So, (G) is the correct answer choice.

Alternatively, work backwards from the answer choices, starting with (H), until finding the one that yields a perimeter of 48. If the width of the rectangle is 15, then its length is $15 + 6 = 21$ and its perimeter is $21 + 21 + 15 + 15 = 72$. So, try the next smaller answer choice, (G). If the width of the rectangle is 9, then its length is $9 + 6 = 15$ and its perimeter is $15 + 15 + 9 + 9 = 48$.

27. **(D) Mathematics/Algebra/Solving Quadratic Relations. CCRS: XEI 28–32e. CC: HSA-REI.B.4b.** For this item, the “official” approach is to first factor the polynomial: $0 = 2x^2 - 3x - 20 = (x - 4)(2x + 5)$. Then, solve for x in each factor: $x - 4 = 0 \Rightarrow x = 4$. And: $2x + 5 = 0 \Rightarrow 2x = -5 \Rightarrow x = -\frac{5}{2}$. So, (D) is the correct answer choice.

Alternatively, test each of the answer choices to find the solution(s) for x that work in the given equation:

- A. If $x = -20$, then $2(-20)^2 - 3(-20) - 20 = 840$. ✗
 B. If $x = -5$, then $2(-5)^2 - 3(-5) - 20 = 15$. ✗
 C. If $x = -4$, then $2(-4)^2 - 3(-4) - 20 = 22$. ✗
 D. If $x = -\frac{5}{2}$, then $2\left(-\frac{5}{2}\right)^2 - 3\left(-\frac{5}{2}\right) - 20 = 0$. ✓

If $x = 4$, then $2(4)^2 - 3(4) - 20 = 0$. ✓

28. **(K) Mathematics/Statistics and Probability/Averages. CCRS: BOA 20–23a. CC: 7.RP.A.3.** For this item, the “official” approach is to set up an equation that uses the definition of average:

$$\text{average} = \frac{T_1 + T_2 + T_3}{3} \Rightarrow 85 = \frac{93 + 82 + T_3}{3} \Rightarrow 3(85) = 175 + T_3 \Rightarrow T_3 = 255 - 175 \Rightarrow T_3 = 80$$
. So, (K) is the correct answer choice.

Alternatively, substitute each of the answer choices for the missing test score into the formula for finding the average. Since the item stem asks for the *minimum* percent, start with the smallest value, (K):

$$\text{K. } 80\%: \frac{93 + 82 + 80}{3} = \frac{255}{3} = 85$$

So, Terrell needs to earn a score of 80% on the third test to have a test average of 85%.

29. **(C) Mathematics/Algebra/Manipulating Algebraic Expressions/Manipulating Expressions Involving Exponents. CCRS: NUM 28–32d. CC: HSN-CN.A.2.** This item requires an understanding of the conventions for manipulating exponents. If $x = a^b$ and $y = c^b$, then $xy = (a^b)(c^b) = (ac)^b$. So, (C) is the correct answer choice.

Alternatively, assume some values for the given variables. For example, let $a = 2$, $b = 3$, and $c = 4$. On that assumption, $x = a^b = 2^3 = 8$, $y = c^b = 4^3 = 64$, and $xy = 512$. So, when $a = 2$, $b = 3$, and $c = 4$, the correct answer will yield a value of 512:

A. $ac^b = (2)(4)^3 = (2)(64) = 128$ ✗

B. $ac^{2b} = (2)(4)^{2(3)} = 8^6$ ✗ (You'll be tempted to use your calculator for 8^6 , but use your number sense instead: 8^6 is a big, big number, so it can't be right.)

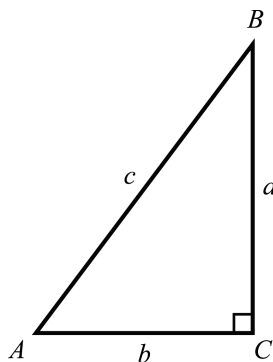
C. $(ac)^b = (2 \cdot 4)^3 = 8^3 = 512$ ✓

30. (J) **Mathematics/Geometry/Circles**. CCRS: MEA 24–27b. CC: 7.G.B.4. Find the radius (r) of the circle and then calculate the area: $r = \frac{\text{diameter}}{2} = \frac{10}{2} = 5$ and $\text{area} = \pi r^2 = \pi(5)^2 = 25\pi$. So, (J) is the correct answer choice.

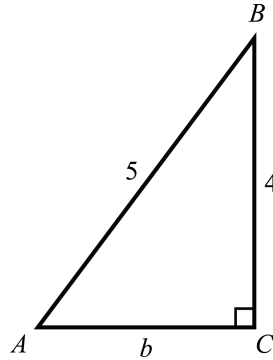
31. (B) **Mathematics/Statistics and Probability/Probability**. CCRS: BOA 20–23a. CC: 7.RP.A.3. This item tests the concept of probability as it relates to independent events. The odds of passing the written test is an independent event, and the odds of passing the driving test after having passed the written test is another independent event. So, the odds, or probability, of passing both tests and thereby getting a driver's license is the product of the two independent probabilities: $0.80 \cdot 0.60 = 0.48$. Therefore, in a random group of 1,000 applicants, the number of applicants expected to receive a driver's license is: $0.48 \cdot 1,000 = 480$. So, (B) is the correct answer choice.

Alternatively, since both events are independent, the solution can be determined by performing a two-step calculation: $1,000 \cdot 0.80 = 800$ and $800 \cdot 0.60 = 480$.

32. (J) **Mathematics/Trigonometry/Definitions of the Six Trigonometric Functions and Trigonometric Relationships and Geometry/Triangles/Pythagorean Theorem**. CCRS: FUN 24–27b. CC: HSG-SRT.C.8. The solution to this item rests on the definitions of sine and tangent: the sine of an angle is the ratio of the length of the side opposite that angle to the hypotenuse of the right triangle. The tangent of an angle is the ratio of the length of the side opposite that angle to the length of the adjacent side.



So, $\sin A = \frac{a}{c}$ and $\tan A = \frac{a}{b}$. According to the item stem, $\sin A = \frac{4}{5}$, so it can be reasoned that $a = 4$ and $c = 5$:



Notice that since this right triangle fits the 3-4-5 structure, b must have a length of 3. Therefore: $\tan A = \frac{4}{3}$. So, (J) is the correct answer choice.

Alternatively, use the Pythagorean theorem to solve for b : $4^2 + b^2 = 5^2 \Rightarrow b^2 = 25 - 16 = 9 \Rightarrow b = 3$.

33. **(B) Mathematics/Algebra/Manipulating Algebraic Expressions/Evaluating Expressions. CRS: XEI 16–19a. CC: 6.EE.B.7.** This item is fairly straightforward and does not require any sophisticated manipulation of the given expression. Since the item stem states that “ x is any number other than 4 and 5,” simply substitute a workable

value for x , such as 0: $\frac{(4-x)(x-5)}{(x-4)(x-5)} = \frac{(4-0)(0-5)}{(0-4)(0-5)} = \frac{(4)(-5)}{(-4)(-5)} = -\frac{20}{20} = -1$. This reasoning can even be

simplified by first canceling like terms in the numerator and denominator: $\frac{(4-x)\cancel{(x-5)}}{(x-4)\cancel{(x-5)}} = \frac{4-0}{0-4} = \frac{4}{-4} = -1$.

34. **(F) Mathematics/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Equations Involving Radical Expressions. CCRS: NUM 24–27e. CC: 8.EE.A.1.** This item tests familiarity with the procedures for manipulating square roots. Based on at least four of the five answer choices, it can be reasoned that there is some way to combine the two roots since the sum will have the same number under the radical sign:

$$\sqrt{50} = \sqrt{25 \cdot 2} = 5\sqrt{2}$$

$$\sqrt{128} = \sqrt{64 \cdot 2} = 8\sqrt{2}$$

$$5\sqrt{2} + 8\sqrt{2} = (5+8)\sqrt{2} = 13\sqrt{2}$$

So, (F) is the correct answer choice.

TIP The same conclusion can be reached by using a calculator to find an approximate sum for the given expression: $\sqrt{50} + \sqrt{128} = 7.07 + 11.31 = 18.41$. Then, repeat this process for each of the answer choices and compare results:

F. $13\sqrt{2} = 13(1.41) = 18.38$

G. $14\sqrt{2} = 14(1.41) = 19.79$

H. $2\sqrt{5} + 2\sqrt{8} = 2(2.23) + 2(2.82) = 4.46 + 5.64 = 10.10$

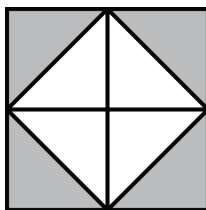
J. $89\sqrt{2} = 89(1.41) = 125.49$

K. $\sqrt{178} = 13.34$

(F) is the closest value to 18.41.

35. **(B) Mathematics/Geometry/Triangles/Working with Triangles. CCRS: MEA 20–23a. CC: 6.RP.A.3d.** Since the two triangles are similar, set up a direct proportion to determine the length for each of $\triangle DEF$'s two unknown sides. If the longest side of $\triangle ABC$ (\overline{AC}) measures 16 inches, and the similar side of $\triangle DEF$ (\overline{DF}) measures 40 inches, then these two sides are of the proportion $40:16$, or $5:2$. So: $\frac{\overline{DE}}{\overline{AB}} = \frac{5}{2} \Rightarrow \frac{\overline{DE}}{8} = \frac{5}{2} \Rightarrow \overline{DE} = 20$. And: $\frac{\overline{EF}}{\overline{BC}} = \frac{5}{2} \Rightarrow \frac{\overline{EF}}{10} = \frac{5}{2} \Rightarrow \overline{EF} = 25$. So, $\text{perimeter}_{\triangle DEF} = 40 + 20 + 25 = 85$.

36. **(K) Mathematics/Geometry/Complex Figures and Rectangles and Squares and Triangles/Working with Triangles. CCRS: MEA 24–27a. CC: 6.G.A.1.** Square $ABCD$ is unique in that given any dimension of the figure, one can then find the measure of every other aspect of the figure. Imagine \overline{KM} and \overline{LN} :



Since $K, L, M,$ and N are midpoints, each of the shaded triangular regions is bound by an isosceles triangle. The area of each isosceles triangle can be found with the known length of either its missing side or its hypotenuse. And with the area of any part of the figure, the area of every other part can be determined.

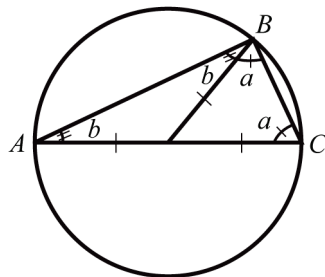
So, the easiest way to approach this item is to recognize that each shaded region has a corresponding unshaded region (isosceles triangle) of equal area. Therefore, the area of the shaded region is equal to half the area of the complete square: $\text{area}_{ABCD} = \overline{AB}^2 = 6^2 = 36$, so $\text{area}_{\text{shaded region}} = \frac{\text{area}_{ABCD}}{2} = \frac{36}{2} = 18$. So, (K) is the correct answer choice.

Another approach is to reason that the area of the shaded region is equal to the area of the unshaded region subtracted from the area of the complete square ($\text{area}_{ABCD} = \overline{AB}^2 = 6^2 = 36$). To find the area of square $KLMN$, first find the length of one of its sides: $\overline{KL}^2 = \overline{AK}^2 + \overline{AL}^2 = 3^2 + 3^2 = 18 \Rightarrow \overline{KL} = \sqrt{18} = 3\sqrt{2}$. So: $\text{area}_{KLMN} = \overline{KL}^2 = (3\sqrt{2})^2 = 18$. And: $\text{area}_{\text{shaded region}} = \text{area}_{ABCD} - \text{area}_{KLMN} = 36 - 18 = 18$.

Finally, a third approach is to find the area of the shaded region. To do so, find the area of one of the shaded triangles and then multiply that area by four. Since each of the segments around the perimeter of square $ABCD$ is equal to half the length of \overline{AB} , $\overline{AL} = 3$ and $\overline{AK} = 3$. So: $\text{area}_{\text{triangle}} = \frac{1}{2}(\text{base})(\text{height}) \Rightarrow \text{area}_{\triangle AKL} = \frac{1}{2}(3)(3) = \frac{9}{2}$. And: $\text{area}_{ABCD} = 4(\text{area}_{\triangle AKL}) = 4\left(\frac{9}{2}\right) = 18$.

37. **(D) Mathematics/Geometry/Lines and Angles. CCRS: PPF 24–27c. CC: HSG-CO.C.10.** Perhaps the easiest way to solve this item is to imagine $\angle ABC$ mirrored across the diameter \overline{AC} , which results in a quadrilateral with four sides and four angles of equal measure (a square). So, $\angle ABC$ must equal 90° .

Note that this item is peculiar in that the given information that $\overline{AB} \cong \overline{BC}$ is completely irrelevant. Regardless of where point B falls along the arc between points A and C , $\angle ABC$ must equal 90° . Consider the following diagram:



Since the sum of the interior angles of a triangle must equal 180° : $2a + 2b = 180 \Rightarrow 2(a + b) = 180 \Rightarrow a + b = 90$.

TIP You can also compare $\angle ABC$ in the given figure with the corner of the answer sheet. A quick comparison shows an angle measurement very close to 90 degrees.

38. **(F) Mathematics/Coordinate Geometry/The Coordinate System. CCRS: GRE 20–23a. CC: 6.NS.C.8.** One way to solve this item is to reason informally about the given endpoints. As for the y -coordinates, their difference is $7 - 3 = 4$, so the y -coordinate of the midpoint will be $4 \div 2 = 2$ units from either endpoint. ($3 + 2 = 5$ or $7 - 2 = 5$). Therefore, $y = 5$. (F) is the only answer choice with a y -coordinate of 5. Similarly, the same conclusion can be reached using the x -coordinates. Since their difference is $2 - (-1) = 3$, the x -coordinate of the midpoint will be $3 \div 2 = \frac{3}{2}$ units from either endpoint ($-1 + \frac{3}{2} = \frac{1}{2}$ or $2 - \frac{3}{2} = \frac{1}{2}$). Therefore, $x = \frac{1}{2}$. Again, (F) is the only possible answer choice.

Alternatively, use the midpoint formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{-1 + 2}{2}, \frac{3 + 7}{2}\right) = \left(\frac{1}{2}, \frac{10}{2}\right)$ or $\left(\frac{1}{2}, 5\right)$. If one or more of the other answer choices duplicated one of the coordinates in (F), it would be necessary to use the midpoint formula.

TIP As a matter of good test-taking strategy, do not do additional work unless it is necessary.

39. **(B) Mathematics/Arithmetic/Solving Complicated Arithmetic Application Items. CCRS: BOA 24–27a. CC: 6.RP.A.3d.** For this item, given the measures of time and distance, use the formula for finding the rate:
- $$\text{rate} = \frac{\text{distance}}{\text{time}} = \frac{1.2 \text{ miles}}{2 \text{ minutes}, 24 \text{ seconds}} = \frac{1.2 \text{ miles}}{144 \text{ seconds}} = \frac{0.0083 \text{ miles}}{\text{second}} \cdot \frac{60 \text{ seconds}}{\text{minute}} \cdot \frac{60 \text{ minutes}}{\text{hour}} = 30 \text{ miles per hour.}$$
- So, (B) is the correct answer choice.

40. **(G) Mathematics/Algebra/Expressing and Evaluating Algebraic Functions/Function Notation. CCRS: FUN 33–36a. CC: HSF-IF.A.1.** This item tests the ability to read function notation. As for $g(f(3))$, start with the innermost function and then work outward. According to the table for the function $f(x)$, when $x = 3$, $f(x) = 2$. So, $f(3) = 2$. Then, according to the table for the function $g(x)$, when $x = 2 = f(3)$, $g(x) = -3$. So, $g(f(3)) = -3$.

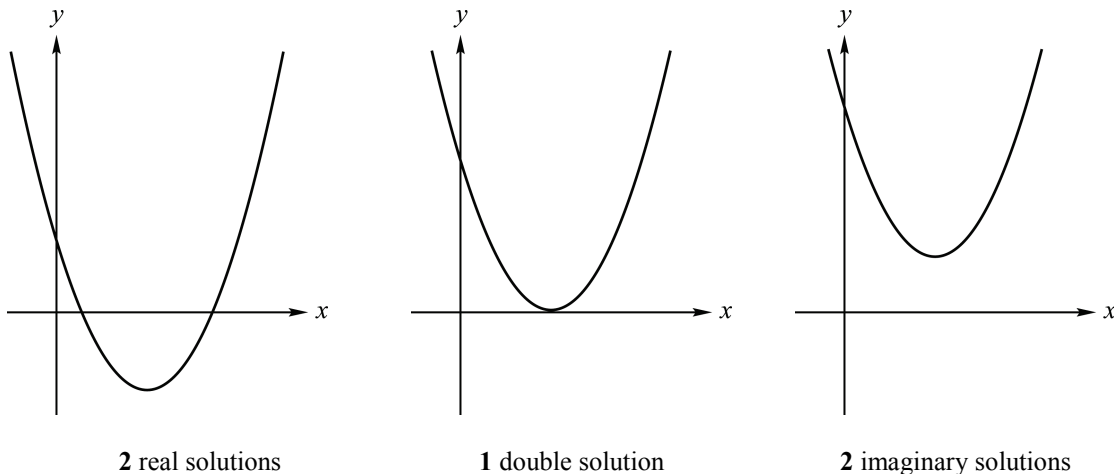
41. **(D) Mathematics/Algebra/Manipulating Algebraic Expressions/Manipulating Expressions Involving Exponents. CCRS: NUM 28–32d. CC: HSN-CN.A.2.** This item cannot easily be solved by assuming values for the variables because of the fractional exponents. So, instead, follow the conventions for manipulating exponents:
- $$x^{\frac{1}{2}} y^{\frac{2}{3}} z^{\frac{5}{6}} = x^{\frac{3}{6}} y^{\frac{4}{6}} z^{\frac{5}{6}} = \left(x^3 y^4 z^5\right)^{\frac{1}{6}} = \sqrt[6]{x^3 y^4 z^5}.$$
- So, (D) is the correct answer choice.

42. (F) *Mathematics/Algebra/Manipulating Algebraic Expressions/Basic Algebraic Manipulations. CCRS: MEA 28–32a. CC: 6.NS.B.4.* Manipulate the given equation so that it is defined in terms of d_2 :

$$A = \frac{1}{2}(d_1)(d_2) \Rightarrow 2A = (d_1)(d_2) \Rightarrow d_2 = \frac{2A}{d_1}. \text{ So, (F) is the correct answer choice.}$$

43. (D) *Mathematics/Algebra/Expressing and Evaluating Algebraic Functions/Functions as Models. CCRS: GRE 28–32a. CC: HSF-IF.A.1.* The straight line on the graph indicates that the car uses the same amount of gasoline per mile, which means that the rate of gasoline use is constant over distance. So, select any convenient point on the graph; for example, 10 gallons. According to the graph, the car drives about 350 miles on 10 gallons of gasoline. Therefore, its predicted rate of gasoline use is $350 \div 10 = 35$ miles per gallon.

44. (F) *Mathematics/Coordinate Geometry/Graphs of Quadratic Relations. CCRS: GRE 28–32e. CC: HSG-GPE.A.2.* The terminology used is likely the most challenging aspect of this item. “Real solutions” are those that appear on the standard coordinate plane and consist of real numbers. “Imaginary solutions” entail an imaginary axis and are not real numbers. “Double solution” refers to cases where the solutions are equal, regardless of whether the numbers are real. (For a parabola, this solution occurs only at the vertex.) Here is an example of each:

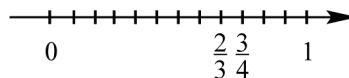


So, according to this graph, when $y = 0$, the parabola will intersect the x -axis. The graph shows that the x -axis is crossed twice, which means that there are 2 real solutions.

45. (C) *Mathematics/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Equations Involving Absolute Value. CCRS: XEI 28–32d. CC: HSA-REI.B.4b.* One way to define absolute value is as follows: when $x \geq 0$, $|x| = x$ and when $x < 0$, $|x| = -x$. Therefore: $y = y + 6$ or $y = -(y + 6)$. The first of these derived equations does not have a solution; however, the solution to the second equation is:
 $y = -(y + 6) = -y - 6 \Rightarrow 2y = -6 \Rightarrow y = -3$. So, (C) is the correct answer choice. You can double-check this result by substituting -3 for y in the original equation: $|y| = y + 6 \Rightarrow |-3| = -3 + 6 \Rightarrow 3 = 3$.

TIP You can also solve this item by substituting each of the answer choices back into the given equation. Only (C) returns a true statement.

46. (K) *Mathematics/Arithmetic/Simple Manipulations. CCRS: BOA 16–19b. CC: 7.NS.A.3.* For this item, use a number line to help visualize:





The distance from either $\frac{2}{3}$ or $\frac{3}{4}$ to the fraction that lies exactly halfway between them is: $\frac{\frac{3}{4} - \frac{2}{3}}{2} = \frac{\frac{1}{12}}{2} = \frac{1}{24}$. So, that unknown fraction is: $\frac{2}{3} + \frac{1}{24} = \frac{17}{24}$.

Alternatively, recognize that the fraction that lies exactly halfway between $\frac{2}{3}$ and $\frac{3}{4}$ would be the average of those two values. So, the unknown fraction is: $\frac{\frac{2}{3} + \frac{3}{4}}{2} = \frac{\frac{17}{12}}{2} = \frac{17}{24}$.

47. **(E) Mathematics/Arithmetic/Solving Complicated Arithmetic Application Items. CCRS: BOA 13–15a. CC: 4.OA.A.3.** Reason informally. Since Elliott adds \$15 instead of subtracting \$15, his register shows \$15 + \$15 = \$30 more than it should. So, (E) is the correct answer choice.

Alternatively, represent the given information using algebraic terminology. Let x represent the original balance. So, the correct new balance should be $x - 15$, and the incorrect new balance is $x + 15$. The difference between these two balances is $x + 15 - (x - 15) = 15 + 15 = +30$.

Similarly, approach the item more concretely by representing the given information with hypothetical figures. For example, if the original balance is \$100, then the correct new balance should be \$100 - \$15 = \$85. Instead, however, the incorrect new balance is \$100 + \$15 = \$115. So, the balance is \$115 - \$85 = \$30 more than the correct balance.

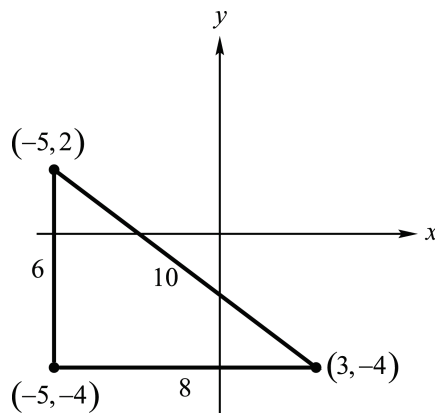
48. **(K) Mathematics/Arithmetic/Simple Manipulations. CCRS: PSD 28–32c. CC: HSS-CP.B.9.** The most direct way to solve this item is to recognize that the number of arrangements (possibilities) described is the factorial of 6, or 6!: $6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 720$. If necessary, use a calculator to perform the operations.

Alternatively, reason informally to reach the same conclusion. Only one plant can be chosen for the first spot. So, no matter which one is chosen, five plants will remain. Of the five plants that remain, only one of them can be chosen for the second spot. So far, therefore, it can be reasoned that for each of the six choices for the first spot, there are five choices for the second spot, and $5 + 5 + 5 + 5 + 5 + 5 = 30$, or $6 \cdot 5 = 30$, possible combinations. Continuing with this reasoning, there are four choices for the third spot ($6 \cdot 5 \cdot 4 = 120$), three choices for the second spot ($6 \cdot 5 \cdot 4 \cdot 3 = 360$), and so on. This approach provides a more concrete understanding of the factorial.

49. **(D) Mathematics/Coordinate Geometry/Distance Formula and Geometry/Triangles/Pythagorean Theorem. CCRS: GRE 28–32c. CC: 8.G.B.8.** The “official” way to solve this item is to use the distance formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(-5 - 3)^2 + (2 - (-4))^2} = \sqrt{(-8)^2 + (6)^2} = \sqrt{64 + 36} = \sqrt{100} = 10$$

Alternatively, consider the distance between the two points as the hypotenuse of a right triangle. Then, either recognize the 3–4–5 structure or use the Pythagorean theorem to determine the length of the hypotenuse.



50. **(J) Mathematics/Geometry. CCRS: MEA 28–32a. CC: 7.G.B.6.** Use the formula provided to calculate the volume of the cylindrical tank: $V = \pi r^2 h = \pi(5)^2(4) = 100\pi \approx 100(3.14) = 314$ cubic meters. Then, find the weight of 314 cubic meters: $314 \cdot 2,205 = 635,850$. So, (J) is the correct answer choice. While a calculator would be useful for this item, the answer choices are broad enough that it may be easier to estimate: 314 cubic meters at 2,000 pounds per cubic meter is a bit more than 600,000 pounds.
51. **(B) Mathematics/Trigonometry/Determining Trigonometric Values. CCRS: FUN 33–36b. CC: HSF-TF.B.7.** This item requires an understanding of trigonometric functions, specifically the tangent function. So, create a triangle whose hypotenuse acts as the radius of a unit circle. Since $\tan \theta = \frac{\text{side opposite } \theta}{\text{side adjacent to } \theta} = -1$, the ratio between the two sides is $\frac{1}{1}$. In other words, they must have the same length, creating an isosceles right triangle. Then, find the angle of θ , ignoring for a moment its orientation around the unit circle. The angles of an isosceles right triangle measure 45° – 45° – 90° , and θ corresponds to one of the 45° angles. Now, find which quadrant(s) contain the triangle. Only $\frac{-\text{side opposite } \theta}{\text{side adjacent to } \theta}$ and $\frac{\text{side opposite } \theta}{-\text{side adjacent to } \theta}$ will result in a negative value, which places the triangle in the second and fourth quadrants: $90^\circ + 45^\circ = 135^\circ$ and $270^\circ + 45^\circ = 315^\circ$, respectively.
52. **(F) Mathematics/Coordinate Geometry/Graphs of Quadratic Relations. CCRS: GRE 28–32e. CC: HSG-GPE.A.1.** The standard form of the equation of a circle is $(x-h)^2 + (y-k)^2 = r^2$, where (h,k) is the center of the circle, and r is the radius of the circle. Since the circle described in the item stem has its center at $(3,4)$, the equation, in part, is $(x-3)^2 + (y-4)^2 = r^2$. So, (G), (H), and (K) can be eliminated. Then, since the item stem states that the circle is tangent to the x -axis, and given that the center has a y -coordinate of 4, the radius of the circle is $4-0=4$. So, (F) must be the correct answer choice.
53. **(C) Mathematics/Coordinate Geometry/Graphs of First-Degree Inequalities. CCRS: GRE 33–36b. CC: HSA-REI.D.12.** This item asks for the best representation of the graph of $y \leq ax + b$. (B), (D), and (E) can immediately be eliminated since these are graphs in which y -values greater than those on the line are shaded. Next, look for a line with a positive slope ($a > 0$). Since (A) and (C) both have positive slopes, look for a negative y -intercept ($b < 0$). (A) has a positive y -intercept. So, (C) must be the correct answer choice.
54. **(F) Mathematics/Trigonometry/Determining Trigonometric Values. CCRS: FUN 33–36d. CC: HSF-IF.C.7e.** This item requires an understanding of the sine function. Begin with a couple of points to eliminate answer choices. At $\theta = 0$, $y = A \sin \theta = A \sin 0 = 0$, so the first point on the graph is $(0,0)$. (G), (J), and (K) can be eliminated. At $\theta = 6.28$ radians, which is approximately 2π radians, or 360° , $y = A \sin \theta = A \sin 2\pi = 0$. The graph begins and ends at 0. Unfortunately, this fact does not help to distinguish between (F) and (H). What will



help to distinguish between the two is the knowledge that A is the amplitude of the function and does not affect the frequency. As a result, only one period of the sine function (not three) should be completed between 0 and 2π .

TIP A good way to save time is to use the process of elimination (POE) to narrow down the answer choices, as outlined in the explanation to #54.

55. (E) Mathematics/Geometry/Lines and Angles. CCRS: PPF 24–27a. CC: 7.G.B.5. One way to solve this item is to make the following series of deductions:

- ABC is a triangle, and the sum of the degree measures of its interior angles is 180, so $\angle ABC$ is $180^\circ - 20^\circ - 60^\circ = 100^\circ$.
- Since E and F are midpoints of their respective sides, \overline{EF} is parallel to \overline{AB} . Similarly, $\overline{DF} \parallel \overline{BC}$, and $\overline{DE} \parallel \overline{AC}$.
- When parallel lines are intersected by a transversal, corresponding angles are equal. Therefore, $\angle ABC = \angle FEC$, $\angle BAC = \angle EFC$, $\angle BED = \angle BCA$, and $\angle AFD = \angle ACB$.
- The measures of $\angle FED$ and $\angle DFE$ remain as gaps in the 180° of \overline{BC} and \overline{AC} , respectively. For $\angle FED$, $180^\circ - 100^\circ - 20^\circ = 60^\circ$. For $\angle DFE$, $180^\circ - 60^\circ - 20^\circ = 100^\circ$.
- So, $\angle FED + \angle DFE = 60^\circ + 100^\circ = 160^\circ$.

Another way to find the measures of $\angle DFE$ and $\angle FED$ is to recognize that since E , D , and F are midpoints of the three sides of a triangle, the four smaller triangles are congruent. Based on this information, it can be concluded that $\angle C$, with a measure of 20° , is congruent to $\angle EDF$; and $\angle A$, with a measure of 60° , is congruent to $\angle FED$. So, with the measures of $\angle EDF$ and $\angle FED$ determined, the measure of $\angle DFE$ can then be determined.

A third way to solve this item is to “guesstimate” the size of the marked angles at points E and F . The marked angle at point E appears to be about the same measure as $\angle A = 60^\circ$, and the marked angle at point F appears to be slightly larger than 90° . So, their sum is at least $60^\circ + 90^\circ = 150^\circ$. (E) is the only answer choice that is greater than or equal to 150° .

Finally, a fourth way to solve this item is to fold the page over at \overline{EF} to match point C with point D and in turn recognize that $\angle EDF = \angle BCA$, which leaves $180^\circ - 20^\circ = 160^\circ$ for the sum of the measures of $\angle DFE$ and $\angle FED$.

56. (G) Mathematics/Geometry. CCRS: MEA 28–32a. CC: 7.G.B.6. The formal approach to solving this item is to multiply each of the dimensions by 2, reconstructing the formula for the surface area, and then compare the two formulas:

$$A_1 = 2lw + 2lh + 2wh = 2(lw + lh + wh)$$

$$A_2 = 2(2l)(2w) + 2(2l)(2h) + 2(2w)(2h) = 8lw + 8lh + 8wh = 8(lw + lh + wh)$$

$$\frac{A_2}{A_1} = \frac{8(lw + lh + wh)}{2(lw + lh + wh)} = 4$$

Another approach is to assign values to each of the dimensions. A cube is a type of rectangular solid, so use one value for all three dimensions; for example, $l = 1$, $h = 1$, and $w = 1$: $A_1 = 2(1) + 2(1) + 2(1) = 6$. Since each of the dimensions is doubled: $A_2 = 2(4) + 2(4) + 2(4) = 24$. So, the surface area is multiplied by a factor of 4.

57. (A) Mathematics/Trigonometry/Trigonometric Relationships. CCRS: FUN 33–36b. CC: HSF-TF.B.7. This item requires an understanding of the trigonometric functions. In this case, remember that the secant function is

simply an inversion of the cosine function: $\sec x = \frac{1}{\cos x} = \frac{1}{\frac{\text{side adjacent to } x}{\text{hypotenuse}}} = \frac{\text{hypotenuse}}{\text{side adjacent to } x}$. So, if

$$\cos x = -\frac{1}{2}, \text{ then } \sec x = -\frac{2}{1} = -2.$$

58. **(G) Mathematics/Coordinate Geometry/Slope of a Line. CCRS: GRE 24–27b. CC: 8.F.B.4.** In a rhombus, the diagonals are perpendicular, so the slope of \overline{BD} will be the negative reciprocal of the slope of \overline{AC} . The slope of \overline{AC} is: $\frac{(6-0)}{(4-0)} = \frac{3}{2}$. So, the slope of \overline{BD} is $-\frac{2}{3}$.

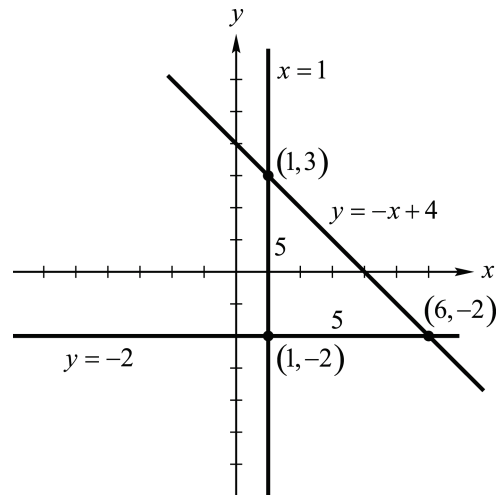
59. **(D) Mathematics/Algebra/Solving Simultaneous Equations. CCRS: PSD 28–32c. CC: HSS-CP.B.9.** For this item, the “official” approach is to translate the given information into a system of equations. Let x equal the number of correctly answered questions, let y equal the number of incorrectly answered questions, and let z equal the number of unanswered questions. Since there are 25 questions on the exam: $x + y + z = 25$. Then, in terms of points, since Yvette earned a score of 56: $6x - 2y + 0z = 56 \Rightarrow 6x - 2y = 56$. Now, since the item stem asks for the number of correctly answered questions, isolate x , combine the equations so as to eliminate y (note that z can be disregarded at this point since the item stem asks for x):

$$\begin{array}{r} 6x - 2y = 56 \\ + 2(x + y = 25) \\ \hline 8x = 106 \\ x = \frac{106}{8} = 13.25 \end{array}$$

Since 13.25 does not fit the integer requirement, make an assumption about the total score based on an approximation of the correct and incorrect answers: $6x - 2y = 56 \Rightarrow 6(13) - 2(12) = 78 - 24 = 54 \neq 56$. According to this assumption, if Yvette answered 13 questions correctly, then she could not have answered 12 questions incorrectly. So, to earn a score of 56, she would had to have answered $12 - 11 = 1$ less question incorrectly and therefore would have left 1 question unanswered: $6(13) - 2(11) = 78 - 22 = 56$, with 1 question unanswered. So, (D) is the correct answer choice.

Alternatively, since the item stem asks for the *maximum* number of questions answered correctly, test each of the answer choices, starting with the greatest value, 14. If Yvette answered 14 questions correctly, then she would have received $14 \cdot 6 = 84$ points. 84 earned points would require that $84 - 56 = 28$ points were deducted for 14 questions answered incorrectly. However, $14 + 14 = 28$ total questions answered is greater than the 25 questions that are on the test. So, (E) must be wrong. Next, try (D). 13 questions answered correctly earns $13 \cdot 6 = 78$ points, which would mean that $78 - 56 = 22$ points were deducted for 11 wrong answers. $13 + 11 = 24$ total questions answered would mean leave 1 question unanswered. So, (D) works.

60. **(J) Mathematics/Coordinate Geometry/The Coordinate System and Geometry/Triangles/Working with Triangles. CCRS: MEA 24–27a. CC: 6.G.A.1.** This item requires finding the three vertices of the triangle described in the item stem. If $x - 1 = 0$, then $x = 1$, and if $y + 2 = 0$, then $y = -2$. At $x = 1$, $x + y = 4$ returns $y = 3$, or (1, 3). At $y = -2$, $x + y = 4$ returns $x = 6$, or (6, -2). A sketch of the graphs on the (x, y) coordinate plane will be helpful:



The triangle has a base of 5 and an altitude of 5. So, the area of the triangle is: $\text{area}_{\text{triangle}} = \frac{1}{2}(\text{altitude})(\text{base}) =$

$$\frac{1}{2}(5)(5) = \frac{25}{2}.$$

The following tables list the descriptions for all the Common Core State Standards and the College and Career Readiness Standards that are referenced in this *Navigator Plus*.

Mathematics — Common Core State Standards

Standard	Description
4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators
6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.
6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
6.RP.A.3c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
6.RP.A.3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
6.SP.B.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.



7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
7.G.B.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
7.G.B.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
7.G.B.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
7.RP.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
7.SP.C.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
HSA-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
HSA-REI.B.4	Solve quadratic equations in one variable.
HSA-REI.B.4b	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .
HSA-REI.D.12	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
HSF-BF.B.5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.
HSF-IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
HSF-IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
HSF-IF.C.7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
HSF-TF.B.7	Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.
HSG-CO.C.10	Prove theorems about triangles. <i>Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</i>
HSG-GPE.A.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
HSG-GPE.A.2	Derive the equation of a parabola given a focus and directrix.
HSG-SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
HSG-SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

HSN-CN.A.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
HSS-CP.B.9	Use permutations and combinations to compute probabilities of compound events and solve problems.

Mathematics — College Readiness Standards

Standard	Description
Basic Operations and Applications	
BOA 13-15a	Perform one-operation computation with decimals and whole numbers.
BOA 16-19a	Solve one-step arithmetic problems.
BOA 16-19b	Solve routine two-step arithmetic problems.
BOA 20-23a	Solve two- or three-step arithmetic problems involving rate and proportion, tax added, percentage off, computing with a given average, etc.
BOA 24-27a	Solve multistep arithmetic problems that involve planning or converting units of measure.
Probability, Statistics, and Data Analysis	
PSD 16-19a	Calculate the average of a list of numbers.
PSD 20-23c	Determine the probability of a simple event.
PSD 28-32c	Use counting techniques.
Number Concepts	
NUM 24-27e	Demonstrate the ability to work with squares and square roots of numbers.
NUM 28-32d	Apply the rules of exponents.
NUM 33-36b	Demonstrate knowledge of logarithms and geometric sequences.
Expressions, Equations, and Inequalities	
XEI 16-19a	Evaluate expressions by substituting whole numbers for unknown quantities.
XEI 20-23a	Evaluate algebraic expressions using integers.
XEI 20-23b	Add and subtract simple algebraic expressions.
XEI 20-23c	Solve routine first-degree equations.
XEI 20-23d	Perform direct word-to-symbol translations.
XEI 24-27e	Factor simple quadratics such as the difference of squares and perfect square trinomials.
XEI 24-27f	Solve first-degree inequalities that don't require reversing the inequality sign.
XEI 28-32a	Manipulate equations and expressions.
XEI 28-32d	Solve an absolute value equation.
XEI 28-32e	Solve quadratic equations.
Graphical Representations	
GRE 20-23a	Locate points in the coordinate plane.
GRE 20-23b	Understand the concept of length expressed by a number line.
GRE 20-23c	Exhibit knowledge of slope.
GRE 24-27b	Find the slope of a line from points or equations.
GRE 28-32a	Analyze and apply information from graphs in the coordinate plane.
GRE 28-32c	Use the distance formula.
GRE 28-32e	Demonstrate the knowledge of special characteristics of parabolas and circles.
GRE 33-36b	Identify characteristics of graphs based on a general equation or a set of conditions.
Properties of Plane Figures	
PPF 20-23a	Find the measure of angles using properties of angles created by parallel lines.
PPF 24-27a	Find an unknown angle measure by using several angle properties.
PPF 24-27c	Use properties of isosceles triangles.
PPF 28-32a	Apply the properties of similar, congruent, 30° - 60° - 90° , and 45° - 45° - 90° triangles.



Measurement	
MEA 13-15a	Find the length of a line segment based on other lengths given on a geometric figure.
MEA 20-23a	Compute the area and perimeter of triangles and rectangles in simple problems.
MEA 24-27a	Find the area of triangles and rectangles when additional simple steps are required.
MEA 24-27b	Identify the necessary information and then compute the area and circumference of circles.
MEA 28-32a	Compute another measure using relationships involving area, perimeter, and volume of geometric figures.
Functions	
FUN 24-27a	Evaluate polynomial functions that are expressed in function notation, at integer value.
FUN 24-27b	Express the sine, cosine, and tangent of a right triangle angle as a ratio of given side lengths.
FUN 33-36a	Demonstrate the ability to write an expression for the composite of two simple functions.
FUN 33-36b	Solve problems using trigonometric concepts and basic identities.
FUN 33-36d	Identify graphs of basic trigonometric functions and match these graphs to their equations.

TEST 3: READING

1. **(C) Reading/Prose Fiction/Implied Idea. CCRS: GEN 13–15a. CC: ELA.Literacy.CCRA.R.1.** According to the first paragraph, the neighbors all gossiped about the fact that Louisa used her china every day—even though she was neither rich nor royally bred. So, (C) is the correct answer choice. The neighbors apparently felt that Louisa was “putting on airs.” As for (A), there is nothing in the passage to suggest that Louisa’s neighbors are her close friends. In fact, the author implies just the opposite—that Louisa keeps to herself. As for (B), the neighbors do not imagine that they should act like Louisa. Finally, (D) is wrong because it is contradicted by the passage; Louisa is no better off financially than are her neighbors.

2. **(G) Reading/Prose Fiction/Implied Idea. CCRS: REL 16–19b. CC: ELA.Literacy.CCRA.R.3.** The first and second statements cannot be inferred from the passage because there is simply not enough information to draw a conclusion about Joe’s *typical* behavior. It is not made clear whether he is generally reckless or careful, clumsy or graceful, weak or strong. So, by process of elimination, (G) must be the correct answer choice. Based on the passage, the way Joe feels can only be determined “at the moment” of his visit at Louisa’s house: he sits in a stiff manner; the conversation is stilted; and his attempt at humor is strained. So, it can be concluded that he is feeling “uneasy.”

TIP The process of elimination (POE) is a powerful test-taking strategy and a useful way to reduce the time it takes to answer an item, as outlined in this explanation to #2.

3. **(A) Reading/Prose Fiction/Implied Idea. CCRS: GEN 13–15a. CC: ELA.Literacy.CCRA.R.1.** As noted in the explanation for item #2 on this test, Joe feels uneasy in Louisa’s house. While he may or may not always feel that way, there is no reason to believe that he feels amused, happy, or annoyed. So, (A) must be the correct answer choice; it can be inferred that Joe primarily feels uncomfortable in Louisa’s house.

4. **(J) Reading/Prose Fiction/Application. CCRS: REL 16–19b. CC: ELA.Literacy.CCRA.R.3.** Although the author of the passage does not explicitly state why Louisa tells Joe that she will pick up the spools after he leaves, a reasonable conclusion may be drawn from the sequence of events. Joe sits across from Louisa, “glancing with a good-humored uneasiness” and then trips over a rug on his way out, knocking her work-basket to the floor. So, when Joe “duck[s] himself awkwardly” to pick up the spools, Louisa most likely fears a repeat incident. (J) best capture this idea. As for (F), Louisa tells Joe that she will pick up the spools after he leaves, so it can be inferred that the mess *is* important to her. As for (G), Joe is leaving the house when he knocks over the work-basket; if Louisa wanted him to stay, she would have accepted his unspoken offer to help tidy up the mess. Finally, (H) is wrong because it is clear that Joe is completely at fault for knocking over the basket. Louisa is very well-organized, as is suggested by her reaction when Joe repositions her books.

5. **(C) Reading/Prose Fiction/Implied Idea. CCRS: MOW 20–23a. CC: ELA.Literacy.CCRA.R.4.** According to the first paragraph, Louisa, even though she lives alone, goes through an elaborate ritual both at teatime and at supper, using her good china and linens and performing meticulous preparations. So, in lines 3–4, the phrase “a veritable guest to her own self” implies that she treats herself as she would a guest. (C) best captures this idea. (A) is wrong because the phrase refers to herself, not to someone else; additionally, Louisa is alone, setting only the one place for herself. As for (B), there is simply nothing in the passage to suggest that Louisa wants for company. Finally, (D) is wrong because it provides a misreading of the term “guest.” Louisa does not feel like a stranger in her own home; in fact, she seems quite comfortable, with her various rituals.

6. **(H) Reading/Prose Fiction/Implied Idea. CCRS: REL 16–19b. CC: ELA.Literacy.CCRA.R.3.** According to lines 40–42, Louisa always wears a second apron over her company apron unless she has a guest. These conditions suggest that there is a method to her behavior. So, (H) is the correct answer choice. Note also in line 43 that the author refers to Louisa’s actions as performed with “methodical haste.” As for (F), Louisa has her reasons for wearing more than one apron, so it is not a matter of forgetfulness. As for (G) and (J), there is nothing in the passage to suggest that Louisa wears two aprons either to cover herself out of modesty or to protect herself from germs, respectively.



7. **(D) Reading/Prose Fiction/Application. CCRS: GEN 13–15a. CC: ELA.Literacy.CCRA.R.1.** In lines 21–22, the author states that Louisa “ate quite heartily, though in a delicate, pecking way.” So, (D) is the correct answer choice. “Meticulous” means “showing extreme care with minute details,” which is synonymous with a delicate and pecking manner. As for the remaining answer choices, each phrase is only partially accurate. With (A), Louisa does eat “heartily,” but “quickly” does not capture the idea of showing extreme care. With (B), Louisa’s manner might be described as “dainty,” but she does not eat “with little appetite.” Finally, with (C), Louisa’s “delicate, pecking way” might be described as “slow,” but “without pleasure” is not a good description.
8. **(G) Reading/Prose Fiction/Application. CCRS: SUP 20–23b. CC: ELA.Literacy.CCRA.R.2.** Interestingly enough, lines 87–89 address each of the three given statements. In this paragraph alone, the author says that Joe is loyal to Louisa, which eliminates the first statement; that he feels uneasy in her home (See explanations for items #2 and 3 on this test.), which eliminates the second statement; and that he is perplexed by her behavior (as previously demonstrated by his reaction in lines 70–72 to her obsessive need to organize her books). So, the third statement is the only one that describes the way Joe feels about Louisa; he is puzzled by her.
9. **(B) Reading/Prose Fiction/Implied Idea. CCRS: REL 16–19b. CC: ELA.Literacy.CCRA.R.3.** In line 45, the author says that Joe seems “to fill up the whole room”; in contrast to Louisa, who is apparently a delicate person with modest and meticulous habits, Joe has a “heavy step” (line 37) and works outdoors “haying” (lines 57–59). So, it can be inferred that he is out of place in Louisa’s home, (B). (A) is wrong because, as mentioned in the explanation for item #2 on this test, it is Joe who is ill-at-ease, not Louisa. As for (C), while Joe is strong and perhaps ungraceful, there is nothing in the passage to indicate that he is domineering. Do not be distracted by the incident with the books; Joe does not insist that Louisa leave the books as he left them. Finally, as for (D), based on their conversation in lines 56–59, it seems as though Joe does not do much talking.
10. **(H) Reading/Prose Fiction/Application. CCRS: GEN 24–27a. CC: ELA.Literacy.CCRA.R.1.** According to line 12, the neighbors “whispered...among themselves” about Louisa’s *different* behavior. So, the first statement is supported by the passage. As for the second statement, it can be inferred that Louisa’s neighbors thought she was “putting on airs,” or acting superior, since she used her best china even though she “was no richer nor better bred than they.” For this very reason, however, the third statement cannot be justified by the passage. So, (H) is the correct answer choice.
11. **(D) Reading/Social Science/Explicit Detail. CCRS: SUP 24–27a. CC: ELA.Literacy.CCRA.R.2.** In lines 49–51, the author specifically states that “industrial and commercial growth are the measures of our nation’s strength.” So, (D) is the correct answer choice. As for (A), although the author remarks that our nation’s work ethic has been distorted to one of single-minded focus (lines 51–54), he does not say that it is the measure of our nation’s strength. As for (B), while individual political freedom might be considered a mark of our nation’s strength, it is not one of the measures mentioned by the author. Finally, (C) is wrong because the neutral marketplace economies are an historical development of the 17th and 18th centuries (lines 58–60).
12. **(H) Reading/Social Science/Implied Idea. CCRS: GEN 20–23b. CC: ELA.Literacy.CCRA.R.1.** In lines 43–46, the author argues that virtuous consumption may actually have the unwanted consequence of detracting attention from the real problem, which is simply too much consumption. As a result, such environmentally conscious behaviors (e.g., using biodegradable plastic bags and CFC-free deodorant) merely treat a symptom and not the disease. (H) best captures this idea. (F) is wrong because the author makes no argument as to whether these behaviors will change American business practice. (G) is wrong because the author suggests that non-virtuous consumption, so to speak, and the endless pursuit for growth already contribute to our productive economy. Therefore, it can be inferred that virtuous consumption would not be a necessary factor in maintaining this productivity. Finally, (J) is wrong because the author argues the exact opposite of this position; he argues that these behaviors will *not* solve our environmental problems.
13. **(B) Reading/Social Science/Explicit Detail. CCRS: SUP 24–27a. CC: ELA.Literacy.CCRA.R.2.** In lines 38–39, the author specifically states that “fluorocarbons from aerosols deplete upper atmosphere ozone.” So, (B) is the correct answer choice. As for (A) and (C), the passage does not attribute the problem of ozone depletion to the burning of disposable diapers or overflowing landfills. While these activities may indeed cause problems for the

environment, they are not the cause of ozone depletion. Finally, as for (D), the use of any CFC-free products is actually consistent with the goal of protecting the ozone.

14. **(J) Reading/Social Science/Voice. CCRS: GEN 20–23b. CC: ELA.Literacy.CCRA.R.1.** The author’s tone throughout the entire passage is clearly one of negativity towards our society’s practice of consumption. He regards this consumption as both wasteful and dangerous behavior. So, (J) is the best answer choice. The author considers consumption to be a destructive practice as confirmed by his reference to Stuart Ewen (line 56), who describes the negative consequences of a consumption-based economy. As for (F), while the word “materialistic” often carries negative connotations, it is not strong enough to describe the author’s tone. Consumption is by definition materialistic, but as practiced by our society it is destructive. (G) is wrong because the author considers excess consumption to be an inefficient practice. Finally, (H) simply does not make sense. Consumption is not imminent; it is already practiced in our society.
15. **(D) Reading/Social Science/Vocabulary. CCRS: MOW 24–27b. CC: ELA.Literacy.CCRA.R.4.** In lines 55–62, the author cites social critic Stuart Ewen, who notes the historical sense of the idea of consumption: before the seventeenth century, it had a negative connotation; during the seventeenth and eighteenth centuries, it had a neutral connotation; and by the twentieth century, the idea became “exalted.” So, the idea of consumption changed (over time) from having a negative meaning to having a positive meaning. (A) and (B) are certainly wrong since these words have negative overtones. As for (C), while “satisfied” is a positive description and may indeed be used in reference to “consumption” (e.g., a satisfied consumer), it does not provide the appropriate meaning in this context. So, (D) must be the correct answer choice.
16. **(F) Reading/Social Science/Implied Idea. CCRS: MOW 24–27b. CC: ELA.Literacy.CCRA.R.4.** The feedback loop process to which the author refers in line 30 is described in the previous paragraph: experts predict a disaster (ozone depletion, global warming, etc.); the public reacts to its potential danger; the disaster never materializes; and the public relaxes. In the story of the “Boy Who Cried Wolf,” a boy in a village falsely claims that he saw a wolf, a threat to the village. The villagers respond by getting out their sticks and pitchforks to go hunt for the wolf; however, they never find any such creature. This series of events is repeated until the boy actually sees a wolf and raises the alarm; however, at this point, no one believes him. The moral of this story is that the public begins to doubt the legitimacy of a threat when it does not in fact occur. (F) best captures this idea. As for the remaining answer choices, none of them fit the fable of the “Boy Who Cried Wolf.”
17. **(B) Reading/Social Science/Explicit Detail. CCRS: REL 24–27e. CC: ELA.Literacy.CCRA.R.3.** In lines 34–35, the author explains that since environmental problems are presented as crises, we as a society do not get the opportunity to examine them calmly. So, (B) is the correct answer choice. As for (A), the author does not address whether we are capable of calmly examining these problems but simply that we do not do so. (C) is wrong because the author does not mention such a problem. Finally, (D) is wrong since the author believes that the environmental movement is well-established.
18. **(H) Reading/Social Science/Explicit Detail. CCRS: SUP 24–27a. CC: ELA.Literacy.CCRA.R.2.** In the author’s description of the feedback loop process in the fourth paragraph, he or she specifically states that when the mass media ceases its coverage of an environmental issue, the public relaxes. (H) best captures this idea. (F) is wrong because the public does not become outraged or uneasy; instead, the public assumes that there is no longer a threat. As for (G), the feedback loop provides that scientists present a new environmental concern once the previous one has been dismissed; scientists do not *attempt* to seek out another crisis. Finally, as for (J), the author states that the government offers band-aid programs *before* the media drops its coverage of the issue.
19. **(D) Reading/Social Science/Explicit Detail. CCRS: REL 28–32b. CC: ELA.Literacy.CCRA.R.3.** According to lines 73–76, our ancestors did not measure success solely by material gain. Instead, they sought fulfillment in “spiritual, educational, and other realms.” Their view of success was therefore broader than the current view. So, (D) is the correct answer choice. (A) is wrong because the author does not compare the two world views in terms of their outlook on society. (B) is directly contradicted by the passage. Our ancestors did not exalt consumerism; we exalt consumerism. Finally, (C) is wrong because it reaches the exact opposite conclusion of that expressed in (D).



20. **(F) Reading/Social Science/Explicit Detail. CCRS: SUP 28–32a. CC: ELA.Literacy.CCRA.R.2.** According to the passage, the change in the connotation of the word “consumption” paralleled a change in the goals of American society: from a broad mix of spiritual, educational, and other objectives to the more narrow definition of consumeristic growth. (F) best capture this idea. (G) is wrong because American society has become more, not less, materialistic. (H) is wrong because the shift in meaning was driven by material gains, not educational or spiritual gains. Finally, (J) is wrong because the “greening” of our society is not connected to the change in the meaning of “consumption.”
21. **(C) Reading/Humanities/Explicit Detail. CCRS: SUP 20–23b. CC: ELA.Literacy.CCRA.R.2.** In line 86, Reagon states that the civil rights movement gave her the courage to be herself. So, her experience in the movement made her more “confident,” (C). (A) is wrong because the civil rights movement was a positive experience for Reagon; she says that “[it] was the most wonderful thing [she] ever experienced in [her] life” (lines 84–85). (B) is wrong because it is simply not supported by the passage. While Reagon may have been “serious” about her involvement in the civil rights movement, there is nothing to indicate that it made her a more “serious” person. Finally, as for (D), while the civil rights movement indeed dealt with “social” issues, the passage does not suggest that it made Reagon a more “social” person.
22. **(J) Reading/Humanities/Implied Idea. CCRS: GEN 16–19a. CC: ELA.Literacy.CCRA.R.1.** In lines 74–76, Reagon explains that people “respond...enthusiastically to Sweet Honey” because they “hear their own inner echo” and “hear...their thoughts confirmed.” In this context, the phrase “inner echo” is used as a metaphor to describe a shared relationship between the artist and the audience; the audience has a sympathetic response to the message delivered in the music. (J) best captures this idea. As for (F), while the audience may very well appreciate the talent of the performers, there is nothing in the passage to suggest that the audience themselves are performers whose talents are echoed in those of Sweet Honey in the Rock. As for (G), the audience’s thoughts are confirmed by the music, so the music reinforces existing ideas rather than expresses “new ideas.” Finally, as for (H), though congregational singing involves the participation of the audience, the idea of an “inner echo” is not meant to be interpreted literally to mean that the audience echoes the performers in song.
- TIP** Make sure to review the line numbers listed in the item before making your answer choice. If you preview the questions before reading the passage, note any questions that mention line numbers and write the question number next to the referenced lines in the passage.
23. **(C) Reading/Humanities/Implied Idea. CCRS: REL 13–15b. CC: ELA.Literacy.CCRA.R.3.** In lines 14–16, Reagon suggests that she sang a cappella because her church did not have a piano for 11 years. So, (C) is the correct answer choice. As for (A) and (B), Reagon began singing a cappella long before she became involved with either the SNCC Freedom Singers or the D.C. Black Repertory Theater, respectively. Finally, as for (D), while Reagon does say that the nineteenth-century congregational tradition can be traced to Africa (lines 16–18), there is nothing in the passage to indicate that she chose this style specifically to honor African traditions.
24. **(F) Reading/Humanities/Implied Idea. CCRS: GEN 20–23a. CC: ELA.Literacy.CCRA.R.1.** In lines 65–71, the author describes the “communal” relationship between the members of Sweet Honey in the Rock. Each member of the group is aware of the others’ unique abilities, and they all defer to each other’s particular area(s) of expertise when working together to compose songs and treatments. (F) best characterizes this working relationship. (G) is wrong because the project emphasizes cooperation rather than competition. (H) is wrong because “communal,” by definition, describes a group setting in which members are not arranged hierarchically. Finally, (J) is wrong because it can be inferred that the group’s objective as it is described in lines 65–71 is to encourage musicianship (though songs that the group sings often address social and political issues).
25. **(D) Reading/Humanities/Explicit Detail. CCRS: SUP 13–15a. CC: ELA.Literacy.CCRA.R.2.** In lines 65–66, the author specifically states that the “ancient way of women [is to meet] communally.” So, (D) is the correct answer choice. As for the remaining answer choices, while they do mention topics that are addressed in the selection, they fail to address the question that is being asked.

26. **(F) Reading/Humanities/Implied Idea. CCRS: GEN 13–15a. CC: ELA.Literacy.CCRA.R.1.** In lines 11–13, the author refers to Reagon’s “sure knowledge of music’s informational and transformative power.” It can be inferred that her knowledge of such power must in fact have been a product of her experiences singing in church and with the SNCC Freedom Singers. The former gave her music a spiritual dimension, and the latter informed her music with the political and social issues confronted during the civil rights movement. So, (F) is the correct answer choice. (G) is wrong because the passage does not say that Reagon studied civil rights issues in school. Instead, she actually participated in the civil rights movement. (H) is wrong because Reagon says that her first experiences with music did not include instruments. Finally, (J) is wrong because Reagon brought her “sure knowledge” of the value of music to the forming of Sweet Honey; this knowledge was not a product of her experience with the group.
27. **(A) Reading/Humanities/Main Idea. CCRS: MID 24–27a. CC: ELA.Literacy.CCRA.R.2.** The passage clearly focuses on the life and accomplishments of Bernice Johnson Reagon and her relationship to the group Sweet Honey in the Rock. (A) best summarizes this focus. As for (B), the passage does not focus on the group Sweet Honey so much as it focuses on Reagon and her influence on the group. (C) is wrong because the passage does not discuss female artists in general or suggest that Reagon had a difficult time becoming successful. Finally, as for (D), while Reagon does say that the civil rights movement played a very important part in her life, this idea is only a minor point in support of the author’s greater focus.
28. **(H) Reading/Humanities/Implied Idea. CCRS: SUP 20–23b. CC: ELA.Literacy.CCRA.R.2.** In the third paragraph (lines 19–26), Reagon describes congregational singing as a tradition marked by “spontaneity” in which “singers create as they go along.” So, (H) is the correct answer choice. (F) is wrong because “methodical” contradicts the idea of spontaneity, which suggests that singers deviate from set procedures. As for (G) and (J), while the singers may be “determined” or “inspired,” neither of these is the defining characteristic of congregational singing.
29. **(D) Reading/Humanities/Main Idea. CCRS: MID 24–27a. CC: ELA.Literacy.CCRA.R.2.** In lines 53–59, Reagon describes the metaphor of the “honey in the rock,” explaining that black women have two aspects: a hard and strong outside, when resistance and fortitude are required, and a warm and sweet inside, when compassion and love are needed. (D) is the best description of this dual nature. (A) and (B) are wrong for two reasons. Not only do they point to a singular nature (rock) rather than to a dual nature (honey in the rock), but they both misinterpret the intention of the metaphor. Reagon does not suggest that the “rock” quality is one possessed only by the most admirable or self-aware individuals. Finally, (C) is wrong because Reagon does not suggest that black women concealed their duality but that they simply exhibited one or the other aspect when appropriate.
30. **(G) Reading/Humanities/Explicit Detail. CCRS: SUP 16–19a. CC: ELA.Literacy.CCRA.R.2.** In lines 63–64, the author specifically states that “over the years more than 20 singers have been members of the group.” So, (G) is the correct answer choice. As for the remaining answer choices, the passage makes it clear that, despite the changes in membership, the underlying philosophy of the group has remained the same: (F)—the music addresses social issues; (H)—the singing style is a capella; and (J)—the intended audience always consists of people who respond to the message of the music.
31. **(A) Reading/Natural Science/Vocabulary. CCRS: MOW 13–15a. CC: ELA.Literacy.CCRA.R.4.** In line 46, the term “novel” is used to refer to the structure of *R. exoculata*’s patches. Prior to Chamberlain’s studies, the nature of these patches was quite unknown. So, (A) provides the best meaning for “novel” in this context. As for (B), while a novel is indeed a type of book, that is not how the term is being used in this context. (C) is wrong because something that is “novel,” or “unfamiliar,” would be considered atypical. Finally, (D) is wrong because “inadequate” simply does not provide an appropriate meaning.

TIP Remember that the correct answer to a Vocabulary item is usually not the most common meaning of the term.

32. **(H) Reading/Natural Science/Application. CCRS: GEN 20–23a. CC: ELA.Literacy.CCRA.R.1.** In lines 51–52, the author states that “rhodopsin...is the light-sensing molecule in all known types of eyes.” So, if *R.*



exoculata's patch functioned as a gland, rather than as an eye, then it would not contain rhodopsin. The reasoning structure is as follows:

If rhodopsin is present in the patches, then the patches are eyes.

The patches are not eyes.

Therefore, no rhodopsin is present in the patches.

So, (H) is the correct answer choice. As for the remaining answer choices, these ideas are mentioned in the passage, but they simply do not enter into the above chain of reasoning.

33. **(A) Reading/Natural Science/Main Idea. CCRS: SUP 24–27b. CC: ELA.Literacy.CCRA.R.2.** Szuts was looking for the visual pigment rhodopsin in *R. exoculata*'s patches. In lines 69–74, the author says not only that Szuts discovered the rhodopsin but that his findings showed there to be at least five times more rhodopsin in *R. exoculata*'s eye patch than in the eyes of most other shrimp. So, (A) is the correct answer choice. As for (B), this statement is not at all consistent with the passage. Szuts did not *create* the possibility that the patches might be glands. Instead, Szuts sought to prove that these patches were eyes. (C) confuses two separate ideas discussed in the passage. While the author does mention that *R. exoculata* was discovered swarming around underwater geysers (lines 5–6) and that it possessed “adaptations for sensing extremely weak light” (lines 80–81), Szuts' research did not show any relationship between the development of the shrimp's patch and its surrounding conditions. Finally, as for (D), Szuts did not prove that the patches were similar to eyes found in other shrimp but simply that they did in fact function as eyes.
34. **(J) Reading/Natural Science/Explicit Detail. CCRS: SUP 13–15a. CC: ELA.Literacy.CCRA.R.2.** In lines 17–19, the author states that an initial interest in the eyes of *R. exoculata* came about when Van Dover obtained some specimens to learn about their diet. So, (J) is the correct answer choice. (F) and (G) are wrong because Van Dover's interest in *R. exoculata*'s patch grew out of her research on diet. Finally, (H) is wrong because Van Dover was initially studying diet, not habitat.
35. **(B) Reading/Natural Science/Implied Idea. CCRS: REL 20–23c. CC: ELA.Literacy.CCRA.R.3.** According to lines 24–28, the videotapes taken from the deep submersible *Alvin* showed that the patches were reflective, not unlike cats' eyes that seem to glow when looking into the headlights of a car. It can be inferred that without this videotape Van Dover might not have wondered whether the patches were eyes. So, (B) is the correct answer choice. As for (A), while it is a true statement, it does not address the discovery of *R. exoculata*'s eyes. (C) is wrong because the videotapes did not provide Van Dover with a “clear picture” of the eye structure but instead simply brought her attention to the reflectivity of the spots. Finally, (D) is wrong for a similar reason to that of (C); the videotapes did not provide any information as to the nature of *R. exoculata*'s eyes.
36. **(H) Reading/Natural Science/Implied Idea. CCRS: GEN 16–19a. CC: ELA.Literacy.CCRA.R.1.** According to lines 33–35, Van Dover observed that the patches were connected to the shrimp's brain by a bundle of neurons that looked similar to an optic nerve. Then, in lines 52–54, the author states that the rhodopsin molecules absorb light photons and initiate a message to the brain. Based on this information, it can be reasonably inferred that the message initiated by rhopsodin is transmitted to the brain through this bundle of neurons. So, (H) is the correct answer choice. As for (F), “caraspace” is a shell-type material that sits above the patches; it is not an organ that serves the function of transmitting messages to the brain. (G) is wrong because the “reflective patches” are the source of the transmission. Finally, (J) is wrong because the author states that *R. exoculata* lacks “eyestalks.”
37. **(C) Reading/Natural Science/Explicit Detail. CCRS: SUP 24–27b. CC: ELA.Literacy.CCRA.R.2.** According to lines 66–68, Szuts worked with a limited sample; he had extracts from 5 to 10 shrimp, which constitutes only one-tenth of the normal range. In lines 70–74, Szuts says that he detected visual pigment even in such a limited sample because the pigment existed in high concentrations. So, the limited sample had no effect on the outcome of the research. (C) best captures this idea. (A) and (B) are wrong because Szuts did find the characteristic pigment in large concentrations. Finally, (D) is wrong because the pigment was damaged by bright lights from the submersible (lines 74–75).

38. **(G) Reading/Natural Science/Implied Idea. CCRS: SUP 13–15a. CC: ELA.Literacy.CCRA.R.2.** According to lines 44–46, Chamberlain was able to uncover detailed information about the anatomy of the patch but was unable to determine its function. So, (G) is the best answer choice. (F) is a misreading of the passage; Szuts (not Chamberlain) conducted an analysis to determine whether the patches themselves were visual organs, not to determine whether the patches contained visual organs. As for (H), the only mention of “lenses” is in the last paragraph, and it is not discussed in the context of Chamberlain’s work. Finally, (J) is wrong because it contradicts the passage; as previously mentioned, Chamberlain was able to gain information about the anatomy of the patch.
39. **(B) Reading/Natural Science/Main Idea. CCRS: MID 24–27a. CC: ELA.Literacy.CCRA.R.2.** In lines 55–68, the author describes the reasons why Szuts did not expect to find rhodopsin in the patches. First, the shrimp’s back seemed to be the wrong place for a pair of eyes to be located. Second, the sample of shrimp was severely limited. (See explanation for item #37 on this test.) (B) best summarizes these details. As for (A) and (D), while both of these statements are true, neither of them summarizes the main idea of lines 55–68. In fact, (A) is related to the second of the two reasons listed above and (D) is related to the first. So, they actually function as supporting details to the main idea. As for (C), it had already been established that *R. exoculata* lacked eyestalks (line 9); Szuts was looking for the visual pigment rhodopsin to prove that the patch functioned as an eye.
40. **(G) Reading/Natural Science/Implied Idea. CCRS: MOW 24–27a. CC: ELA.Literacy.CCRA.R.4.** In line 39, the “characteristic visual molecules” to which the author refers are those being sought after by Szuts. Then, in lines 50–51, the author says that Szuts was looking for a visual pigment called rhodopsin. So, it can be reasonably inferred that the visual molecules refer to rhodopsin. As for (F) and (H), the author says that the shrimp lack both “eyestalks” and “corneas,” respectively. (J) is wrong because Szuts is looking for visual molecules inside the patches.

The following tables list the descriptions for all the Common Core State Standards and the College and Career Readiness Standards that are referenced in this *Navigator Plus*.

Reading — Common Core State Standards

Standard	Description
ELA-Literacy.CCRA.R.1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
ELA-Literacy.CCRA.R.2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
ELA-Literacy.CCRA.R.3	Analyze how and why individuals, events, or ideas develop and interact over the course of a text.
ELA-Literacy.CCRA.R.4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

Reading — College Readiness Standards

Standard	Description
Main Idea and Authors Approach	
MID 24-27a	Recognize the main idea or purpose of a paragraph or paragraphs in uncomplicated passages.
Supporting Details	
SUP 13-15a	Locate basic facts such as names, dates, and events that are clearly stated in a passage.
SUP 16-19a	Locate basic details at the sentence and paragraph level in uncomplicated passages.
SUP 20-23b	Make simple inferences about the role of details in passages.
SUP 24-27a	Locate important details in more complex passages.
SUP 24-27b	Locate and interpret minor details in uncomplicated passages.
SUP 28-32a	Locate and interpret subtle details in more complex passages.
Sequential, Comparative, and Cause-Effect Relationships	
REL 13-15b	Recognize clear cause-effect relationships in a passage described within a single sentence.
REL 16-19b	Recognize cause-effect relationships within a paragraph in uncomplicated literary narratives.
REL 20-23c	Identify clear cause-effect relationships in uncomplicated passages.
REL 24-27e	Identify clear cause-effect relationships in more complex passages.
REL 28-32b	Understand the dynamics between people, ideas, etc. in more complex passages.
Meaning of Words	
MOW 13-15a	Understand the implication of simple descriptive and familiar words or phrases.
MOW 20-23a	Determine the meaning of figurative and nonfigurative words, phrases, and statements in uncomplicated passages using contextual clues.
MOW 24-27a	Use context to decide the appropriate meaning of any word, phrase, or statement in an uncomplicated passage.
MOW 24-27b	Determine, using context, the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in more complex passages.
Generalizations and Conclusions	
GEN 13-15a	Make simple generalizations and draw conclusions about main characters in uncomplicated literary narratives.



GEN 16-19a	Make simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages.
GEN 20-23a	Make generalizations and conclusions about people, ideas, etc. in uncomplicated passages.
GEN 20-23b	Make generalizations and conclusions using details that support the main points of more challenging passages.
GEN 24-27a	Make subtle generalizations and conclusions about people, ideas, and so on in more literary passages.



TEST 4: SCIENCE

Passage I

- (B) Science/Conflicting Viewpoints/Comprehension. CCRS: EM 20–23b.** Hypothesis 2 explicitly states that “the material that composes the Moon came mostly from Earth’s surface.” So, (B) is the correct answer choice. As for (A), while Hypothesis 2 does refer to “a large object from another part of the solar system,” it does not mention distant stars. (C) and (D) are wrong because Hypothesis 2 does not mention Mars or the Sun.
- (J) Science/Conflicting Viewpoints/Analysis. CCRS: EM 20–23b.** According to Hypothesis 1, the Moon was formed long ago from material spun off from Earth. At that time, according to this theory, Earth was spinning fast enough to cause the material to fly off. Therefore, this theory depends upon the assumption that Earth once turned on its axis at a much higher rate than it does now. Since one cycle of Earth’s rotation is equal to a single day (in human estimation), our current rate of rotation can thus be expressed as 365 rotations (days) per year. If Earth turned on its axis at a much higher rate when the Moon was formed, then the rate of rotation at that time must be greater than 365 days per year. (J) is the only answer choice that follows from the above reasoning.
- (A) Science/Conflicting Viewpoints/Application. CCRS: EM 24–27b.** Observation 3 states that “the Moon contains little or no water.” So, supporters of Hypothesis 2 who believe that the Moon contained a significant amount of water when it was first formed must be committed to the position that the water disappeared between that time and the present. (A) best captures this idea. As for the remaining answer choices, none of these statements is consistent with the supposed suggestion.
- (F) Science/Conflicting Viewpoints/Analysis. CCRS: EM 24–27a.** If Earth and the Moon are formed from the same material, then Observation 1 (that Earth and the Moon have the same proportions of various oxygen isotopes) and Observation 2 (that Earth and the Moon have similar lava minerals) are likely to be true as they are the only two observations that point to *similarities* in the composition of Earth and the Moon. So, (F) is the correct answer choice. Observation 3 refers only to the Moon, and Observation 4 points to a *difference* in composition between Earth and the Moon.
- (A) Science/Conflicting Viewpoints/Analysis. CCRS: EM 24–27d.** According to Hypothesis 1, the driving influence behind the formation of the Moon is Earth’s gravitational force, without which the material that formed the Moon would have escaped into space. This is also true of Hypothesis 2. Though the cause behind the Moon’s initial break from Earth is different, the force retaining it in orbit is the same. According to Hypothesis 3, gravitational attraction was a major force behind the formation of Earth and the Moon. Finally, according to Hypothesis 4, Earth’s gravitational field is the reason behind the Moon’s current orbit. So, (A) is the correct answer choice.

TIP You can use the Process of Elimination (POE) to solve this item. Since the item stem asks for the common feature of all four hypotheses, any answer choice that is not mentioned in any of the four hypotheses can be eliminated. (B) can be eliminated because Earth’s rotation is only important for Hypothesis 1. (C) can be eliminated because none of the hypotheses mention the Moon’s rotation as an important influence in its formation. Finally, (D) can be eliminated because lava is not mentioned in any of the hypotheses. So, (A) must be the correct answer choice.
- (J) Science/Conflicting Viewpoints/Application. CCRS: EM 20–23a.** Observation 1 is the only one that mentions isotopes of oxygen; it states that the proportions of various isotopes are the same on both Earth and the Moon. Therefore, if the ratio between two oxygen isotopes is 500 : 1 on Earth, it must also be 500 : 1 on the Moon. So, (J) is the correct answer choice.
- (B) Science/Conflicting Viewpoints/Comprehension. CCRS: EM 20–23b.** Hypothesis 1 states that the Moon is derived from portions of Earth’s surface, implying that Earth existed before the Moon. So, (B) is the correct answer choice. (A) contradicts the logic proposed in Hypothesis 1. As for (C), while it is possible that the Moon might still have active volcanoes, this assumption is not implicit in Hypothesis 1. Instead, this assumption is

supported by Observation 2. Finally, (D) is wrong because it contradicts the information given in Hypothesis 1. If the Moon is created from the materials at Earth’s surface, then its composition should be identical to that of Earth’s surface, not to that of Earth’s core.

Passage II

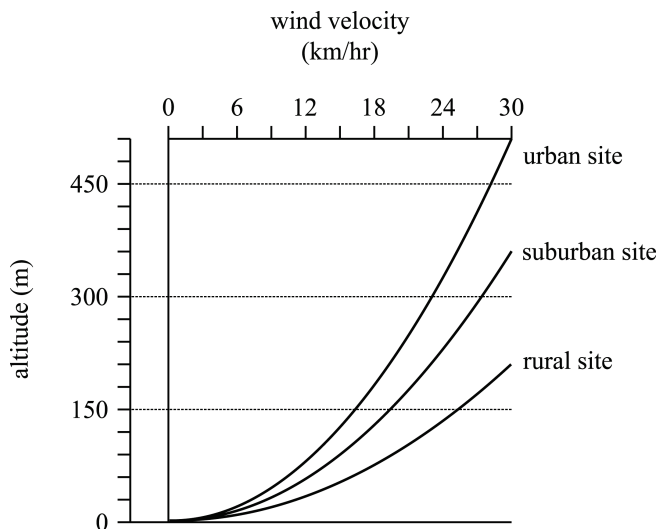
8. **(H) Science/Research Summary/Comprehension. CCRS: ID 13–15a.** Approach this item systematically. First, identify the pertinent data to use in answering the item. In this case, the locator phrase “summer day” indicates that the pertinent data can be found in the upper graph in Figure 1. Second, determine what the item stem is asking and how that translates into data points on the graph. Essentially, the item is asking for the period of time when the “suburban” air temperature reading is higher than the “urban” air temperature reading. (Note that the air temperature readings can be found along the *y*-axis of the graph.) According to the graph, the “suburban” (dotted line) air temperature is higher than the “urban” (solid line) air temperature from 8:00 a.m. until about 2:00 p.m. So, (H) is the correct answer choice.

TIP Taking a second to figure out what the item is asking can help you narrow down what information you need to review from the passage.

9. **(B) Science/Research Summary/Application. CCRS: EM 20–23b.** This item asks for an explanation as to why urban areas have more rain than do rural areas. According to the item stem, water vapor from clouds needs solid “nuclei” seeds to form rain. In Study 4, the only mention of anything that might fit the description of solid “nuclei” is dust particles. And, according to Study 4, urban areas have more dust particles than do suburban areas. So, it can be concluded that urban areas have more rain than do rural areas because they contain more particulate matter in their air. (B) best captures this idea. (A) is wrong because Study 4 deals with precipitation, not wind velocity. (C) is wrong because the less clouds there are in the sky, the less water vapor there is present to aggregate on solid “nuclei” to form rain, and, therefore, the less rain in the area. If (C) were true, then there would be less rain in urban areas, not more rain. Finally, (D) assumes restrictions that are not supported by the item stem; it provides only that solid “nuclei” are required, not that the nuclei must be dust particles.

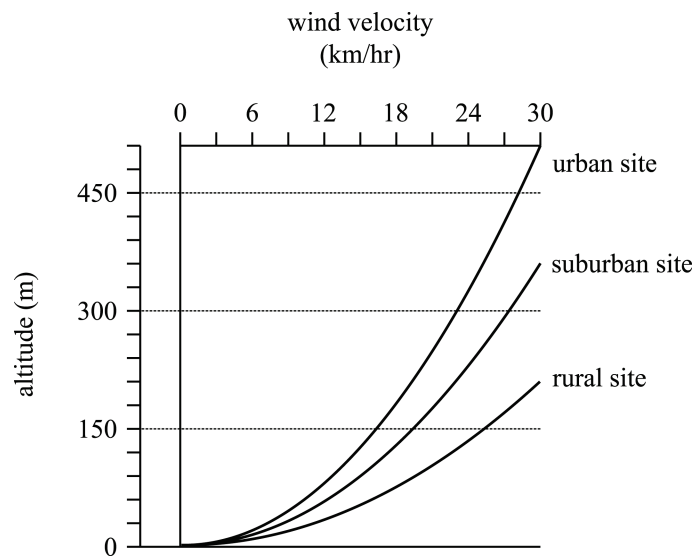
10. **(H) Science/Research Summary/Analysis. CCRS: EM 24–27a.** One way to approach this item is to read and compare several points on the graph for Study 3 (Figure 3). Notice that three out of the four answer choices state a generalization about wind velocities below 150 meters. Therefore, it is prudent to start the comparison with values below 150 meters for all three sites. Reading the graph at 130 meters will show that the wind velocity is roughly 18 km/hr for the urban site, 21 km/hr for the suburban site, and 27 km/hr for the rural site. (H) correctly states this trend.

Alternatively, imagine the same three line graphs superimposed:



The superimposed image shows that the line graph for the rural site “bows” out more than the other two, indicating that the wind velocity is increasing faster earlier for that graph than for the other two. So, at relatively low altitudes, the rural site will have a higher wind velocity than would the urban and suburban sites. (F) is wrong because wind velocity for the urban site is lower than it is for the other two sites at altitudes below 150 meters. (G) is wrong for a similar reason; wind velocity for the suburban site is lower than it is for the rural site at an altitude of 150 meters. (J) is wrong because a superimposed image of the line graphs for the urban and suburban sites will not line up completely, indicating that the wind velocity is not always the same at any given altitude.

11. (A) *Science/Research Summary/Analysis*. CCRS: EM 24–27a. The simplest approach to this item is to examine the general shape of each graph in Figure 1. The winter graph is flatter than the summer graph, signifying that there is less variation in temperature for all three sites in the winter than there is in the summer. So, (A) is the correct answer choice. (B) reaches the opposite conclusion and is contradicted by the graphs. (C) and (D) are wrong because the maximum temperature at the rural site during the winter is less than the maximum temperature at the other two sites during that same season.
12. (G) *Science/Research Summary/Comprehension*. CCRS: ID 20–23b. Read and compare the values for air temperature at the urban site at 6:00 p.m. to the air temperature at the rural site at 6:00 p.m. The air temperature is about -8°C at the urban site and about -12°C at the rural site. So, the temperature difference is about 4 degrees, (G).
13. (D) *Science/Research Summary/Analysis*. CCRS: EM 24–27a. For this item, imagine the three line graphs in Figure 3 superimposed:



The superimposed image shows the following relationships:

- Rural wind velocity increases at a faster rate with respect to altitude than does suburban wind velocity.
- Suburban wind velocity increases at a faster rate with respect to altitude than does urban wind velocity.

Therefore, (D) is the correct answer choice. (A), (B), and (C) are wrong because they do not identify the correct relationships between the three sites.

Passage III

14. (F) *Science/Research Summary/Comprehension*. CCRS: SI 20–23d. In all three experiments, the amount of water was held constant at 50 mL. So, (F) is the correct answer choice. (G) is wrong because the amount of solid dissolved was changed for all three experiments to determine the effect of different concentrations of solutions of

solids on boiling and freezing points of water. (H) is wrong because there were two types of solids dissolved in Experiment 3 (potassium chloride and calcium chloride). Finally, (J) is wrong because the weight percent of solid dissolved in each of the three experiments varied with respect to the amount of solid added to the water. Consult the second column in Tables 1, 2, and 3 to see that the weight percent is not held constant throughout the experiments.

15. **(B) Science/Research Summary/Application. CCRS: ID 28–32c.** To extrapolate the freezing point of Solution 11 from Experiment 3, find the trend among the freezing points in Table 2: as the % KCl and the mass of KCl increase, the freezing point decreases. Estimating the rate of decrease (less than double), it should be clear that -10°C is the only reasonable value for Solution 11. (Compare the rate of decrease to those found in the fourth column of Tables 1 and 3 to confirm the trend.) (A) is wrong because 0°C does not correspond to a decrease in temperature from -6.45°C . As for (C) and (D), both of these temperatures are greater than double -6.45°C .
16. **(H) Science/Research Summary/Analysis. CCRS: EM 24–27a.** The three tables show that an increase in the amount of dissolved solid depresses the freezing point of water and that the amount by which the freezing point is depressed also depends on the type of solid dissolved. So, (H) is the correct answer choice. (F) and (G) are wrong because the freezing point is influenced by both of these factors. (J) is wrong because the procedure for chilling the solutions is constant for both Experiments 2 and 3.
17. **(B) Science/Research Summary/Application. CCRS: ID 24–27c.** Since the item stem asks about calcium chloride (CaCl_2), consult the data in Table 3. Note that the freezing point for a 7.5% CaCl_2 solution is not given; however, freezing points are given for 6% and 9% CaCl_2 solutions: -2.93°C and -5.04°C , respectively. Since 7.5% is the average of 6% and 9%, the freezing point of a 7.5% CaCl_2 solution should be about halfway between -2.93°C and -5.04°C , or about -4.0°C . (B) is the closest value to this approximation.
18. **(H) Science/Research Summary/Analysis. CCRS: EM 20–23b.** The chemist used dry ice to freeze the water solutions in Experiments 2 and 3 because the temperature of the dry ice is significantly less than the freezing point of water. (In essence, the dry ice serves the same function here as does the freezer compartment in a refrigerator.) So, (H) is the correct answer choice. (F) misinterprets the setup provided at the outset of Experiment 2. The chemist used the dry ice to create a dry ice bath consisting of solid CO_2 ; the dry ice bath does not form a solution of CO_2 . (G) is neither relevant to the experiment nor a true statement. Finally, as for (J), if the chemist were to assume that the temperature of dry ice is greater than the freezing points of the solutions, then he or she would not attempt to use dry ice to freeze the solutions.
19. **(C) Science/Research Summary/Analysis. CCRS: SI 24–27d.** As already noted, the results of Experiments 2 and 3 make it clear that adding solids to the water depresses the freezing points of the solutions. So, (A) and (B) must be wrong. Adding more solids to the water would lower, not raise, the freezing point. Since increasing the concentration of solids lowers the freezing point, it follows that decreasing the concentration of solids would raise the freezing point. There are two ways to decrease the concentration of a solid in a solution: either remove the solid from the solution or dilute the solution with additional solvent, in this case, water. (C) is the correct answer choice because it describes the latter of these two methods. As for (D), while it does add water to the solution, it adds an even higher concentration of salt, so the net result is an increase, rather than a decrease, in the concentration of solids, leading to a lowered freezing point.

Passage IV

20. **(G) Science/Research Summary/Analysis. CCRS: SI 24–27c.** According to Table 3, the number of colonies for Drug C decreases by about 50% every 6 hours. So, after 3 hours of incubation, which is half of 6 hours, the expected decrease should be half of 50%, or 25%, of the original 23 colonies: 18 or 19 colonies. Of course, the progression might not be strictly linear, so one should not conclude too narrowly. (G) describes the appropriate range.



Alternatively, since the answer choices are not precise, find the maximum and minimum possible count for the number of colonies for Drug C at 3 hours of incubation. Though Table 3 does not offer a reading for an incubation time of 3 hours, it can be reasoned that the number is somewhere between an incubation time of 1 and 6 hours; therefore, the number of colonies should be between 22 (one less colony than the number of colonies for Drug C at 1 hour of incubation) and 11 (one more colony than the number of colonies for Drug C at 6 hours of incubation). (G) correctly identifies this range.

21. (A) **Science/Research Summary/Comprehension. CCRS: ID 13–15a.** According to the explanatory material accompanying Experiment 1, “the larger the permeability coefficient, the faster the drug enters a cell.” The permeability coefficient in Table 1 is reported using negative exponents, which might be confusing, but just remember that raising a number to a negative exponent is the same as the reciprocal of that number raised to a

positive exponent. So, $10^{-5} = \frac{1}{10^5}$, $10^{-6} = \frac{1}{10^6}$, $10^{-7} = \frac{1}{10^7}$, and $10^{-8} = \frac{1}{10^8}$. And since

$\frac{1}{10^5} > \frac{1}{10^6} > \frac{1}{10^7} > \frac{1}{10^8}$, Drug A has the largest coefficient.

Note that this is a minimum versus maximum problem. Since the item stem is essentially asking for the greatest value, the correct answer must be at one of the two extremes: (A) or (D). (B) and (C) are definitely in-between values and can therefore be eliminated.

22. (J) **Science/Research Summary/Analysis. CCRS: ID 20–23c.** This item tests the ability to evaluate trends in the collected data by translating them into useful graphs. The best way to approach this item is to use the process of elimination. Note that all four graphs plot points as “colonies counted” (x-axis) over “incubation time” (y-axis). The easiest trend to evaluate is that which occurs when no drugs are introduced into the experiment (“None”) because the results are constant. According to Table 3, when no drugs are introduced into the experiment, the number of colonies counted remains at 30 for all 24 hours of incubation. (F) and (G) can be eliminated because they incorrectly plot the number of colonies at around 1 for all 24 hours of incubation. To distinguish between (H) and (J), examine the readings for Drug A. When compared to the other three drugs and to the control in Table 3, Drug A consistently produces the lowest colony count at each measured incubation time and has no colonies remaining at 24 hours of incubation. In (H), however, Drug A exhibits the highest colony count at each measured incubation point, and the colony count never plummets to 0. So, (J) must be the correct answer choice.

Note that this item can be solved by examining the readings for other drugs to help eliminate answer choices, but the process will yield the same results.

23. (B) **Science/Research Summary/Analysis. CCRS: ID 16–19d.** For this item, refer to Table 1. Remember that raising a number to a negative exponent is the same as the reciprocal of that number raised to a positive exponent.

So, at 485 amu, the permeability coefficient is $10^{-5} = \frac{1}{10^5}$; at 500 amu, the permeability coefficient is

$10^{-6} = \frac{1}{10^6}$; at 515 amu, the permeability coefficient is $10^{-7} = \frac{1}{10^7}$; and at 530 amu, the permeability coefficient

is $10^{-8} = \frac{1}{10^8}$. Therefore, the relationship between the molecular mass and the permeability coefficient can be summed up by (B): “As the molecular mass increases, the permeability coefficient decreases.”

24. (F) **Science/Research Summary/Analysis. CCRS: SI 20–23d.** In Experiment 2, the scientist held the incubation time constant at 1 hour for each test case but varied the concentration of drugs (i.e., concentration values ranged from 1 μM to 25 μM). Conversely, in Experiment 3, the scientist held the drug concentration constant for each test case but varied the incubation period (i.e., incubation time ranged from 1 to 24 hours). (F) correctly notes this difference.

25. (A) *Science/Research Summary/Analysis*. CCRS: ID 16–19d. For this item, refer to Table 2. The data provides that the higher the concentration of the drug (across all four drugs tested), the fewer the number of colonies. Therefore, (A) is the correct answer choice.

Passage V

26. (J) *Science/Data Representation/Analysis*. CCRS: ID 20–23c. According to Figure 2, the ocean ridge registers a heat flow of about 140, the abyssal plain registers a heat flow of 40, and the trench registers a heat flow of about 20. In other words, the ocean ridge should be represented by the tallest bar and the trench should be represented by the shortest bar on the graph. So, (J) is the correct answer choice.
27. (D) *Science/Data Representation/Analysis*. CCRS: ID 20–23b. According to Figure 2, the heat flow measured from a back-arc basin is just about in the middle, less than those readings for the ocean ridge and volcanic island arc but more than those readings for the abyssal plain and trench. So, (A), (B), and (C) can all be eliminated. Therefore, (D) must be the correct answer choice. Note that the average heat flow for the oceanic lithosphere points to a point just slightly above the reading for the back-arc basin.

TIP When an item asks about a specific figure, do not waste time rereading the entire passage. Simply locate the relevant information. All the information you need to answer the item will be in that figure.

28. (F) *Science/Data Representation/Application*. CCRS: EM 20–23a. This item stem essentially states that hydrothermal events are located in close proximity to some of the highest heat flows. According to Figure 2, the highest heat flows are found in ocean ridges. So, it can be reasoned that hydrothermal vents are most likely found in these ocean ridges, (F). (G) is wrong because continental mountain ranges are not mentioned in any of the figures. As for (H) and (J), their heat flow measurements are lower than those for ocean ridges.
29. (B) *Science/Data Representation/Application*. CCRS: SI 24–27c. Answering this item requires an understanding of three relationships. First, temperature for the lithosphere increases with depth, as shown in Figure 3. Second, the higher the heat flow, the greater the rate of temperature increase with respect to depth. This relationship is stated in the first paragraph of the passage (“...high heat flow indicates a rapid temperature increase with depth”). Note that, since all four answer choices plot the data on a temperature versus depth graph, the slope is the rate at which temperature rises with respect to depth. Therefore, the correct graph should show that the higher the heat flow, the sharper the incline of the slope. Third, the relative heat flow for the different parts of the oceanic lithosphere, as provided in Figure 2, are as follows: an ocean ridge will have a sharper incline than a volcanic island arc; a volcanic island arc will have a sharper incline than a back-arc basin; a back-arc basin will have a sharper incline than an abyssal plain; and an abyssal plain will have a sharper incline than a trench. Although all four graphs are partially correct, in that temperature rises with respect to depth, only (B) shows the correct relationship between heat flow and rate of temperature increase with respect to depth.
30. (H) *Science/Data Representation/Analysis*. CCRS: ID 20–23b. The simplest approach to this item is to read several points of depth from the line graph for the continental lithosphere and compare them to their respective values on the line graph for the oceanic lithosphere. For instance, the temperature for the continental lithosphere at 20 km is about 250°C, whereas the temperature for the oceanic lithosphere at the same depth is about 500°C. A further comparison of points will reveal the same relationship between temperatures. (Note that the line graph for the oceanic lithosphere is to the right of that for the continental lithosphere at all points along the x -axis.) So, (H) is the correct answer choice. As for (F) and (G), the previous reasoning contradicts these statements. Finally, (J) is wrong because Figure 3 does not provide information regarding the thickness of either lithosphere.

Alternatively, reach the same conclusion by examining the shape of the two line graphs. The line graph for the continental lithosphere has a sharper slope than that for the oceanic lithosphere, signifying that the continental lithosphere can reach greater depths at lower temperatures than can the oceanic lithosphere. So, it can be reasoned that the continental lithosphere is generally cooler than the oceanic lithosphere at any given depth.



Passage VI

31. **(C) Science/Data Representation/Comprehension. CCRS: ID 20–23b.** Figure 1 shows four lines for oil concentration: a solid line for Ecosystem B; a dashed line for Ecosystem C; a dotted line for Ecosystem D; and a long-dashed line for Ecosystem E. The dotted line drops off most sharply, so the oil concentration decreased most rapidly in Ecosystem D.

Alternatively, determine the oil concentration for each ecosystem at a given point in time. For example, in September, it is obvious that Ecosystem D had an oil concentration of 0 ppm while Ecosystems B, C, and E all had oil concentrations greater than 50 ppm.

32. **(H) Science/Data Representation/Analysis. CCRS: SI 20–23a.** The biomass of the flounders would be determined rather than their numbers in order to explain how they are affected in mass by environmental factors. (H) best captures this idea. If the fish do not grow as large, their number may remain the same but their total mass will diminish. (F) hints at a distinction but is not clear as to its relationship with the methods of measurement. (In any event, the experiment concludes at 16 months so there is no way to determine whether this statement is true.) As for (G), it would return the same result from either measurement and therefore does not serve to distinguish between them. Finally, (J) is wrong because it gives a reason why counting numbers would be preferred to weighing the overall mass, which contradicts the method used.
33. **(C) Science/Data Representation/Analysis. CCRS: EM 24–27a.** Figure 1 shows the concentrations of oil in four of the five ecosystems. In general, it starts high in the first month of March and drops off, more or less sharply, over the following months. (The rate of drop does vary from system to system.) Figure 3 shows that there was a sharp drop in the biomass of flounder from the first month of March to the first month of April (coinciding with the introduction of the oil) but that the flounders gradually made a comeback in all five systems. So, as the oil dissipated, the overall weight of the flounders increased.
34. **(J) Science/Data Representation/Application. CCRS: EM 24–27a.** Figure 1 shows that Ecosystem D saw the quickest elimination of oil. Table 1 shows how Ecosystem D differed from the other ecosystems: Ecosystem D is the only one with both bacteria and phosphate fertilizer. The other ecosystems have only one or neither of these additives, so there is reason to believe that both of these additives are responsible for the positive result in Ecosystem D. The bacteria concentrations in Figure 1 help to describe the effect that bacteria and phosphate fertilizer have on the ecosystems: the high levels of oil correspond to an increase in the concentration of bacteria. Then, as the concentrations of oil decrease, the concentrations of bacteria also decrease, and eventually they decrease sharply. In other words, oil is good for bacteria—and, conversely, bacteria are bad for oil. The bacteria appear to “eat” or otherwise eliminate the oil. Moreover, the bacteria grew faster in Ecosystem D than they did in Ecosystem C, and according to Table 1, phosphate fertilizer is the apparent cause. A good shot of phosphate fertilizer appears to stimulate the growth of bacteria, accelerating the clean-up. So, (J) is the correct answer choice.
35. **(B) Science/Data Representation/Analysis. CCRS: EM 24–27b.** If the bacteria disappeared entirely when the oil was gone, then the bacteria required the oil to survive. (B) best captures this idea. (A) suggests that bacteria preserve oil rather than consume it. (C) suggests that the bacteria benefit from the presence of oil but does not prove that oil is necessary for their survival. As for (D), while this argument may show that the bacteria are not harmful to the ecosystem (or perhaps that they do not harm flounder), it does not prove any relationship between the bacteria and oil.

Passage VII

36. **(F) Science/Data Representation/Comprehension. CCRS: ID 16–19a.** Figure 1 can best be understood as three graphs in one diagram: a graph for ultraviolet photons, a graph for visible photons, and a graph for infrared photons. Each graph shows the possible electron jumps in its category, and only the jumps in its category will emit that type of photon. In these terms, the item asks for an orbit from which a jump does not occur in all three of the graphs. Figure 1 shows electron jumps from Orbits 4, 5, and 6 in each of the three graphs. However, the graph for infrared photons does not show any jumps from Orbit 3. So, (F) is the correct answer choice.

37. **(A) Science/Data Representation/Application. CCRS: EM 20–23a.** According to Figure 1, when an electron jumps from Orbit 5 to Orbit 1, it emits a photon of wavelength in the ultraviolet range of the spectrum. If the process is reversed, as suggested by the item stem, it would presumably need to absorb a similar amount of energy. So, (A) is the correct answer choice. As for (B) and (C), the graphs for visible and infrared photons do NOT show any electron jumps to Orbit 1. Finally, (D) is wrong because there is no evidence to support such a conclusion.
38. **(J) Science/Data Representation/Analysis. CCRS: EM 24–27a.** As Table 1 shows, for each type of photon, as its corresponding wavelength values decrease, its corresponding energy values increase. So, (J) is the correct answer choice.
39. **(C) Science/Data Representation/Comprehension. CCRS: EM 24–27a.** According to Figure 1, an electron jump from Orbit 6 to Orbit 3 emits an infrared photon, and an electron jump from Orbit 3 to Orbit 1 emits an ultraviolet photon. So, (C) is the correct answer choice.
40. **(F) Science/Data Representation/Analysis. CCRS: EM 24–27a.** One way to approach this item is to make an assumption about the relationship between the energy of the hydrogen atom and the energy released from its electron jumps—that is to say that the location of the electron determines the hydrogen atom’s *potential* to release energy. Think of the electron orbits as stored energy. After a jump, some of its energy is released. So, all that remains is to determine whether the innermost or outermost orbits store more energy. Figure 1 shows that the jumps from the outermost orbits traverse greater orbital distances than do those from the innermost orbits, with the middle orbits transitioning between the two. Table 1 shows for each of the three types of photons an increase in the energy of the photon for each increased distance of the jump. Therefore, it can be inferred that the outer orbits release more energy than do the inner orbits. (F) best describes this relationship. Since the outer orbits are capable of releasing more energy, more energy is stored in the hydrogen atom when the electron is in an outer orbit.

The following table lists the descriptions for all the College and Career Readiness Standards that are referenced in this *Navigator Plus*.

Science – College Readiness Standards

Interpretation of Data	
ID 13–15a	Select a single piece of data that is numerical or non-numerical from a data presentation.
ID 16–19a	Select two or more pieces of data from a data presentation.
ID 16–19d	In a data presentation, determine how the value of one variable changes as the value of another variable changes.
ID 20–23b	Combine or compare data from a data presentation.
ID 20–23c	Translate information into a diagram, table, or graph.
ID 24–27c	Use data points in a table or graph to interpolate.
ID 28–32c	Use data points in a table or graph to extrapolate.
Scientific Investigation	
SI 20–23a	Demonstrate knowledge of the methods and tools used in a more complex experiment.
SI 20–23d	Identify the similarities and differences between experiments.
SI 24–27c	In an experiment, predict what the results will be for an additional trial or measurement.
SI 24–27d	Identify the experimental conditions that would produce a specified result.
Evaluation of Models, Inferences, and Experimental Results	
EM 20–23a	Choose a simple hypothesis, prediction, or conclusion that is supported by two or more models or data presentations.
EM 20–23b	Identify assumptions or key issues in a model.
EM 24–27a	Choose a simple hypothesis, prediction, or conclusion that is supported by two or more models or data presentations.
EM 24–27b	Decide whether the given information supports or contradicts a hypothesis or conclusion and be able to explain why it does or doesn't.
EM 24–27d	Determine the similarities and differences between models.