



AMERICA'S PREMIERE TESTING READINESS PROGRAM

# PSAT/NMSQT® (Form Code 15PS01)



## *Cambridge Navigator Plus: The Complete Explanation Guide to the Retired Test*

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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.

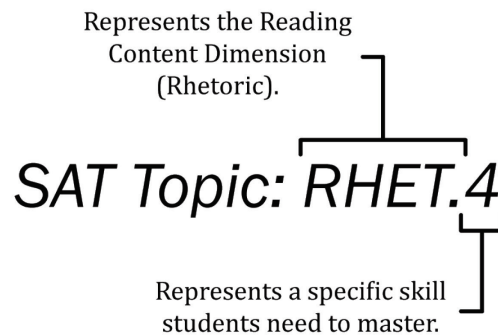
## Category Paths and SAT Topics

Throughout these explanations, each item is categorized in two ways. First, each explanation includes a **Cambridge Category Path** which links the item to the Course Concept Outline in Cambridge's *Victory* series. For example:

***Math: Multiple-Choice/Geometry/Triangles/Pythagorean Theorem***

An item with this particular category path is found in the Math Test (these items have a Level 1 label of "Math: Multiple-Choice" or "Math: Student-Produced Response") and tests students' knowledge of geometry (Level 2 of the category path), more specifically of triangles (Level 3), and even more specifically of the Pythagorean theorem (Level 4). The *Victory* Math Lessons include a section on the Pythagorean theorem, which you can find by referencing the Course Concept Outline at the beginning of the mathematics section in the *Victory* book. Additionally, you can find items testing geometry, triangles, or the Pythagorean theorem using the Item Index at the end of the *Victory* Student Text and Teacher's Guide.

Second, each explanation includes an **SAT Topic** references a specific topic identified as tested on the SAT by the College Board. You can find items testing this SAT Topic using the searchable index available on the Teacher Resource Center ([www.cambridgevictory.com](http://www.cambridgevictory.com)). Here is an example of an SAT Topic reference:





## PSAT/NMSQT READING TEST EXPLANATIONS

- (A) Reading/Literary Fiction/Main Idea. SAT Topic: RHET.4.** This item asks you to find the main purpose, or main idea, of the passage. The first sentence of the passage introduces you to Emma Woodhouse, who had lived in a world of comfort. The passage goes on to discuss her life and family, in particular her relationship with the governess, Miss Taylor, whose departure from the Woodhouse home could potentially lead to Emma's distress. In lines 78–79, the narrator says that Emma “was now in great danger of suffering from ... solitude.” So, (A) is the correct answer choice. As for (B), while Emma's family is mentioned, the passage does not provide an overview of its members; additionally, Miss Taylor was *becoming* a nearby neighbor (“her friend was going only half a mile from them”). As for (C), the narrator only briefly mentions some of Emma's negative traits in lines 28–34, but that is not the main purpose of the passage. And as for (D), while the relationship between Emma and her father is described in lines 80–81 (“[s]he dearly loved her father, but he was no companion for her”) among other places, it is not the main focus of the passage.
- (A) Reading/Literary Fiction/Main Idea. SAT Topic: SUM.1.** This item is not unlike the previous item but only on a smaller scale, asking for a summary of what is described in just the first two paragraphs of the passage. As already discussed in the previous item, the first paragraph describes how Emma had lived comfortably and happily. The second paragraph goes on to tell how a very young Emma lost her mother and whose place had been subsequently filled by Emma's governess. (A) best captures these ideas although, interestingly enough, presents them in reverse order: even though a very young Emma lost her mother, she was raised in a happy home. As for (B), the narrator does not indicate that Emma must *overcome* the loss of her mother; in fact, the passage states that Emma's “mother had died too long ago for her to have more than an indistinct remembrance of her caresses” (lines 9–11). Additionally, Emma's father is not described as indifferent but instead as a “most affectionate, indulgent” (line 7) parent. As for (C), while it might be inferred that Emma's contented life was in part a result of her father's wealth and affection (she is described as the rich daughter of an affectionate father), this does not summarize what is expressed in the first two paragraphs. Finally, (D) is wrong for the same reason that (B) is wrong; the narrator does not suggest that Emma must *recover* from losing her mother.
- (B) Reading/Literary Fiction/Implied Idea. SAT Topic: INFID.1b.** While it has been established that Emma was raised in a loving home and was happy, her situation had negative consequences as well. The narrator is critical of the fact that Emma “think[s] a little too well of herself” (line 30), a disposition that came as a result of her comfortable situation. Someone who thinks too well of him- or herself has an over-elevated sense of self-importance, or is self-satisfied. So, (B) is the correct answer choice. (A) is wrong because Emma is not despondent; she has a “happy disposition” (line 2) as a result of the loving atmosphere provided by her father and Miss Taylor. As for (C), Emma is certainly not friendless; she and Miss Taylor are described as “friend and friend very mutually attached” (line 24). And as for (D), there is nothing in the passage to suggest that Emma is inconsiderate.
- (C) Reading/Literary Fiction/Textual Evidence. SAT Topic: INFID.2.** As already mentioned in the previous explanations, the narrator is critical of the fact that Emma “think[s] a little too well of herself” (line 30). Of the four answer choices, only (C) includes this reference in line 30. As for the remaining answer choices, none of them provide evidence for Emma's self-satisfaction: (A) describes Emma's positive characteristics and states that she has lived a happy life, (B) tells how a very young Emma lost her mother and was subsequently raised by her governess, and (D) states that her self-importance was at that point not perceived in such a way as to be a concern.



The correct answers to Textual Evidence items should match up with the passage quotations that are used to determine the answers to the items to which they refer. So, the best approach to

solving Textual Evidence items is to make a note of such quotations when solving those corresponding items.

5. **(C) Reading/Literary Fiction/Vocabulary. SAT Topic: SUM.2.** In this context, the narrator states that Emma highly esteemed “Miss Taylor’s judgment, but [was] directed chiefly by her own” (lines 26–27). So, (C) is the best answer choice. Note the elliptical reasoning in the above quotation. Emma holds Miss Taylor’s judgment in high regard, but she is typically guided by her own [judgment] when making decisions. As for the remaining answer choices, to say that Emma was trained, aimed, or addressed by her own judgment does not make sense. The phrases “trained by,” “aimed by,” and “addressed by” suggest that there is someone else involved who is doing the training, aiming, or addressing, and that is simply not the case here.

**TIP** The correct answers to Vocabulary items, especially those corresponding to passages that are excerpted from centuries-old literature such as this one, are not always the most obvious meanings to the words in question. Don’t be distracted by the most obvious meanings before you have considered all the possible answer choices.

6. **(B) Reading/Literary Fiction/Vocabulary. SAT Topic: SUM.2.** Do not be distracted by (A); while you might immediately identify the noun “desire” with the noun “want” (if you desire something, you want it), the latter in this context means “lack,” (B). As for (C), the idea of a requirement is more in line with a need than with a want; in any case, the noun “requirement” is not appropriate here. As for (D), while someone who requests something typically wants that particular thing, the noun “request” does not satisfy the intended meaning in this context either.

**TIP** Alternatively, substitution may be an effective problem-solving strategy.

Since it has already been established that Miss Taylor is leaving the Woodhouse home:

- (A) “The *desire* of Miss Taylor would be felt every hour of every day.” ✗
- (B) “The *lack* of Miss Taylor would be felt every hour of every day.” ✓
- (C) “The *requirement* of Miss Taylor would be felt every hour of every day.” ✗
- (D) “The *request* of Miss Taylor would be felt every hour of every day.” ✗

7. **(B) Reading/Literary Fiction/Implied Idea. SAT Topic: INFID.1b.** As already discussed in the explanation for item #1, Emma “was now in great danger of suffering from . . . solitude” (lines 78–79) as a result of Miss Taylor’s departing from the Woodhouse home and in turn becoming a nearby neighbor. So, it can be inferred that after Miss Taylor married and moved out of the Woodhouse home to live with her new husband, she spent less time with Emma, (B). As for (A), the narrator does not discuss the relationship between Miss Taylor and Mr. Woodhouse. As for (C), while getting married might open up Miss Taylor to a greater number of friendships, there is nothing in the passage to suggest either that this is the case or that in such a situation Miss Taylor would have *more* friends than Emma would. Finally, as for (D), while being apart from Emma might increase Miss Taylor’s appreciation of the close relationship that they once had, the narrator makes no mention that this is the case; in fact, the passage does not focus on how Miss Taylor would feel about her relationship with Emma after the former’s marriage but instead describes how Emma would feel as a result of the marriage.

8. **(D) Reading/Literary Fiction/Textual Evidence. SAT Topic: INFID.2.**

**TIP** Remember the tip included with the explanation for item #4 regarding Textual Evidence items; in this case, look to those passage quotations that you used to determine the answer to item #7.

The description of Emma’s potential intellectual solitude resulting from Miss Taylor’s moving to live with her new husband is found in the second-to-last paragraph. So, (D) is the correct answer choice. (A) is wrong because this quotation simply states that “Miss Taylor married,” a fact from which it cannot be



inferred that she then had fewer interactions with Emma. As for (B), these lines state that Miss Taylor's marriage to Mr. Weston should result in happiness for her; again, this is not a reason for Miss Taylor to have less contact with Emma. And (C) is wrong because it describes the close relationship that Miss Taylor and Emma had over the years; such a strong friendship would certainly not have any connection to why Emma and her governess had fewer interactions after the latter's marriage.

9. **(B) Reading/Literary Fiction/Application. SAT Topic: INFID.1c.** Application items ask you to draw a comparison between a situation taken from the passage and one of the answer choices. In lines 83–91, the narrator describes the differences between Mr. Woodhouse and his daughter Emma that made it difficult for the two to be companions in the same way that Emma had been with Miss Taylor: father and daughter were quite apart in age, and the former was a person of weak health who lacked the vim and vigor of youth possessed by the latter.

**TIP** Use the process of elimination to break down the answer choices into parts that are relatable to the given situation: a young person and a much older person have pronounced physical and mental differences.

All four answer choices describe two people with age differences, so identify the situation that is most similar to the difference in health described in the passage. (A) can be eliminated since the mother and son argue, while Mr. Woodhouse and Emma get along quite well. (C) can be eliminated because it provides an example of two people remaining close despite their differences, while the passage suggests that Mr. Woodhouse and Emma were not close. (D) can be eliminated because the high school student and college student “enjoy the same diversions,” while Emma and Mr. Woodhouse spend their time differently due to Mr. Woodhouse's poor health. So, (B) is the correct answer choice. The younger friend who is more active and athletic captures the description of Emma.

10. **(C) Reading/Social Studies/Vocabulary. SAT Topic: SUM.2.** For this item, you should notice the verbal clues found in the first paragraph that suggest the meaning of the verb “plot.” What does the idea of an “informal” economy based on social networks of Soviet people that “[n]o one was teaching them” how to create but that instead “evolved naturally, out of necessity” suggest? Such a spontaneous situation suggests that the Soviet Union had no forethought as to how such an economy was to be created. So, the Soviet people did not plot, or plan, how to build these networks, (C).

**TIP** Alternatively, just as with item #6, substitution may be an effective problem-solving strategy:

- (A) “The Soviet people didn't *mark* how they would build these networks.” ✗  
While “mark” may relate to the idea of plotting on a graph or map, this is not the author's intended meaning.
- (B) “The Soviet people didn't *form* how they would build these networks.” ✗  
Do not be distracted by (B); while one might form a plan as to how to build something, it does not make sense to say that one forms how to build something.
- (C) “The Soviet people didn't *plan* how they would build these networks.” ✓  
To plan is to plot or scheme.
- (D) “The Soviet people didn't *claim* how they would build these networks.” ✗  
While “claim” is as grammatically correct and meaningful as is “plan,” the former is not the author's intended meaning.

11. **(B) Reading/Social Studies/Development. SAT Topic: RHET.4.** In lines 30–37, the author states that “[new technologies] allow us to gain direct access to a worldwide community of others” and that “[w]e can assess those we don't know by checking their reputations” through sites like eBay, Twitter,

Facebook, and YouTube. Then, in lines 37–40, the author references the shoemaker, the programmer, and the apple farmer as examples of different people all around the world who become more easily accessible by means of these connective technologies. (B) best captures this idea of global connectivity. As for (A), while the author does make references to people in different locations around the world (Brazil, India, local community), there is no mention of the quality of their products or services. As for (C), while the author does mention assessing the reputations of others using online technologies, there is no discussion about whether those recommendations are trustworthy. Finally, as for (D), using only three examples of businesses around the world does not call attention to the limits of global economy; in fact, the idea of its limited expansion is the reverse of the author’s intended argument.

12. **(A) Reading/Social Studies/Development. SAT Topic: RHET.2b.** The author begins the passage by discussing an “informal” economy of the Soviet people that was based on social networks and that “evolved . . . out of necessity.” So, (A) is the correct answer choice; this discussion of Soviet life serves to introduce the idea of the world’s present social networking phenomenon. As for (B), while the author does discuss later in the passage how technology has improved social connections by making them on a worldwide scale, the discussion of life in the Soviet Union in the 1960s and 1970s does not serve to demonstrate this fact. (C) is wrong because the Soviet Union is discussed only to introduce social networking; the author does not list differences between this country and others. As for (D), while social networking and globalization may be the latest stage in the historical trend of economics, the discussion of the “informal” economy in the Soviet Union does not emphasize the importance of examining such trends.
13. **(A) Reading/Social Studies/Vocabulary. SAT Topic: SUM.2.** In lines 44–45, the author refers to “websites that allow people to post descriptions of their projects.” To use the parlance of our times, posting a written description of anything on a website means that one is essentially publishing it online. So, (A) is the correct answer choice. As for (B) and (C), while “transfer” and “assign” seem to have some connection to posting or stationing someone at a particular location, neither of these words is appropriate in this context. As for (D), “denounce” means “to publicly proclaim against something,” while “post” in this context simply means “to publicly display.”
14. **(D) Reading/Social Studies/Implied Idea. SAT Topic: INFID.1b.** In the fifth paragraph, the author describes socialstructuring as a phenomenon “in which amplified individuals . . . can take on many functions that previously only large organizations could perform” and that they can do so “more efficiently, at lower cost or no cost at all” (lines 65–72). So, it can be inferred that traditional organizations have tended to be less efficient and more expensive than individuals, (D). As for (A), while the fact that socialstructuring is creating an environment in which large organizations and governments are being replaced or overthrown by individuals might suggest that traditional organizations are less influential, there is nothing in the passage to suggest that they are more innovative than individuals. As for (B), while large organizations do have a greater number of members than does the individual, this is not the point made by the author’s comparison; additionally, the author makes no indication that the former is subject to fewer regulations than is the latter. Finally, as for (C), the author does not suggest that either the large corporation or the individual is more or less reliable or more or less interconnected than the other; in fact, the current landscape of interconnectivity levels the playing field for all.
15. **(D) Reading/Social Studies/Textual Evidence. SAT Topic: INFID.2.** The author makes the comparison between traditional organizations and individuals in lines 66–72. So, (D) is the correct answer choice. None of the other choices make the necessary comparison.
16. **(A) Reading/Social Studies/Development. SAT Topic: RHET.2.** The verbal clue to finding the answer to this item is “counterarguments,” which indicates that the author at some point in the passage provides arguments that are contrary to her own regarding new technologies. Throughout the passage, the author describes how these new technologies benefit modern society and its economic structures. At the beginning of the last paragraph, however, the author mentions concerns that “technology distances us from the benefits of face-to-face communication and quality social time” (lines 85–87). (A) best captures





- this idea. As for (B), the author never discusses the phenomenon of unproductive usage related to internet overuse. (C) is wrong because, as already discussed in the explanation for item #12, the author discusses the Soviet Union of the 1960s and 1970s to introduce the concept of social networking, not to provide a counterargument to its benefits. Finally, do not be distracted by (D); while this answer choice sounds similar to (A), it more specifically references the long-term results of social structuring, which the author suggests should continue since it connects “us at levels never seen before, opening up new opportunities to create, learn, and share” (lines 90–92).
17. **(D) Reading/Social Studies/Textual Evidence. SAT Topic: INFID.2.** The author recognizes counterarguments to her position in the first part of the last paragraph. So, (D) is the correct answer choice. (A) is wrong because lines 35–37 only describe how Facebook and YouTube are used as social networking tools. (B) is wrong because lines 74–76 only give an example of the new world opened up by social structuring. (C) is wrong because lines 79–84 describe some of the benefits of social structuring and these support the author’s argument.
18. **(C) Reading/Social Studies/Data Presentations. SAT Topic: SYN.2.** This is a Data Presentations item that is essentially a Main Idea item—except instead of finding the main idea of the passage, you are finding the main idea of the graph. The horizontal axis represents the *years* from 2005 to 2015, and the vertical axis represents the *quantity of digital information created and shared globally* (measured in zettabytes). Once the nature of the graph has been established (quantity of digital information created and shared globally per year), use the process of elimination. The horizontal axis (years) is described in each of the four answer choices, but (A) can be eliminated since the graph does not provide explicit information pertaining to computer and cell phone ownership. Similarly, (B) can be eliminated since the graph does not provide explicit information about the number of people sharing digital information. And (D) can be eliminated since this statement represents only an accurate projection for the year 2015 and not a summary of the complete information presented in the graph. So, (C) is the correct answer choice. The graph shows overall that the creation and sharing of digital information has increased tremendously from 2005 (at slightly greater than 0 zettabytes) to the 2015 projection (at slightly less than 8 zettabytes).
19. **(D) Reading/Social Studies/Data Presentations. SAT Topic: SYN.2.** Since the only explicit information about 2012 that can be gathered from the graph is the projected amount of digital information for that year (~2.5 zettabytes) and that value is not one of the answer choices, use the process of elimination, just as with previous items, and analyze the quantitative information. (A) can be eliminated since the consecutive years of 2011, 2012, and 2013E demonstrate a steady increase in relationship to each other: from ~1.75 zettabytes to ~2.5 zettabytes to ~3.5 zettabytes. (B) and (C) can be eliminated since the steady increase in the amount of digital information occurs from 2005 to 2015E, indicating a persistent upward trend across all eleven years. So, (D) is the correct answer choice. Since the amount of digital information for each year prior to 2012 is less than 2 zettabytes and the amount of digital information for 2012 is ~2.5 zettabytes, 2012 is the year in which the amount of information created was projected to be greater than 2 zettabytes for the first time.
20. **(C) Reading/Natural Science/Voice. SAT Topic: RHET.3.** Based on what is discussed in the passage, the author is clearly knowledgeable about advances in hibernator research. So, (C) is the correct answer choice. As for (A), while it certainly is a possibility that the author is actively involved in hibernator research, she provides no evidence that such is the case; in fact, the author only discusses other researchers and their studies and never mentions whether she has a role in those studies. As for (B), while the author does discuss cardiologist Fröbert’s study of Scandinavian brown bears, she does not indicate that such cardiology research is under debate. As for (D), the author does not really broach the issue of wildlife preservation; the only comment that could be related to preservation is ambiguous at best regarding her position: “[s]amples . . . that can’t be collected from live bears come from bears killed by hunters during the legal hunting season” (lines 55–57).

21. **(D) Reading/Natural Science/Main Idea. SAT Topic: RHET.4.** Remember that the main idea of a passage is quite often located in its first paragraph and recapitulated in its last paragraph; in this case, the main goal of the scientists is just such a main idea. In the first paragraph, the author states that studying hibernators could lead to possible solutions for a variety of human diseases. In the last paragraph, the author concludes by saying that “Fröbert hopes to find some protective molecule [in bears] that could stave off hardened arteries in humans” (lines 74–76). So, (D) is the correct answer choice. As for (A), the author briefly mentions squirrels and that they store fat for hibernation as do bears, but there is no mention of differences in their hibernation patterns. As for (B), the role that fat plays in hibernation is known and described in the passage as reserves from which sleeping animals nourish themselves in order to survive through the winter. Finally, (C) is wrong because the only mention of exercise is in reference to obese bears getting absolutely none of it during hibernation.
22. **(A) Reading/Natural Science/Textual Evidence. SAT Topic: INFID.2.** In the first paragraph (lines 1–5), the author makes quite clear the main goal of the scientists described in the passage: to understand how animal hibernation may offer solutions to certain health problems. So, (A) is the correct answer choice. As for (B), lines 10–13 simply state that fat stores are what animals use to sustain themselves during hibernation; this is a fact, not a goal. As for (C), lines 31–35 describe the nature of the hibernation research, not its main goal. And (D) is wrong for a reason similar to that of (C); lines 42–46 describe some of the specifics of the hibernation research.
23. **(B) Reading/Natural Science/Voice. SAT Topic: RHET.1.** In describing animals’ preparations for hibernation, Matthew Andrews says such things as “[f]at is where it’s at,” “[the animals] bring [their] own lunch with [them],” and “[t]hey have their last supper.” Such everyday language creates a familiar and conversational tone that makes it easier to relate more complex scientific information. So, (B) is the correct answer choice. As for (A) and (C), Andrews’s playful tone is neither bleak nor ominous, respectively. Do not be distracted by (D); while Andrews does indeed use images of animals acting as if they were human, his language does not create an absurd tone.
24. **(B) Reading/Natural Science/Vocabulary. SAT Topic: SUM.2.** In lines 19–20, the author states that “[b]igger fat stores mean a greater chance of surviving until next spring.” In this context, the plural noun “stores” means “reserves,” or “supplies that are saved to be used in the future.” So, (B) is the correct answer choice. As for (A), while “stores” can be used as a verb to mean “stays fresh,” it does not satisfy the author’s intended meaning. As for (C) and (D), while “stacks” and “shelters,” respectively, are related to the idea of storage, neither of these terms is appropriate in this context.
25. **(D) Reading/Natural Science/Implied Idea. SAT Topic: INFID.1b.** In the last paragraph, the author concludes the passage by saying that, unlike inactive humans, bears don’t build up fatty streaks in their arteries when they are inactive and that Fröbert hopes he will be able to find “some protective molecule” (line 75) that will get such a result in humans. It can be inferred, therefore, that bears possess some molecule that protects against hardened arteries, (D). As for (A) and (B), the process described in the second-to-last paragraph (lines 58–68) discounts their viability as hypotheses regarding why bears’ arteries do not harden during hibernation: increasing plasma cholesterol levels and pinched blood vessels (which lead to sluggish circulation) would be a “recipe for hardened arteries” (line 67), not flexible ones. (C) is wrong because hibernating bears get no exercise at all.
26. **(D) Reading/Natural Science/Textual Evidence. SAT Topic: INFID.2.** The reference to the protective molecule occurs in lines 74–76: “Fröbert hopes to find some protective molecule that could stave off hardened arteries in humans.” So, (D) is the correct answer choice. As for (A), lines 19–20 simply state the importance of fat reserves during hibernation. As for (B), lines 24–27 describe how brown bears go about packing on these fat reserves. And as for (C), lines 69–72 explain how humans develop hardened arteries. None of these answer choices speak to Fröbert’s hypothesis.
27. **(A) Reading/Natural Science/Data Presentations. SAT Topic: SYN.2.** Examine each of the answer choices in turn:



- (A) lines 58–62: “plasma cholesterol levels”
- (B) lines 62–64: “zero exercise”
- (C) lines 64–65: “sluggish circulation”
- (D) lines 67–68: “hardened arteries”

Essentially, the graph describes the total plasma cholesterol levels in seven bears (measured in milligrams/deciliters) during hibernation and when active, noting that these levels are generally higher during hibernation and that a maximum desirable level for humans is a little less than 232 milligrams/deciliters. So, (A) is the correct answer choice. The graph does not describe levels of exercise, circulation flow, or artery conditions.

**TIP** Expedite the problem-solving process by noticing that the line number range spanning across all four of the answer choices (lines 58–68) is the same as that discussed in the explanation for item #25. And as already indicated, the four answer choices to that item are concerned with plasma cholesterol levels, sluggish circulation, exercise, and hardened arteries, respectively. With this information, you should quickly recognize that the first range (lines 58–62) discusses plasma cholesterol levels.

28. **(A) Reading/Natural Science/Data Presentations. SAT Topic: SYN.2.** This Data Presentations item asks you to interpret the information provided by the graph in order to determine which of the given statements is supported by that information. The graph shows for each of the seven bears the change in plasma cholesterol level between states of hibernation and activity. Of the lines shown, only one of them runs nearly parallel to the horizontal axis, indicating that that bear experienced almost no change in plasma cholesterol level between the two states. So, (A) is the correct answer choice. As for (B), since all of the lines except for the one just mentioned are displayed on downward angles, none of the bears experienced an increase in total plasma cholesterol level. (C) is wrong because the maximum desirable plasma cholesterol level for humans is a little less than 232 milligrams/deciliters and only one of the bears experienced a plasma cholesterol level even close to that value. Finally, (D) is wrong because there is not a line connecting the highest value in the state of hibernation to the lowest value in the state of activity.
29. **(B) Reading/Social Studies/Main Idea. SAT Topic: RHET.2a.** In the first paragraph, the author describes “[t]he problem of our age . . . [as] the proper administration of wealth” (lines 1–2) and that the changes in society are “not to be deplored, but welcomed as . . . beneficial” (lines 12–13), comparing them to “[t]he [supposed] ‘good old times’” (line 20) and concluding that “[i]t is a waste of time to criticize the inevitable” (lines 27–28). So, (B) is the correct answer choice: a position is stated, historical context is given, and earnest advice is given. Do not be distracted by (A); the author does not present a personal history or really rely on specific historical examples. As for (C), not only does the author not state principles but there is no description of an opposition to or a consensus reached regarding such principles. Just as with (A), do not be distracted by the use of the term “historical” in (D); the author does not detail a historical period but merely provides contextual details in comparing the past to the present (“our age”).
30. **(C) Reading/Social Studies/Implied Idea. SAT Topic: INFID.1b.** In line 2, the author mentions “the ties of brotherhood” in reference to the relationship between the rich and the poor. In saying that these ties “may still bind [them] together” (line 3), the author is suggesting that the past saw a greater degree of unity than does the present. Additionally, the author goes on to say, in lines 6–12, that there is a greater contrast between the millionaire and laborer today than there was between the chief and his people in the past. So, (C) is the correct answer choice. As for (A) and (D), they can both be disqualified on the basis of the author’s use of the phrase “may still” in line: the ties are NOT fictitious, (A); and there IS a possibility that they can bring together *today* the rich and the poor, (D). (B) is wrong because it directly contradicts the author’s statements; the ties are weaker today than they were in the past and not the other way around.

31. **(D) Reading/Social Studies/Development. SAT Topic: SUM.1.** The author states that “[i]n former days, there was little difference between the dwelling, dress, food, and environment of the chief and those of his retainers” (lines 6–9) and then goes on to say that the contrast between their dwelling places today is indicative of the great changes that have come with advances in civilization. So, he uses the examples of “dwelling, dress, food, and environment” to indicate differences in social status, (D). (A) is wrong because the author does not suggest that these examples are more or less valued at any given point in time; in fact, most would consider them to be timeless necessities. As for (B) and (C), while these examples are certainly considered basic needs to which all people should be entitled, the author does not provide them to make such an obvious point.
32. **(C) Reading/Social Studies/Explicit Detail. SAT Topic: INFID.1a.** In lines 13–18, the author says that one essential to human progression is the accumulation and appreciation of the fine things of culture, such as literature and art, in the houses of those few who can afford them. So, the “some” to whom the author refers are those people interested in the advantages of culture, (C). As for (A) and (B), this reference to houses has nothing at all to do with their physical characteristics but instead to the cultural interests of their inhabitants. Do not be distracted by (D); while the people living in these homes might very well care whether the pedigree of their guests is of a cultural status not unlike their own, the idea in (D) is not supported by the passage.
33. **(B) Reading/Social Studies/Textual Evidence. SAT Topic: INFID.2.** As already discussed, the author says that “[i]t is . . . essential . . . for the progress of the race that the houses of some should be homes for all that is highest and best in literature and the arts” (lines 13–16), referring to those people interested in the advantages of culture. So, (B) is the correct answer choice.

**TIP** With this item, notice that the previous, corresponding item has an explicit line reference in its stem (line 15). In such cases, it is highly likely that the correct answer to the Textual Evidence item contains that line number in its range. This item is a case in point (lines 13–16).

As for (A), lines 9–10 refer to “the palace of the millionaire and the cottage of the laborer” as an example of class comparison and have nothing to do with those people who live in the “houses of some” (line 15). As for (C), lines 18–19 refer to the author’s position supporting the irregularity of wealth over universal poverty for the sake of the arts. As for (D), lines 19–20 refer to the one historical example in the paragraph, Maecenas; the author mentions Maecenas to support his idea that wealth is necessary for the arts.

34. **(D) Reading/Social Studies/Development. SAT Topic: RHET.1.** This item does not ask for the meaning of the phrase “good old times” but instead asks you to determine the strategy that the author employs in using this phrase. What is significant here is that the author puts the phrase in quotation marks. Quotation marks are typically used for emphasis but may also be used to indicate a reversal of thought, suggesting that the author does not agree with the idea expressed. And in reading the complete sentence from which this phrase is excerpted, such a reversal of thought is confirmed: “The ‘good old times’ were not good old times.” So, (D) is the correct answer choice. As for (A) and (B), while the phrase “good old times” in some cases may still be considered a useful cliché and might even be used to signal the subsequent sharing of a bit of folk wisdom, respectively, the author disagrees with its sentiment in this particular context and therefore does not view it positively. Finally, (C) is wrong because there is nothing to indicate that the phrase “good old times” is one used by the wealthy; in fact, in this context the phrase would be used by those who miss the times when there wasn’t much difference between the possessions held by master and servant and not by persons of wealth who prefer differences in status.
35. **(C) Reading/Social Studies/Main Idea. SAT Topic: INFID.3.** In the second half of the passage, the author discusses the evolution of the modern economic system and its consequences, from the small-scale manufacture of products to the mode of mass production. He states that we can obtain many things for a much lower cost than before, but the price paid for cheaper goods and services is the alienation of the laborer by the employer and of the poor by the rich. So, one of the disadvantages of having a modern



economic system is that it creates divisions between different categories of people, (C). As for (A) and (D), when the author states that “[m]uch better this great irregularity than universal squalor” (lines 18–19), he is arguing that the imbalance between those who have the advantages of culture and wealth and those who do not is preferred to a world of wholesale poverty. And (B) is wrong because the author states that “[t]he conditions of human life have not only been changed, but revolutionized” (lines 4–5) and that these modern conditions are “essential . . . for the progress of the race” (line 14); change, revolution, and progress are not suggestive of replicating the past.

36. (D) *Reading/Social Studies/Textual Evidence*. SAT Topic: INFID.2. The author captures the idea that the modern economic system creates divisions between different categories of people when he states that “[a]ll intercourse between them is at an end . . . [and] [r]igid castes are formed” (lines 65–66). So, (D) is the correct answer choice. As for (A), lines 37–39 describe a time prior to the modern mode of manufacture, when master and servant were on more equal terms. As for (B), lines 43–45 refer to the “social equality” and “political equality” of master and servant during that time. And (C) is wrong because lines 46–47, too, make reference to the results of that earlier mode of manufacture when master and servant worked side by side.
37. (B) *Reading/Social Studies/Vocabulary*. SAT Topic: SUM.2. Use the process of substitution to determine which of the answer choices sounds most appropriate in this context:
- (A) The law of competition “brings improved conditions *before it*.” ✗
  - (B) The law of competition “brings improved conditions *with it*.” ✓
  - (C) The law of competition “brings improved conditions *anticipating it*.” ✗
  - (D) The law of competition “brings improved conditions *advancing it*.” ✗

So, (B) is the correct answer choice. The idea that the law of competition brings improved conditions “in its train” suggests that it brings them along with it or that they accompany it. As for the remaining answer choices, none of them make sense in this context; the improved conditions do not come in front of the law, expect the arrival of the law, or promote the law.

38. (D) *Reading/Natural Science/Explicit Detail*. SAT Topic: INFID.1a. In the second paragraph of Passage 1, the author states that the only species that will not be able to take advantage of de-extinction technology are the ones whose DNA is too old, like dinosaurs. So, the usefulness of de-extinction technology may be limited ONLY by the length of time that a species has been extinct, (D). As for (A), the author states that de-extinction “will take decades” (line 13) but does not suggest that the amount of time that scientists will be able to devote to research will limit the usefulness of its technology. As for (B), while the author mentions that bringing species back from extinction will “restore diminishing ecosystems” (line 18), he does not suggest that the relationship between them is a limiting factor. Finally, as for (C), the author does not indicate that the complexity of the DNA of an extinct species would pose an issue to this process.
39. (B) *Reading/Natural Science/Textual Evidence*. SAT Topic: INFID.2. In lines 9–11, the author states that “[only] species whose DNA is too old to be recovered, such as dinosaurs, are the ones to consider totally extinct, bodily and genetically.” So, (B) is the correct answer choice. As for (A), lines 7–9 simply say that genetic technology is capable of using recoverable DNA to bring extinct animals back to life. As for (C), line 13 states that de-extinction “will be expensive and difficult,” suggesting that it will be challenging but not proposing that these factors are limiting. And (D) is wrong because lines 13–14, too, refer to challenges and not to limiting factors.
40. (D) *Reading/Natural Science/Vocabulary*. SAT Topic: SUM.2. The author of Passage 1 concludes by saying that the very thought of seeing mammoths walk the earth and passenger pigeons in flight “invokes the awe and wonder that drives all conservation at its deepest level” (lines 26–27). At their core (most fundamental), de-extinction, which seeks to restore life, and conservation, which seeks to preserve life, have shared inspirations. So, (D) is the correct answer choice. As for the remaining answer



choices, while something that is considered deep may be described as engrossing, challenging, or extensive, none of these meanings are appropriate in this context.

41. **(B) Reading/Natural Science/Explicit Detail. SAT Topic: INFID.1a.** In lines 37–41, the authors of Passage 2 state that great numbers of species are disappearing and refer to this trend as an extinction comparable to that of the dinosaurs. So, a matter of mass extinction on such a scale would be considered a global catastrophe, (B). As for (A) and (C), the current matter of shrinking biodiversity would not be considered a historical anomaly (unprecedented freak occurrence) or a scientific curiosity (unusual scientific event) since the authors state it is the sixth such extinction. Finally, as for (D), the authors never indicate that the biodiversity crisis should primarily be considered a political problem.
42. **(A) Reading/Natural Science/Textual Evidence. SAT Topic: INFID.2.** The authors’ use of the phrase “mass extinction” (line 40) provides the best evidence that they believe the matter of shrinking biodiversity to primarily be considered a *global catastrophe*. So, (A) is the correct answer choice. As for the remaining answer choices, they are all concerned with the matter of de-extinction and not of shrinking biodiversity. (B) is wrong because lines 42–45 address the issue of the “false promise that technology alone can solve our ongoing environmental woes”; this issue does not suggest the global proportions of shrinking biodiversity. (C) is wrong because lines 53–56 address the concern that such a costly undertaking as de-extinction “in the name of conservation looks irresponsible.” And (D) is wrong because lines 65–67 speak to the authors’ position that de-extinction “should be conducted . . . [to] preserv[e] modern diversity rather than to conjur[e] . . . [the dead] from the grave.”
43. **(C) Reading/Natural Science/Vocabulary. SAT Topic: SUM.2.** This is a fairly straightforward Vocabulary item. In lines 37–38, the adjective “great” is used to modify the plural noun “numbers.” So, in this context, the word “great” is used to mean “large,” (C): species today are vanishing in such large numbers. As for the remaining answer choices, none of them provide the appropriate meaning in this context. “Great” meaning “lofty” or “wonderful” might be used to describe, for example, the quality of an idea; and “great” meaning “intense” might be used to describe a matter of degree (e.g., a great heat).
44. **(C) Reading/Natural Science/Development. SAT Topic: RHET.4.** In lines 61–64, the authors reference the ferret and the rhino as species that have lost genetic diversity, or whose gene pools are compromised, (C). As for the remaining answer choices, none of them address the concern of compromised gene pools. The idea of lost genetic diversity does not emphasize a distinction between extinct and living species, account for dwindling numbers of animals, or highlight failure to adapt to new habitats.
45. **(B) Reading/Natural Science/Main Idea. SAT Topic: SYN.1.** The author of Passage 1 describes the promise that de-extinction could have for such things as biodiversity preservation, diminished ecosystem restoration, and extinction prevention. He refers to de-extinction as “profound” (line 22), “a stunning realization” (lines 23–24), and something that “invokes . . . awe and wonder” (line 26). The authors of Passage 2, on the other hand, hold that it would be irresponsible to devote our energies to de-extinction when there is an already existing biodiversity crisis that requires our attention. They say that de-extinction has a “gee-whiz appeal” (line 29), “poses a risk of selling the public on a false promise” (lines 42–43), and is “a costly and flamboyant project” (lines 53–54). So, while the author of Passage 1 is overall in favor of de-extinction technology, the authors of Passage 2 are more wary of its feasibility and potential. (B) best captures this relationship. As for (A), neither passage deals with the issues of conservation or de-extinction from a political point of view. As for (C), the passages do not make reference to a specific research study. And (D) is wrong because Passage 2 considers the negative effects, not the practical applications, that could arise from the use of de-extinction technology.
46. **(C) Reading/Natural Science/Application. SAT Topic: INFID.1c.** As already established in the previous explanation, the author of Passage 1 is overall in favor of de-extinction technology, while the authors of Passage 2 are more wary of its feasibility and potential. So it is likely that the authors of Passage 2 would respond unfavorably to something proposed by the authors of Passage 1.



**TIP** Notice that each of the four answer choices begins with a word describing the authors' tone (approval, resignation, concern, and disdain). So, understanding the nature of the prospect to which the author of Passage 1 refers and recognizing the tone held by the authors of Passage 2 towards such a prospect, use the process of elimination.

(A) and (B) can be eliminated since the authors of Passage 2 neither approve of the prospect of de-extinction nor resign themselves to the inevitability of its significance. As for (C) and (D), concern and disdain, respectively, are appropriately negative tones; the latter, however, is not only too extreme in describing the authors of Passage 2 but there is nothing to indicate that these authors are critical of people's understanding of genetic diversity. So, (C) is the correct answer choice.

47. (A) *Reading/Natural Science/Explicit Detail. SAT Topic: INFID.2.* In lines 24–26, the author of Passage 1 says that “[t]he imagination soars . . . [at] the thought of mammoths and passenger pigeons alive again” and that de-extinction technology “invokes . . . awe and wonder.” The authors of Passage 2 agree when they say at the very outset that “[t]he idea of bringing back extinct species holds obvious gee-whiz appeal and a respite from a steady stream of grim news” (lines 28–30). The phrase “gee-whiz” is indicative of astonishment. So, (A) is the correct answer choice. As for (B), lines 30–33 describe the authors' concern that the excitement of de-extinction technology takes people's attention away from real biodiversity problems. Do not be distracted by (C); while lines 58–59 indicate that the authors of Passage 2 do not think de-extinction is totally bad, the idea of a venture having merit is not nearly as passionate as the idea that it inspires the imagination to soar. As for (D), lines 61–63 simply provide an example of the merit of de-extinction recognized by the authors of Passage 2.

# PSAT/NMSQT Writing and Language Test Explanations

- (C) Writing and Language/Expression of Ideas/Style/Conciseness. SAT Topic: EXPID.3b.** As written, the underlined portion contains a redundancy. “Annually” and “yearly” mean the same thing, so only one of these words is needed. (C) offers the most concise correction. (B) and (D) are wrong because neither of them corrects the problem. (B) uses both “annual” and “year,” and (D) uses both “yearly” and “annually.”
- (D) Writing and Language/Expression of Ideas/Style/Tone. SAT Topic: EXPID.3c.** This passage is written in a professional style, and you need to choose the wording that fits most seamlessly with the rest of the passage. As written, the wording is too casual. (B) is no better; “main things leading up to” is very informal usage. (C) is wrong because it is non-idiomatic. (D) is the best choice. The phrase “primary causes of” sounds professional and fits the context of the passage.
- (C) Writing and Language/Standard English Conventions/Grammar and Usage/Subject-Verb Agreement. SAT Topic: SEC.2c.ii.** This question is tricky because, at first glance, it appears that “hours” is the subject of the verb, and “hours spend” is a correct construction. However, the real subject of the verb “spend” is “American,” and “American spend” is incorrect because the subject is singular and the verb plural. (C) corrects the error by substituting the correct plural verb, “spends.” (B) is wrong for two reasons. First, the wrong verb tense is used. The sentence is talking about the number of hours that the average American currently spends working, so simple present is needed. Using the present perfect confuses the meaning of the sentence. Second, even if the present perfect tense were allowable, the choice would have to read “has spent” to agree with “American.” As for (D), this is a misconstruction of the simple present tense and, even if this form were correct, it would have to be “is spent” to agree with “American.”
- (D) Writing and Language/Standard English Conventions/Punctuation/Commas. SAT Topic: SEC.3.** This sentence is made up of two parts, a subordinate clause beginning with “as long as” and a main clause beginning with “managers.” These clauses should be joined by punctuation only; the word “and” is not needed. (B), (C), and (D) all eliminate “and,” so to choose the right answer, compare the punctuation that they use. (B) is wrong because a semicolon can join two independent clauses, but not an independent clause and a subordinate clause. (C) is wrong because it inserts an unnecessary comma after “managers.” Read this choice to yourself, pausing at the comma, and you’ll hear the error. (D) is the right choice. A comma should be used to join the subordinate clause to the independent clause.
- (C) Writing and Language/Expression of Ideas/Organization/Paragraph-Level Structure. SAT Topic: EXPID.2a.** To answer this question correctly, you need to analyze the structure of the paragraph. Sentence 3 states one of the reasons that workers have a hard time getting enough sleep—they work many more hours than they used to. Where does this fact fit most logically? Use the process of elimination to work through your choices. As written, the sentence is sandwiched between two other sentences that discuss napping at work. Logically, the sentences about napping should be together, so the sentence doesn’t work well where it is now—eliminate (A). Move on to (B). If we put sentence 3 first, it is followed by a sentence that gives a much more general statement of the problem. This is awkward, since paragraphs usually start with a broad idea and move into more specific details later. Eliminate (B). In (C), sentence 3 is placed directly after sentence 1. This makes sense—we start with a general statement (the work itself is a main cause of workers’ lack of sleep) and move into a specific detail that supports the main idea (work hours have increased dramatically, thus leading to less time for





sleep). Check that the rest of the paragraph flows well—the sentences about naps are together, and the last sentence offers a nice conclusion. (C) is the best choice. Finally, check (D) just to make sure it doesn't offer a better alternative. Placing sentence 3 after sentence 4 breaks up the logical flow of ideas within the paragraph, so eliminate (D) as well.

6. **(A) Writing and Language/Expression of Ideas/No Change. SAT Topic: EXPID.1c.** This item asks you to analyze whether the suggested sentence should be added to the paragraph in the indicated place or not. First, read the sentence and ask yourself whether it seems to fit with the flow of the paragraph. On first reading, the sentence does seem to fit. It gives further information about naps and adds the point that even short naps can result in significant benefits for the workplace. Next, read the choices and see whether the reasoning in each choice holds up. (A) is very similar to the reasoning we have just given—short naps provide benefits without asking employers to give up much employee time. This is a valuable point that merits mention in the paragraph. (B) recommends adding the sentence, but the reasoning is wrong. The suggested sentence doesn't address methodology at all. (C) and (D) both say the sentence should not be added, so if you're short on time, eliminate them and move on to the next question. Here, however, let's take a look at the reasoning. (C) is wrong because the addition strengthens the main point by noting that only 15 minutes are needed to reap the benefits of napping. (D) is wrong because the suggested sentence doesn't contain any information that contradicts the previous sentences.
7. **(B) Writing and Language/Expression of Ideas/Strategy/Main Idea. SAT Topic: EXPID.1b.** For this item, you need to identify the main idea of the sentence and select the choice that best supports that idea. The sentence states that employee naps might reduce health care costs because napping leads to long-term health benefits. The best way to support this idea would be to cite a specific health benefit. Look at your choices; only (B) provides specifics. As written, the underlined portion introduces a new idea unrelated to health care, so eliminate (A). (C) and (D) both make vague statements, (C) about rising health care costs and (D) about efficiency. Neither of these choices is as strong as (B).
8. **(B) Writing and Language/Standard English Conventions/Sentence Structure/Faulty Parallelism. SAT Topic: SEC.1a.iii.** The underlined portion suffers from faulty parallelism. The sentence states that some companies have invested in nap pods and goes on to state what those nap pods do: "block out," "play," and "gently waking." "Block out" and "play" are simple present tense verbs, and the third verb in the series should be a simple present tense verb as well. "Waking" should be changed to "wake," (B). Don't let the presence of the word "gently" confuse you; it is merely an adverb modifying the verb "wake." (C) and (D) are wrong because they both use the wrong form of the verb.
9. **(B) Writing and Language/Standard English Conventions/Grammar and Usage/Diction. SAT Topic: SEC.2f.** This item asks you to choose the appropriate word to express an idea. As written, the sentence mentions leaders who have promoted napping "throughout" their workers. This is wrong because it is a non-idiomatic usage of "throughout." (C) and (D) are wrong for the same reason. It is not possible to nap "between" workers or "into" workers. (B) is the correct choice. The leaders have promoted napping "among" their workers.
10. **(D) Writing and Language/Standard English Conventions/Sentence Structure/Problems of Coordination and Subordination. SAT Topic: SEC.1a.ii.** The underlined portion of the sentence needs to successfully complete the comparison that began with "not only." "Not only . . . and again" is non-idiomatic. Eliminate (A). Look at the other choices. (B) starts out promisingly ("not only . . . but"). But, it is derailed by the inclusion of an extra subject, "it." "The benefits not only . . . but it benefits" is incorrect. (C) also fails to complete the comparison successfully. "Not only . . . as also" is non-idiomatic. Only (D) offers a correct completion: "not only . . . but also."

11. **(D) Writing and Language/Expression of Ideas/Strategy/Effective Concluding Sentence. SAT Topic: EXPID.2b.** For this item, you are looking for a concluding sentence that restates the main idea of the passage: the benefits of napping on the job. Let's examine the choices. (A) can be eliminated because it does not deal with the subject of napping, but rather deals with an additional detail about the leaders mentioned in the last paragraph. This sentence is not at all a restatement of the passage's main argument. (B) is related to the main argument of the passage in that it discusses overworked employees, but it mentions a solution that isn't discussed in the rest of the passage—reducing employee hours. This sentence is not a restatement of the main argument about allowing naps. (C) does mention napping, but the main point of the sentence is that employers should think about employee schedules when implementing a napping policy, and again, this is not the main idea of the passage. (D) offers the best restatement of the passage's argument. Like the business leaders mentioned in the last paragraph, other company executives should offer on-the-job napping.
12. **(C) Writing and Language/Standard English Conventions/Punctuation/Commas. SAT Topic: SEC.3e.** This item requires you to choose the best punctuation for the underlined portion. To decide on the best option, identify the phrase of which the underlined portion is a part: "including honeybee pollination." This phrase provides extra information about the noun "animal pollination," and the beginning of the phrase is set off with a comma. This tells you that the end of the phrase must also be set off with a comma. (A) and (D) are wrong because they both use the wrong closing punctuation mark. (B) is wrong because it introduces unnecessary words. The standard usage here is to set off extra information with two commas, as (C) does.
13. **(B) Writing and Language/Standard English Conventions/Grammar and Usage/Subject-Verb Agreement and Diction. SAT Topic: SEC.2c.ii.** This item tests two subtle but important points: subject-verb agreement and word choice. Looking over the choices, you'll notice that there are two differences between them. First, some choices use "highlight" and some use "highlights," and second, some use "affects" and some use "effects." Let's first decide whether "highlight" or "highlights" is needed in this sentence. The subject of the sentence is "importance." ("Bees" is part of a prepositional phrase, so it can be ignored for the purpose of determining subject-verb agreement.) "Importance" is singular, so you need the singular verb "highlights." Eliminate choices (C) and (D). Second, decide whether "affects" or "effects" is correct. Remember that "affects" is a verb and "effects" is a noun. The sentence says that the importance highlights the effects, so the noun form is needed since it serves as the object of the verb. Eliminate (A), which uses "affects," and you're left with choice (B).
14. **(B) Writing and Language/Standard English Conventions/Sentence Structure/Comma Splices and Grammar and Usage/Pronoun Usage. SAT Topic: SEC.1a.i.** As written, this sentence is incorrect because "they" has no antecedent. In addition, it is a run-on sentence in which two independent clauses are joined by only a comma. Let's examine the choices to see which offers the best correction for the sentence. (C) can be eliminated because it, too, creates a run-on sentence. (D) creates an incomplete sentence that has just a phrase, "colony collapse disorder," tacked on to an independent clause. (B), however, provides a dependent clause that properly introduces the idea that follows. "Known as colony collapse disorder" appropriately refers to "this phenomenon." (B) is the best choice.
15. **(B) Writing and Language/Expression of Ideas/Strategy/Data Presentation. SAT Topic: EXPID.1d.** This item requires you to look at the chart and see which of the statements offers the most accurate interpretation of the data. Choice (A) says that bee mortality rates have exceeded 25 percent of the population each winter. However, losses were less than 25% in 2011–2012, so eliminate (A). (B) says that the losses were above the acceptable range. This is true; we can see from the chart that 15% is the top end of the acceptable range, and the losses were well above that number every year. (C) says that losses haven't changed notably from year to year. However, losses have fluctuated every year, from as high as above 35% in 2007–2008 to around 22% in 2011–2012. (D) says that the losses have greatly



- increased every year, but as we have already seen, they have gone up and down over recent years. (B) is the best answer.
16. **(D) Writing and Language/Expression of Ideas/Strategy/Data Presentation. SAT Topic: EXPID.1d.** For this item, you have to see which answer choice best describes what happened during the winter of 2012–2013. The best approach is to compare each of the answer choices to the chart and use the process of elimination to sort through the answers. (A) says that the portion of the bee population that was lost *fell* 10 percent. However, if we compare the loss rate to that of the previous year, we see that bee mortality *rose* nearly 10 percent. Eliminate (A). (B) says that the loss rate was double what it had been the previous year. Look at 2011–2012: the loss rate was around 22%. Now look at 2012–2013: the loss rate was around 31%. This is far less than double 22%, so eliminate (B). (C) indicates that the number of losses rose, which is correct. However, it also says that the losses had been within the acceptable range in the previous year, and the chart shows us that this is not true. In 2011–2012, the loss rate was over 20%, still out of the acceptable range. Eliminate (C). Finally, examine (D). (D) says that the portion of bees lost rose almost 10 percent, totaling a loss of 31 percent. Is this true? 2011–2012 showed a loss of approximately 22% and 2012–2013 showed a loss of about 31%. This is equal to a rise of “almost 10 percentage points.” (D) is the best answer.
17. **(A) Writing and Language/Expression of Ideas/No Change. SAT Topic: EXPID.2b.** This item is a question of style. Which of the choices “most smoothly and effectively” introduces the topic of this paragraph? For a question like this, you have to use your ear. Read through the choices. (A) is a well-constructed sentence that reads smoothly and connects easily to the next sentence. This is definitely a contender for best answer. (B) is less appealing. The first clause of the sentence restates a fact that has already been well established in the passage, and it is redundant to state it again. (C) is awkwardly constructed and does not read smoothly. Finally, (D) suggests deleting the sentence altogether, but this leaves us with a paragraph that lacks a topic sentence. (A), leaving the paragraph as it is, is the best option.
18. **(A) Writing and Language/Expression of Ideas/No Change. SAT Topic: EXPID.1b.** This paragraph addresses the reasons that bees may be vanishing. The second sentence gives one reason: the use of neonicotinoids. The suggested sentence, which would be inserted at this point, says that exposure to neonicotinoids increases bees’ vulnerability to disease and parasites. This supporting information strengthens the claim that has just been made, so it should be included. (A) is the correct answer. Let’s double-check the other options. (B) says that the sentence should be included, but the reason is faulty. The sentence does not really introduce a new idea; rather, it offers support for a previous claim. Also, if you look ahead at the rest of the passage, you’ll see that this idea is not further developed, so it does not “become important later in the passage.” (C) and (D) are both wrong because they say that the sentence should not be included in the proposed place. (C) suggests placing the sentence elsewhere, but that would be illogical. The present position is the best option because the sentence logically supports the claim made in the preceding sentence. (D) says that the sentence contradicts the main idea of the passage, but in fact it offers explanation and support for the main topic, the disappearance of honeybees.
19. **(D) Writing and Language/Expression of Ideas/Style/Tone. SAT Topic: EXPID.3c.** All of the phrases mean the same thing, so this should be a clue to you that the question is one of tone, not content. Three of the four choices use slang or very casual English: “not to be scoffed at,” “pretty big deal,” and “on the back burner.” Compare those to (D), “cannot be ignored.” You’ll see that (D) is the best fit for the scholarly tone and style of the passage.
20. **(C) Writing and Language/Standard English Conventions/Punctuation/Commas. SAT Topic: SEC.3b.** This item requires you to smooth out the wording and punctuate the sentence correctly. As written, the second half of the sentence contains an incomplete clause (“this being an expensive proposition”). Instead, it should say “this is an expensive proposition.” Let’s examine the other choices to see what

would be better. (B) has smoother wording, but it contains a comma splice. A comma cannot be used to join two independent clauses. (D) makes a similar mistake. The part of the sentence after the semicolon is an incomplete sentence, but a semicolon can be used to join only two independent clauses, not an independent and a dependent clause. (C) is the right choice. It joins the independent and dependent clauses with a comma.

21. **(C) Writing and Language/Standard English Conventions/Grammar and Usage/Diction. SAT Topic: SEC.2b.** This item requires you to select the correct word from among several similar or often-confused words. First, read through the sentence and try to predict the correct form. Once you have your own idea, check to see whether it is among the choices. If so, bingo! You can select it and move on. If not, go through the choices using the process of elimination. As written, the sentence doesn't work because "they're" is a contraction for "they are." "Other farmers have increased they are dependence . . ." clearly doesn't make sense. Eliminate (A). (B) is incorrect because "there" is used to refer to a place. For example, "We went there on vacation." This doesn't make sense in the context, so eliminate (B) also. (C) suggests the possessive pronoun "their." "Farmers have increased their dependence" makes sense because "their" refers back to "farmers." Just to make sure, let's also check (D). "Its" is also a possessive pronoun. However, it refers not to people but to things, and the subject in this sentence is a group of people (the farmers). (C) is the best choice.
22. **(A) Writing and Language/Expression of Ideas/No Change. SAT Topic: EXPID.2b.** Read the question carefully—the writer is looking for a concluding sentence that will talk about future efforts to combat CCD. So, you need to find the choice that most effectively addresses future efforts. (B) doesn't work well because it looks back to the past. The point made in this sentence, that losses have been devastating and widely felt, has been made thoroughly already and doesn't point toward any future efforts. (C) makes an irrelevant statement—that scientists have been studying various aspects of bees for over a century. This statement doesn't provide any kind of conclusion, forward-looking or otherwise. (D) is a poor concluding sentence because it introduces new information in the last sentence that cannot be developed because the passage is at an end. It also fails to specifically address what the writer wants—a last sentence that points toward future efforts to combat CCD. (A) turns out to be the best choice. The sentence as written provides a nice summary of possible courses of action for the future.
23. **(D) Writing and Language/Standard English Conventions/Punctuation/Commas. SAT Topic: SEC.3f.** As written, the comma after "stood" interrupts the flow of the sentence by separating the verb and its object for no reason. (B) and (C) similarly interrupt the flow; the only difference is that they use different punctuation marks to do so. (D) is the correct answer. There should be no punctuation after "stood."
24. **(A) Writing and Language/Standard English Conventions/No Change. SAT Topic: SEC.2f.** This item asks you to choose the word that best fits into the sentence. To answer this correctly, you need to know typical English word usage. In English, mountains can be dotted "with" vineyards. However, it is incorrect to say that they are dotted "inside," "for," or "on" vineyards. (A) is the correct answer.
25. **(A) Writing and Language/Expression of Ideas/No Change. SAT Topic: EXPID.2.** This item asks you to choose the aside that makes the most sense within the context of the paragraph. Look back to the sentence that comes before the one in question. It says that lunar farmers believe that the moisture level in the soil is affected by the Moon. The next sentence goes on to give an example of this belief: the idea that moisture content increases when the Moon is waxing and decreases when it is waning. The sentence as written makes perfect sense, so (A) is the correct choice. (B) is wrong because "however" is used to show a contrast between two ideas. In this case, though, the second sentence is a continuation of the first sentence, so a contrasting word is inappropriate. (C) is wrong for the same reason. (D) uses the word "thereafter," which is used to indicate that something happened after something else. For example:



“Daniel’s boss reprimanded him for showing up late to work. Thereafter, he always made sure to be on time.” The connection between the two sentences is not time related, so this choice is incorrect.

26. **(B) Writing and Language/Standard English Conventions/Grammar and Usage/Diction. SAT Topic: SEC.2f.** In the sentences leading up to #26, the paragraph has been discussing the influence of the Moon on moisture levels in the soil. Now, you need to choose the connecting word that best indicates the relationship between the present sentence and what has come before. As written, the sentence doesn’t make sense. “Although” is used to indicate a contrast. But this sentence is really saying that a guide to planting and weeding is advantageous *because* moisture influences seed germination, not *in spite of* the fact. Eliminate (A). (C) and (D) can both be eliminated because each results in a comma splice. (B) works well because “given that” is similar in meaning to “since” and can be used to express the continuation of a thought.
27. **(C) Writing and Language/Expression of Ideas/Style/Effective Opening Sentence. SAT Topic: EXPID.2b.** One mark of good writing is the ability to open a paragraph with a strong first sentence that effectively sets up the content that follows. The sentence that appears here fails this test. “Nature has been around forever” is not only an obvious and meaningless sentence, it also fails to introduce the content of the paragraph, which is about the use of the lunar calendar throughout the history of agriculture. Eliminate (A). (B) is a good second-best choice, because the paragraph does mention the fact that people around the world have used the Moon as a guide to farming. However, the focus of the paragraph is more on the length of time that people have used the Moon than on the various cultures that have used it. The second sentence mentions the first century, and the third sentence says that not only have Chinese and Egyptian people used the lunar calendar “for millennia,” it is still used today by followers of the *Old Farmer’s Almanac*. Given this focus on the length of time people have used the lunar calendar, (C) is the best choice. It ties together the beginning of the passage, which talks about a modern farmer, with the next section, which talks about the history of the lunar method. (D) is wrong because it is too vague. The paragraph is not about the Moon’s influence in general, but specifically about its influence on farming.
28. **(D) Writing and Language/Expression of Ideas/Style/Precision. SAT Topic: EXPID.3a.** For this item, it is very important to read the item stem carefully. It asks you which choice provides “the most specific information.” (A), (B), and (C) all provide very general information. (D), however, lists specifics and is therefore the best answer to the question.
29. **(C) Writing and Language/Standard English Conventions/Punctuation/Apostrophes. SAT Topic: SEC.3c.** As written, the word “almanacs” is plural but not possessive. This is incorrect for two reasons. First, we can see from the previous sentence that only one almanac is being discussed. Second, the sentence intends to refer to the editor of the almanac, and a possessive should be used for this purpose: “the almanac’s editor.” (C) is the correct choice because it correctly forms the singular possessive. (B) is wrong because it is plural and also because the plural possessive is incorrectly formed. (To form the possessive of a plural word that ends in “-s”, add only an apostrophe, not an apostrophe plus an “-s”.) (D) is wrong because, while the possessive is formed correctly, “almanacs” should not be plural.
30. **(D) Writing and Language/Expression of Ideas/Style/Conciseness. SAT Topic: EXPID.3b.** The word “skeptical” means “someone who doubts the truth of a statement or belief.” (A), (B), and (C) are all redundant because they give information that is already contained within the meaning of the word “skeptical.” It is unnecessary to say that a skeptic is one who “[is] not sure of the method’s efficacy,” “[has] yet to be convinced,” or “doubt[s] the method.” Those traits are inherent to skeptics. (D) is the best choice because it eliminates the unnecessary explanations.



One way to determine the correct answer is to note that there is no significant difference between three of the four choices. (A), (B), and (C) are all grammatically correct and all say more or less the



same thing. It would be impossible to choose a correct answer among these three, because there is nothing to make one more correct than the others. Therefore, the answer must be (D).

31. **(D) Writing and Language/Standard English Conventions/Grammar and Usage/Pronoun Usage. SAT Topic: SEC.2c.i.** For this item, you have to choose the correct pronoun. Start by finding the subject of the sentence: “agriculture.” The pronoun in question refers back to the subject, so which of the pronouns agrees with “agriculture”? (A) is incorrect because “their” is plural, and “agriculture” is singular. (B) is incorrect because “those” is also plural. In addition, it is the wrong word choice for this context. (C) reflects a common error—the incorrect spelling of the possessive of “it” as “it’s.” However, “it’s” is the contraction for “it is,” not the possessive form of “it.” (D) is the correct choice. Since “agriculture” is singular, the singular pronoun “its” is the right choice.
32. **(D) Writing and Language/Expression of Ideas/Organization/Effective Concluding Sentence. SAT Topic: EXPID.2b.** Just as in #28, be sure to read the item stem carefully. You are looking for an effective concluding sentence that reinforces the fact that lunar farming has skeptics. As written, the underlined portion is weak. It really just repeats the point made in the previous clause—the fact that there is no scientific support for lunar farming. (B) is very similar to (A). (C) can be eliminated because it doesn’t reinforce the point about skepticism. Rather, it just states that many people continue to practice lunar farming. (D) is the best choice. It extends the point in the previous clause, that no related scientific studies have yet been conducted, by spelling out the conclusion that skeptics reach: lunar farming is based in folklore rather than science. This is a much stronger reinforcement of the point about skepticism than either (A) or (B) offers.
33. **(A) Writing and Language/Expression of Ideas/No Change. SAT Topic: EXPID.1b.** The key to answering this item is in careful reading of the item stem. You are looking for a supporting example that emphasizes the importance of the senses. Which of the choices evokes the most powerful sensory image? As written, (A) offers a very evocative example. The reader can imagine him or herself smelling a fragrant sprig of rosemary. (B) mentions photographs, but the sentence does not produce a strong sensory image. (C) is not related to the senses at all; rather, it describes a professor’s note-taking method. (D) describes an act related to taste, but again, the image falls flat compared to (A). (A) is the best answer because it produces the most vivid sensory response.
34. **(C) Writing and Language/Expression of Ideas/Strategy/Appropriate Supporting Material. SAT Topic: EXPID.1c.** The question we need to consider here is whether the underlined portion adds valuable information to the paragraph or not. Let’s examine what the paragraph says so far. We have learned that a chef donated a large collection of culinary artifacts to a library, including 100 “manuscript recipe books.” The underlined portion gives a definition of these books; they are collections of recipes handwritten by their users. Is this valuable information? Yes, because it explains the meaning of an unfamiliar phrase. Therefore, the information should not be deleted. Eliminate (A) and (B). (By way of further explanation, (A) is wrong because the underlined portion gives further information about the collection rather than detracting from the focus on the collection; (B) is wrong because the information is not provided in the previous sentence.) Now we are left with choices (C) and (D). Which gives the best reason for not deleting the information? (C) says that the portion defines an important term. This is true, as explained above. (D) says that the underlined portion gives an example of a culinary artifact. This is not accurate; the underlined portion is a definition, not an example. (C) is the best choice.
35. **(A) Writing and Language/Expression of Ideas/No Change. SAT Topic: EXPID.2b.** The sentence containing the underlined portion consists of a subordinate clause (“Because of the astonishing size and range of Szathmary’s donation”) and a main clause (“making this cornucopia . . . available . . . was a challenge”). Does the underlined portion appropriately connect the subordinate clause to the main clause? Yes, it does. The donated collection was huge, and because of its size, making it accessible to



readers was a challenge. (A) correctly shows the cause-and-effect relationship between the two clauses. Let's look at the other options to see why they don't work as well. (B) uses the phrase "regardless of," which is similar in meaning to "even though." It doesn't make sense to say that it was difficult to make the collection available even though it was massive. (C) is wrong for a similar reason. It contrasts the size of the collection with the ease of making it available, rather than showing that the collection's size was the *reason* it was hard to make it available. (D) is closer than either (B) or (C), but it still falls short. The relationship is not merely one of continuation; it is one of causation.

36. **(D) Writing and Language/Expression of Ideas/Style/Conciseness. SAT Topic: EXPID.3b.** The underlined portion is not grammatically incorrect, but it does contain information that has already been mentioned in the passage. The very first sentence says that Szathmary's donation was made to the University of Iowa, so it is unnecessary to repeat that information here. Eliminate (A). (B) is wrong for a similar reason; the fact that the donation consisted of culinary artifacts has also been established previously. (C) is wrong because earlier in the sentence, the donation is described as one of "astonishing size and range." Therefore, the word "massive" is redundant. (D) is the best option. The donation has already been described, so keep the sentence simple by eliminating excess words.
37. **(D) Writing and Language/Standard English Conventions/Sentence Structure/Problems of Subordination and Coordination. SAT Topic: SEC.1a.ii.** Begin by looking at the sentence that contains the underlined portion. It is a compound sentence consisting of two independent clauses. The first states that librarians were happy to show the collection to people who visited the library. The second states that the manuscripts remained largely unexplored. To connect these two contrasting ideas, we need a conjunction that expresses contrast. "So" is used to show cause and effect, so (A) can be eliminated. "For" has many different meanings, but in this sentence its meaning is similar to that of "because." Since the relationship is not one of cause and effect, eliminate (B). "And" is used to join two similar or complementary ideas, so eliminate (C). (D) is the best choice. "But" is used to show contrast, and that is the meaning we need here.
38. **(C) Writing and Language/Standard English Conventions/Grammar and Usage/Pronoun Usage. SAT Topic: SEC.2c.i.** This item tests pronoun usage. To start, identify the antecedent, or the noun that the pronoun replaces. "Working from our home computers" is a subordinate clause that modifies "the volunteers." As written, the sentence is incorrect because "our" is used with the first person plural subject "we," but "volunteers" is third person plural. (B) is wrong because both "his" and "her" are singular pronouns, and "volunteers" is plural. (C) is the best answer. "Their" can replace "volunteers" because both are third person plural. (D) is wrong for the same reason as (B); "one's" is a singular pronoun, but "volunteers" is plural.
39. **(B) Writing and Language/Expression of Ideas/Style/Tone. SAT Topic: EXPID.3c.** This item requires you to decide on the appropriate tone to be used in the underlined phrase. Each of the choices means essentially the same thing, but only one matches the style and tone of the rest of the passage. (A) and (D) both use uncommon adjectives whose meaning may not be clear to all readers. Eliminate these choices. (C) errs in the opposite direction: "bare-bones how-tos" is casual slang that is not appropriate for a report on a scholarly collection. (B) is the best choice. "Simple directions" is clearly worded and neither too formal nor too casual for the passage.
40. **(C) Writing and Language/Expression of Ideas/Organization/Sentence-Level Structure. SAT Topic: EXPID.2.** To determine which conjunction to use, look at the development of the idea from the previous sentence to the one containing the underlined word. The previous sentence states that "transcribing is easy." The sentence with the underlined word states that the "ingredients . . . and measurements . . . can be puzzling." The ideas of "easy" and "puzzling" are opposite, so a conjunction showing contrast is needed. (C), "however," is the only choice that shows contrast. (A) is wrong because "moreover"

indicates the continuation of an idea. (B) is wrong because “therefore” is used in a cause-and-effect relationship. (D) is wrong because “in short” is used to provide a summary of an idea. None of these meanings are appropriate in this context.

41. **(B) Writing and Language/Standard English Conventions/Grammar and Usage/Diction. SAT Topic: SEC.2d.** Upon first examination of the answer choices, you will see that two choices use the word “access” and two use the word “excess.” Your first task, then, is to see which of these words is most appropriate. The sentence is talking about the purpose of digitizing the Szathmary manuscripts, which is to make sure that anyone who has a computer and the Internet can see them. (A) and (B) use the word “access,” which means “a way of being able to use or get something.” “Excess,” used in (C) and (D), means “too much of something.” Given these two definitions, we can eliminate (C) and (D). It is illogical to say that the manuscripts are available to anyone with “too much of” a computer. Now we are left with (A) and (B). Which usage is correct, “access of” or “access to”? “Access of” is not standard English usage, so eliminate (A). By the process of elimination, (B) is the correct answer.

Alternatively, you may recognize (B) as the correct usage from your reading and knowledge of English vocabulary. If you can, select this choice quickly and move on.

42. **(B) Writing and Language/Standard English Conventions/Grammar and Usage/Verb Tense. SAT Topic: SEC.1b.i.** The answer choices for this item are four different tenses of the verb “work.” To choose the correct one, look at the context of the sentence. The first part of the sentence says that some recipes don’t work well in the twenty-first century (simple present). To complete the thought (other recipes *do* work in the twenty-first century), you need another simple present verb. (B), “work,” is the best answer because it provides consistency in verb tense between the two parts of the sentence. (A) and (C) are wrong because both of these verbs use past tense. (D) is wrong because it changes the meaning of the sentence into something hypothetical (“could have worked”).
43. **(A) Writing and Language/Standard English Conventions/No Change. SAT Topic: SEC.3d.** This sentence describes a contest at the Iowa State Fair and says that contestants baked three types of desserts. Part of the description of these desserts is underlined. Based on an examination of the answer choices, your task is to decide how to logically divide the names of these dessert types using commas. As written, the dessert names are logically divided: almond cheesecake, summer mince pie, and Marlborough pie. None of the other choices make logical divisions. (B) includes “cheesecake summer,” clearly not the name of a dessert. In addition, if the commas are inserted in this way, five different dessert types are named (“almond, cheesecake summer, mince, pie, and Marlborough pie”). (C) makes the situation worse by including something called “almond cheesecake summer.” (D) uses a comma between every single word, resulting in six different types of desserts rather than three.
44. **(D) Writing and Language/Expression of Ideas/Organization/Paragraph-Level Structure. SAT Topic: EXPID.2a.** The additional sentence has to be placed after sentence 4, because the contest isn’t mentioned until sentence 4. It would be illogical and confusing to describe the judges’ reaction to the entries until after the contest has been mentioned. (A), (B), and (C) are wrong because until sentence 4, there is no mention of a contest or judges, and the addition wouldn’t make any sense.



# PSAT/NMSQT Math Test Explanations, No Calculator

1. (A) *Math: Multiple-Choice/Algebra/Creating, Solving, and Interpreting Algebraic Equations and Functions.* **SAT Topic: ALG.1.** This item requires translating the given information into an algebraic expression.

When writing the expression, include units so that “like” units cancel, leaving the final unit of the expression in dollars, as the expression must be equal to “how much the babysitter earned.” The variable in the expression will be the total number of hours, as this is what can be varied in the situation

(the number of children is fixed). The amount earned is  $\frac{\$8}{\text{hour}} \times x \text{ hours} = \$8(x)$  plus the \$3 tip, or  $8x + 3$  (in units of “dollars”).

2. (B) *Math: Multiple-Choice/Algebra/Manipulating Algebraic Expressions/Basic Algebraic Manipulations.*

**SAT Topic: PAM.4.** The inclusion of “ $y \neq 0$ ” in the item stem is necessary because otherwise the ratio  $\frac{x}{y}$  is undefined, but it also means that it is okay to divide by  $y$  when rewriting the given equation to yield the required form,  $\frac{x}{y}$ :  $3(x + y) = y \Rightarrow \frac{x + y}{y} = \frac{1}{3} \Rightarrow \frac{x}{y} + \frac{y}{y} = \frac{1}{3} \Rightarrow \frac{x}{y} + 1 = \frac{1}{3} \Rightarrow \frac{x}{y} = \frac{1}{3} - 1 = -\frac{2}{3}$ .

Alternatively, assign values for  $x$  and  $y$  using the ratios for  $\frac{x}{y}$  given in the answer choices. When substituted in the given equation, only values derived from the correct choice will make the equation hold true. For (B),  $x = -2$  and  $y = 3$ , so  $3(x + y) = y \Rightarrow 3(-2 + 3) = 3 \Rightarrow 3(1) = 3$ , which is true. Note that it doesn’t matter to which variable the negative sign is assigned: for  $x = 2$  and  $y = -3$ ,  $3(x + y) = y \Rightarrow 3(2 + (-3)) = -3 \Rightarrow 3(-1) = -3$ .

3. (A) *Math: Multiple-Choice/Algebra/Solving Simultaneous Equations.* **SAT Topic: ALG.5.** Simultaneous linear equations can be solved by elimination, substitution, or graphing the linear equations. Since this item is on the non-calculator section of the test, only the first two options are realistic. On a timed exam, it’s helpful to anticipate which of the first two methods will be quickest for any particular problem. A quick glance at the answer choices confirms that the  $x$  and  $y$  values are different in each of the given ordered pairs. So, a solution requires solving for only one variable—making the elimination method the fastest.

To create a second equation that, when combined with the first, eliminates the  $y$ -variable, multiply the second equation by  $-2$  (to make the coefficients of  $y$  add to zero when the two equations are combined):

$$-2\left(\frac{1}{8}x - \frac{1}{8}y = 19\right) \Rightarrow -\frac{1}{4}x + \frac{1}{4}y = -38. \text{ Now, combine the two equations:}$$

$$\begin{array}{r} \frac{1}{2}x - \frac{1}{4}y = 10 \\ + \left( -\frac{1}{4}x + \frac{1}{4}y = -38 \right) \\ \hline \frac{1}{4}x = -28 \Rightarrow x = -112 \end{array}$$

Therefore, of the given choices,  $(-112, -264)$  must be correct.

4. **(D) Math: Multiple-Choice/Geometry/Triangles/Properties of Triangles. SAT Topic: ATM.6.**  $\triangle ABC$  is an isosceles triangle, so the two base angles are equal (congruent). Since  $\angle DBE = \angle DCF$  and  $\angle DEB = \angle CFD$  (both are right angles),  $\triangle BED$  and  $\triangle CFD$  are similar triangles (at least two angles are equal), so the ratio of similar sides is the same. According to the item stem, the ratio of  $\overline{DE}$  to  $\overline{DF}$  is 5 to 7, so  $\frac{\overline{DE}}{\overline{DF}} = \frac{5}{7}$  and  $\frac{\overline{BD}}{\overline{DC}} = \frac{5}{7}$ . According to the item stem,  $\overline{BC} = 48$ , so  $\overline{BC} = \overline{BD} + \overline{DC} = 48 \Rightarrow \overline{DC} = 48 - \overline{BD}$ .

$$\text{Therefore, } \overline{DC} = 48 - \overline{BD} = 48 - \frac{5}{7}\overline{DC} \Rightarrow \frac{12}{7}\overline{DC} = 48 \Rightarrow \overline{DC} = 28.$$

If the direct solution eludes you, eliminate as many answers as possible and guess. While the figure is not drawn to scale, the position of  $D$  with respect to  $B$  and  $C$  as shown in the figure is true because the ratio of  $\overline{DE}$  to  $\overline{DF}$  is 5:7 and each intercepts the isosceles triangle at  $90^\circ$ , so  $\overline{DC}$  must be longer than  $\overline{BD}$ . Since the total length is 48,  $\overline{DC}$  must be greater than half:  $\overline{DC} > \frac{48}{2} = 24$ . This eliminates (A), (B), and (C). Thus, by the process of elimination, (D) must be the correct choice.

5. **(B) Math: Multiple-Choice/Algebra/Solving, Creating, and Interpreting Algebraic Equations and Functions and Solving Simultaneous Equations. SAT Topic: ALG.5.** Translate the information given in the item stem into a system of algebraic equations. The trick in creating equations that describe real world situations is to include units in your equations so that after canceling “like” units, the equations (in terms of units) hold true. Let  $e$  represent the number of easy games (30 points per game) and  $h$  represent the number of hard games (60 points per game). The total score is 1,950, so

$$1,950 \text{ points} = \frac{30 \text{ points}}{\text{easy puzzle}} \times e \text{ easy puzzles} + \frac{60 \text{ points}}{\text{hard puzzles}} \times h \text{ hard puzzles} \Rightarrow 1,950 = 30e + 60h \text{ (in units of “points”).}$$

Similarly, since the total number of puzzles is 50,  
 $50 \text{ puzzles} = e \text{ easy puzzles} + h \text{ hard puzzles} \Rightarrow 50 = e + h \text{ (in units of “puzzles”).}$

Now, we have two equations written in two variables, so use one of the methods for solving simultaneous equations. In this case, the substitution method is probably fastest because the second equation ( $50 = e + h$ ) is so simple:  $e = 50 - h$ . Substitute this for  $e$  in the first equation and solve for  $h$ :

$$30(50 - h) + 60h = 1,950 \Rightarrow 1,500 - 30h + 60h = 1,950 \Rightarrow 30h = 450 \Rightarrow h = \frac{450}{30} = 15 \text{ hard puzzles.}$$

6. **(B) Math: Multiple-Choice/Algebra/Solving Quadratic Equations and Relations/The Quadratic Formula (Equation) and Manipulating Algebraic Expressions/Factoring Expressions. SAT Topic: PAM.5.** Typically, if the PSAT/NMSQT (or SAT) presents a quadratic equation, it can be factored, which makes finding the roots simple. Indeed, this is the case here:  $0 = 2x^2 + 7x - 15 = (2x - 3)(x + 5)$ . However, if finding the factors proves too difficult, simply use the quadratic formula (if  $ax^2 + bx + c = 0$ , the roots are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}). \text{ Thus, the roots of the given quadratic equation are } x = \frac{-7 \pm \sqrt{7^2 - 4(-15)(2)}}{2(2)} =$$

$$\frac{-7 \pm \sqrt{49 + 120}}{4} = \frac{-7 \pm 13}{4}, \text{ or } -\frac{20}{4} \text{ and } \frac{6}{4}. \text{ Since } r > s, r = \frac{6}{4} \text{ and } s = -\frac{20}{4}, \text{ so}$$

$$r - s = \frac{6}{4} - \left(-\frac{20}{4}\right) = \frac{26}{4} = \frac{13}{2}, \text{ (B).}$$

7. (A) **Math: Multiple-Choice/Solving Algebraic Equations or Inequalities with One Variable/Simple Inequalities and Creating, Solving, and Interpreting Algebraic Equations and Inequalities. SAT Topic: ALG.2.** This is another real world scenario requiring translation into a system of algebraic equations and/or inequalities. Again, the trick to correct translations is to include any units, so “like” units cancel, leaving the equation (or inequality) in the units prescribed in the item stem. In this case, Allan charges \$15 plus \$8.50 per hour, and Taylor charges \$12 plus \$9.25 per hour. If  $x$  is the number of hours, the total charges for Allan,  $A$ , and Taylor,  $T$ , translate to:

$$A = \$15 + \frac{\$8.50}{\text{hour}} \times x \text{ hours} = 15 + 8.5x \text{ (in units of “dollars”)}$$

$$T = \$12 + \frac{\$9.25}{\text{hour}} \times x \text{ hours} = 12 + 9.25x \text{ (in units of “dollars”)}$$

Furthermore, the item stem states that Taylor’s total charge is greater than Allan’s total charge, so

$$T > A: 12 + 9.25x > 15 + 8.5x \Rightarrow \frac{3}{4}x > 3 \Rightarrow x > 4.$$

8. (D) **Math: Multiple-Choice/Algebra/Creating, Solving, and Interpreting Algebraic Equations and Inequalities. SAT Topic: ALG.8.** In this item, the equation representing a real world scenario is given and the requirement is to interpret a variable in the equation. The same logic applies when working in reverse: write the given equation with units, including any unknown units, which allows interpretation of the constants and/or variables based on the units required for the equality to hold true. In this case,
- $$n \text{ (cups)} = 456 \text{ cups} - 3 \left( \frac{? \text{ unit}}{? \text{ unit}} \right) T \text{ (degrees Fahrenheit)}, \text{ where the “? unit/? unit” represents the}$$
- unknown units of the “3” in question. In order for this equality to hold true, the “degrees Fahrenheit” unit must cancel with the “?” in the denominator, and the numerator unit must be “cups.” Therefore, the “3” corresponds to the number of cups sold per degree Fahrenheit—that is, 3 more cups of hot chocolate are sold for every decrease of 1°F.

9. (B) **Math: Multiple-Choice/Algebra/Creating, Solving, and Interpreting Algebraic Equations and Inequalities. SAT Topic: ALG.1.** The item stem asks for an expression that describes the elevation (in meters) as a function of time (in seconds). The road decreases 4 meters of elevation per 100 meters along the road; the elevation at time  $t = 0$  is 1,300 meters; and the truck travels at 16 meters per second. If  $E(t)$  represents the elevation in meters as a function of time,  $E$  meters elevation =

$$1,300 \text{ meters elevation} - \frac{4 \text{ meters elevation}}{100 \text{ meters along road}} \times \frac{16 \text{ meters along road}}{\text{second}} \times t \text{ seconds} \Rightarrow$$

$$E = 1,300 - \frac{64}{100}t = 1,300 - 0.64t \text{ (in units of “meters elevation”).}$$

10. (D) **Math: Multiple-Choice/Algebra/Expressing and Evaluating Algebraic Functions/Function Notation. SAT Topic: PAM.13.** Let the argument of the function  $f(x - 1)$  equal  $-3$ , so  $x - 1 = -3 \Rightarrow x = -2$ . Now, substitute  $-2$  for  $x$  in the given function and evaluate:  $f(-3) = 2(-2) + 3 = -4 + 3 = -1$ .

11. (C) *Math: Multiple-Choice/Algebra/Manipulating Algebraic Expressions/Basic Algebraic Manipulations.*

**SAT Topic: PAM.4.** Apply the distributive property,  $(a - b)(c) = ac - bc$ :  $(s - t)\left(\frac{s}{t}\right) = s\left(\frac{s}{t}\right) - t\left(\frac{s}{t}\right) = \frac{s^2}{t} - s$ .

12. (A) *Math: Multiple-Choice/Algebra/Manipulating Algebraic Expressions/Basic Algebraic Manipulations.*

**SAT Topic: PAM.11.** Since the polynomial  $p(x)$  is divisible by  $x$ ,  $\frac{p(x)}{x} = n$ , where  $n$  is a constant. Thus,

$p(x) = nx = 3(x^2 + 10x + 5) - 5(x - k) = 3x^2 + 30x + 15 - 5x + 5k = 3x^2 + 25x + 15 + 5k = x(3x + 25) + 15 + 5k$ , so  $nx = x(3x + 25) + 15 + 5k$ . In order for this to be true,  $15 + 5k = 0$  (and  $3x + 25 = n$ , but the item doesn't ask about the value of  $n$ , only  $k$ ), so  $5k = -15 \Rightarrow k = -3$ .

13. (D) *Math: Multiple-Choice/Coordinate Geometry/Graphs of Quadratic Equations and Relations and Algebra/Manipulating Algebraic Expressions/Evaluating Expressions.* **SAT Topic: PAM.12.** Since the parabola passes through the coordinate point  $(-1, 1)$ , the equation of the parabola must be true for  $x = -1$  and  $y = 1$ . Substitute these values for  $x$  and  $y$  in the given equation and evaluate:

$$y = ax^2 + bx + c \Rightarrow 1 = a(-1)^2 + b(-1) + c \Rightarrow 1 = a - b + c.$$

14. (300) *Math: Student-Produced Responses/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Simple Equations.* **SAT Topic: ALG.6.** Solve the given equation for  $h$ :

$$24 = \frac{h}{10} - 6 \Rightarrow h = 10 \times (24 + 6) = 300.$$

15. (2) *Math: Student-Produced Responses/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Simple Equations.* **SAT Topic: ALG.6.** Solve the given equation for  $a$ :

$$(2a + 3) - (4a - 8) = 7 \Rightarrow 2a + 3 - 4a + 8 = 7 \Rightarrow -2a + 11 = 7 \Rightarrow 4 = 2a \Rightarrow a = 2.$$

16. (9) *Math: Student-Produced Responses/Algebra/Manipulating Algebraic Expressions/Manipulating Expressions Involving Exponents.* **SAT Topic: PAM.9.** The item stem includes the note about  $x$  not being equal to zero because otherwise the given expression would be undefined. Perform the indicated

operations, using the rules for working with exponents, and simplify:  $\frac{4(3x)^2}{(2x)^2} = \frac{\cancel{4}(3)^2 \cancel{x^2}}{(\cancel{2})^2 \cancel{x^2}} = 3^2 = 9$ .

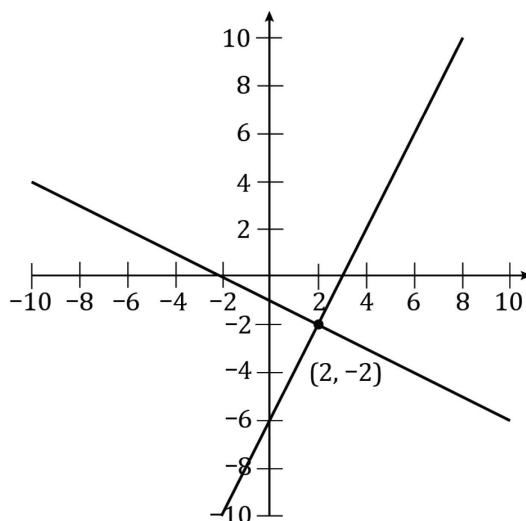
17. (4) *Math: Student-Produced Responses/Algebra/Manipulating Algebraic Expressions/Factoring Expressions.* **SAT Topic: PAM.11.** The quickest solution method is to recognize that the given quadratic equation  $x^2 - bx + b$  fits the pattern for the difference of two squares:  $x^2 - 2ax + a^2 = (x - a)^2$ , so  $b = 2a$  and  $b = a^2$ . Furthermore, the item stem identifies one of the factors as  $x - 2$  (in fact, both factors equal  $x - 2$ ), so  $a = 2$  and  $b = 4$ .

Alternatively, reason that the given equation is a quadratic, so it has two factors and can be rewritten as the product of those factors:  $x^2 - bx + b = (x \pm ?)(x \pm ?)$ . Since one of the factors is  $x - 2$ ,  $x^2 - bx + b = (x - 2)(x + a)$ , where  $a$  represents an unknown constant of unknown sign. Use the FOIL method to multiply the factors and simplify:  $x^2 - bx + b = x^2 + ax - 2x - 2a \Rightarrow -bx + b = x(a - 2) - 2a$ . Now, create two simultaneous equations by setting the coefficients of the  $x$  terms as equal and the constant terms as equal:  $-b = a - 2 \Rightarrow a = 2 - b$  and  $b = -2a$ . Thus,  $b = -2a = -2(2 - b) = -4 + 2b \Rightarrow b = 4$ .

# PSAT/NMSQT Math Test Explanations, Calculator

- (C) Math: Multiple-Choice/Algebra/Creating, Solving, and Interpreting Algebraic Equations or Functions. SAT Topic: ALG.3.** The total cost,  $C$  (in dollars), as a function of time spent playing the games,  $x$ , is equal to the monthly fee plus the hourly rate times the number of hours:  $C(x) = \$5 + \frac{\$0.25}{\text{hour}} \times x \text{ hours} = 5 + 0.25x$ , in dollars.
- (A) Math: Multiple-Choice/Algebra/Creating, Solving, and Interpreting Algebraic Equations or Functions. SAT Topic: ALG.1.** Again, translate the given information into an equation, including the units so “like” units cancel, leaving the expression with the desired units. In this case, the total number of bottles, 281, is equal to the number of individual bottles, 29, plus the number of bottles in  $p$  packs that have 6 bottles each:  $281 \text{ bottles} = 29 \text{ bottles} + p \text{ 6-packs} \times \frac{6 \text{ bottles}}{6\text{-pack}} \Rightarrow 281 = 29 + 6p \Rightarrow p = \frac{281 - 29}{6}$ .
- (C) Math: Multiple-Choice/Data Interpretation/Bar, Cumulative, and Line Graphs. SAT Topic: PSD.5.** The greatest change (negative or positive) between successive data points corresponds to the line segment with the greatest slope (negative or positive). A quick glance at the graph is enough to identify the steepest slope as that between the September data point (5 inches) and the October data point (2.5 inches). Therefore, the greatest change, in absolute value, is  $|2.5 - 5| = 2.5$  inches.
- (C) Math: Multiple-Choice/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Simple Equations and Geometry/Rectangles and Squares. SAT Topic: PAM.14.** The perimeter,  $P$ , of a rectangle is twice the width,  $2w$ , plus twice the length,  $2l$ :  $P = 2w + 2l$ . Solve the equation for  $l$ :

$$P = 2w + 2l \Rightarrow l = \frac{P - 2w}{2}.$$
- (C) Math: Multiple-Choice/Algebra/Solving Simultaneous Equations. SAT Topic: ALG.5.** Since this is the calculator section, you can use your calculator to graph the two given equations—they are both linear, so the intersection of the two lines represents the solution to the equation system.



Alternatively, solve the system using either the method of elimination or substitution. In this case, the fastest method is probably to multiply the first equation by 2 and combine the two equations to eliminate the  $y$ -variable:

$$\begin{array}{r} 2(2x - y = 6) \\ + \quad x + 2y = -2 \\ \hline 5x = 10 \Rightarrow x = 2 \end{array}$$

A quick glance at the  $x$ -values in the ordered pairs in the answer choices shows that only one has 2 as the  $x$ -value, so it isn't necessary to solve for  $y$ . The correct choice must be  $(2, -2)$ , (C). Indeed,

substituting 2 for  $x$  in either equation shows that  $y = -2$ :  $x + 2y = -2 \Rightarrow 2 + 2y = -2 \Rightarrow y = \frac{-2-2}{2} = -2$ .

6. **(D) Math: Multiple-Choice/Problem Solving and Advanced Arithmetic/Complicated Problem Solving Items. SAT Topic: PSD.1.** Set up an expression for the number of 20-ounce bottles that can be filled by 500 gallons, including units so “like” units cancel, leaving the answer in units of “bottles”:

$$500 \cancel{\text{ gallons}} \times \frac{128 \cancel{\text{ ounces}}}{\cancel{\text{ gallon}}} \times \frac{\text{bottle}}{20 \cancel{\text{ ounces}}} = 3,200 \text{ bottles.}$$

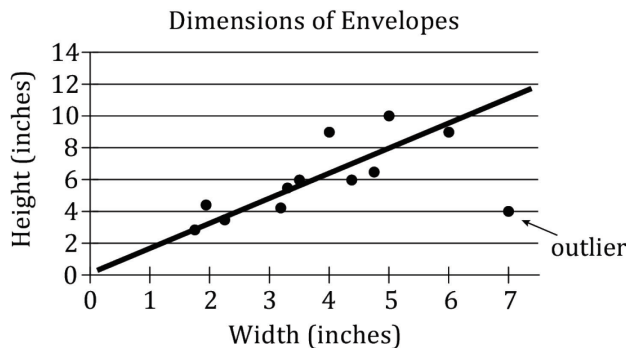
7. **(D) Math: Multiple-Choice/Problem Solving and Advanced Arithmetic/Common Problem Solving Items/Proportions and Direct-Inverse Variation. SAT Topic: PSD.1.** Again, translate the given information into an expression for number of gallons used for a 3-hour trip traveling 80 miles per hour in a car that consumes fuel at a rate of 34 miles per gallon. Include the units so “like” units cancel, leaving the value with units of “gallons”:

$$3 \cancel{\text{ hours}} \times \frac{80 \cancel{\text{ miles}}}{\cancel{\text{ hour}}} \times \frac{\text{gallon}}{34 \cancel{\text{ miles}}} \approx 7 \text{ gallons.}$$

8. **(D) Math: Multiple-Choice/Coordinate Geometry/Slope of a Line. SAT Topic: ALG.9.** The slope of a line,  $m$ , is defined as the rise over run, or the change in  $y$ -coordinates divided by the corresponding change in  $x$ -coordinates:  $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$ . The item stem gives two coordinate points through which the line

passes, so substitute these in the equation for slope and evaluate:  $m = \frac{4-1}{\frac{1}{2}-\frac{5}{2}} = \frac{3}{\frac{5}{2}-\frac{1}{2}} = \frac{3(2)}{4} = \frac{3}{2}$ .

9. **(C) Math: Multiple-Choice/Data Interpretation/Scatterplots. SAT Topic: PSD.4.** A line of best fit is the trend-line that best fits the data set. An outlier is any value far from the rest of the data. Sketch in a line of best fit in the provided graph:



The data point that is farthest from the line of best fit corresponds to a height of 4 inches and a width of 7 inches.

10. (B) **Math: Multiple-Choice/Problem Solving and Advanced Arithmetic/Common Problem Solving Items/Percents. SAT Topic: PSD.2.** The number of wins,  $w$ , is equal to 65% of the total number of games,  $t$ . So,  $w = 0.65t$ . Test each of the answer choices in the equation; the correct choice will yield a whole number for the number of wins:

A) 22:  $w = 0.65(22) = 14.3$

B) 20:  $w = 0.65(20) = 13$

This is enough to answer the question—the correct choice must be (B). Indeed, both (C) and (D) fail to yield whole numbers:

C) 18:  $w = 0.65(18) = 11.7$

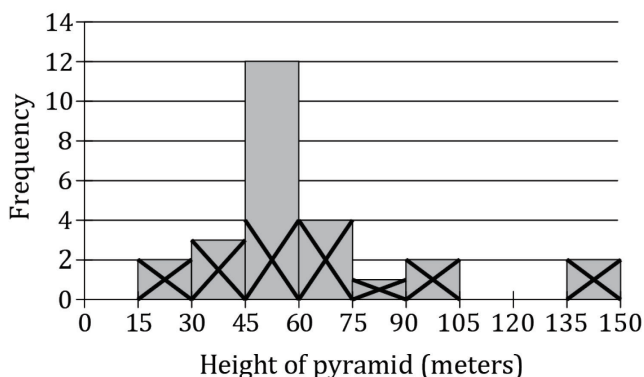
D) 14:  $w = 0.65(14) = 9.1$

11. (C) **Math: Multiple-Choice/Algebra/Creating, Solving, and Interpreting Algebraic Equations and Functions. SAT Topic: ALG.8.** Solve the given equation for  $y$  as a function of  $x$ , and include the real world units for clarity:  $110(x \text{ days}) + y \text{ samples remaining} = 1,210 \Rightarrow y \text{ samples remaining} = 1,210 - 110(x \text{ days})$ . Based on the units, the value 1,210 must have units of “samples” and the value 110 must have units of “samples per day” (so that the “days” cancel, leaving the term with units of “samples”). Now, substitute the given solution (11,0) into the equation:  $0 \text{ samples remaining} = 1,210 \text{ samples} - \frac{110 \text{ samples}}{\text{day}}(11 \text{ days})$ .

Therefore, the promotion started with 1,210 samples and after 11 days (of giving away 110 samples per day), no samples were left.

12. (B) **Math: Multiple-Choice/Data Interpretation/Scatterplots and Statistics/Drawing Inferences. SAT Topic: PSD.4.** The item stem explains that a negative association is one in which higher values of one variable correspond to lower values of the other variable, and vice versa. Furthermore, a line of best fit can be drawn through data with a linear association. The only approach to an item like this is to eliminate the wrong choices. The data in (A) demonstrates a negative, linear association, so eliminate (A). The data in (B) does demonstrate a negative association that is not linear. Double-check (C) and (D). The data in (C) shows both negative and positive association, so (C) cannot be correct. Finally, the data in (D) show no correlation, so the correct choice is indeed (B).

13. (B) *Math: Multiple-Choice/Statistics/Median and Data Interpretation/Bar, Cumulative, and Line Graphs and Statistics/Median. SAT Topic: PSD.9.* The median of a frequency distribution is the midpoint of the observed values or quantities, such that there is an equal probability of falling above or below the median. In the graph of the frequency distribution, simply mark off equal units from each end of the distribution:



Therefore, the median is somewhere in the height range of 45 meters to 60 meters. The only choice that falls within this range is 48 meters, (B).

14. (B) *Math: Multiple-Choice/Problem Solving and Advanced Arithmetic/Common Problem Solving Items/Percents and Data Interpretation/Tables (Matrices) . SAT Topic: PSD.2.* According to the table, the total number of teenagers surveyed was 170, and 59 of those have summer jobs:  $\frac{59}{170} \approx 0.35 = 35\%$ .

15. (B) *Math: Multiple-Choice/Statistics/Data Interpretation in Statistics and Data Interpretation/Tables (Matrices) and Problem Solving and Advanced Arithmetic/Common Problem Solving Items/Proportions and Direct-Inverse Variation. SAT Topic: PSD.8.* Set up a proportion between the ratio of number of surveyed teenagers between 16 and 17 years old who had summer jobs to the total number surveyed and the same ratio from the total population and solve for the unknown:

$$\frac{39}{170} = \frac{x}{17,000,000} \Rightarrow x = \frac{39 \times 17,000,000}{170} = 3,900,000 .$$

16. (C) *Math: Multiple-Choice/Probability/Arithmetic Probability and Data Interpretation/Tables (Matrices) and Problem Solving and Advanced Arithmetic/Common Problem Solving Items/Proportions and Direct-Inverse Variation. SAT Topic: PSD.2.* Again, set up a proportion between the specified ratios, but in this case, the ratios are related according to some unknown multiplier,  $x$ . The number of 14-to-15-year-olds who do not have summer jobs to the total number of 14-15-year-olds surveyed is  $\frac{69}{89}$ . The number of

16-to-17-year-olds who do not have summer jobs to the total number of 16-to-17-year-olds surveyed is  $\frac{42}{81}$ . Therefore,  $\frac{69}{89} = \frac{42}{81} x \Rightarrow x = \frac{69 \times 81}{89 \times 42} \approx 1.5$ . If not using your calculator to solve for  $x$ , approximate:

$$x = \frac{69 \times 81}{89 \times 42} \approx \frac{7 \times 8}{9 \times 4} = \frac{14}{9} \approx \frac{15}{10} = \frac{3}{2} .$$

17. (C) *Math: Multiple-Choice/Data Interpretation/Bar, Cumulative, and Line Graphs and Problem Solving and Advanced Arithmetic/Common Problem Solving Items/Percents. SAT Topic: PSD.2.* Compare the four food products listed in the answer choices in terms of protein per dollar, using the information given in the graph and the item stem:



A)  $A: \frac{10\% \text{ protein}}{\$2} = 5\% \text{ protein per dollar}$

B)  $B: \frac{15\% \text{ protein}}{\$2.20} \approx 6.8\% \text{ protein per dollar}$

C)  $C: \frac{20\% \text{ protein}}{\$2.50} = 8\% \text{ protein per dollar}$

D)  $E: \frac{30\% \text{ protein}}{\$5.00} = 6\% \text{ protein per dollar}$

Therefore, food product *C* has the greatest percent protein, and thus overall quantity of protein, per dollar.

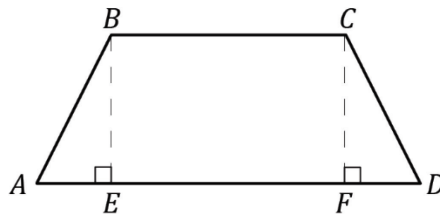
18. (C) **Math: Multiple-Choice/Geometry/Complex Figures. SAT Topic: PAM.14.** The quadrilateral shown has exactly one pair of parallel sides, so it is a trapezoid. If you remember the formula for the area of a

trapezoid ( $\frac{h}{2}(a+b)$ , where  $h$  is the height and  $a$  and  $b$  are the lengths of the parallel sides), this item is

simple:  $A = \frac{\overline{BE}(\overline{BC} + \overline{AD})}{2}$ . Now, double  $\overline{BC}$  and  $\overline{AD}$ , and reduce  $\overline{BE}$  by half:

$$A' = \frac{\frac{\overline{BE}}{2}(2\overline{BC} + 2\overline{AD})}{2} = \frac{\overline{BE}(\overline{BC} + \overline{AD})}{2}, \text{ which is the same as before the changes.}$$

What if you don't remember the formula for the area of a trapezoid? You most likely do remember the formulas for the area of a triangle ( $\frac{bh}{2}$ ) and the area of a rectangle ( $wl$ ). Since  $\overline{AB} = \overline{CD}$  and  $\overline{BC}$  is parallel to  $\overline{AD}$ ,  $\triangle ABE = \triangle DCF$ :



The area of the two triangles are equal, so the area of the entire figure is  $2\left(\frac{\overline{AE} \times \overline{BE}}{2}\right) + \overline{BC} \times \overline{BE} =$

$\overline{BE}(\overline{AE} + \overline{BC})$ . Note that  $\overline{AD} = \overline{AE} + \overline{EF} + \overline{FD} = 2(\overline{AE}) + \overline{BC} \Rightarrow \overline{AE} = \frac{\overline{AD} - \overline{BC}}{2}$ , so the area of the trapezoid is

$\overline{BE}(\overline{AE} + \overline{BC}) = \overline{BE}\left(\frac{\overline{AD} - \overline{BC}}{2} + \overline{BC}\right) = \frac{\overline{BE}}{2}(\overline{AD} + \overline{BC})$ . From this point, continue as already shown above.

19. (A) **Math: Multiple-Choice/Problem Solving and Advanced Arithmetic/Common Problem Solving Items/Percents. SAT Topic: PSD.2.** This year's production of tomatoes is 80% of last year's production (140 pounds), or  $(0.8)(140) = 112$  pounds. This year's production of raspberries is 50% of last year's production (60 pounds), or  $(0.5)(60) = 30$  pounds. This year's total production of tomatoes and

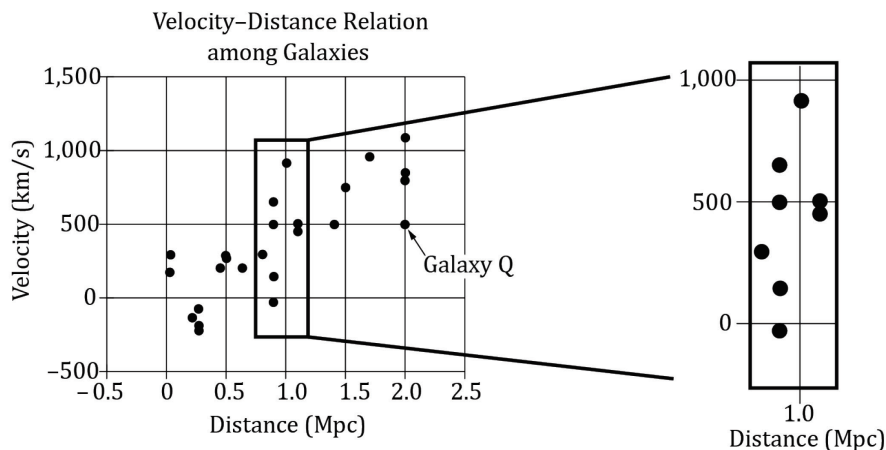
raspberries combined is  $112 + 30 = 142$  pounds, which is  $\frac{142}{140 + 60} = \frac{142}{200} = \frac{71}{100} = 71\%$  of last year's total production, a decline of 29%.

20. (C) *Math: Multiple-Choice/Data Interpretation/Bar, Cumulative, and Line Graphs and Statistics/Averages. SAT Topic: PSD.9.* The mean (average) of a list of numbers is the sum of all the values divided by the total number of values. Since the data set is given as a frequency distribution, multiply each value by the number of times it occurs:  $\text{mean} = \frac{0 + 1 + 2 + 3(3) + 4(2) + 6 + 7 + 8 + 10}{12} = \frac{51}{12} = 4.25$ .

21. (C) *Math: Multiple-Choice/Coordinate Geometry/The Coordinate System and Qualitative Behavior of Graphs of Functions. SAT Topic: PAM.12.* The minimum value of a function graphed in the  $xy$ -coordinate plane is the minimal value for  $y$ . The item stem specifically states the domain:  $-4 \leq x \leq 6$ . A quick glance at the graph shows the minimal value for  $y$  occurs for  $x = -4$ :  $y(-4) = -2$ .

22. (B) *Math: Multiple-Choice/Data Interpretation/Scatterplots. SAT Topic: PSD.3.* According to the graph, the  $y$ -coordinate (velocity) for Galaxy Q is 500 kilometers per second. The answer choices are given in meters per second using scientific notation, so convert 500 kilometers per second to meters per second:  $\frac{500 \text{ kilometers}}{\text{second}} \times \frac{1,000 \text{ meters}}{\text{kilometer}} = 5 \times 10^5$  meters per second. Note that the superscript on the "10" in scientific notation corresponds to the number of zeroes in a number (e.g.,  $5 \times 10^5 = 5 \times 100,000 = 500,000$ ).

23. (D) *Math: Multiple-Choice/Statistics/Range. SAT Topic: PSD.5.* The item stem asks about the range of velocities of the four galaxies approximately 0.9 Mpc from Earth:



The velocity range of the four galaxies at a distance of approximately 0.9 Mpc is -25 km/s to 675 km/s, or an absolute range of 700 km/s.

24. (A) *Math: Multiple-Choice/Algebra/Solving Algebraic Equations or Inequalities with One Variable/Simple Equations. SAT Topic: ALG.1.* The model relating velocity of a galaxy to distance from Earth is given in the introductory material:  $v \text{ km/s} = 500(d \text{ Mpc})$ . Therefore, the velocity for a distance of 15 Mpc is  $v = 500(15 \text{ Mpc}) = 7,500 \text{ km/s}$ .
25. (A) *Math: Multiple-Choice/Geometry/Rectangles and Squares and Algebra/Solving Quadratic Equations and Relations and Basic Algebraic Manipulations/Factoring Expressions. SAT Topic: PAM.14.* According

to the item stem, the length of the garden,  $l$ , is 9 feet less than 3 times its width,  $w$ :  $l = 3w - 9$ . The area of the rectangular garden is  $lw$ , or  $(3w - 9)w = 3w^2 - 9w$ , which is equal to 5,670 ft<sup>2</sup>. Therefore, we have a quadratic equation:  $3w^2 - 9w - 5,670 = 0 \Rightarrow w^2 - 3w - 1,890 = 0$ . Use the quadratic formula to solve for  $w$ :  $w = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{3 \pm \sqrt{9 - 4(-1,890)}}{2} = \frac{3 \pm \sqrt{7569}}{2} = \frac{3 \pm 87}{2} = 45$  meters (distances must be positive). Solve for the length:  $l = 3w - 9 = 3(45) - 9 = 126$  meters. Therefore, the perimeter is  $2(w + l) = 2(45 + 126) = 342$  meters.

26. (D) **Math: Multiple-Choice/Trigonometry/Definitions of the Six Trigonometric Functions. SAT Topic: ATM.7.**

This item tests recall of the trigonometric functions, so immediately start thinking “side opposite” and “side adjacent,” with respect to a specific angle. Initially, you may notice that  $\frac{b}{a}$  represents

$\frac{\text{side adjacent } \angle A}{\text{side opposite } \angle A}$ . Recall the mnemonic SOH-CAH-TOA:  $\frac{\text{side adjacent } \angle A}{\text{side opposite } \angle A} = \frac{1}{\tan A}$ , which isn't an

option. So, look at the other angle:  $\frac{b}{a} = \frac{\text{side opposite } \angle B}{\text{side adjacent } \angle B} = \tan B$ , which is (D).

27. (A) **Math: Multiple-Choice/Coordinate Geometry/Graphs of First-Degree Inequalities. SAT Topic: ALG.9.**

First identify the line  $y = -x$ : the values of  $y$  that correspond to  $y \leq -x$  include this line and the area of the  $xy$ -coordinate plane below the line. The line of  $y = -x$  intersects the origin and has a negative slope. So, the sections that correspond to  $y \leq -x$  are sections R and S. As for  $2y > 3x + 2$ , the solutions are

represented by the regions above the line  $y = \frac{3x + 2}{2} = \frac{3}{2}x + 1$ . This line has a positive slope and  $y$ -

intercept of 1—the solutions are represented by sections R and Q. Therefore, the only section included in both solutions is section R.

28. (6) **Math: Student-Produced Responses/Coordinate Geometry/Graphs of Quadratic Equations and Relations and Slope of a Line. SAT Topic: PAM.12.** To find the  $x$ -coordinate,  $v$ , at which the two functions interact, first determine the equations for the parabola and the line. Use the vertex form of a parabola:

$y = a(x - h)^2 + k$ , where  $a$  is a constant and  $(h, k)$  is the vertex of the parabola. The figure gives the vertex of the parabola,  $(4, 19)$ , so substitute these values for  $h$  and  $k$  in the vertex form of a parabola, use the point  $(0, 3)$  for  $x$  and  $y$ , and solve for  $a$ :  $y = a(x - h)^2 + k \Rightarrow 3 = a(0 - 4)^2 + 19 \Rightarrow a = \frac{3 - 19}{16} = -1$ . So, the

parabola has the equation  $y = -(x - 4)^2 + 19$ . Next, determine the equation of the line. The figure gives the  $y$ -intercept of the linear equation:  $-9$ . So, the line has the equation  $y = mx - 9$ . Use the point  $(2, -1)$  for  $x$  and  $y$  and solve for  $m$ :  $y = mx - 9 \Rightarrow -1 = m(2) - 9 \Rightarrow m = 4$ . So, the line has the equation  $y = 4x - 9$ . Finally, to determine the value of  $v$  at the point  $(v, w)$  where the two functions intersect, set the two equations equal to each other and solve for  $x$ :  $-(x - 4)^2 + 19 = 4x - 9 \Rightarrow -(x^2 - 8x + 16) + 19 - 4x + 9 = 0 \Rightarrow -x^2 + 4x + 12 = 0 \Rightarrow x^2 - 4x - 12 = 0$ . This quadratic is easily factorable:  $(x - 6)(x + 2) = 0$ . Therefore, the two functions intersect at two values of  $x$ : 6 and  $-2$ . In the figure,  $v$  is in the first quadrant, so it must have a positive value:  $v = 6$ .

Alternatively, what can you do if you don't remember the vertex form of a parabola equation? Not all is lost. Recall that figures on the exam are drawn to scale (unless otherwise noted): use the edge of a piece of paper to mark the distance from the origin of the graph to the value  $x = 2$ . You'll see that this is the same distance (to within measurement error) as from  $x = 2$  to  $x = 4$  (at the vertex). And this distance is

the same as the  $x$ -distance from the vertex to the unknown  $x$ -coordinate,  $v$ . Therefore, if forced to guess,  $v = 4 + 2 = 6$  would make an excellent guess.

29. (9) **Math: Student-Produced Responses/Algebra/Creating, Solving, and Interpreting Algebraic Equations and Functions and Solving Simultaneous Equations. SAT Topic: ALG.5.** Create a system of simultaneous equations, where  $a$  represents the number of two-student groups and  $b$  represent the number of four-student groups, and the number of sections, 24, equals the total number of groups:

$$78 \text{ students} = \frac{2 \text{ students}}{\cancel{2\text{-student group}}} \times a \cancel{2\text{-student groups}} + \frac{4 \text{ students}}{\cancel{4\text{-student group}}} \times b \cancel{4\text{-student groups}} \Rightarrow$$

$78 = 2a + 4b$  and  $24 \text{ sections} = a \text{ 2-student groups} + b \text{ 4-student groups} \Rightarrow 24 = a + b$ . Substitute  $24 - a$  for  $b$  in the first equation and solve for  $a$ , the number of 2-student groups:  $78 = 2a + 4(24 - a) =$

$$2a + 96 - 4a = 96 - 2a \Rightarrow a = \frac{96 - 78}{2} = 9.$$

30. (510) **Math: Student-Produced Responses/Algebra/Expressing and Evaluating Algebraic Functions/Functions as Models and Solving Algebraic Equations or Inequalities with One Variable/Simple Equations. SAT Topic: PAM.13.** The item stem asks for the maximum height of the arrow. Ask yourself, what happens at the maximum height? The arrow stops and begins to fall; in other words, the velocity of the arrow is briefly zero at the top of its path ( $v = 0$  at  $h_{\max}$ ). Therefore, substitute

$$0 \text{ for } v \text{ in the "position-speed" equation and solve for } h: v^2 = 0 = v_0^2 - 2gh \Rightarrow h = \frac{v_0^2}{2g} = \frac{100^2}{2(9.8)} \approx 510$$

meters.

31. (10.2, 51/5) **Math: Student-Produced Responses/Algebra/Expressing and Evaluating Algebraic Functions/Functions as Models and Solving Algebraic Equations or Inequalities with One Variable/Simple Equations. SAT Topic: PAM.13.** Don't be distracted by the "position-time" equation, which is a quadratic equation in the variable  $t$ . While it is possible to solve this equation by substituting 510 (as found in the previous item) for  $h$  and solving for  $t$ , it is much faster to use the "speed-time" equation, which contains only the first power of  $t$ . Remember,  $v = 0$  at the maximum height:

$$v = v_0 - gt \Rightarrow 0 = 100 - (9.8)t \Rightarrow t = \frac{100}{9.8} \approx 10.2 \text{ seconds.}$$