

Answer Key: TEST 2



SECTION 1—READING

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. C | 11. B | 22. B | 33. C | 43. C |
| 2. C | 12. D | 23. B | 34. A | 44. C |
| 3. A | 13. C | 24. A | 35. A | 45. D |
| 4. B | 14. B | 25. A | 36. B | 46. B |
| 5. B | 15. D | 26. C | 37. B | 47. D |
| 6. A | 16. C | 27. C | 38. C | 48. B |
| 7. C | 17. D | 28. D | 39. C | 49. A |
| 8. B | 18. A | 29. D | 40. A | 50. C |
| 9. D | 19. A | 30. C | 41. B | 51. A |
| 10. B | 20. C | 31. B | 42. D | 52. B |
| | 21. D | 32. D | | |

SECTION 2—WRITING

- | | | | |
|-------|-------|-------|-------|
| 1. C | 12. A | 23. B | 34. A |
| 2. A | 13. B | 24. C | 35. D |
| 3. D | 14. A | 25. A | 36. C |
| 4. C | 15. D | 26. B | 37. A |
| 5. B | 16. B | 27. D | 38. C |
| 6. D | 17. C | 28. B | 39. C |
| 7. D | 18. A | 29. D | 40. C |
| 8. C | 19. B | 30. B | 41. B |
| 9. C | 20. C | 31. B | 42. C |
| 10. A | 21. C | 32. C | 43. B |
| 11. C | 22. D | 33. A | 44. A |

SECTION 3—MATH

- | | |
|-------|------------------|
| 1. A | 12. D |
| 2. D | 13. B |
| 3. B | 14. C |
| 4. C | 15. A |
| 5. A | |
| 6. D | Fill-Ins: |
| 7. D | 16. 10 |
| 8. C | 17. 3 |
| 9. C | 18. 35 |
| 10. B | 19. 125 |
| 11. B | 20. 25 or 4 |

SECTION 4—MATH

- | | | | |
|-------|-------|-------|------------------|
| 1. C | 13. D | 24. B | Fill-Ins: |
| 2. C | 14. D | 25. C | 31. 11 |
| 3. C | 15. C | 26. C | 32. 68 |
| 4. B | 16. B | 27. C | 33. 44/5 or 8.8 |
| 5. A | 17. B | 28. D | 34. 4 |
| 6. B | 18. A | 29. A | 35. 13 |
| 7. B | 19. B | 30. A | 36. 48.8 |
| 8. C | 20. A | | 37. 6552 |
| 9. D | 21. A | | 38. 7500 |
| 10. C | 22. B | | |
| 11. A | 23. A | | |
| 12. C | | | |

Answer Explanations

SAT Practice Test #2

Section 1: Reading

QUESTION 1.

Choice C is correct. The passage describes how Klaus revisits his mother’s “cottage” (line 18) in the early stages: later, Klaus talks with the “young woman who lived next door” (line 47) about his relationship with his mother. This information supports C. A states that the passage describes a “catastrophe” (yet such a negative occurrence never arises) and D states that Klaus observes the cottage “affectionately” (yet many of his remarks are in fact critical). Because the young woman is already familiar to Klaus, B, which wrongly specifies a “new acquaintance”, must also be eliminated.

QUESTION 2.

Choice C is correct. The word “stiffly” describes how a gate “opened”: the gate required a hard push and grated along the ground. This information supports C and contradicts D. A refers to a personal REACTION while B refers to an ATTITUDE: neither is an effective description of a resistant “gate”.

QUESTION 3.

Choice A is correct. In lines 55-58, Klaus refers to his mother’s tendency to stay away from home and voices his awareness that she has a difficult personality. He is thus familiar with her, justifying A. Klaus observes her independence but does not voice discomfort (eliminating B), responds to his mother’s new circumstances not eagerly but “wearily” (line 67, eliminating C), and observes a lapse in his WRITING, not in his mother’s READING (line 63, eliminating D).

QUESTION 4.

Choice B is correct. In context, Klaus is sorting out documents, first “bills and demands” (line 29), then “communications” which his mother has disregarded. These discarded documents would contain “messages” to her, making B an effective answer. A wrongly assumes that the mother has been PART of an exchange, when in fact she neglects the “communications”; C and D both assume that the subjects of the “communications” are personal and emotional, yet there is no context for this assumption.

QUESTION 5.

Choice B is correct. In the first paragraph, Klaus observes an “early, Bavarian, November morning” (lines 1-2) in the town where he has just arrived; the second paragraph presents a memory of “the Ethiopian town he had left so urgently” (line 11) but where he has a house. This information supports B and eliminates A, which assumes that the second paragraph describes the FUTURE rather than the past. C wrongly discusses Klaus’s “childhood” rather than his present, while D refers to an “array of cultures” rather than the SINGLE Ethiopian culture that interests Klaus.

QUESTION 6.

Choice A is correct. In lines 40-45, the author describes some of the unappealing sights in the home of Klaus's mother and observes that "dust was everywhere". This information supports A, while other answers distort the content of the passage. Klaus didn't write "that often" (line 63), but his mother may still have meaningful knowledge of his activities from other channels (eliminating B). Klaus's mother has "never been easy" (line 57), but only one neighbor, the young woman, is described in detail and seems not to have any problems with Klaus's mother. And Klaus's mother has just "stepped out" (line 54) of her house, but is never described as wanting to leave her "community" itself.

QUESTION 7.

Choice C is correct. See above for the explanation of the correct answer. A describes the Bavarian town in general (not Klaus's mother), B offers a description of some items of mail, and D indicates that Klaus has been "busy" but has now decided to attend to his mother. None of these offer a precise characterization of the mother, yet be careful of wrongly taking B as a justification for Question 6 A.

QUESTION 8.

Choice B is correct. In the relevant paragraph, Klaus is reflecting on his mother's gate and his intention to "replace the supporting hinges" (line 21): this task is what Klaus has "promised" to fulfill. B is an effective answer while A ("burden") is much too negative. While C and D refer to themes from ELSEWHERE in the passage, they do not directly reference the TASK that Klaus is contemplating.

QUESTION 9.

Choice D is correct. As depicted in lines 49-50, the young woman is aware that Klaus has arrived and offers him a cup of tea: she is conscious both of details and of his needs, or "attentive" in these situations. While A ("awestruck") wrongly implies that the young woman is surprised or confused, B ("pompous" or stuck-up) wrongly introduces a negative. C ("idiosyncratic" or unusual) cannot describe the woman, who is presented mainly as trying to make pleasant dialogue, but COULD be taken as a description of Klaus or his mother, since their tastes and habits are better defined.

QUESTION 10.

Choice B is correct. See above for the explanation of the correct answer. A mainly establishes that the young woman is "timid", C depicts the young woman concurring with Klaus, and D mainly relates the young woman's actions and the sentiments of Klaus's mother. The traits that can be gleaned from these answers (timidity, acceptance, sympathy) are not among the answer choices for the previous question.

QUESTION 11.

Choice B is correct. The first paragraph explains how Esperanto functions as "a constructed language" (line 1) that could allow "diverse populations to communicate" (line 9). This focus on explanation and possible advantages supports B. Ultimately, the author constructs a thesis AGAINST the applicability of Esperanto (eliminating positive answers A and C) and ONLY talks about Esperanto itself (eliminating A and D, which both assume that multiple constructed languages are analyzed in the passage).

QUESTION 12.

Choice D is correct. While the author spends the early paragraphs (lines 1-27) explaining the modern language Esperanto, he spends later portions of the passage (lines 45-74) explaining that Esperanto is limited in usefulness but is still linked to the idea of “mutual understanding” (lines 73-74). This combination of analysis and assessment justifies D, while other answers focus on the wrong TOPICS: Esperanto, not a “linguist” (A), an “ancient” language (B), or a “philosophy” (C), is the focus of the passage.

QUESTION 13.

Choice C is correct. The author often calls attention to the limitations of Esperanto: in lines 25-28, it is observed that Esperanto relies on “Romance languages” and bypasses “non-European language structures entirely”. This information aligns with C as a qualification of the idea of “political neutrality” (which is CONTRADICTED by such language bias). A and B both wrongly assume that the author ACCEPTS and is building off the idea that Esperanto is politically neutral, while D distorts the reasoning behind Esperanto’s lack of popularity. As argued in lines 45-57, people avoid Esperanto because it seems confusing and unnecessary, NOT because it is a threat to cultures.

QUESTION 14.

Choice B is correct. See above for the explanation of the correct answer. A indicates that Esperanto can ease specific international tensions, C indicates that Esperanto bears resemblances to Romance languages, and D WEAKENS claims that Esperanto can bring cultures together. Be careful of answer A, which only refers to a SPECIFIC set of relationships but can be confused as justification for the GENERAL idea of political neutrality.

QUESTION 15.

Choice D is correct. In lines 52-54, the author points out a criticism of Esperanto: English speakers have difficulty with the language, which derives from languages spoken in Continental Europe. This information supports D, while other answers distort arguments from the passage. Although the author points out that English is prevalent in lines 49-50, this does NOT mean that other languages are unnecessary (eliminating trap answer A). And while B and C apply negative tones to Esperanto, these answers indicate problems with the DEVELOPMENT or SOPHISTICATION of Esperanto, not objections to its USEFULNESS as cited by the author.

QUESTION 16.

Choice C is correct. See above for the explanation of the correct answer. A points out that Esperanto is both belittled and taken seriously, B simply explains an Esperanto translation, and D indicates that Esperanto will probably not become widely popular. Be careful of taking A as a justification for Question 15 B or C (which deal with Esperanto’s STRUCTURE, an issue that is not raised here) and of taking D as a justification for Question 15 D (which raises the issue of English usage, which is not discussed in the line reference).

QUESTION 17.

Choice D is correct. The phrase “partake so fluidly of” refers to Esperanto, which (as established in the previous paragraph) is strongly indebted to “Romance languages” (line 39). It thus includes parts of these languages or “samples” them, making D the best answer. A would indicate that Esperanto is being portioned or split, while B refers primarily to actions that PEOPLE would perform, as does trap answer C: people can “engage” with Esperanto, but it cannot itself engage them.

QUESTION 18.

Choice A is correct. The word “common” refers to English, which is widely and efficiently used in certain settings. A, “prevalent”, is an effective usage: both B and D indicate negatives while C emphasizes the wrong issue. The author is concerned with how widespread English is, not with whether it is granted “approval” in any formal way.

QUESTION 19.

Choice A is correct. The author begins this paragraph by noting how “unlikely” it is that Esperanto “will ever achieve linguistic ascendancy” (lines 59-60); however, it is then pointed out that Esperanto could “unite far-flung factions” (line 73), an ability that is similar to Zamenhof’s intent (lines 3-7) in creating the language. This information supports A and eliminates B (since the paragraph ends in a positive fashion). C and D both wrongly assume that the paragraph begins in a neutral fashion and introduces contexts (the media and school settings, respectively) that are not of interest to the author here.

QUESTION 20.

Choice C is correct. In the passage, the author calls attention to Esperanto associations (lines 11 and 17) and continues to be motivated by “idealism” (line 65). This information supports C, since mature linguists would be likely to form such associations. A and D are contradicted by the author’s argument that Esperanto has not been instituted at large in the realms of business or politics, while B is problematic because the author is concerned with how adults, NOT children, respond to Esperanto.

QUESTION 21.

Choice D is correct. In the passage, the author indicates that English is “already the common language of expediency” (lines 49-50) and that Esperanto is unlikely as a popular replacement. The graph substantiates this idea by showing that English (at 46.40%) is a more popular second language than Esperanto (at 0.90%). The graph only lists Esperanto speakers in the European Union: eliminate A and C because the graph does not show how the popularity of Esperanto has changed OVER TIME, and eliminate B because the graph says nothing about the AGE or MOTIVES of people who learn Esperanto.

QUESTION 22.

Choice B is correct. The passage discusses indications that “water flows on the Martian surface” (lines 34-35) and goes on to consider the implications of such a “monumental discovery” (line 49), including new missions, the possibility of life on Mars, and the danger of contamination. This information supports B, while A is inaccurate (since humans have only explored Mars using probes) and C is too extreme (since the author considers possible liabilities of exploring Mars but does not argue that Mars should NOT be explored). D misstates the final stages of the passage, which introduce the positives and negatives of a course of action but do not define sides in a “controversy”.

QUESTION 23.

Choice B is correct. In lines 6-7, the author explains that life could “theoretically evolve in dry conditions” such as those that exist on Mars: this information supports B and eliminates A, which wrongly states that life definitively CANNOT exist on Mars. C and D overstate the other side of the issue: the author describes life on Mars as a “possibility” (line 52) while these answers wrongly assume that there definitely is life on Mars.

QUESTION 24.

Choice A is correct. See above for the explanation of the correct answer. B explains that massive dust storms take place on Mars, C explains that Mars has polar ice caps, and D notes the presence of liquid water on Mars. None of these answers directly states whether Mars harbors life or not, though make sure not to wrongly align B with Question 23 A or C with Question 23 C.

QUESTION 25.

Choice A is correct. The word “definitive” refers to “evidence” of liquid water: this evidence is certain or occurs at the end of a rigorous and “conclusive” study, making A the best answer. The author is concerned with how VALID the evidence is on its own merits, not with the level of DETAIL (eliminating B and D) or the level of ACCEPTANCE (eliminating C).

QUESTION 26.

Choice C is correct. In lines 32-35, the author explains that, despite years of difficulties, researchers found “new evidence” of liquid water on Mars in 2011. This information supports C and can be used to eliminate A (which cites the wrong year and the wrong factor as part of the research breakthrough) and B (which wrongly indicates that scientists were uninterested in the issues of liquid water and life on Mars). D misconstrues part of the passage: “hydrated salts” were DISCOVERED on Mars, not USED as research tools.

QUESTION 27.

Choice C is correct. See above for the explanation of the correct answer. A indicates that life has not yet been discovered on Mars, B indicates that ice (but not life or liquid water) has been found on Mars, and D refers to a research breakthrough that took place in 2015 (not 2011, as demanded by the correct answer to the previous question). Make sure not to wrongly take A as evidence for Question 26 A.

QUESTION 28.

Choice D is correct. In lines 40-48, the author explains that “evidence of hydrated salts” (line 43), when combined with earlier findings involving recurring slope lineae, substantiated the idea that water flows on Mars. This information supports D, while the passage never definitively states that Mars harbors life (eliminating B) or draws an explicit link between the RSL and the ice caps on Mars (eliminating C). A is a trap answer: the “perchlorates” (line 44) accompanied the RSL, but did not necessarily CAUSE the RSL.

QUESTION 29.

Choice D is correct. Near the end of the passage, the author notes that Martian micro-organisms would present a “huge contamination risk” (lines 54-55) on Earth, and that micro-organisms from Earth could reach Mars and “contaminate the planet irreversibly” (line 63). This information directly supports D, while A (writers and artists), B (settlements and cities), and C (planets beyond Mars) touch on topics in space exploration that are not major considerations of the passage.

QUESTION 30.

Choice C is correct. The word “meticulous” refers to the “science” methods that would be necessary to prevent contamination on Mars and Earth: such methods would involve caution, making C the best answer. A refers to MEASUREMENT, not to AVOIDING a danger, while B (“creative”) and D (“ethical”) refer to issues that have more to do with JUDGMENT and little to do with a straightforward PRACTICAL problem such as contamination.

QUESTION 31.

Choice B is correct. In the graph, the bar for “Bradbury to Rocknest” is highest, thus indicating the greatest depth of water. Rapidly eliminate A, C, and D, but make sure not to wrongly assume that the LOWEST bar (A) signifies the greatest depth.

QUESTION 32.

Choice D is correct. While the passage discusses the water that “flows on the Martian surface” (lines 34-35), the graph considers the depth of water relative to or BELOW the surface of Mars (since the water levels are consistently below the topography levels). D correctly reflects this information, while A is directly contradicted by the graph and B is contradicted by the passage (which only states that ICE can be found below the surface of Mars). C is a faulty answer: while the passage FOCUSES on water aboveground, the author of the passage never argues that water CANNOT be found below the surface of Mars.

QUESTION 33.

Choice C is correct. After attributing recent revolutionary activity in Europe to justifiable “social want” (line 24), Marx transitions to an “inquiry into” (line 55) the forces behind the rise and fall of such activity. This information supports C, while A wrongly assumes that Marx takes a negative stance towards revolutionary activity, B wrongly focuses on a SINGLE revolutionary (not on broad revolutionary conditions), and D misstates as positive the tone of later portions of the passage (which delve into the negative misperceptions that surround revolution).

QUESTION 34.

Choice A is correct. The word “irresistible” is used to describe the result of “wants and necessities” (lines 41-42), which would result in an unavoidable or “inevitable” manifestation. A is the best answer: B and C wrongly focus on OPINIONS or EMOTIONS, rather than on the idea of being strongly needed. Trap answer D is incorrect in context: the movements and “manifestations” that Marx saw as inevitable were in fact defeated for a time, so that “powerful” is not the best possible fit.

QUESTION 35.

Choice A is correct. In lines 21-23, Marx argues that revolutions are no longer seen as the activity of a few disgruntled agitators: A effectively reflects Marx’s rejection of such an earlier, outdated opinion. Although Marx does argue that revolutions can face setbacks, this line reference indicates that Marx’s attitude towards revolution is positive overall. Eliminate B, C, and even D (since Marx is mostly interested in the nature of revolution, now in how individuals “experience” revolution) as too negative.

QUESTION 36.

Choice B is correct. See above for the explanation of the correct answer. A records the outcome of a single revolutionary movement (not of revolution in general), C rejects a specific inquiry as unimportant (and again does not address revolution in general), and D notes that specific nationalities may have little concern with specific national quarrels. Only in B does Marx offer a broad characterization of “revolution” as demanded by the previous question.

QUESTION 37.

Choice B is correct. The phrase “bursts its fetters” refers directly to a revolutionary movement or “convulsion” (line 24) that eventually overpowers and defeats “forcible repression” (line 28). This information directly supports B, while A (“events of 1848”) and C (social class) refer to issues that may interest Marx but that are NOT directly relevant to the line reference. D is relevant to events described earlier (lines 1-12), but NOT to Marx’s optimistic prediction that repression can eventually be defeated.

QUESTION 38.

Choice C is correct. In the second paragraph, Marx depicts revolution as a broad-based struggle driven by “social want” (line 24), but often believed to be doomed by a single individual who “betrayed” (line 47) the people. This information supports C, while Marx would disagree with A (since it only SEEMS that a small effort or single betrayal compromises a revolution) and B (since Marx acknowledges that some repressive efforts have in fact been successful). D wrongly focuses on the “mindset” of revolutionaries: in fact, Marx is mostly interested in the practical OUTCOMES of revolutions, not the principles that motivate them.

QUESTION 39.

Choice C is correct. The word “light” refers to the result of how an “American or Englishman” (line 64) would observe distant event. Because the “details” (line 66) could not be effectively taken in, the American or Englishman would have poor “context” for understanding political events abroad. C is thus the best answer: A and D both wrongly assume that the events would be serve a PRACTICAL purpose (rather than simply being OBSERVED), while B is ineffective in a different way. The American or Englishman could still form an “opinion” of distant events, though such opinions would be faulty.

QUESTION 40.

Choice A is correct. Marx notes that the figures named in the line reference were subjected to “petty” (line 58) accusations and “contradictory assertions” (line 59) concerning revolutionary matters. These men were thus unfairly criticized, making A an effective answer and eliminating B and D (which ultimately describe the figures negatively). C uses flawed logic: although Marx notes that the figures may not deserve strong blame, he never notes that they committed great or heroic actions in promoting political ideals.

QUESTION 41.

Choice B is correct. In lines 55-58, Marx argues that inquiring into the nature of revolutionary activity and its suppression is “of paramount [or supreme] importance” (line 57). This information supports B. While Marx often speaks positively of revolution and its eventual chances of success, he does not necessarily endorse political reform (A), education in socialism (C), or legislation and elections (D). In fact, because he believes that “single individuals” (line 40) are often beside the point and expresses faith in political upheaval, these answer may be too moderate to fit his argument.

QUESTION 42.

Choice D is correct. See above for the explanation of the correct answer. A notes and dismisses a political and revolutionary defeat, B notes that revolutionary efforts will eventually overcome suppression, and C notes that political parties cannot premise their success on distrust of individuals. None of these answers aligns with an answer to the previous question, though make sure not to mistake the positive B as a justification for either Question 41 B or another, positive answer to Question 41.

QUESTION 43.

Choice C is correct. In discussing the Mozart Effect, Passage 1 develops the position that there have not been “particularly conclusive results” (line 4) about the validity of the Effect; Passage 2 makes the argument that the Mozart Effect “is a reality” (line 68) but has not been sufficiently assessed. This information justifies C, while A and D wrongly attribute a harsh tone to the skeptical (but not sharply condemning or broadly critical) Passage 1. B misconstrues Passage 2, which argues that the Mozart Effect has been “formulated simplistically” (line 69) and thus does NOT advocate all the reasoning behind the effect.

QUESTION 44.

Choice C is correct. While Passage 1 indicates that research on the Mozart Effect has not resolved “the issue of whether or not the effect exists” (line 36), the author of Passage 2 wants to “re-evaluate” (line 40) the Mozart Effect and consider responses to non-classical music, which have typically not played a part in Mozart Effect research. This information supports C, while the inconclusive Passage 1 contradicts A and Passage 2, which mostly accepts the Mozart Effect, contradicts B. Only Passage 2 considers “musical genres besides classical”, making D a faulty answer.

QUESTION 45.

Choice D is correct. In lines 15-18, the author explains that the flaws in the 1993 study included small sample size, consideration of only a single age group, and a focus only on short-term changes. This information supports D and is linked to the author's generally skeptical stance on the Mozart Effect. A, B, and C all identify the wrong flaws: data manipulation, outdated technology, and inability to reproduce results are not mentioned. Rather, the TYPE of people and CONSIDERATIONS involved in testing the Mozart Effect were both much too narrow.

QUESTION 46.

Choice B is correct. See above for the explanation of the correct answer. A notes a possible positive result linked to the Mozart Effect, C indicates that the Mozart Effect was attractive despite a seeming drawback, and D notes measures that indicate the popularity of the Mozart Effect as a premise. While all of the answers to Question 45 are to some extent negative, these answer choices are all positive and should be eliminated.

QUESTION 47.

Choice D is correct. The word “modest” describes the results of a specialized study: these results were not large in scope or were “limited” in scope, since they are contrasted with a broader notion that “captured the public’s imagination” (line 21). D is the best answer, while A refers to complexity and B refers to temperament (two issues unrelated to the author’s discussion of EXTENT and limitation). C is a trap answer: the results were limited in extent, but were not truly “insignificant” since they did attract public attention and have a clear impact.

QUESTION 48.

Choice B is correct. The different music-based “Effects” mentioned in the line reference precede a discussion of how different genres of music can in fact help people “think more effectively” (line 49): B is thus a highly effective answer, since the line reference refers to non-classical musical genres. A refers primarily to Passage 1 (“spatial reasoning test”), C contradicts Passage 2 (which ultimately argues that listening to music can aid cognition), and D combines an accurate tone (“lighthearted”) with an overly strong negative (“pessimistic”) that is nowhere present in the mostly analytic Passage 2.

QUESTION 49.

Choice A is correct. The word “formulated” refers to the Mozart Effect “phenomenon” that has been analyzed and summed up, or “described”, by two researchers. A is thus the best answer, while B, C, and D wrongly assume that the Mozart Effect was a fabricated RESULT of specific activities by Shaw and Rauscher, not an OBSERVATION of something that existed independent of them.

QUESTION 50.

Choice C is correct. In lines 2-4, the author of Passage 1 observes that experimentation surrounding the Mozart Effect has “not yet arrived at particularly conclusive results”: however, the author of Passage 2 declares that “The Mozart Effect is a reality” (line 68). This information supports C and can be used to eliminate both A and B, which wrongly assume that the author of Passage 1 ultimately accepts the Mozart Effect as an effective explanation. However, D is much too negative, since the author of Passage 1 argues that the Mozart Effect is not fully verified, NOT that it is definitively a “hoax” or a deception.

QUESTION 51.

Choice A is correct. See above for the explanation of the correct answer. B indicates that the Mozart Effect was an effective marketing premise, C indicates that numerous experiments have been devoted to the Mozart Effect, and D records the results of an analysis. While B and C are purely factual (and thus do not offer the perspective of the author of Passage 1), D offers a DIFFERENT perspective that should not readily be attributed to the author of Passage 1.

QUESTION 52.

Choice B is correct. The words “less lofty” refer to a source other than Mozart, such as popular music. Such music, as described by the author of Passage 2, would be widely regarded as less impressive or “more humble” than Mozart’s music. B is a correct answer, while A refers to physical form, C refers to the ability to recover, and D indicates a negative EXCESS rather than a simple COMPARISON as demanded by the passage.

Section 2: Writing

Passage 1, Restaurant Woes

QUESTION 1.

Choice C is correct. The underlined portion should be a singular possessive that refers to the “New York restaurant” mentioned earlier. C is exactly the possessive required: A is a nonexistent form, B is the contraction of “it is”, and D is plural.

QUESTION 2.

Choice A is correct. The underlined verb should refer to the restaurant Alder and its position on a piece of “real estate”: Alder “occupied” this area. While A is an effective answer, B and D both wrongly assume that Alder had a negative effect or was difficult to oppose. C would best refer to a person who is “preoccupied”, not to the “occupation” of an area.

QUESTION 3.

Choice D is correct. Without the underlined portion, there is no other context in the passage that directly explains who Pete Wells is: D is the best answer. While Wells is never again mentioned (eliminating B) and no other newspapers are mentioned in the passage (eliminating C), the author still needs to clarify Wells’s role (eliminating A, despite its deceptively good logic).

QUESTION 4.

Choice D is correct. This question requires a concise and logical description of the “restaurant industry”. A and B are both redundant because they use the synonyms “unstable” and “volatile”, while C wrongly assumes that the restaurant industry is “notorious” or highly negative OVERALL, rather than that its lack of stability is a well-known negative. D is thus the best answer in the context of the passage.

QUESTION 5.

Choice D is correct. The relevant sentence describes two different problems with Alder, which are linked by the underlined portion. D, “while”, rightly indicates that these problems were simultaneous and complementary. A wrongly assumes that the dining room CAUSED the problems with the serving portions, B creates a contrast, and C indicates that one problem ENDED when the other began when in fact both problems with Alder were present at once.

QUESTION 6.

Choice D is correct. In this paragraph, the author explains a few of the further troubles that face restaurants, so that a general statement about “why restaurants fail” effectively introduces this discussion. Nowhere in the paragraph are celebrity chefs (A), food critics (B), or individual restaurant owners (C) mentioned, so that all of the other answers must be eliminated even though they are negative in tone.

QUESTION 7.

Choice D is correct. The underlined noun refers to “customers”: because customers can be counted individually, the word “number” (not “amount”, which refers to NON-COUNTABLE quantities) must be used. Eliminate A and B, but also eliminate the singular C, since plural “urban areas” would involve plural and perhaps different “numbers” of customers.

QUESTION 8.

Choice C is correct. The underlined portion must be in parallel with the phrase “interrupt business”, since these are two hypothetical situations that are being presented together. Only C, “halt cash flow”, creates effective parallelism: A is in past tense, B is not grammatically correct (“would . . . halts”), and D is wordier and less clearly in parallel than C.

QUESTION 9.

Choice C is correct. This sentence is structured to compare the “negative publicity” that met Chipotle to the publicity that would confront smaller restaurants: C properly uses the phrase “that which met” to refer to the publicity that met Chipotle. A wrongly compares publicity to Chipotle itself, B wrongly compares publicity to restaurants, and D wrongly uses the plural pronoun “those” to refer to the singular “publicity”.

QUESTION 10.

Choice A is correct. The proper English idiom for this sentence is “slated for”, which means “intended for”. B, C, and D all supply the wrong preposition. Be careful of some of these choices in context, however, since a building is being described but is not in fact being covered “with” slate.

QUESTION 11.

Choice C is correct. Sentence 4 calls attention to the topic of “real estate”: while sentence 2 raises the issue of Wylie Dufresne’s “weak point,” sentence 3 explains that “zoning strictures” or real estate problems undermined one of his restaurants. Thus, sentence 4 effectively transitions from sentence 2 to sentence 3. While A and D wrongly re-introduce the issue of real estate AFTER the issue is raised in sentence 3, B places the issue of real estate too early and renders the pronoun “It” ambiguous.

Passage 2, How Shakespeare Works

QUESTION 12.

Choice A is correct. Because the sentence involves a hypothetical situation, use the subjunctive: in cases such as this, “were” is the proper verb form for a hypothetical cause and “would” is the proper verb form for a hypothetical effect. A is thus the best answer. While B and C are not subjunctive forms, D presents a “would” form for a CAUSE rather than an EFFECT.

QUESTION 13.

Choice B is correct. The underlined portion should link two independent clauses, and should contrast two pursuits (“short-run plays”, “show business”) that are connected to Shakespeare. A involves a comma splice, C wrongly states a similarity, and D places a fragment after a semicolon. (When linking two independent clauses, “but” should be preceded by a comma.) B involves both effective grammar and the correct sentence relationship.

QUESTION 14.

Choice A is correct. The underlined portion occurs in a series and should be in parallel with “his appearances” and “his stints”: “his remarks” is the best choice. B is an awkward phrasing that does not involve a plural noun, and C and D both break parallelism by introducing verbs.

QUESTION 15.

Choice D is correct. This portion of the passage calls for the idiomatic expression “invited to”, since Shakespeare would be invited “to a place” or “to a location”. All the other answers break this common idiom and assume different relationships: A indicates that he is already present (“at”), B indicates that his only purpose is to see the White House (“for”), and C mainly indicates that he is leaving (“from”).

QUESTION 16.

Choice B is correct. The underlined portion, Shakespeare is described, not people in general: eliminate A and C. Furthermore, in subjunctive-form sentences such as this, a hypothetical cause must be phrased using “were” and a hypothetical effect must be phrased using “would”. Because the underlined portion describes the effect or condition Shakespeare would face, eliminate the simple present D and choose B for proper subjunctive phrasing.

QUESTION 17.

Choice C is correct. In this paragraph, the writer addresses the documentation efforts of Hemminge and Condell, who faced challenges because the “plays were ephemeral” or short-lived. This content makes the negative answer C effective. A focuses on scholars (not mentioned here at all), and B attributes the wrong difficulty (writing background and reputation) to the project undertaken by Hemminge and Condell. D refers to the issue of money, which is important only in previous paragraphs.

QUESTION 18.

Choice A is correct. Before he “oversaw” the printing process, Ben Jonson “had written” the plays that were being printed: to register this difference in timing, choose A and eliminate B, which uses an improper verb form. C and D (“has” forms) both describe action that continues from the past into the present: because Jonson lived centuries ago, these choices are automatically illogical.

QUESTION 19.

Choice B is correct. The underlined portion should indicate similarity or simultaneity, since the publication of “Shakespeare’s works” was designed as “an act of homage” that would have a positive effect. Eliminate A, which wrongly indicates a contrast, and choose B. Both C and D result in comma splices.

QUESTION 20.

Choice C is correct. The underlined word should refer to “scripts” that were searched out and utilized when other documents “were not available”: “unearthed” is a word that can mean “discovered” or “found” in standard written English. A and D both refer literally to the act of removing a body from the ground, while B is needlessly wordy.

QUESTION 21.

Choice C is correct. In this sentence, the subject “Shakespeare Industry” takes the verb “was set”: a subject and verb cannot be divided by a single dash, but may be interrupted by information that is placed between two dashes. C creates this sentence structure, while A, B, and D all wrongly involve only a single interrupting dash.

QUESTION 22.

Choice D is correct. Watch for redundancy in this question: A and B both contain content that is interchangeable with the earlier phrase “worldwide”, while C pairs the interchangeable phrases “a year” and “annual”. D is the most concise option and does not present any redundant content.

Passage 3, Somebody's Got a Date . . . with Carbon

QUESTION 23.

Choice B is correct. The underlined portion requires a noun which will serve as the subject of “can give”: this noun must be modified by an adjective. A and C both employ adverbs, NOT adjectives: for the remaining answers, “behavior” as opposed to “behaving” is the noun expected in common English usage. Thus, eliminate D and choose B.

QUESTION 24.

Choice C is correct. The underlined pronoun should refer to “carbon dating”, which is what can give “a reasonably accurate” estimate of the true age of a sample. While A and D are plural and B would only refer to people, C properly refers to carbon dating as “it”.

QUESTION 25.

Choice A is correct. Sentence 4 transitions from a discussion of how carbon dating works to a discussion of the “accurate dating” of materials, a topic that is discussed primarily in sentence 5. Thus, sentence 4 should be left in its current position: B, C, and D would all interrupt the introductory explanation of how carbon dating works.

QUESTION 26.

Choice B is correct. While the previous paragraph has pointed out an asset of carbon dating (its accuracy), this sentence points to a possible negative (its questionable naming). The underlined portion should thus introduce a contrast in tone, not a causal relationship (A), a dismissal of the earlier information (C), or an indication of similarity (D).

QUESTION 27.

Choice D is correct. Because the sentence has already established that carbon-14 is one of “18 or so elements”, it is not necessary to repeat the fact that carbon-14 is an element. A, B, and C are thus redundant, while D is the most concise and effective answer.

QUESTION 28.

Choice B is correct. The paragraph as a whole explains the decay of carbon samples in order to explain how “applicable” carbon is for estimating sample ages: the author is thus concerned with the effectiveness of the measurements, so that B is the best answer. Specific researchers (A) and specific objects (C) are never mentioned directly, while the author has established why carbon dating is important in the PREVIOUS paragraphs and mostly explains its specifics in this one.

QUESTION 29.

Choice D is correct. Because atoms (at least in theory) are individual things that can be counted, eliminate A and B, since “much” is used for NON-COUNTABLE quantities. While C breaks noun to noun agreement (since the “atoms” should decay into “forms”), D creates such agreement and is thus the best answer.

QUESTION 30.

Choice B is correct. The information in the graph lists the “relatively short timeline” of the half-life for Carbon-14, 5730 years. Since this half-life is used for dating measurements, it would be used primarily to estimate the ages of samples that are thousands of years old: B is an effective answer, while A, C, and D all wrongly assume that Carbon-14 would be effective on much longer timelines.

QUESTION 31.

Choice B is correct. While the half-life of Uranium-238 is 4.5 billion years, the half-life of Samarium-147 is 106 billion years, a much larger number. B effectively states information from the graph, while A and C state faulty relationships and D wrongly assumes that the half-life for Samarium-147 has not been measured at all.

QUESTION 32.

Choice C is correct. In the underlined portion, the singular subject “dating” is wrongly paired with the plural verb “are”. Eliminate A, B (“using . . . are”), and D (“samples . . . is”) on account of subject-verb disagreement, and choose C (“sampling . . . is”) as the only grammatically correct answer.

QUESTION 33.

Choice A is correct. The passage as a whole has addressed the fact that carbon dating is an imperfect yet generally effective method that has undergone improvement and revision: this qualified positive tone toward “Data determination” aligns best with A. While B and C both distract from the topic of age measurement to address “different atoms” and “more accurate ways”, trap answer D is mostly about the EFFECTS of carbon dating on research at large, not about HOW carbon dating functions and how it has been improved.

Passage 4, Whose Business Is Social Media?

QUESTION 34.

Choice A is correct. In context, the underlined portion should refer to a “way” that was observed “a few decades” ago but has been disregarded as a result of the growth of social media. A is the best answer: B and D both assume continuation into the present, while C introduces a remote past form that is unnecessary in a sentence that describes a single practice that “was” once customary.

QUESTION 35.

Choice D is correct. The “employers” described in the sentence would naturally want to research possible or “prospective” employees before hiring them, making D the best choice in context. The other answers involve diction errors and would best fit other contexts: A distinguishes between two things, B refers to a viewpoint, and C is a term of praise.

QUESTION 36.

Choice C is correct. The subject of the underlined verb is the plural “Various [different] social media”, so that C is the only choice that provides an acceptable plural form. A and D are both singular while B creates a sentence fragment.

QUESTION 37.

Choice A is correct. According to the graph, over 80% of employers consult Facebook and over 70 % consult LinkedIn; thus, at least some employers must consult both of these sites. This information supports A, while the much more infrequent use of the two other social media platforms listed in the chart disqualifies B. Neither location nor background checks are considered in the graph, so that C and D must be eliminated.

QUESTION 38.

Choice C is correct. According to the graph, the only social media platform that employers use to a greater extent than LinkedIn is Facebook; this information justifies C and eliminates A, B, and trap answer D, which wrongly assumes that Facebook and Twitter are COMPARABLE in terms of employer preference, while the figure for Twitter is in fact significantly LOWER than the figure for Facebook.

QUESTION 39.

Choice C is correct. The phrase “By scanning social media accounts” must refer directly to the people doing the scanning. Both A (“professionalism”) and D (“it”) create misplaced modifiers. B introduces a misplaced modifier at the end of the sentence, since the “culture” belongs to the “company” and is not the “culture of the applicant”. Eliminate this answer and choose C as the best-coordinated and most logical choice.

QUESTION 40.

Choice C is correct. As a whole, this paragraph describes problems in early uses of social media by employers: C effectively captures this negative topic. A refers to new measures (not early mistakes), B refers to a variety of platforms (not to specific uses by employers), and D makes a distinction between employers that is not explored at length and that does not capture the negatives that this paragraph addresses.

QUESTION 41.

Choice B is correct. The underlined word should refer to “reasons”, which are distinct and countable: “much” refers to non-countable quantities (eliminating A and C), while the preposition “of” is not necessary (eliminating D). B properly phrases the “many reasons” why a particular social media strategy would be foolish.

QUESTION 42.

Choice C is correct. In order to properly address this question, pay attention to closely-related phrases that are redundant: “Additionally” and “also” (A), “Additionally” and “as well” (B), and “also” and “too” (D). Eliminate all of these answers and choose C, which only involves the qualifier “also”.

QUESTION 43.

Choice B is correct. The question demands a specific “example”, and the “Facebook friend request” mentioned in B would be one such example. Although the other answers are roughly on-topic, they do not add examples or detail: A simply qualifies the preceding statement, C lists a general preference, and D refers to “specific employee search methods” without explaining what exactly these methods are.

QUESTION 44.

Choice A is correct. The underlined word should be a possessive that modifies “personal lives”, which belong to multiple “people”: “people’s” in A is the best choice. B is a plural noun, C is a nonexistent form, and D is a singular possessive.

Section 3: Math Test - No Calculator

QUESTION 1.

Choice A is correct. Dividing both sides of $4x = 12$ by 2 yields $2x = 6$. Subtracting 1 from both sides yields $2x - 1 = 5$.

Choice B is incorrect and may result from adding 1 to both sides after dividing by 2 instead of subtracting 1 from both sides. Choice C is incorrect and may result from multiplying both sides by 2 then subtracting 1 from each side. Choice D is incorrect and may result from multiplying both sides by 2 and adding 1 to each side.

QUESTION 2.

Choice D is correct. The remaining value on the gift card is calculated using the equation $f(v) = 75 - 12.50v$, where 75 is a fixed dollar value and $-12.50v$ is the expression that represents the amount of money removed for v visits to the gym. Substituting 0 for v in the original equation gives $f(0) = 75 - 12.50(0)$, or $f(0) = 75$. With 0 visits to the gym, the remaining balance on the gift card is \$75. Thus, the initial value of the gift card is \$75.

Choice A is incorrect because the coefficient 75 is neither negative nor attached to the variable v , which represents the number of visits. Choice B is incorrect because the equation is built around the number of visits, v , not the number of days at the gym. Choice C is incorrect because if you substitute 8 for v in the original equation, it yields $f(8) = 75 - 12.50(8)$, or $f(8) = -25$. This results in a negative gift card balance, which is impossible.

QUESTION 3.

Choice B is correct. Since line k is perpendicular to the line $y = -4x + 2$, line k has an opposite reciprocal slope of $\frac{1}{4}$. Additionally, since the y -intercept is given, $(0, -2)$, the equation for line k can be written as $y = \frac{1}{4}x - 2$. Substituting the point $(20, m)$ into the equation for line k gives $m = \frac{1}{4}(20) - 2$, or $m = 3$.

Choices A, C, and D are incorrect and may result from errors in conceptual understanding or errors in calculation.

QUESTION 4.

Choice C is correct. Given an arc length of 22π , one can create the equation

$$22\pi = \frac{\theta}{360}(2\pi r). \text{ Solving this equation for } \theta \text{ yields } \frac{360(22\pi)}{(2\pi r)} = \theta, \text{ or more simply } \frac{3960}{r} = \theta. \text{ Since } \theta \text{ is at least } 45^\circ, \text{ then } \frac{3960}{r} \leq 45. \text{ Solving for } r \text{ yields } r \geq 88. \text{ The}$$

shortest possible measure of r is 88.

Choices A and B are incorrect because the values of $\frac{11}{2}$ and 11 are both less than 88

which is the lowest possible value for the radius. Choice D is incorrect. 176 could be the measure of the radius, but it is not the shortest possible measure of the radius.

QUESTION 5.

Choice A is correct. Multiplying each side of $-3x + y = -10$ by 2 gives the equation $-6x + 2y = -20$. Adding $-6x + 2y = -20$ to $6x - 2y = 10$ gives $0 = -10$. Since both variables are eliminated and the final statement makes no sense, the two lines are parallel, which yields 0 solutions.

Choices B, C, and D are incorrect and may result from computational errors when solving the system of linear equations.

QUESTION 6.

Choice D is correct. Factoring a 3 out of the binomial $(3a + 3b)$ yields the expression $3(a + b)(a - b)$. From this form, one can see the factors of the difference of perfect squares which, when multiplied, give the expression $3(a^2 - b^2)$, or $3a^2 - 3b^2$.

Choices A and B are incorrect and may result from errors in expanding the expression $(3a + 3b)(a - b)$. Choice C is incorrect and may result from errors in conceptual understanding of the difference of perfect squares.

QUESTION 7.

Choice D is correct. Since $(x - 3)^2 = h$ and $h = 25$, one can substitute h with 25 which yields $(x - 3)^2 = 25$. Taking the square root of both sides of the equation $(x - 3)^2 = 25$ yields $x - 3 = \pm 5$. Since $x > 0$, one would solve the equation $x - 3 = 5$ which gives $x = 8$.

Choice A is incorrect because -2 is less than 0 and $x > 0$. Choices B and C are incorrect because substituting 2 or 5 into the expression $(x - 3)^2$ is not equivalent to 25.

QUESTION 8.

Choice C is correct. By the laws of exponents, the equation $f(x) = \frac{x^a x^b}{x^3}$ can be

rewritten as $f(x) = \frac{x^{a+b}}{x^3}$, which can be further simplified to $f(x) = x^{(a+b)-3}$. Substituting

2 for x and 12 for $a + b$ gives $f(2) = 2^{(12)-3}$, or $f(2) = 2^9$. Therefore, $f(2) = 512$.

Choices A, B, and D are incorrect and may result from errors in applying the laws of exponents. For example, Choice A is incorrect because if one applies the exponent division rule incorrectly and divides the power of 12 by 3 instead of subtracting 3, the equation would give $2^4 = 16$.

QUESTION 9.

Choice C is correct. Since the absolute value makes every value inside greater than or equal to 0, the equation $f(x) = |x - 1|$ would only have solutions greater than or equal to zero. Inverting the equation and making it $f(x) = -|x - 1|$ would only give solutions that are less than or equal to zero. These solutions would all occur at or below the x -axis, or in Quadrants III and IV. By adding 2 and creating the equation $f(x) = 2 - |x - 1|$, the graph of the function $f(x) = -|x - 1|$ is shifted vertically creating solutions in both Quadrants I and II as well. Therefore, $f(x) = 2 - |x - 1|$ has solutions in all four quadrants of the xy -plane.

Choice A is incorrect because its graph in the xy -plane only has solutions in Quadrants I and II. Choice B is incorrect because its graph in the xy -plane only has solutions in Quadrants I and III. Choice D is incorrect because it is an inverted absolute value function with a negative y -intercept and its graph in the xy -plane only has solutions in Quadrants III and IV.

QUESTION 10.

Choice B is correct. Multiplying both sides of $P = \frac{2(s - c)}{5}$ by 5 yields $5P = 2(s - c)$.

Distributing the 2 gives $5P = 2s - 2c$ which can be further simplified $5P - 2s = -2c$.

Dividing both sides by -2 yields $-\frac{5P}{2} + s = c$. Finally, rearranging the equation gives the solution $c = s - \frac{5P}{2}$.

Choices A, C, and D are incorrect and may result from errors in calculation or errors in mental math when attempting to manipulate the form of the given equation.

QUESTION 11.

Choice B is correct. Since line k goes through $(-4, 0)$ and $(3, 2)$, one can use the

slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ to calculate the slope. Therefore, $m = \frac{(2) - (0)}{(3) - (-4)} = \frac{2}{7}$. Then,

substituting the point $(-4, 0)$ into $y = \frac{2}{7}x + b$ yields $(0) = \frac{2}{7}(-4) + b$, which gives

$b = \frac{8}{7}$. The equation for line k is $y = \frac{2}{7}x + \frac{8}{7}$. Similarly, since line m contains $(4, 0)$ and

$(-3, 2)$, one can use the slope formula to get $m = \frac{(2) - (0)}{(-3) - (4)} = -\frac{2}{7}$. Then, substituting the

point $(4, 0)$ into $y = -\frac{2}{7}x + b$ yields $b = \frac{8}{7}$. The equation for line m is $y = -\frac{2}{7}x + \frac{8}{7}$.

Finally, substituting into $m_1b_2 + m_2b_1$ yields $(\frac{2}{7})(\frac{8}{7}) + (-\frac{2}{7})(\frac{8}{7})$, or 0.

Choices A, C, and D are incorrect and may be the result of errors in calculating the appropriate y-intercepts for the equations of line k and line m .

QUESTION 12.

Choice D is correct. In order to simplify $i(3+2i)(12-8i)$, multiply the binomials first, which yields $i(3(12)+3(-8i)+2i(12)+2i(-8i))$, or $i(36-16i^2)$. Substituting -1 for i^2 yields $i(36-16(-1))$, which simplifies to $52i$.

Choices A, B, and C are incorrect and may be the result of errors in expanding the portion of the complex expression $(3+2i)(12-8i)$.

QUESTION 13.

Choice B is correct. Every year, the mass of a fallen tree branch decays by 25 percent from the previous year's mass. So, each year, 75 percent of the previous year's amount remains. Since the initial mass of the fallen tree branch is 55 kilograms, the remaining amount after one year is equivalent to $55(.75)$. After two years, the remaining amount would be equivalent to $55(.75)(.75)$, or $55(.75)^2$. Therefore, after t years have passed, the remaining mass of the fallen tree branch is $55(.75)^t$. So, $f(t) = 55(.75)^t$.

Choice A is incorrect and may result from multiplying the initial mass by the percent of decay rather than the decay factor of $1 - .25 = .75$. Choices C and D are incorrect because they are both linear models and not exponential as defined by the context of the problem.

QUESTION 14.

Choice C is correct. Dividing $x^3 - 2x^2 + 4x + 6$ by $x - 4$ yields:

$$\begin{array}{r}
 x^2 + 2x + 12 \\
 x - 4 \overline{) x^3 - 2x^2 + 4x + 6} \\
 \underline{-(x^3 - 4x^2)} \\
 2x^2 + 4x \\
 \underline{-(2x^2 - 8x)} \\
 12x + 6 \\
 \underline{-(12x - 48)} \\
 54
 \end{array}$$

Therefore, the expression $\frac{x^3 - 2x^2 + 4x + 6}{x - 4}$ can be rewritten as $x^2 + 2x + 12 + \frac{54}{x - 4}$. So, in the form $ax^2 + bx + c + \frac{k}{x - 4}$, k is equivalent to 54.

Choices A, B, and D are incorrect and may result from finding the incorrect remainder when using long division.

QUESTION 15.

Choice A is correct. In order to find the product of all of the solutions of the equation

$2x^2 + 10x + 1 = 0$, one must substitute into the quadratic formula, $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Substituting $a = 2$, $b = 10$, and $c = 1$ yields $\frac{-(10) \pm \sqrt{(10)^2 - 4(2)(1)}}{2(2)}$, or $\frac{-10 \pm \sqrt{92}}{4}$. This simplifies to $\frac{-5 \pm \sqrt{23}}{2}$. So, multiplying the two roots yields $\frac{-5 + \sqrt{23}}{2} \cdot \frac{-5 - \sqrt{23}}{2} = \frac{25 - 23}{4} = \frac{1}{2}$.

Choices B, C, and D are incorrect and may result from errors in applying the quadratic formula or errors when multiplying the roots of the equation.

QUESTION 16.

The correct answer is 10. Given that $\triangle ACF$ and $\triangle ABE$ are both right triangles and share a common angle at A , the two triangles are similar and thus have sides of proportional length. In $\triangle ACF$, \overline{AC} measures 6 and \overline{CF} measures 15. In $\triangle ABE$, \overline{AB} measures 4 and the measure of \overline{BE} is the unknown. Using the proportion $\frac{\overline{AC}}{\overline{CF}} = \frac{\overline{AB}}{\overline{BE}}$, one can solve for \overline{BE} . Substituting gives $\frac{6}{15} = \frac{4}{\overline{BE}}$. Cross-multiplying yields $6\overline{BE} = 60$, or $\overline{BE} = 10$.

QUESTION 17.

The correct answer is 3. Let p be the number of mini pumpkin pies consumed and let f be the number of blocks of fudge consumed. Since 16 people ate dessert, each pie feeds 4 people, each block of fudge feeds 2 people, and at least one pie and one block of fudge were consumed, one can conclude that p and f are positive integers and the equation $4p + 2f = 16$ is true. Solving for p yields $p = 4 - \frac{1}{2}f$. Since the question is asking for the greatest number of pies, p , that could have been consumed and p is a positive integer, one must substitute the lowest positive integer value for f that gives a positive value of p . This is 2. Substituting 2 for f yields $p = 4 - \frac{1}{2}(2)$, or $p = 3$.

QUESTION 18.

The correct answer is 35. Since $(ax - c)(bx + c) = 5x^2 - 49$ is true for all values of x , the two sides of the equation must be equal to each other. Expanding the left hand side gives $(ab)x^2 + (ac)x - (bc)x - c^2 = 5x^2 - 49$, which can be rewritten as $(ab)x^2 + (ac - bc)x - c^2 = 5x^2 - 49$. Given that both sides of the equation are equal, one can see that $ab = 5$, $ac - bc = 0$, which only means that a and b are equal, and $c^2 = 49$. Solving $c^2 = 49$ for a positive value of c yields $c = 7$ and substituting 5 for ab and 7 for c yields the product $abc = (5)(7) = 35$.

QUESTION 19.

The correct answer is 125. If a circle is centered on the origin, its equation follows the form $x^2 + y^2 = r^2$. Since the question states that the circle's equation follows the form $x^2 + y^2 = D$, then $D = r^2$. Given that \overline{AB} measures $10\sqrt{5}$ and \overline{AB} is a diameter, the radius is equivalent to $5\sqrt{5}$. Substituting $5\sqrt{5}$ for r yields $D = (5\sqrt{5})^2$, which is equivalent to 125.

QUESTION 20.

The correct answer is 25 or 4. Since the system of equations has only one solution, one can eliminate y , find K , and finally square to get K^2 . Multiplying the second equation

by -2 yields $-2(\frac{K}{2}x + 4y) = -2(5)$, or $-Kx - 8y = -10$. Adding $K^2x + 8y = 30$

to $-Kx - 8y = -10$ yields $K^2x - Kx = 20$. Factoring out a K and an x gives

$K(K-1)x = 20$. One can see that K and $K-1$ are two numbers that are one apart, and since K and x are positive integers, K , $K-1$, and x must be three factors of 20 that have a product of 20, two of which are one apart. Since K and $K-1$ are the two numbers that are one apart, if x is 1, K and $K-1$ are 5 and 4. If x is 10, K and $K-1$ are 2 and 1. Therefore, it follows that if K is 5 or 2, $K^2 = 25$ or $K^2 = 4$.

Section 4: Math Test - Calculator

QUESTION 1.

Choice C is correct. If a Goodwill store donates 5 of every 120 donated articles of clothing it receives to a local shelter and the store donated 24 articles of clothing to the local shelter, one can solve the proportion $\frac{5}{120} = \frac{24}{x}$, where x represents the total number of articles of clothing donated to the goodwill store. Cross-multiplying yields $5x = 2880$ and then dividing both sides of the equation by 5 gives $x = 576$.

Choices A, B, and D are incorrect and may result from errors in setting up the appropriate proportion or errors in calculation. For example, Choice A is incorrect because it is the solution to the proportion $\frac{5}{120} = \frac{x}{24}$, an error in which the 24 articles of clothing are assumed to be the donations made to the Goodwill store, not the denotations made by the Goodwill store to the local shelter as was stated in the question.

QUESTION 2.

Choice C is correct. If $6x + 2 = 8$ and the question asks for the value of $6x - 2$, one can simply subtract 4 from both sides of $6x + 2 = 8$, which yields $(6x + 2) - 4 = (8) - 4$. Simplifying gives the answer $6x - 2 = 4$.

Choice B is incorrect because 1 is the answer if one were to solve for x . Choices A and D are incorrect and may result from errors in calculating the value of $6x - 2$.

QUESTION 3.

Choice C is correct. The number of days worth of emergency food rations is inversely proportional to the number of passengers aboard the lifeboat. By the definition of an inversely proportional relationship, $R = \frac{k}{P}$, where R is the number of days of emergency food rations and P is the number of passengers aboard the lifeboat. However, this can be rewritten as $RP = k$, which shows that the number of days of emergency food rations multiplied by the number of passengers must always equal the same constant. Therefore, the number of current days worth of rations, 4, times the number of current passengers, 18, must be equal to the unknown number of days worth of emergency rations, x , times the new number of passengers, $18 + 6 = 24$. This yields $4(18) = x(24)$, or simply $x = 3$.

Choice A is incorrect and may result from using a directly proportional relationship,

$R = kP$, instead of the inversely proportional relationship defined by $R = \frac{k}{P}$. Choice

B is incorrect and may result from a calculation error when solving for the unknown number of days worth of emergency rations. Choice D is incorrect and may result from calculating the inverse relationship with 6 passengers instead of 24 passengers on the lifeboat.

QUESTION 4.

Choice B is correct. If the current amount of emergency food rations allows the 18 passengers on the lifeboat to survive for 4 days and this is only 25% of the original amount of food rations, then 75% of the initial amount of rations have already been used or lost at sea. Since 75% is three times 25%, the 18 passengers could have survived for $3(4) = 12$ additional days.

Choices A, C, and D are incorrect and may result from errors in calculation or comprehension of the question. For example, Choice A is incorrect because 16 days would have been the total number of days the 18 passengers could have survived with all of the initial emergency food rations, not the *additional* number of days that the passengers could have survived.

QUESTION 5.

Choice A is correct. Since the tailor receives \$8 for each shirt that he repairs, the tailor will earn $8s$ dollars if he repairs s shirts. In addition, since the tailor receives \$22.50 for each suit that he repairs, the tailor will earn $22.50u$ dollars if he repairs u suits. So, the amount of money that the tailor makes, M , for repairing s shirts and u suits is represented by the equation $M = 8s + 22.5u$.

Choice B is incorrect because the fee for repairing a pair of pants, \$10, was substituted for the fee for repairing a shirt. Choice C is incorrect because the fee for repairing a pair of pants, \$10, was substituted for the fee for repairing a suit. Choice D is incorrect because it includes the money the tailor would have earned for also repairing p pairs of pants, which was not stated in the question.

QUESTION 6.

Choice B is correct. The number of hours worked, h , can be found by substituting the \$860 earned by the webmaster for $P(h, v)$ and substituting 200,000 for v , the number of visits to the website. Making these substitutions into the equation $P(h, v) = 28h + .0001v$ yields $860 = 28h + .0001(200,000)$, or $860 = 28h + 20$. Subtracting 20 from each side and dividing by 28 yields $h = 30$ hours.

Choice A is incorrect and may result from calculating $.0001(200,000)$ as 200 instead of 20. Choice C is incorrect and may result from adding 20 to each side instead of subtracting 20 from each side. Choice D is incorrect and may result from calculating $.0001(200,000)$ as 200 instead of 20 and adding it to both sides instead of subtracting.

QUESTION 7.

Choice B is correct. Since a student receives 5 points for every minute of physical activity and 1 point for every jumping jack that is performed, using m for minutes of continuous exercise, j for the number of jumping jacks, and P for total points, one can solve the equation $P = 5m + 1j$ to find the number of minutes of continuous physical activity the student performed. Substituting 95 points for P and 80 for j yields the expression $(95) = 5m + 1(80)$. Subtracting 80 from both sides of the equation yields $15 = 5m$, which simplifies to $m = 3$ minutes.

Choices A, C, and D are incorrect and may result from calculation errors when solving or errors in solving for the appropriate value. For example, Choice D is incorrect because 15 is the total number of points earned for the minutes of continuous physical activity, not the number of minutes for which the student had continuous activity.

QUESTION 8.

Choice C is correct. Given that $f(x) = x - g(x)$ and $g(x) = x - 1$, substituting $x - 1$ for $g(x)$ in the first equation yields $f(x) = x - (x - 1)$, or $f(x) = 1$. $f(x) = 1$ is a constant function which means that regardless of the input, the output will always be 1. Therefore, $f(g(x)) = 1$.

Choices A, B, and D are incorrect and may result from errors in substitution or calculation errors involved in distributing the negative sign when $x - 1$ is substituted for $g(x)$.

QUESTION 9.

Choice D is correct. Linear equations can be written in three forms: slope-intercept form ($y = mx + b$), point-slope form ($y - y_1 = m(x - x_1)$), and standard form ($Ax + By = C$). The question asks for the equation of a line that has both the x and y coordinates of a point that lies on the line as constants in the equation. This would be an equation in point slope form. Looking at the equation in point-slope form given in answer choice D, $y - 1 = 2(x - 1)$, one can distribute the 2 which yields $y - 1 = 2x - 2$, and after adding 1 to both sides, the equation yields our original linear equation $y = 2x - 1$. $y - 1 = 2(x - 1)$ is an equivalent form of $y = 2x - 1$ that has the constants of the point (1, 1), within the equation.

Choices A and B are incorrect because they are not linear equations in point-slope form. Choice C is incorrect because it is not equivalent to the given equation $y = 2x - 1$.

QUESTION 10.

Choice C is correct. The inequality $a + b \leq 200$, where a represents the number of boxes of toilet paper and b represents the number of boxes of paper towels, dictates that the elevator is filled to capacity when it is carrying a total of 200 boxes. In order for the elevator to be filled to capacity and have an equal number of boxes of toilet paper and paper towels, there would have to be 100 boxes of each. If the elevator were carrying 100 boxes of toilet paper and 100 boxes of paper towels, the overall weight could be checked using the other equation, $15a + 10b \leq 2500$. Substituting 100 for a and 100 for b yields $15(100) + 10(100) \leq 2500$, or $1500 + 1000 \leq 2500$. Since this is also a true statement, answer choice C is correct.

Choice A is incorrect because the elevator can only transport a maximum of 200 boxes of any type. Choice B is incorrect because 200 boxes of toilet paper would weigh $15(200) = 3000$ pounds. This is heavier than the maximum 2,500 pounds. Choice D is incorrect because the elevator can transport just boxes of toilet paper as long as the weight of those boxes does not exceed 2,500 pounds.

QUESTION 11.

Choice A is correct. The total number of miles driven in a week for any person can be calculated by multiplying the total number of hours of driving by the average speed in miles per hour ($D = rt$). If Meryl drives 6 hours a day and 5 days a week, her total weekly hours of driving are $6(5) = 30$ hours. Multiplying Meryl's weekly hours of driving by her average speed of 50 miles per hour yields $30(50) = 1500$ miles. If Dana drives 8 hours a day and 4 days a week, her total weekly hours of driving are $8(4) = 32$ hours. Multiplying Dana's weekly hours of driving by her average speed of 40 miles per hour yields $32(40) = 1280$ miles. Subtracting Dana's total miles from Meryl's total miles yields $1500 - 1280 = 220$ miles. Meryl drives 220 more miles per week than Dana.

Choices B, C, and D are incorrect and may be the results of a comprehension error in solving for the incorrect difference in mileage. For example, Choice B is incorrect because 300 miles is the number of additional miles that Randy drives over Meryl.

QUESTION 12.

Choice C is correct. The research study is attempting to get an idea through sampling as to the true percentage of people in this large metropolitan area that prefer to shop online rather than in person. Although the survey selected people randomly, the location of the selection creates bias. The only people surveyed were exiting a mall. These are people who were shopping "in-person" already. This means that the results of the surveyed would be skewed towards shopping in person, since the only people selected were already shopping in person. Hence, the location of the survey creates bias.

Choices A is incorrect because an inference can only be made if the sampling was conducted appropriately. Choice B is incorrect because it is the opposite of the result that was attained, regardless of sampling error. Choice D is incorrect because a sample size of 200 is sufficiently large.

QUESTION 13.

Choice D is correct. First, one must convert to the units that the question requires. Since the question is asking for the speed of the rocket in kilometers per hour, one must convert miles to kilometers. Multiplying 240,000 miles by 1.609 kilometers will yield $240,000(1.609) = 386,160$ kilometers. Dividing 386,160 kilometers by 24 hours will give the speed of the rocket in kilometers per hour which is $\frac{386,160}{24} = 16,090$ kilometers per hour.

Choices A, B, and C are incorrect and may result from calculation errors when converting from miles to kilometers.

QUESTION 14.

Choice D is correct. If an adult male Maine Coon is 125% larger than its female counterpart, it is $(1 + 1.25) = 2.25$ times the size of its female counterpart. Therefore, if a female Maine Coon weighs 12 pounds, its male counterpart weighs $12(2.25) = 27$ pounds.

Choice A is incorrect and may result from a error in solving for the size of a female Maine Coon when the male weighs 12 pounds. Choice B is incorrect and may result from calculating the size of a female Maine Coon when assuming the male Maine Coon is 12 pounds and only 25% larger. Choice C is incorrect and may result from calculating the size of a male Maine Coon at only 25% larger than the female, not 125% larger.

QUESTION 15.

Choice C is correct. Factoring the right hand side of the function $p(x) = -x^2 + 12x - 20$ yields $p(x) = -(x - 2)(x - 10)$. Looking at the new function, one can see that the zeros occur at 2 and 10. Checking a value in between 2 and 10, such as 3, yields $p(3) = -((3) - 2)((3) - 10)$, or $p(3) = 7$. Since this is positive, all values that fall between 2 and 10 make the equation positive. Therefore, the company broke even or returned a positive profit during the duration from 1982 to 1990. Subtracting 1982 from 1990 yields 8 years.

Choices A, B, and D are incorrect and may result from errors in factoring and/or solving for the incorrect quantity.

QUESTION 16.

Choice B is correct. Given that the model $G(x) = 13.8 - 0.06x$ can be used to estimate the number of gallons remaining, $G(x)$, given x , the number of miles driven, one must simply substitute 150 miles for x to estimate the number of remaining gallons of gas. Substituting 150 for x yields $G(x) = 13.8 - 0.06(150)$; or $G(x) = 13.8 - 9$. Therefore, the estimated number of remaining gallons given 150 miles driven is $G(x) = 4.8$ gallons, or approximately 5 gallons.

Choices A, C, and D are incorrect and may result from calculation errors while utilizing the equation for the line of best fit or through estimating the remaining gallons of gas visually as opposed to using the best fit model.

QUESTION 17.

Choice B is correct. In order to calculate the average number of family vacations taken during a school year for all 52 students surveyed, one must add up the total number of vacations taken and divide by 52. Looking at the bar chart and accounting for both bars in each category, one can see that $8 + 3 = 11$ students took 0 vacations, $6 + 6 = 12$ students took 1 vacation, $6 + 8 = 14$ students took 2 vacations, $4 + 6 = 10$ students took 3 vacations, and $2 + 3 = 5$ took 4 vacations. Multiplying the number of students in each category by the number of vacations taken, then summing the results yields $11(0) + 12(1) + 14(2) + 10(3) + 5(4) = 90$ total vacations. Dividing the 90 total vacations by the 52 total students yields an average of $\frac{90}{52} = 1.73$ vacations per student.

Choice A is incorrect because it is the average number of family vacations per year for the students from Century High School only. Choice C is incorrect because it is the average number of family vacations for the students from Krane High School only. Choice D is incorrect and may result from errors in calculation.

QUESTION 18.

Choice A is correct. In Krane High School, 6 of the 26 surveyed students reported that they take 1 family vacation per year. Given that there are 2,600 students in Krane High School, one can estimate that $\frac{6}{26}$, or $\frac{3}{13}$ of the students at Krane High School will take one family vacation in a school year. Therefore, one can estimate that $\frac{3}{13}(2,600) = 600$ students from Krane High School will take one vacation in a school year. In Century High School, similarly, 6 of the 26 students reported that they take 1 vacation per year. Given that there are 1,820 students in Century High School, one can estimate that $\frac{6}{26}$, or $\frac{3}{13}$ of the students at Century High School will take one family vacation in a school year. Therefore, one can estimate that $\frac{3}{13}(1,820) = 420$ students from Century High School will take one vacation in a school year. So, the number of students who take one family vacation in Krane High School exceeds the number of students who take one family vacation in Century High School by $600 - 420 = 180$ students.

Choice B is incorrect because it is the number of total students that are estimated to take one family vacation at Krane High School, not the number of additional students over Century High School. Choice C is incorrect because the two schools have the same percent of students in the survey that take one family vacation, but not the same number of total students estimated to take one family vacation. Choice D is incorrect because Krane High School clearly has more students estimated to take one family vacation in a school year than Century High School.

QUESTION 19.

Choice B is correct. If a solution with a pH level of 1-4 is selected at random, the population has changed to only solutions with pH levels between 1 and 4. This means our total population is 10, two with blue tint and eight with red tint. The probability of randomly selecting one with a blue tint is $\frac{\text{blue}}{pH \rightarrow 1-4} = \frac{2}{10} = \frac{1}{5}$.

Choice A is incorrect because $\frac{1}{4}$ are the odds of selecting blue as opposed to red given a pH level of 1-4. Choice C is incorrect because $\frac{2}{15}$ is the probability of selecting a pH of 1-4 given that a blue tint was chosen. Choice D is incorrect because $\frac{1}{14}$ is the probability that a solution with a pH level of 1-4 and a blue tint is selected from all of the solutions.

QUESTION 20.

Choice A is correct. Calculating height, h , from a given radius, r , and a given print area, A_p , can be achieved by solving the equation $A_p = (2\pi r + 2)(h + 2)$ for h . First, divide both sides of the equation by the expression $2\pi r + 2$, which yields $\frac{A_p}{2\pi r + 2} = h + 2$. Subtracting 2 from both sides yields $h = \frac{A_p}{2\pi r + 2} - 2$.

Choices B, C, and D are incorrect and may result from calculation errors or errors in correctly applying the order of operations.

QUESTION 21.

Choice A is correct. Calculating the print area for Cylinder A by substituting 4 for h and 1 for r yields $A_p = (2\pi(1) - 2)((4) + 2)$, which can be simplified to $A_p = (2\pi - 2)(6)$, or $A_p = 12\pi - 12$. Calculating the print area for Cylinder B by substituting 8 for h and 1 for r yields $A_p = (2\pi(1) - 2)((8) + 2)$, which can be simplified to $A_p = (2\pi - 2)10$, or $A_p = 20\pi - 20$. In order to calculate what percent smaller the print area required for Cylinder A is compared to Cylinder B, one can multiply the print area for the larger cylinder, Cylinder B, by an unknown decay factor, x , to get to the print area for Cylinder A, and then subtract from one. Therefore, $(20\pi - 20)x = (12\pi - 12)$ which simplifies to $x = \frac{12\pi - 12}{20\pi - 20} = \frac{12(\pi - 1)}{20(\pi - 1)} = \frac{12}{20} = \frac{3}{5}$. This means that the print area required for Cylinder A is $\frac{3}{5}$, or 60% of the print area required for Cylinder B. Therefore the print area required for Cylinder A is $1 - \frac{3}{5} = \frac{2}{5}$, or 40% smaller than the print area required for Cylinder B.

Choices A, B, and C are incorrect and may result from calculation errors or errors in comprehension of the question. For example, choice B is incorrect because 60% is the percent of Cylinder B's print area required by Cylinder A, not the percent *smaller*.

QUESTION 22.

Choice B is correct. An average can be strongly affected by an outlier. For example, the average of the consecutive numbers 1, 2, 3, 4, and 5 is 3. However, if the top number, 5, is changed to a 10, the average jumps to 4. Now, look at the median. The median of the consecutive numbers 1, 2, 3, 4, and 5 is 3. However, when the top number, 5, is changed to a 10, the median is still 3. Therefore, averages are more strongly effected by outliers. If the company in question advertised its average salary, this average salary could be skewed based upon a few employees that have very high salaries. A new hire may begin work for the company seeing that there is a very high average salary, but the average salary may only be that high because of a few employees, maybe the owners of the company, who have very high salaries. The company may change to reporting the median salary because the median would be affected much less by the outliers pulling the average salary upward, which would give new hires a more realistic idea about the salaries they may receive.

Choice A is incorrect because if a few employees were paid much less than the rest, the average salary would be skewed downward; a case in which new employees would most likely be happier with the salaries they receive. Choices C and D are incorrect because the spread of the data has little bearing on the difference between the average and the median unless there are outliers. If anything, highly scattered data with no outliers would be better represented by an average due to potentially large gaps between different employee salaries that could make the median jump sufficiently in either direction.

QUESTION 23.

Choice A is correct. One way to see if an absolute value meets the criteria is to check the extremes of each end of the weigh range and see if the statement is true. Substituting 17.5 into the equation $|x - 18.5| < 1$ yields $|(17.5) - 18.5| < 1$, or $1 < 1$. This statement is not true, which means that a value greater than 17.5 must be input to make the statement true. Substituting the other extreme value, 19.5, into the equation yields $|(19.5) - 18.5| < 1$, or $1 < 1$. This statement is not true. However, this time it means that a value lower than 19.5 must be entered. Combining the two statements yields $17.5 < x < 19.5$ which is what the manufacturer requires.

Alternatively, one can use the formula $|Variable - Middle| < \text{or } \leq \frac{Range}{2}$. One would elect to use $<$ because the manufacturer requires that the weights are strictly *between* 17.5 and 19.5. Then substituting x for the randomly selected box's weight, substituting 18.5 for the middle, and substituting $19.5 - 17.5 = 2$ for the range yields $|x - 18.5| < 1$.

Choices B, C, and D are incorrect because for each equation there are input values that satisfy the equation, but do not meet the criteria defined by the manufacturer. For example, choice C is incorrect because if one inputs a weight of 17 ounces, the equation yields $|(17) - 18.5| < 18.5$, or $16 < 18.5$. The statement is true, however, that a cereal box that weighs 17 ounces is not accepted by the manufacturer.

QUESTION 24.

Choice B is correct. Factoring the right side of the equation $f(x) = x^2 - 4x - 12$ yields $f(x) = (x-6)(x+2)$. Substituting 0 for $f(x)$ yields $0 = (x-6)(x+2)$ which gives the x -intercepts of $(6,0)$ and $(-2,0)$. Since d is greater than e , d is equivalent to 6 and e is equivalent to -2 . Substituting 6 and -2 for d and e in the expression $2e + d$ yields $2(-2) + (6) = 2$. The x -coordinate of the vertex of any quadratic equation is the average of its roots. The average of 6 and -2 is 2. Therefore, $2e + d$ is equivalent to the average of 6 and -2 making $f(x) = x^2 - 4x - 12$ a possible definition of f .

Choices A, C, and D are incorrect and may result from calculation errors, errors in factoring, and/or errors in substituting.

QUESTION 25.

Choice C is correct. Going to -6 on the x -axis and tracing downward yields $f(-6) = -4$. Going to 4 on the x -axis and tracing downward yields $f(4) = -8$. Adding 2 to both sides yields $f(4) + 2 = -6$. Therefore, since $f(4) + 2 = -6$ and $f(-6) = -4$, $f(4) + 2 \neq f(-6)$.

Choices A, B, and D are incorrect because all three expressions yield the same value as $f(-6)$, -4 .

QUESTION 26.

Choice C is correct. The equation $x^2 + y^2 - 8y = 9$ must be written in the form of a circle that is not centered on the origin: $(x-a)^2 + (y-b)^2 = r^2$, where (a,b) is the coordinate center of the circle. This can be accomplished by completing the square for the y expressions in the equation:

$$\begin{aligned}x^2 + y^2 - 8y + \underline{\quad} &= 9 + \underline{\quad} \\x^2 + y^2 - 8y + \underline{16} &= 9 + \underline{16} \\x^2 + (y^2 - 8y + 16) &= 25 \\x^2 + (y-4)^2 &= 25 \\(x-0)^2 + (y-4)^2 &= 25\end{aligned}$$

Given that $(x-0)^2 + (y-4)^2 = 25$ follows the form $(x-a)^2 + (y-b)^2 = r^2$, $r^2 = 25$. This yields a radius of $r = 5$. Therefore, using the area formula for a circle, $A = \pi r^2$, yields an area of the circle is $A = \pi(5)^2 = 25\pi$.

Choice A is incorrect and may result from neglecting to complete the square before calculating the circle's area. Choice B is incorrect and may result from incorrectly calculating the radius after completing the square. Choice D is incorrect and may result from neglecting to complete the square and also misinterpreting the equation of a circle as $x^2 + y^2 = r$, rather than r^2 .

QUESTION 27.

Choice C is correct. In the equation $y = -2x^2 + 18$, the y -intercept occurs at the point $C(0,18)$. In order to calculate the x -intercepts, substitute 0 for y and solve for x in the equation $y = -2x^2 + 18$. Doing so yields $0 = -2x^2 + 18$, which simplifies to $-18 = -2x^2$, or $9 = x^2$. Taking the square root of both sides yields $x = \pm 3$, which reveals the two x -intercepts $A(-3,0)$ and $B(3,0)$. D is the point that is one fourth of the distance from A to B . One fourth of the distance from A to B can be calculated by simplifying the expression $\frac{|3 - (-3)|}{4}$, which yields 1.5. The point that is 1.5 units to the right of $(-3,0)$ is $D(-1.5,0)$. The slope of the line that goes through the points C and D can be calculated by substituting the points $(0,18)$ and $(-1.5,0)$ into the slope equation $m = \frac{y_2 - y_1}{x_2 - x_1}$ which yields $m = \frac{(0) - (18)}{(-1.5) - (0)} = \frac{-18}{-1.5} = 12$.

Choices A, B, and D are incorrect and may result from calculation errors resulting in an incorrect value for the coordinates of point D .

QUESTION 28.

Choice D is correct. The area of an equilateral triangle can be calculated using the formula $A = \frac{s^2\sqrt{3}}{4}$. Substituting $16\sqrt{3}$ for the area yields $16\sqrt{3} = \frac{s^2\sqrt{3}}{4}$. Multiplying by 4 on either side gives $64\sqrt{3} = s^2\sqrt{3}$ and dividing by $\sqrt{3}$ yields $64 = s^2$, or $s = 8$. If the side length of $\triangle ABC$ is 8, it follows that the area of square $BCED$ is $8 \times 8 = 64$. The area of the pentagon $ACEDB$ is the sum of the area of $\triangle ABC$, $16\sqrt{3}$, and square $BCED$, 64, which is $64 + 16\sqrt{3}$.

Choices A, B, and C are incorrect and may result from errors in calculating the side length of $\triangle ABC$ and ultimately the area of square $BCED$.

QUESTION 29.

Choice A is correct. Expanding the left side of the equation $(x^2 + bx) + c(x + d) = x^2 + 5x + 12$ yields $x^2 + bx + cx + cd = x^2 + 5x + 12$. Factoring out an x from $bx + cx$ on the left hand side yields $x^2 + (b + c)x + cd = x^2 + 5x + 12$. Looking at both sides of the equation, one can see that $b + c = 5$ and $cd = 12$. If d were equal to 2, then c would have to equal 6 so that $cd = 12$. However, if c were equal to 6 then b would have to equal -1 in order for $b + c = 5$. Since b , c , and d must be positive integers, -1 cannot be a value of b . Therefore, d cannot be equal to 2.

Choices B, C, and D are incorrect because all three values for d yield values of b and c that are positive integers.

QUESTION 30.

Choice A is correct. Substituting a value of 0.5 for t into the moped's value equation $V_1(t) = 10,000 - 1,000t$ yields $V_1(0.5) = 10,000 - 1,000(0.5)$, or $V_1(0.5) = 9,500$. Substituting a value of t into the dirt bike's value equation $V_2(t) = 10,000(0.9)^t$ yields $V_2(0.5) = 10,000(0.9)^{(0.5)}$, or $V_2(0.5) = 9,486.83$. Therefore, between 0 and 1 years the value of the moped is higher than the value of the dirt bike.

Choices B and C are incorrect and may result from calculation errors while substituting values for t . Choice D is incorrect and may result from substituting only integer values for t .

QUESTION 31.

The correct answer is 11. There are 12 inches in every foot. Using the equation $N = Dx + R$, where N is the larger number, D is the divisor, and R is the remainder when N is divided by D , one can see that $77 = 12(6) + 5$ is a true statement. Since there are 6 feet with a remainder of 5 inches in a total of 77 inches, 77 inches can be written as, "6 feet, 5 inches." This would make $F + I = (6) + (5) = 11$.

QUESTION 32.

The correct answer is 68. Using S for the number of photos that Sadie had on her cell phone and E for the number of photos Enrique had on his cell phone, if Enrique had 20 more than half the number of photos on his cell phone that Sadie had on her cell phone,

this can be written as $E = \frac{1}{2}S + 20$. If Sadie and Enrique sold a total of 124

photos, then $S + E = 122$. Substituting E with $\frac{1}{2}S + 20$ yields $S + (\frac{1}{2}S + 20) = 122$.

Combining like terms yields $\frac{3}{2}S + 20 = 122$ and subtracting 20 from both sides yields

$\frac{3}{2}S = 102$. Finally, multiplying both sides by $\frac{2}{3}$ yields $\frac{2}{3}(\frac{3}{2}S) = \frac{2}{3}(102)$, or $S = 68$.

QUESTION 33.

The correct answer is 8.8 or $\frac{44}{5}$. Since the area of the circle is 121π , setting 121π

equal to πr^2 yields $\pi r^2 = 121\pi$. Dividing both sides by π and taking the square root of each side reveals the length of the radius, $r = 11$.

A regular pentagon that is inscribed in a circle divides the circle into 5 arcs of equal

length. \widehat{ABC} is visibly $\frac{2}{5}$ of the circumference of the circle. Using the equation

$\frac{2}{5}(2\pi r)$ to find the length of \widehat{ABC} and substituting 11 for r yields $\frac{2}{5}(2\pi(11))$, or $\frac{44}{5}\pi$.

Therefore, D is equivalent to $\frac{44}{5}$.

QUESTION 34.

The correct answer is 4. If the freshman class grows steadily over the course of 17 years, it follows a linear model in the form of $y = mx + b$, where x is the number of years that have passed since the professor began teaching and y is the enrollment in the class. If the enrollment was 54 students at a time of 0 years, that corresponds to the coordinate point $(0, 54)$, which is the y -intercept of the model. At a time of 17 years, the enrollment grew to 122, which corresponds to the coordinate point $(17, 122)$. The average increase in enrollment per year would be equivalent to m , the slope of the line. Substituting into

the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ yields $m = \frac{(122) - (54)}{(17) - (0)} = \frac{68}{17} = 4$. Therefore, the course

enrollment had an average increase of 4 students per year.

QUESTION 35.

The correct answer is 13. The linear equation $5y - 12x = 5$ can be rewritten to the

form $y = \frac{12}{5}x + 1$. If line k is parallel to $y = \frac{12}{5}x + 1$, it has the same slope, which is $\frac{12}{5}$. Since line k intercepts the x -axis at 5, the x -intercept is $(5, 0)$. Using the equation

$y = \frac{12}{5}x + b$ to represent line k and substituting the coordinate point $(5, 0)$ yields

$(0) = \frac{12}{5}(5) + b$, or $0 = 12 + b$. Solving for b yields $b = -12$, which makes the

y -intercept $(0, -12)$. Substituting the x -intercept and the y -intercept into the distance

formula $D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ yields

$$D = \sqrt{((0) - (5))^2 + ((-12) - (0))^2} = \sqrt{25 + 144} = \sqrt{169} = 13.$$

Alternatively, one can recognize that the points $(5, 0)$ and $(0, -12)$ form a 5-12-13 special right triangle with the origin, thus making the distance from $(5, 0)$ to $(0, -12)$ equivalent to 13.

QUESTION 36.

The correct answer is 48.8. The equation $B = 3,520(0.8)^m$ dictates that the account balance of 3,520 euros will reduce to 0.8 times or 80% of its current value each month that passes. After 3 months, the 3,520 euros would reduce to $(0.8)^3$, 0.512 times or 51.2% of its original value. This is a reduction of $100\% - 51.2\%$, or 48.8%. The answer is 48.8.

QUESTION 37.

The correct answer is 6552. The manufacturer's current profit, P_{Current} , is equivalent to 120% of last year's profit, or $1.2(P_{\text{Last}})$. Substituting $1.2(P_{\text{Last}})$ for P_{Current} and 5,200 for

A_{Last} in the equation $A_{\text{Current}} = 1.05\left(\frac{P_{\text{Current}}}{P_{\text{Last}}}\right)(A_{\text{Last}})$ yields $A_{\text{Current}} = 1.05\left(\frac{1.2(P_{\text{Last}})}{P_{\text{Last}}}\right)(5,200)$.

Simplifying yields $A_{Current} = 1.05(1.2)(5,200) = 6,552$. Therefore, the company can expect to spend \$6,552 on advertising in the current year. Disregard the comma when gridding your answer. The answer is 6552.

QUESTION 38.

The correct answer is **7500**. Substituting 5,187 for $A_{Current}$, 142,500 for

$P_{Current}$, and 5,200 for A_{Last} in the equation $A_{Current} = 1.05\left(\frac{P_{Current}}{P_{Last}}\right)(A_{Last})$ yields

$$(5,187) = 1.05\left(\frac{142,500}{P_{Last}}\right)(5,200)$$

. Dividing both sides by 1.05 and 5,200 yields

$0.95 = \frac{142,500}{P_{Last}}$. Multiplying both sides by P_{Last} and dividing both sides by 0.95

yields $P_{Last} = \frac{142,500}{0.95} = 150,000$. Therefore, last year's net profit of \$150,000 was

\$150,000 – \$142,500, or \$7,500 larger than this year's net profit. Disregard the comma

when gridding your answer. The answer is 7500.