Answer Key: TEST 1

SAT

SECTION 1—READING

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

SECTION 2—WRITING

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

SECTION 3—MATH

1.	A	12.	D
2.	D	13.	B
3.	C	14.	A
4.	C	15.	A
5.	B		
6.	B	**Fill-Ins:**	
7.	D	16.	.384, .385, or 5/13
8.	C	17.	.5 or 1/2
9.	C	18.	240
10.	B	19.	18
11.	C	20.	48

SECTION 4—MATH

1.	B	13.	A	24.	A	**Fill-Ins:**	
2.	D	14.	A	25.	D	31.	3
3.	C	15.	A	26.	C	32.	.6 or 3/5
4.	C	16.	B	27.	D	33.	30
5.	B	17.	B	28.	A	34.	44
6.	C	18.	D	29.	B	35.	20
7.	D	19.	B	30.	A	36.	75
8.	B	20.	B			37.	.5 or 1/2
9.	D	21.	C			38.	1015
10.	A	22.	B				
11.	C	23.	A				
12.	C						

Answer Explanations

SAT Practice Test #1

Section 1: Reading

QUESTION 1.

Choice B is correct. While the early segments of the passage establish that Jane is facing new conditions and traveling to "Thornfield" (line 21), the passage goes on to establish that Jane is experiencing "doubts and fears" (line 25) and that she does not know exactly what her assignment at Thornfield entails. (In lines 61-68, for instance, Jane offers a few speculations about the family that will employ her.) This combined anxiety and uncertainty justifies B and eliminates A (since little is known of Jane's earlier "lifestyle") and C (since no "disappointments" are mentioned). D can also be eliminated because it involves the wrong emphasis: the passage is concerned mostly with Jane's present and future, NOT her backstory.

QUESTION 2.

Choice C is correct. In lines 27-31, the passage establishes that Jane is "quite alone in the world", thus justifying C. The passage contradicts other negatives: Jane was in fact miserable with "fine people" (line 63, eliminating A), is confused and anxious but not truly sad (eliminating B), and seems awkward and unsure in lines 36-55 but does not voice embarrassment about her conduct (eliminating D).

QUESTION 3.

Choice B is correct. See above for the explanation of the correct answer. A explains that Jane is anxious, C records a conversation and alludes to some of Jane's uncertainties, and D explains Jane's PAST attitudes of dissatisfaction. Only B aligns with a previous answer choice, though emotions that are not named CAN be gleaned from the other references.

QUESTION 4.

Choice A is correct. In lines 15-16, Jane explains that she is "comfortably accommodated" in her new surroundings but not "very tranquil" in her mind. This contrast lines up directly with A and is expanded upon in Jane's descriptions of the inn and of her emotions. Jane never describes her education or specific talents at any length (eliminating C and D, respectively), and DOES accept the only real ambition mentioned in the passage: entering her new position. B thus misinterprets the content as a contrast.

QUESTION 5.

Choice C is correct. The word "resource" refers to the possibility of being "shown into a private room" (line 24), or to an "option" that Jane would have. C is the best answer, while A, B, and D are all strong positives that would refer to TALENTS or VIRTUES, not to a simple, everyday CHOICE that could be made.

QUESTION 6.

Choice B is correct. As explained in lines 10-14, Jane has endured "sixteen hours" of harsh outdoor conditions since leaving Lowton: she is now warming herself and recovering from this travel. This content justifies B and can be used to eliminate C (too thoroughly negative) and D (not negative at all). Make sure not to confuse the discussion of "A new chapter" (line 1) or "a play" (line 2) as a justification for A: these are IMAGES that Jane uses, not direct indications that she has AMBITIONS to create art or literature.

QUESTION 7.

Choice B is correct. See above for the explanation of the correct answer. A uses imagery to set up Jane's narrative, C indicates that Jane is anxious, and D describes the later stages of the journey in a positive manner. Be careful of wrongly aligning the negative C with Question 6 C and the positive D with Question 6 D: forgetting and good fortune are not among this passage's actual themes.

QUESTION 8.

Choice D is correct. The word charm refers to "adventure", which Jane finds attractive or alluring in certain respects. Choose D and eliminate A (which refers too literally to mystical charms), B (which means enthusiasm and can only refer to people) and C (which wrongly introduces a strong negative tone).

QUESTION 9.

Choice A is correct. The conversation involves the placement of Jane's luggage, the distance that she will travel, and the time it will take to cover this distance: these "practical details" make A an excellent description. The "vehicle" is only mentioned in line 50 and is not described at any length (eliminating B); furthermore, no information, other than the fact that he speaks abruptly, is offered about the carriage driver. This small piece of information does not justify inferences about social status (eliminating C) or grudges (since Jane has only met the driver and does not reflect on his conduct at any length, eliminating D).

QUESTION 10.

Choice B is correct. In the paragraph that follows the line reference, Jane describes the sensation of being "cut adrift from every connection" (lines 28-29): this sensation is linked to her own "doubts and fears" since she is on her own at the inn. This information supports B. Jane never explains EXACTLY what her new duties will be (eliminating A), never mentions a specific "friend" (only general connections, eliminating C), and reflects on HERSELF, not on the people AROUND her (eliminating D).

QUESTION 11.

Choice C is correct. The passage begins by explaining the field of "genomics" (line 9) and a few of the recent events that surround it; the author then goes on to describe the forms of "controversy" (line 33) and debate that surround genomics. This information supports C and eliminates A (which assumes that the passage becomes entirely positive) and D (which assumes that the passage becomes entirely negative). While B rightly seems to allude to Angelina Jolie's "double mastectomy" (lines 1-2), this "surgical procedure" is almost entirely disregarded in the later stages of the passage, so that this answer mistakes a small detail for an overall explanation of the developmental pattern.

QUESTION 12.

Choice C is correct. In the first paragraph, the author links celebrity Angelina Jolie's "double mastectomy" (lines 1-2) to "genetic testing" (line 5), a testing method that is revealed as hotly debated in later paragraphs. This information supports C. Eliminate A because Jolie is only described (NOT quoted herself); eliminate B because it is not clear that Jolie has PROMOTED genome testing, only that she has UNDERGONE genome testing. D is too broad: it avoids direct reference to Jolie and raises an issue ("everyone is susceptible") that is at best tangential to the author's record of the genome testing debate.

QUESTION 13.

Choice A is correct. In lines 18-20, the author explains that genome mapping costs dropped by a factor of 50 between 2010 and 2015: this information supports the idea that such testing is more "affordable and accessible". The other answers distort the author's discussion of current genomics debates: while tests are accurate (eliminating B), the USEFULNESS and IMPLICATIONS of these tests remain problematic issues. C misrepresents the information about Angelina Jolie in the first paragraph (who simply underwent genome testing) and wrongly assumes that other celebrities have been visibly involved; D wrongly assumes that lines 62-73 ("Others contend . . . today") which describe a HYPOTHETICAL problem, describe an ACTUAL problem.

QUESTION 14.

Choice B is correct. See above for the explanation of the correct answer. A explains the costs and objectives of the Human Genome Project, C explains the effectiveness and accuracy of genetic testing, and D indicates that genetic testing is controversial, but not WHY. In fact, the positive answer C can be used to eliminate Question 13 B and D, which wrongly assume that testing PROCEDURES are badly flawed.

QUESTION 15.

Choice D is correct. In lines 26-30, the author explains that genome testing can allow greater precision in the treatment of cancer and perhaps eliminate "blanket chemotherapy" (line 30). This information supports D. Cancer is the only disease that the author discusses at length in terms of genetic testing: the article never mentions everyday lifestyle choices (eliminating A) or psychological ailments (eliminating C). B is out of scope: even an accurate cancer or disease diagnosis based on genetic testing MAY involve high-risk procedures for successful elimination.

QUESTION 16.

Choice A is correct. In lines 44-48, the author calls attention to the possible "stigmatization of entire ethnic or genetic groups" (lines 47-48) as a result of genetic testing. This information supports A, while the record of DECREASING costs in lines 18-20 indicates that C is a faulty answer. B and D both rely on unjustified extrapolations from the passage: in lines 62-73, problems with testing healthy people are noted, but never the "worry" or other psychological costs; in line 35, the "publication of the HeLa genome" is mentioned, but the publication of "medical and legal records" for a large number of people is not linked to this event.

QUESTION 17.

Choice B is correct. See above for the explanation of the correct answer. A introduces the HeLa genome controversy, C notes the excessive activity and pressure that genome testing could place on the healthcare system, and D notes the difficulty of predicting the effects of gene mutations. None of these answers align with an answer to the previous question, though be careful of pairing A with Question 16 D and C with 16 B or C.

QUESTION 18.

Choice B is correct. The word "exchange" is used to describe the "conflicting opinions" (line 51) of two experts on genomics: these opinions were published in the *Wall Street Journal*. A "debate" would be an appropriate wording, while A refers to goods (not ideas), C falsely assumes that a reconciliation was reached, and D indicates that the conversation was hostile or trifling (when in fact it was analytic in nature and featured in a newspaper).

QUESTION 19.

Choice D is correct. The word "deep" refers to the flaws that Robert Green cited in his discussion of genetic testing. These flaws would be evident or "considerable", since Green argues that such testing can cause stress on the medical industry and may not be especially useful. A is wrongly positive, while B wrongly indicates that the flaws are DIFFICULT to explain or pin down (even though Green has just explained and emphasized the severity of the flaws) and C wrongly indicates that the flaws would lead to disasters (when the most that they would do is put additional stress on the healthcare system).

QUESTION 20.

Choice A is correct. As indicated by the dark bar, there were 100 laboratories in 1993 and 600 laboratories in 2010: in other words, the number of laboratories increased by 500. Do not forget to subtract the figure from the year 1993 (an error which would result in B, 600), and do not use the light gray bars at all (an error which would result in C or D, which both introduce figures above 600).

QUESTION 21.

Choice B is correct. Throughout the passage, the author has noted the possible advantages and drawbacks of the growth of genetic testing, ultimately concluding that it is not clear whether genomics research has changed the world "For better or worse, or perhaps both" (line 74). This information establishes the author's "ambivalence" or spirit of divided uncertainty about the growth of genomics, a phenomenon that the chart records by showing the growing number of labs and of diseases tested. B is appropriate, while A is too positive, D is too negative, and C wrongly indicates that the author is "apathetic" about or uninterested in the growth of genomics. In contrast, the author is engaged, but has not arrived at a single set opinion about the virtues of genetic testing.

QUESTION 22.

Choice D is correct. The passage introduces the technology surrounding "Reusable rockets" (15), then describes an experiment that created promising ion engines that, nonetheless, are "not yet fully optimized" (line 54). D refers appropriately to this "relatively new" technology and refers appropriately to both positives and negatives. A ("popularize") assumes that the results have been wholly positive, while C ("disputes") wrongly emphasizes negatives. B focuses on the "goals" of the rockets, not on the EXPLANATION of the rockets themselves and of their development that takes up much of the passage.

QUESTION 23.

Choice B is correct. In this paragraph, the author introduces the "cost-per-ton" (line 9) of plane travel and rocket travel: planes are more cost-efficient because they can "complete many trips" (line 12). This information supports B, while other answers refer to outside factors: it is clear why rockets have not been used in transit (but NOT why planes have not been used in space exploration, eliminating A); it is clear that reusable rockets have relatively short lifespans (but NOT what the average lifespan is, eliminating C); it is not clear that airlines and space exploration companies collaborate at all (since these two industries are simply COMPARED, eliminating D).

QUESTION 24.

Choice B is correct. The line reference describes how "Another type of engine" uses the movement and interaction of ions to create propulsion. This information justifies B, while the size of an ion engine is not mentioned here at all (eliminating C) and cost effectiveness is mentioned primarily in the first paragraph (eliminating D). A is a trap answer: although SpaceX and Reaction Engines are DEVELOPING ion engines, it is not clear that ion engines explain why these companies are FAMOUS.

QUESTION 25.

Choice A is correct. In lines 37-40, the team headed by Vaudolon is mentioned as trying to address the "degradation of the engine wall" in ion engines. This information on a technological flaw supports A: the cost-efficiency of the engines has already been established in the earlier, broader stages of the passage and was not a motivation for the experiment (eliminating B), Vaudolon's engines still form "plasma" (line 40, eliminating C), and computer simulation is only mentioned explicitly in the FINAL paragraph as a late stage of the experiment (eliminating D).

QUESTION 26.

Choice B is correct. See above for the explanation of the correct answer. A explains the cost efficiency of reusable rockets generally, C describes a trade-off that resulted from Vaudolon's design, and D describes a later stage of Vaudolon's research. None of these answers, as demanded above, deals with the main objective that the research was "designed to address".

QUESTION 27.

Choice C is correct. The word "reach" refers to the speed of Hall Thruster exhaust: this speed would be registered as a measure or "attained". A refers to physical GESTURES (not a MEASUREMENT), B wrongly assumes that the speed is a physical thing that is increasing in size, and D would be best for a HUMAN accomplishing a goal, not inanimate EXHAUST.

QUESTION 28.

Choice C is correct. As explained in lines 64-65, Vaudolon's design removes "the most unpredictable" element of ion thruster design: his team's design is thus more stable, or less unstable. This information supports C and eliminates D. Expense is considered primarily in the opening paragraphs and is not explicitly mentioned in the discussion of Vaudolon's thruster (eliminating A), while Vaudolon's thruster REARRANGES engineering elements but still relies heavily on chemical reactions (eliminating B).

QUESTION 29.

Choice D is correct. See above for the explanation of the correct answer. A indicates the efficiency of ion engines in general, B explains how Vaudolon manipulated the ion engine configuration, and C explains that the engine developed by Vaudolon is promising but not ideal. Though all relevant to the overall topic of ion engines, none of these answers clearly COMPARES Vaudolon's engine to other engines.

QUESTION 30.

Choice C is correct. The "system" referred to in the passage is Vaudolon's ion engine setup. C properly describes a physical object built by scientists: B refers to the actions of PEOPLE rather than to created OBJECTS, while A and D both refer to topics from the passage but do NOT directly fit the word "system" as used to describe the engine configuration.

QUESTION 31.

Choice C is correct. While the Hall Thruster has a propulsion efficiency of roughly 85%, the SpaceX Reusable Rocket has a propulsion efficiency of roughly 50%, a difference that supports C as a statement of the Hall Thruster's superior fuel efficiency. While the chart indicates that the Hall Thruster is MORE expensive and thus less cost-effective than a similar reusable rocket (eliminating A), the chart does not explicitly consider either acceleration rates (eliminating B) or the requirements for a Mars mission (eliminating D).

QUESTION 32.

Choice A is correct. The author notes that reusable rockets offer "some promise for lowering the cost per flight" because single-use rockets have short lifespans and cites SpaceX as a company that is developing such rockets. However, while SpaceX Reusable Rockets are cost efficient but have limited propulsion capabilities, Hall Thrusters are more powerful and thus relatively expensive, requiring "multiple engines and more money" (line 36) for substantial trips. A appropriately paraphrases this reasoning to explain the low costs of the SpaceX Reusable Rocket recorded in the graph. B, C, and D all refer to aspects of how ion engines are ENGINEERED, not to the central FACTOR (reusability that increases engine lifespan) that makes the Space X Reusable Rocket more cost-effective.

QUESTION 33.

Choice B is correct. In the final paragraph of Passage 2, it is explained that railway companies have been linked to fatalities yet that there is no "court treacherous enough to enforce a law against a railway company" (lines 60-61). This cynical description supports B, while the overall negative, sarcastic tone taken toward the railway companies eliminates C. However, Passage 2 does not explain HOW the railroads are built or WHY so many fatalities occur: thus, eliminate A and D, respectively.

QUESTION 34.

Choice D is correct. While Passage 1 describes how the railroads can "run over a man" (line 27), Passage 2 mentions the "three thousand and seventy lives" (lines 53-54) destroyed by railroad collisions. This information supports D. Only Passage 1 calls attention to the people who build the railroads (eliminating B), only Passage 2 deals with the legal corruption that protects the railroads (eliminating C), and NEITHER Passage 1 nor Passage 2 cites public protests (eliminating D), even though both AUTHORS criticize the railroads.

QUESTION 35.

Choice B is correct. In lines 33-35, the author of Passage 1 addresses what "Men say" commonly and takes issue with a certain line of conduct: this information supports B. Other answers distort the passage's content: the author is HIMSELF a rebel or freethinker, but does not praise a larger group (eliminating A); the author refers to nationalities linked to industry in lines 21-22, but does not say that these are the nationalities MOST oppressed by industry (eliminating C); the author describes misfortune in lines 27-30, but is not speaking about a PERSONAL experience (eliminating D).

QUESTION 36.

Choice D is correct. See above for the explanation of the correct answer. A explains a desirable lifestyle, B links a few demographic groups to the railroad, and C describes a man who encounters misfortune. None of these aligns effectively with an answer to the previous question, though be careful not to pair A with Question 35 A, B with Question 35 C, or C with Question 35 D.

QUESTION 37.

Choice A is correct. The word "rigid" refers to an "economy" (line 8) or lifestyle that is notable for being stern and simplified: the word "austere" effectively characterizes exactly such a lifestyle. B and D both wrongly assume that the lifestyle cannot CHANGE at all (when in fact it may remain austere but change in other ways), while C means "observing traditional beliefs" and is thus a poor fit for Thoreau's recommendation for a new, better lifestyle.

QUESTION 38.

Choice C is correct. Although used in a sarcastic manner, the word "great" is paired with the word "glorious" and indicates the reasons why America is well-known. C, "distinguished", is an appropriate fit. A wrongly refers to physical size, B is concerned with either political ideology or personal generosity (topics that are secondary at best here), and D discusses material wealth (while Twain is more interested in basic matters of reputation and never directly mentions wealth at this point).

QUESTION 39.

Choice D is correct. In lines 43-47, the author of Passage 2 sarcastically calls America's legal system "superior" and notes that it relies in large part on men who "don't know anything and can't read". This information supports A, while B, C, and D all raise topics that are tangential to the passage: only the penalties on the railroads (not on the poor and wealthy generally) are discussed, an "insanity plea" (line 47) is mentioned but not compared to the rules for "other citizens", and HOW people make trial decisions ("sentiments") is never explained.

QUESTION 40.

Choice A is correct. See above for the explanation of the correct answer. B describes the insanity plea in America and the power of money in politics, C notes that the railroads are oppressive, and D describes railroad fatalities and how the railroads responded. None of these answers characterize the justice system in a way that fulfills the demands of the previous question, though be cautious of taking B as evidence for Question 39 A or B.

QUESTION 41.

Choice B is correct. While Passage 1 indicates that a "Spartan simplicity of life" (line 4) can solve some of America's problems, Passage 2 does not call attention to any such solution. (At most, the author of Passage 2 speaks cynically of the good intentions of the railroad ownership.) This information supports B, while A is relevant ONLY to Passage 2, since Passage 1 is concerned mostly with railroads and individuals, not the government. C and D describe features of BOTH passages and must be eliminated.

QUESTION 42.

Choice D is correct. While the "Men" are interested in new projects and pursuits, the author of Passage 1 argues that such pursuits have "tripped up" (line 4) the nation and that, despite all the activity, there is not any work "of any consequence" (line 35). This information supports D and contradicts C, since the author is considerably PESSIMISTIC about the influences in the nation. A ("agriculture") and B (overturning "laws") refer to interests that are never EXPLICITLY attributed to the author and must thus be eliminated.

QUESTION 43.

Choice C is correct. The passage begins by explaining the famous fossilized skeleton known as Lucy, then asserts that she was "not the first of her species to be found" (lines 14-15) and describes other findings such as the Taung Child, Selam, and Ardi. These various discoveries help to explain how humans might have developed: C is thus the best answer. A focuses too much on the process of finding these fossils (not on their SIGNIFICANCE), B wrongly treats the passage as PERSUASIVE rather than INFORMATIVE, and D calls attention to a detail (bipedalism) but neglects the author's larger emphasis on a RANGE of fossils.

QUESTION 44.

Choice B is correct. In lines 13-15, the author explains that Lucy was "not the first of her species to be found" despite her importance. This information supports B and eliminates both A and D, which both indicate that Lucy was NOT the first of her species. Although the author notes that other fossils are important, the passage does not argue that Lucy has fallen in stature: in fact, lines 55-56 suggest that she is the "most interesting hominid fossil ever found" both years ago and "possibly even now". This information thus contradicts answer C.

QUESTION 45.

Choice A is correct. See above for the explanation of the correct answer. B describes a discovery OTHER than Lucy (the Taung Child), C summarizes one of Richard Leakey's arguments (NOT one of the author's), and D indicates Lucy's high level of recognition. Make sure not to wrongly take D as a justification for a positive answer such as Question 44 A or D.

QUESTION 46.

Choice A is correct. The words in the question prompt express uncertainty and refer (respectively) to Lucy's status as "the oldest example of a human ancestor" (lines 6-7) and her "female" gender (line 11). These pieces of evidence refer to factors that interested the researchers who found Lucy and support A. B, C, and D all refer to Lucy's RECEPTION rather than her DISCOVERY, and C and D both introduce negatives that have no relation to the tone of this informative paragraph.

QUESTION 47.

Choice C is correct. The word "detect" refers to a single observation made by an anthropologist, that Lucy "wasn't a knuckle-dragger" (lines 23-24). In other words, this statement would be an observation or perception, so that C, "perceive", is an effective answer. Both B and D refer to observation that occurs OVER TIME, not to a SINGLE observation. Trap answer A relates to the overall topic of the passage, but it is not clear that Lucy's posture was an ONGOING research topic, only that Johanson offered a SINGLE perception related to Lucy.

QUESTION 48.

Choice D is correct. In lines 22-25, the author indicates a similarity between Lucy and the Taung Child: both, instead of dragging their knuckles over the ground, walked upright "as contemporary human beings do". This information supports D. Other answers are contradicted by the content of the passage: the Taung Child was discovered BEFORE Lucy (eliminating A), the Taung Child's likely gender is never specified (eliminating B), and while Lucy was "at least 3.2 million years old" (lines 5-6), the Taung Child probably lived "3 million years ago" (line 18, contradicting D, which indicates that the Taung Child is OLDER than Lucy).

QUESTION 49.

Choice B is correct. See above for the explanation of the correct answer. A explains the discovery and dating of the Taung Child (but NOT the discovery's importance), C explains the structure of Lucy's society (NOT the Taung Child in particular), and D explains that fossils older than Lucy have been found (but does NOT mention the Taung Child). Be careful not to take C as evidence for Question 48 B, which raises the issue of gender.

QUESTION 50.

Choice A is correct. In the final paragraph, the author states that anthropologists have found human ancestor remains that are "older and better preserved" (lines 45-46) than Lucy, then returns to the topic of Lucy's significance. This information supports A, while only Lucy's "originality" (line 54) is called into question: other fossils such as the Taung Child have displayed bipedalism (eliminating B) and Lucy is described as an accurate "human ancestor" (line 50, eliminating C). D is a trap answer: although Lucy is in fact better known than other fossils, she is not the ONLY hominid fossil known to the public.

QUESTION 51.

Choice D is correct. The word "discount" refers to "revelations" (line 53) that Lucy is NOT the first human ancestor of her kind. In other words, an idea has been definitively negated or disproven, so that D is the best answer. A and B are negative but do not offer the needed content: the ideas about Lucy would REQUIRE attention to be negated and could not be simply "disregarded" or "overlooked". C is too weak, and would describe an idea that has DECREASED in popularity, not been COMPLETELY disregarded.

QUESTION 52.

Choice A is correct. In lines 55-56, the author describes Lucy as "the most interesting hominid fossil ever found, certainly in 1974 and possibly even now". This information supports A, while B, C, and D are all inappropriate negatives; C and D also introduce the topics of "science funding" and "archaeological remains" unlike Lucy (respectively), topics that are not considerations of this passage.

Section 2: Writing

Passage 1, Domfront: Where the Middle Ages Live

QUESTION 1.

Choice A is correct. This question requires you to determine the correct idiomatic expression: "of some importance" is the standard English phrase for describing the "little town of Domfront." (The same accepted usage occurs in phrases such as "idea of some importance" and "person of some importance.") B, C, and D all use prepositions that do not fit the standard idiom.

QUESTION 2.

Choice B is correct. The underlined portion must describe the "sixteenth century," which is a time period and thus takes "when" as the best reference. A refers to a place, C refers to a thing, and D refers to a means or a procedure.

QUESTION 3.

Choice D is correct. Sentence 3 begins by describing the energy of Domfront, then points out the "sleepy state" of the town, an idea discussed at length in the next paragraph. It would thus be best to use this sentence to transition to the next paragraph, justifying D as the best answer. Both A and C would interrupt the series of examples of activity in old Domfront that takes up much of the paragraph, while B would wrongly introduce these examples with a reference to the town's "sleepy state," which is traced to a different time period.

QUESTION 4.

Choice B is correct. The paragraph as a whole describes Domfront in the present tense, so the present "bursts" is the best verb for the subject "the old part." A is a past tense form (or may be read as a noun), while C and D both create sentence fragments rather than proper subject-verb combinations.

QUESTION 5.

Choice A is correct. The verb must describe the "rhythms" or sounds of the instruments mentioned in the sentence: "rebound" would properly refer to how a sound bounces off "stone walls." Of the false answers, A refers to a reprimand, C refers to the act of getting better, and D refers to the act of complementing or giving in return, so that all of these answers assume incorrect contexts.

QUESTION 6.

Choice C is correct. The underlined portion should provide the final noun in a list of items available at the Domfront festival: thus, look for parallelism. C rightly refers to "biscuits", while A ("they make") and D ("making") both break the parallelism and B ("these are made") introduces a comma splice.

QUESTION 7.

Choice B is correct. This question requires a reference to "additional spectacles": "Flag throwers, jugglers, and tumblers" have not been mentioned earlier, so that B is an excellent answer. A ("performers"), C ("feats"), and D ("wrestling") all refer to spectacles that have ALREADY been mentioned, not to ADDITIONAL spectacles as demanded by the prompt.

QUESTION 8.

Choice A is correct. The underlined phrase should be in parallel with "cleared of": "replaced by" offers the correct, past tense verb form. B breaks parallelism by introducing an -ing verb form, while C and D both disrupt the parallelism by introducing superfluous pronouns.

QUESTION 9.

Choice C is correct. In the relevant sentence, the non-essential phrase "to great fanfare" should describe how the mayor "declares" the opening of the celebration: it is best to offset this phrase using two commas. A, B, and D all wrongly divide the subject "mayor" from the verb "declares" using a single unit of punctuation.

QUESTION 10.

Choice D is correct. For this question, find a phrasing that is logical in the context of the passage: at a festival that energizes the otherwise inactive town of Domfront, "attendance" would naturally "swell." Trap answer A wrongly assumes that the people in attendance would INDIVIDUALLY swell or grow larger, B introduces an ambiguous pronoun, and C wrongly assumes that the costumes would swell.

QUESTION 11.

Choice C is correct. The best answer for this question will be consistent with the style and logic of the passage. A and B should be eliminated because these choices simultaneously indicate that the Domfront festival both happens EVERY two years and will NEVER happen again, while D is much too colloquial in phrasing. C is thus the most sensible and concise answer.

Passage 2, Beyond Rosie the Riveter: Women and World War II

QUESTION 12.

Choice B is correct. In the original phrasing, "the military" is wrongly compared to "any previous war". Eliminate A and choose B, which rightly indicates that the situation in World War II was different from the situation "in any previous war". C and D construct the comparison using "as" instead of "than", which is idiomatically incorrect in the relevant sentence.

QUESTION 13.

Choice B is correct. Earlier in the passage, the writer explains that jobs once worked by men "became vacant" and that "the government allowed women to assume roles previously restricted to men": one such role involved direct employment by the government, as specified in the new sentence. Choose B and eliminate A (since the sentence states a FACT, rather than arguing a REASON). C is incorrect because it is not firmly established earlier that women were given direct government jobs, while D uses flawed reasoning: even though the sentence does not pinpoint specific government jobs, it does effectively anticipate the discussion that follows.

QUESTION 14.

Choice C is correct. The subject of the underlined verb "are" is "one" (since the phrase "out of every three civil service workers" is an interrupting phrase that must be factored out. Eliminate the plural answers A and D. Because the sentence describes a situation in the 1940s, the underlined verb must also be in past tense: eliminate B and choose C as the best answer.

QUESTION 15.

Choice D is correct. The underlined portion must effectively refer back to the plural noun "women", who would accept plural "jobs". Eliminate A and B (which both refer to a single "job" for multiple women"), then choose D over the wordy and awkward C.

QUESTION 16.

Choice D is correct. This sentence presents a contrast between how women were "not permitted to participate" and the eventual measures that allowed women to "serve in the Army, Navy, and Coast Guard". B and C do not articulate contrasts, while A ("however") cannot connect two independent clauses in the way that a conjunction such as "but" or "yet" can. Thus, D is the best answer.

QUESTION 17.

Choice A is correct. While the previous paragraph discusses how women contributed to medical work and combat missions, this paragraph focuses on women's jobs in factories and on production lines. The best replacement will emphasize that the author is continuing to discuss new women's roles, as A effectively does. B is more closely related to ideas in the next paragraph, C distracts from the discussion of women's employment by discussing women as homemakers, and D returns to the topic of "government" (which was an emphasis only earlier in the passage).

QUESTION 18.

Choice C is correct. The phrase should describe HOW "Rosie the Riveter" was known, so that "popularly known" is the best construction. A wrongly treats both underlined words as adjectives (while "popularly" should MODIFY "known"), and B and D are awkward expressions that are not as concise as C.

QUESTION 19.

Choice B is correct. The underlined word should be part of a standard phrase introduced by "so" and describing degree or extent: "so . . . that" is the proper English usage. A and C both distort this common expression, while D turns the sentence into two independent clauses ("demand was", "women . . . worked") that are not effectively linked.

QUESTION 20.

Choice A is correct. The descriptive phrase "such as domestic labor, teaching, and sewing" must be offset by two dashes, as accomplished by A. In B, C, and D, the subject "jobs" is improperly separated from the verb "were" by a single dash.

QUESTION 21.

Choice B is correct. For this question, eliminate choices that introduce structural errors at the underlined portion: A and D both create comma splices. While B and C both avoid this error, C introduces faulty parallelism ("the war ended", "soldiers returning"), while B properly puts two full subject-verb ("the war ended", "the soldiers returned") combinations in parallel.

QUESTION 22.

Choice B is correct. The previous sentence explains that female workers were "quickly laid off", while the sentence introduced by the underlined portion explains what was "generally expected" of women as a result of this shift. Thus, look for an answer that creates a cause-and-effect relationship between the sentences: B does so, while A, C, and D all wrongly introduce contrast relationships.

Passage 3, Being Grateful for Gratitude

QUESTION 23.

Choice D is correct. The underlined pronoun should refer to an IDEA supported by research on gratitude, particularly the idea that "a grateful heart is a happy heart". D properly references an idea or notion, while A (an ambiguous "it"), B (an ambiguous "that"), and C ("them", which does not refer to any noun directly) do not clarify the content of the sentence as needed.

QUESTION 24.

Choice D is correct. Look for the correct idiomatic phrase: "appreciation of" is standard English usage, as in "appreciation of one's advantages" and "appreciation of one's family". A, B, and C all distort this phrase by introducing incorrect prepositions.

QUESTION 25.

Choice A is correct. The underlined phrase must refer directly to the noun "experiment", which is a THING and will naturally take "which" as the proper pronoun in any descriptive phrase. B can only describe a LOCATION, C creates an awkward construction and is best used to introduce a THOUGHT or IDEA, and D must refer to a TIME.

QUESTION 26.

Choice B is correct. The subject of the underlined verb is the plural "Participants", since the interrupting phrase "in the first group" must be factored out. Eliminate A and C, which involve singular verbs; then note that the sentence describes an experiment which was performed in the past. Thus, eliminate the present-tense D and choose the past-tense B as the best answer.

QUESTION 27.

Choice B is correct. The correct version of this sentence should compare the actions of "people who wrote about gratitude" to the actions of other "participants". While A wrongly compares the actions of the "people" directly to the "participants", and C wrongly compares the actions to "either of the other groups", B rightly compares the actions of the "people" to what the participants "did". Thus, choose B over the unnecessarily wordy D.

QUESTION 28.

Choice D is correct. Because the underlined sentence introduces a new point about gratitude that advances the writer's argument, it should be kept: eliminate A and B, but also eliminate C, since the sentence BUILDS OFF a point ("Moreover") rather than INTRODUCING a concept. Thus, D is the best answer.

QUESTION 29.

Choice C is correct. The underlined portion must both logically refer to the action taken by Seligman and obey correct grammar. While A involves a comma splice, B wrongly assumes that Seligman designed the experiment by assigning (not that he designed the experiment, THEN assigned the techniques) and D wrongly indicates that Seligman HIMSELF was "being assigned" a technique. Only C properly refers back to how Seligman performed his research by "assigning" techniques.

QUESTION 30.

Choice C is correct. As indicated by the word "than", the sentence should entail a comparison. A ("great . . . than") does not properly compare increases in happiness as the sentence demands. D would only be appropriate to a comparison involving more than two groups, while B ("more great") is closer in meaning to "more impressive" than "larger". The concise C is the best answer.

QUESTION 31.

Choice A is correct. The sentence relevant to this question involves the standard phrase "not only . . . but also", so that A is the best answer. B, C, and D all disrupt this standard pairing with different second conjunctions.

QUESTION 32.

Choice B is correct. According to the graph, the group that heard the speech made 80 phone calls in the second week, while the group that did not made 40 phone calls. B properly records the difference at 40 phone calls, while A records the increase within the group that didn't hear the speech, C records the increase within the group that did hear the speech, and D records the second-week number of phone calls for the group that did hear the speech.

QUESTION 33.

Choice B is correct. The underlined portion must properly refer back to the noun "positives", so that the plural "them" is the best pronoun. While C is singular, A and D are both possessive pronouns that indicate ownership, NOT pronouns that would refer directly to factors such as "positives".

Passage 4, The Good Graces of Seawater Greenhouses

QUESTION 34.

Choice B is correct. The underlined verb takes the subject "One" (since "of today's humanitarian dilemmas" is an interrupting phrase that most be temporarily disregarded). Eliminate plural choices A and D; then, consider that the "One" is present "today" and must be described in the present tense. Thus, eliminate C and choose B.

QUESTION 35.

Choice D is correct. The relevant sentence should involve the standard comparison phrase "more . . . than", so that A and B must be eliminated. Be cautious of trap answer C, which involves a faulty comparison: the sentence is meant to explain the situation "in desert countries", not to indicate that the "crisis is more apparent than desert countries", since the crisis is NOT a country. Thus, D is the best answer.

QUESTION 36.

Choice A is correct. The underlined portion must refer back to "desert countries" using an effective pronoun. B wrongly uses a singular pronoun, C is excessively wordy, and D awkwardly omits any pronoun whatsoever. A, which is concise and grammatically correct, is the best answer.

QUESTION 37.

Choice B is correct. The sentence refers to the "troubling" situation involving food needs in Africa, then explains problems that surround the high food prices and "already disadvantaged desert populations". Thus, the sentence follows an idea-and-illustration structure, so that B is the best answer. A wrongly introduces a contrast, C introduces a comma splice, and D uses faulty punctuation, since "because" cannot be fully separated from an independent phrase by a comma.

QUESTION 38.

Choice C is correct. The phrase "First assembled in 1994" should logically refer to Paton's greenhouse prototype, NOT to Paton. A and B thus involve misplaced modifiers, while D introduces redundancy with the phrase "resulting from the product of", since "result" and "product" are interchangeable ideas. C is thus the most concise and effective answer.

QUESTION 39.

Choice D is correct. To create the proper comparison in this sentence, prioritize both concision and grammar. Both A and C use the grammatically incorrect phrase "more cooler", while B is needlessly wordy. (It is also not clear whether or not the "more" in B is meant to modify "cooler", and it is best to eliminate confusion of this sort.) D is thus the best answer.

QUESTION 40.

Choice D is correct. While sentence 1 introduces the topic of how the greenhouses were "designed to work", sentences 3 and 4 explain exactly how the greenhouses work and sentence 2 mentions the "side benefits" of greenhouses. It would be most logical to place the discussion of benefits AFTER the full explanation of the greenhouses and how they operate: thus, D is the best answer. A and C would continue to wrongly split up the explanation of how the greenhouses operate, while B would turn sentence 2 into a problematic and ambiguous topic sentence, since this sentence does not mention the "greenhouses" as directly as sentence 1.

QUESTION 41.

Choice A is correct. Because multiple verbs occur in series in this sentence, try for effective parallelism. While A creates parallelism between "to filter" and "to cool and humidify", C wrongly introduces "humidifying" into this structure. B wrongly introduces an ambiguous pronoun ("them"), while D distorts the meaning of the original sentence so that all the verbs illogically refer to all of the nouns involved.

QUESTION 42.

Choice B is correct. At this point in the passage, the author is discussing the use of seawater greenhouses: a consideration of "irrigation techniques" only interrupts this analysis. Choose B and eliminate C and D, since the example of irrigation is IRRELEVANT rather than supporting or contradictory. Although the sentence should be deleted, it is not "entirely unrelated" to the passage's discussion of desert countries, which are in fact mentioned: thus, eliminate A on the basis of its faulty logic.

QUESTION 43.

Choice C is correct. In the underlined phrase, "cautious" should describe HOW "optimistic" the scientists are and should be replaced with the adverb "cautiously". Thus, eliminate A and B and choose C; trap answer D COMPARES the words "cautious" and "optimistic" rather than relating them in terms of DEGREE.

QUESTION 44.

Choice A is correct. Throughout the passage, the author has pointed to seawater greenhouses as a promising solution that has not yet been universally accepted: the correct answer should refer to the greenhouses using a positive tone. A fits all of these requirements, while B omits any reference to the author's position on the greenhouses and C and D wrongly assume that the author's tone is primarily negative.

Section 3: Math Test - No Calculator

QUESTION 1.

Choice A is correct. The first equation can be rewritten as $4x-2y=10$. If the second equation is then multiplied by -2, the second equation gives $-4x+4y=-14$. Then, if both equations are added together, the x variable is eliminated leaving $2y=-4$, or $y=-2$.

Choices B, C, and D are incorrect and may have resulted from errors in computation or conceptual understanding of when solving the linear system.

QUESTION 2.

Choice D is correct. Distributing the 3 in the numerator will yield the expression $6x+15$ which also appears in the denominator. Simplifying the overall expression by canceling the $6x+15$ in the numerator and the denominator gives the expression $\frac{1}{6x+5}$.

Choices A is incorrect and may result from attempting to simplify the $2x$ in the numerator with the pair of $6x$'s in the denominator and likewise, the 5 with the 5 and 15 in the denominator. Choice B is incorrect and may result from accidentally cancelling the $2x+5$ with the $6x+5$. Choice C is incorrect and may be the result of only distributing the 3 in the numerator to the $2x$ and not the 5, which would then cancel with the $6x+5$ in the denominator.

QUESTION 3.

Choice C is correct. Billy's score on the 3rd night was 64 and his score on the 7th night was 48. Billy's score was reduced by 16 over the course of 4 nights. Since Billy's score reduces by the same amount each night, the change in score, 16, divided by the change in days, 4, gives a reduction of 4 points each night. To get from 48 to zero, it will take $\frac{48}{4}$, or 12 nights to achieve a score of zero. 12 nights from the 7th night is the 19th night.

Choice A is incorrect because Billy's score was 48 on the 7th night which is already past the 4th night. Choices B and D are incorrect because neither of those days allows for a linear decrease with a score of 64 on the 3rd night and a score of 48 on the 7th night.

QUESTION 4.

Choice C is correct. In the expression $(-|x|)^3$, besides 0 which is the greatest possible solution, every number is the cube of a non-zero negative value, which is negative.

Choices A and B are incorrect because if you enter a value of 0 for x in both cases you will get a positive value of 1. Choice D is incorrect because it makes every value in Choice C the opposite. So, in Choice D, 0 is the lowest value and every non-zero value of x yields a positive solution.

QUESTION 5.

Choice B is correct. Since $f(x) = Kx^2 + 1$ and $f(8) = 33$, substituting 6 for x and 33 for $f(x)$ gives $33 = K(8)^2 + 1$. Then, solving the equation for K gives $32 = 64K$ which makes $K = \frac{1}{2}$. Substituting this value for K and evaluating $f(4)$ by substituting 4 for x gives $f(4) = \frac{1}{2}(4)^2 + 1$, or $f(4) = \frac{1}{2}(16) + 1$. Thus, $f(4) = 8 + 1 = 9$.

Choice A is incorrect because it is the answer if the 4 is input, but not squared. Choice C is incorrect because it assumes the constant K is 1. Choice D is incorrect because it assumes the constant K is 2.

QUESTION 6.

Choice B is correct. If one evaluates $f(\frac{1}{9}x)$ using $f(x) = 3x + 5$ by substituting $\frac{1}{9}x$ for every instance of x, the equation yields $f(\frac{1}{9}x) = 3(\frac{1}{9}x) + 5$, which simplifies to $\frac{1}{3}x + 5$.

Choices A, C, and D are incorrect because none will produce a coefficient of $\frac{1}{3}$ when substituted appropriately.

QUESTION 7.

Choice D is correct. The equation $\frac{a(b+a)}{2a} = 5$ can be rewritten as $\frac{b+a}{2} = 5$. It follows that $b + a = 10$, or $a = 10 - b$.

Choices A, B, and C are incorrect and most likely result from miscalculations when rewriting the original equation $\frac{a(b+a)}{2a} = 5$. For example, choice A may be the result of a distribution error in which the a is distributed and reduced properly with the first term, but distributed and not reduced with the second term.

QUESTION 8.

Choice C is correct. In order for two lines to be perpendicular when in the form $y = mx + b$, their slopes, m, must have opposite reciprocal values. In choice C, if $3y + 6x = 12$ is rewritten in the form $y = mx + b$, it yields $y = -2x + 4$. Likewise, if $-6y + 3x = 9$ is rewritten in the form $y = mx + b$, it yields $y = \frac{1}{2}x - \frac{3}{2}$. In this form it is easy to see that -2 and $\frac{1}{2}$ are opposite reciprocals.

Choices A, B, and D are incorrect and may be the result of confusing perpendicular slopes with parallel slopes or of other potential miscalculations, such as a missed sign.

QUESTION 9.

Choice C is correct. One can see that the two solutions $(a,16)$ and $(b,16)$ share a common y-value of 16. If this value is substituted for $f(x)$ in the quadratic equation $f(x)=x^2+7$, the equation yields $16=x^2+7$, or $9=x^2$. Thus the solutions $x=\pm 3$. Substituting the two x-values into the expression $|a-b|$ yields a value of 6 regardless of which value you substitute for a or b.

Choices A, C, and D are incorrect and may be the result of calculation errors in solving for a and b. For example, choice A may be the result of mistaking $|a-b|$ for $|a+b|$.

QUESTION 10.

Choice B is correct. To solve for x, square each side of the equation, which gives $(x-2)^2=(\sqrt{x})^2$, or $(x-2)^2=x$. Then by expanding the left side $(x-2)^2$ the equation becomes $x^2-4x+4=x$, or $x^2-5x+4=0$. From here, factoring the left hand side gives $(x-4)(x-1)=0$, and so $x=1$ or $x=4$. Substituting 1 for x in the original equation gives $1-2=\sqrt{1}$, which yields $-1=1$, which is an extraneous solution.

Choices A and C are incorrect because -1 and 2 could only arise as solutions from calculation errors. Choice D is incorrect because if 4 is substituted into the original equation, $4-2=\sqrt{4}$, or $2=2$, which is true and not extraneous.

QUESTION 11.

Choice C is correct. Multiplying each side of the equation $\dfrac{4m}{m+\dfrac{1}{24}}=8$ by $m+\dfrac{1}{24}$ gives $4m=8(m+\dfrac{1}{24})$. Distributing 8 over the parentheses gives the equation $4m=8m+\dfrac{1}{3}$, or $-4m=\dfrac{1}{3}$. Solving for m, one gets $m=-\dfrac{1}{12}$.

Choices A, B, and D are incorrect and may be the result of calculation errors or improper use of the distributive property.

QUESTION 12.

Choice D is correct. The price of Rachel's package was x dollars and the price of Angela's package was $x+3$ dollars. Thus, the total price of all muffins without discount was $2x+3$ dollars. However, since both purchases were made at 50% off the marked prices, the actual price was $0.5(2x+3)$, or $x+\dfrac{3}{2}$. Since the cost was split evenly among Rachel, Angela, and 10 other friends, we must divide this total by 12, yielding $\dfrac{x+\dfrac{3}{2}}{12}$, or $\dfrac{2x+3}{24}$.

Choice A is incorrect because the total price was not divided evenly among the 12 friends. Choices B and C are incorrect because neither expression accounts for the 50% discount on the final purchase price.

QUESTION 13.

Choice B is correct. The equation $x^2 - a^2 = ax$ can be rewritten in the form $x^2 - ax - a^2 = 0$. Applying the quadratic formula, $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, to this equation with $a = 1$, $b = -a$, and $c = -a^2$ gives $\frac{-(-a) \pm \sqrt{(-a)^2 - 4(1)(-a^2)}}{2(1)}$, or $\frac{a \pm a\sqrt{5}}{2}$.

Choices A, C, and D are incorrect and may be the result of applying the quadratic formula inappropriately.

QUESTION 14.

Choice A is correct. In the graph, $y > 1$ represents the region strictly above the horizontal line at 1. $y < 5 - x^2$ represents the region strictly below the parabola. Plotting every coordinate point with integer coordinates that falls in this region yields the following 7 points: $(-1,2)$, $(0,2)$, $(1,2)$, $(-1,3)$, $(0,3)$, $(1,3)$, and $(0,4)$.

Choices B, C, and D are incorrect and may be the result of misinterpreting the constraints of the inequalities. For example, Choice D is incorrect because 15 would be the correct number of coordinate points with integer coordinates that satisfy the system of inclusive inequalities defined by $y \geq 1$ and $y \leq 5 - x^2$.

QUESTION 15.

Choice A is correct. To rewrite $\frac{(16+3i)(1+4i)}{i}$ in the form $a - bi$, one must first expand the numerator which gives $\frac{16+64i+3i+12i^2}{i}$, or $\frac{4+67i}{i}$. Multiplying the numerator and the denominator by i gives $\frac{4+67i}{i} \bullet \frac{i}{i} = \frac{4i+67i^2}{i^2}$. Since $i^2 = -1$, this expression is equivalent to $\frac{4i-67}{-1}$, or $67 - 4i$. Since the question asks for the remainder when a is divided by b, if one divides 67 by 4, one is left with a remainder of 3.

Choices B, C, and D are incorrect and may be the result of errors in expanding the numerator or errors in converting to the form $a - bi$.

QUESTION 16.

The correct answer is .384, .385, or $\frac{5}{13}$. The cosine of $y°$ is $\frac{12}{13}$ the ratio of the side adjacent to the $y°$ angle and the hypotenuse is $\frac{12}{13}$. One can use this ratio in the right triangle to recognize the pythagorean triple 5-12-13. Then, it follows that the ratio of adjacent to hypotenuse for the $x°$ angle would be $\frac{5}{13}$.

QUESTION 17.

The correct answer is .5 or $\frac{1}{2}$. In order for a system of linear equations to have no solutions using the elimination method, both variables must be eliminated. Multiplying the first equation $Ax+2y=12$ by 16 gives $16(Ax+2y=12)$, or $16Ax+32y=192$. This makes the y-coefficient in both equations the same. In order for the system to have no solutions, the x-coefficient must be the same in both equations. Setting $16A=8$ gives $A=\frac{1}{2}$.

QUESTION 18.

The correct answer is 240. Knowing $D=rt$, Truck A's trip can be represented by the equation $D=40t_1$, where D represents the distance between the loading dock and Dover County and t_1 represents the time that Truck A spent traveling to Dover County. Truck B's trip can be represented by the equation $D=60(t_1-2)$, where D represents the same distance between the loading dock and Dover County that Truck A had traveled and t_1-2 represents the two hours less that Truck B traveled to get to Dover County. Setting the equations equal to each other yields $40t_1=60(t_1-2)$. Distributing the 60 gives $40t_1=60t_1-120$ and through solving yields $-20t_1=-120$, or $t_1=6$. Substituting 6 for time in Truck A's equation gives $D=40(6)=240$.

QUESTION 19.

The correct answer is 18. The polynomial on the left-hand side can be factored by grouping into the form on the right-hand side of the equation. On the left-hand side of $x^3-2x^2-9x+18=(x-a)(x-b)(x+c)$, one can group the first two terms together and the last two terms together and factor both groups which yields the expression $x^2(x-2)-9(x-2)$, which can be further simplified to $(x^2-9)(x-2)$. Factoring the binomial x^2-9 and rearranging the order of the factors yields $(x-2)(x-3)(x+3)=(x-a)(x-b)(x+c)$. Since a, b, and c are positive constants, $a=2$, $b=3$, and $c=3$. Therefore, $abc=(2)(3)(3)=18$.

QUESTION 20.

The correct answer is 48. When a rectangle is inscribed in a circle, the connection between the circle and the rectangle is that the diameter of the circle is the diagonal of the rectangle. If the area of the circle is 25π and the formula for finding the area of a circle is πr^2, solving $\pi r^2=25\pi$ yields $r^2=25$, or $r=5$. It follows that the diameter is 10 inches. Since the diagonal of a rectangle splits the rectangle into two right triangles and these triangles each have one side length measuring 6 inches and a hypotenuse measuring 10 inches, recognizing the Pythagorean triple 6-8-10 gives us the length of the rectangle, 8 inches. Using the area formula for a rectangle $A=lw$, $A=(8)(6)=48$ square inches.

Section 4: Math Test - Calculator

QUESTION 1.

Choice B is correct. Melvin will spend the budgeted \$85 each day for d days. Therefore, Melvin will spend a total of $85d$ dollars. Because his vacation account had \$600 to start and Melvin has spent $85d$ dollars, Melvin will have $600-85d$ dollars left in his account.

Choices A and C are incorrect because both expressions indicate that his account will be growing in size which cannot happen because he is spending money. Choice D is incorrect because it indicates that his vacation account started with \$85 and that he would be spending \$600 each day.

QUESTION 2.

Choice D is correct. Since the population data is known, it is reasonable to estimate that a random sample from that population will follow the same proportion as the population. 4,000 out of 20,000 people prefer to park inside of a garage, or 20%. So, it follows that 20% of the random sample of 100 people from that population, or $100(.20)=20$, should prefer parking in a garage.

Choices A, B, and C are incorrect and may be the result of miscalculating the appropriate percent of the sample.

QUESTION 3.

Choice C is correct. Let x be the amount of money, in dollars, that Amelia raised for cystic fibrosis research. Since Juan raised \$100 more than half of the amount of money that Amelia raised, Juan raised $\frac{1}{2}x+100$ dollars. Since they raised a combined total of \$2,800, the equation $x+\frac{1}{2}x+100=2800$ must be true. Simplifying, $\frac{3}{2}x+100=2800$ yields $\frac{3}{2}x=2700$, or $x=1800$. Therefore, Amelia raised \$1,800 for cystic fibrosis research.

Choice A is incorrect because \$900 is half of the amount of money Amelia raised, but not \$100 more than half. Choice B is incorrect because it is the amount of money that Juan raised for cystic fibrosis research. Choice D is incorrect and may be the result of incorrectly adding 100 when solving for Amelia's total.

QUESTION 4.

Choice C is correct. Quadrants I and II together are defined to be the area above the x-axis. If Line k only has solutions above the x-axis, it must be a horizontal line, which by definition has a slope of 0. In order to be in quadrants I and II, it must be above the x-axis as defined above. This means that Line k must have a positive y-intercept. Therefore, if Line k has a slope of 0 and a positive y-intercept, it will have no x-intercept.

Choice A is incorrect because Line k does have a slope of 0. Choice B is incorrect because Line k does have a positive y-intercept. Choice D is incorrect because Line k has a slope of 0 and the x-axis has a slope of 0, which does make them parallel.

QUESTION 5.

Choice B is correct. Let s represent the number of songs that Brandon purchased in a year. Since the annual membership fee for the digital music streaming service is \$36 and each song purchase costs \$0.98, the total of the annual membership fee and all of the song purchases in a year can be represented by the expression $36+0.98s$. Since Brandon's annual dues were \$71.28, the equation $36+0.98s=71.28$ must be true. Therefore, $0.98s=35.28$, or $s=36$. If Brandon purchased 36 songs in one year, then his average monthly song purchases are $36\div 12$, or 3.

Choices A and C are incorrect and may be the result of errors in solving the appropriate equation. Choice D is incorrect because it gives the total number of song downloads for the year, not the monthly average.

QUESTION 6.

Choice C is correct. Because there are 36 inches in 1 yard, 6 yards of rope have a measure of $6(36)=216$ inches. If these 216 inches are distributed evenly to 9 people, each person will receive $216\div 9=24$ inches of rope.

Choices A, B, and D are incorrect and are most likely the result of errors in properly applying the unit conversion and dividing.

QUESTION 7.

Choice D is correct. Pressure is equivalent to force divided by the area of an object that makes contact with another surface. This can be expressed as $Pressure=\frac{Force}{Area}$.

Substituting 2,000 newtons of force and a contact area of 0.2 m^2, $Pressure=\frac{2{,}000N}{0.2m^2}$ which yields a pressure of 10,000 pascals of pressure.

Choices A, B, and C are incorrect because when force is divided by area in each case, the result is well below 10,000 pascals of pressure.

QUESTION 8.

Choice B is correct. According to the table, of the 520 total sales, 120 are cell phone sales from January to March and another 120 are cell phone sales from April through June. Therefore, there were a total of 240 cell phone sales from January through June. This leaves the proportion of total sales that were cell phone sales between January and June as $\frac{240}{520}$, or $\frac{6}{13}$.

Choice A is incorrect because $\frac{3}{13}=\frac{120}{520}$, which is the proportion of total sales that were from cell phone sales in January through March or April through June, but not both.

Choice C is incorrect because $\frac{3}{5}=\frac{240}{400}$, which is the proportion of all cell phone sales that took place in the period from January to June. Choice D is incorrect because $\frac{5}{6}=\frac{240}{288}$, which is the proportion of total sales in the period from January to June that were cell phone sales.

QUESTION 9.

Choice D is correct. All of the answer choices are quadratic equations and in order for a quadratic equation to have only one x-intercept, it must be the square of a single factor and that x-intercept must be a maximum or a minimum of the function. Further, if the function has a negative y-intercept, the function must be an inverted parabola and the x-intercept must be a maximum. Since $y=-x^2-4x-4$ is the only solution that is an inverted parabola that can be written as the square of a single factor, $y=-(x+2)^2$, it is the only function that fits the required criteria.

Choice A is incorrect because it has a y-intercept of 0, which is not negative. Choices B and C are incorrect because they are parabolas that are concave upward, a form which does not allow for a single root and a negative y-intercept.

QUESTION 10.

Choice A is correct. In order to have the highest ratio of hours of study to hours of sleep, one looks for the student that had the highest number of hours of study and the lowest number of hours of sleep. This student, who had studied for 8 hours, had 1 hour of sleep.

Choices B and D are incorrect because 6 hours and 10 hours of sleep were attained by the students with the *lowest* ratio of hours of study to hours of sleep. Choice C is incorrect because 8 hours is the number of hours studied by the student with the highest ratio of hours of study to hours of sleep, not the number of hours slept.

QUESTION 11.

Choice C is correct. If one removes the student who studied for one hour and slept for 2 hours and removes the student who studied for 7 hours and slept for 7 hours, a general trend is present in the data points. The number of hours of sleep ranges from 6 to 10 when hours of study is at 0 and falls to 0 to 3 hours of sleep when the study hours reach 8. Using these ranges, we can see that the y-intercept should be at approximately 8 and the number of hours of sleep falls by approximately 6 hours over the course of the 8 hours of study. This gives a slope of $-\frac{6}{8}$, or $-\frac{3}{4}$.

Choices A and B are incorrect because the slopes are positive. Choice C is incorrect and may result from an error in calculating the y-intercept, which is too high.

QUESTION 12.

Choice C is correct. The value of the motorcycle starts at \$9,000 and drops quickly to \$4,000 over the course of two years. The value of the motorcycle then drops by approximately \$2,000 over the next 8 years. This non-linear decay follows an exponential decay model in the form $y = 9{,}000(r)^t$, where r is a fractional constant that is greater than 0 but less than 1.

Choices A and B are incorrect due to the fact that the scatterplot clearly does not follow a linear model. Choice D is incorrect because in an inverted quadratic model, the value of the motorcycle would decay slowly at first and decay more rapidly as time went on.

QUESTION 13.

Choice A is correct. Solving $S(x) = I(1+\frac{r}{100})^x$ for r first yields $\frac{S(x)}{I} = (1+\frac{r}{100})^x$, or $\sqrt[x]{\frac{S(x)}{I}} = 1+\frac{r}{100}$. By subtracting 1 from both sides and multiplying by 100, $r = 100\sqrt[x]{\frac{S(x)}{I}} - 100$.

Choices B, C, and D are incorrect and may be the result of errors in isolating the appropriate variable.

QUESTION 14.

Choice A is correct. Since $1728\,in^3$ are equivalent to $1\,ft^3$ and Ankit has a cube of ice with a volume of $27\,ft^3$, multiplying gives $(\frac{1728in^3}{1ft^3})(27\,ft^3) = 46{,}656in^3$. Each cube Ankit cuts will measure 2 inches X 2 inches X 2 inches. Since the volume of a cube is given by s^3, we know that the volume of a single smaller cube is $(2)^3$, or $8\,in^3$. Then, by dividing the volume of the larger cube by the volume of a single smaller cube, one gets $\frac{46{,}656in^3}{8in^3} = 5{,}832$ cubes.

Choices B, C, and D are incorrect and may result from calculation errors when dividing up the volume of the large cube. For example, choice D is incorrect because carving 46,656 cubes from a single cube whose volume is $46{,}656\,in^3$ would make the volume of each smaller cube $1\,in^3$, not $8\,in^3$.

QUESTION 15.

Choice A is correct. An equation in the form $y = mx + b$ where b is a positive constant and m is a negative fractional constant, has a positive y-intercept and a slope that gently

decreases from left to right. The scatterplot shown in answer choice A is the only one that would best be modeled by this equation.

Choice B is incorrect because it would best be modeled by a linear model with a slope of exactly -1. Choices C and D are incorrect because they would best be modeled by exponential decay and growth models, respectively.

QUESTION 16.

Choice B is correct. Given that one extra man is needed to complete the job and assuming that the initially quoted hours stay the same, if m is increased by 1 in the equation for Company 1, $C_1(h)$ will increase by one multiple of $12h$. In the equation for Company 2, if m is increased by 1, $C_2(h)$ will increase by one multiple of $15h$. Given that h is the same in both equations, the quote for Company 2 will increase by more.

Choices A and C are incorrect and may result from misinterpreting the coefficients and the slope of each linear equation. Choice D is incorrect since h occurs in both equation and nothing implies that h has a different value for both equations. Therefore, if h is the same in both quotes, hourly cost can be calculated from the number of men on the job, m.

QUESTION 17.

Choice B is correct. Given that both jobs require ten men, the least number of hours, h, where the total cost to have the house painted by Company 1 would be less than the total cost to have the house painted by Company 2 can be calculated by solving $640+12(10)h<400+15(10)h$. Simplifying the equation gives $640+120h<400+150h$ and after combining like terms the equation simplifies to $240<30h$. Therefore, $8<h$. So, the least value for h is 9.

Choice A is incorrect and may result from misreading and trying to determine when the two companies will cost the same. Choices C is incorrect and may result from a calculation error while solving. Choice D is incorrect and may result from substituting one man in each equation rather than 10 men.

QUESTION 18.

Choice D is correct. Dividing both sides of the inequality $6m\le 2$ by 3 gives $2m\le\frac{2}{3}$.

Adding 1 to both sides of $2m\le\frac{2}{3}$ yields $2m+1\le\frac{2}{3}+1$, or $2m+1\le\frac{5}{3}$. Therefore, the greatest possible value of $2m+1$ is $\frac{5}{3}$.

Choice A is incorrect because it gives the greatest possible value of m, not of $2m+1$. Choice B is incorrect because it gives the greatest possible value of $2m$, not of $2m+1$. Choice C is incorrect because it gives the greatest *integer* value of $2m+1$, which was not required by the question.

QUESTION 19.

Choice B is correct. There are a total of 18 marbles in the jar. However, the question dictates that a black or a red marble will be selected at random. This reduces the total to 12. There are two black marbles marked with a number greater than 4 and two red marbles marked with a number greater than 4. This is a total of 4 marbles. So, the probability of randomly selecting a marble with a number greater than 4 given that the marble is black or red is $\frac{4}{12}$, or $\frac{1}{3}$.

Choice A is incorrect and may result from multiplying the probability of randomly selecting a black marble with a number greater than 4, $\frac{1}{3}$, with the probability of randomly selecting a red marble with a number greater than 4, $\frac{1}{3}$. $\frac{1}{3}\times\frac{1}{3}=\frac{1}{9}$. Choices C and D are incorrect and may result from errors in calculating the proability of selecting numbers that are 4 or less.

QUESTION 20.

Choice B is correct. One must calculate by what percent of its original value each form of exercise was reduced. This can be calculated by taking the initial value and multiplying by a decay factor $(1-x)$, where x is percent decrease in decimal form, which results in a final value. In the case of Cycling, the initial value in 2012 is 350 miles which gets multiplied by a decay factor and results in a value of 100 miles in 2013. So, the equation $350(1-x)=100$ yields $1-x=0.285$. Simplifying further gives $x=0.714$, or a 71.4% decrease which is the largest decrease of the 3 exercise types.

Choices A and C are incorrect and may be the result of a conceptual error in understand the concept of percent decrease. Choice D is incorrect and may result from finding the decrease in mileage, not the *percentage* decrease in mileage.

QUESTION 21.

Choice C is correct. Jackson's total miles of exercise for 2012 and 2013 is 2,000 miles; 1,000 miles for each year. Adding the number of miles he swam each year, 150 and 650, gives 800 miles. Finding the percentage of his overall miles for 2012 and 2013 accounted for by swimming can be calculated by dividing the miles swum by the total miles: $\frac{800 miles}{2{,}000 miles}=0.40$, or 40%.

Choices A, B, and D are incorrect and may be the result of errors in calculating the percentage or misinterpreting the question. For example, choice D is incorrect because 65% is the percentage of Jackson's total miles accounted for by swimming in 2013 only.

QUESTION 22.

Choice B is correct. Since the graph shows an inverted parabola with a negative y-intercept and a two positive x-intercepts, the function whose graph is shown must have those characteristics. Factoring $y=-x^2+4x-3$ gives $y=-(x-3)(x-1)$, a function

whose graph is an inverted parabola with a negative y-intercept and two positive x-intercepts.

Choice A is incorrect because it has *no* x-intercepts. Choices C is incorrect because it has two *negative* x-intercepts. Choice D is incorrect because its graph is *not* an inverted parabola and the function has a *positive* y-intercept.

QUESTION 23.

Choice A is correct. The polynomial, with four terms, can be factored by grouping the first two terms together and grouping the second two terms together. $0 = x^3 - 4x^2 - 9x + 36$ becomes $0 = (x^3 - 4x^2) + (-9x + 36)$ which factors to $0 = x^2(x-4) - 9(x-4)$. Factoring out the $(x-4)$ gives $0 = (x-4)(x^2-9)$ which can ultimately be fully factored to $0 = (x-4)(x-3)(x+3)$. In this form, it is clear that the solutions are 4, 3, and -3. The only answer that is not a solution to the equation is -4.

Choices B, C, and D are incorrect because they are all solutions to the equation and the question asked for the answer that is *not* a solution.

QUESTION 24.

Choice A is correct. If a and b are numbers such that $|a-b| > 10$, absolute value rules state that a and b are more than 10 apart. This however does not dictate whether these numbers are positive or negative. A counterexample to statement I could have $a = -12$ and $b = 1$. Substituting these values gives $a - b = (-11) - (1) = -12$ which is *not* greater than 0. A counterexample to statement II could have $a = -6$ and $b = 6$. Substituting these values gives $|(-6) + (6)| = 0$ which is *not* greater than 10. A counterexample for statement III could use the same values for a and b used in the counterexample for statement II. Substituting these values gives $(-6)(6) = -36$ which is *not* greater than 0. The three counterexamples prove that *none* of the statements are true.

Choices B, C, and D are incorrect and may result from errors in generating counterexamples that disprove some of the statements.

QUESTION 25.

Choice D is correct. The perimeter can be represented by the equation $3x + 4x + 3x + 4x = 56$ which can be simplified to $14x = 56$, or $x = 4$. Since $x = 4$, the length of the rectangle is $3(4) = 12$ and the width of the rectangle is $4(4) = 16$. In the diagram, the diagonal forms a pythagorean triple with the length and the width, $3x : 4x : 5x$. So, the diagonal, or hypotenuse in the pythagorean triple, is equal to $5(4) = 20$.

Choice A is incorrect and may result from miscalculating the value of x. Choices B and C are incorrect and may result from misreading the question and solving for the length or width of the rectangle, respectively.

QUESTION 26.

Choice C is correct. In order to interpret the value of the coefficient 0.55 in the equation, one must first understand the context of the equation. The equation gives the increase in value of a home based on the amount of money that the homeowner invests in renovations. Since the equation is linear, $10+0.55x$, the y-intercept may represent the increased value of the home regardless of home improvements. This may be due to an improvement in the housing market. The slope, 0.55, is directly attached to x, the amount of money in thousands of dollars that the homeowner invests in home improvements. The coefficient 0.55 can be considered as a percentage, 55% to be exact. So, in the context of the question, any money invested in home improvements by the homeowner will return 55% of the investment. In choice C, 55 cents is returned on every dollar spent, which is 55%.

Choices A, B, and D are incorrect because they do not represent a 55% return for each dollar that is invested by the homeowner toward home improvements.

QUESTION 27.

Choice D is correct. Since average can be calculated by dividing the sum of a set of numbers by the number of numbers, the sum of four bags of concrete divided by 4 must equal 85, $\frac{a+b+c+d}{4}=85$. Multiplying by 4 on both sides gives the sum of the four bags, $a+b+c+d=340$. When two additional bags are added, the average increases to 92, which gives the equation $\frac{a+b+c+d+(e+f)}{6}=92$, which produces the sum $a+b+c+d+(e+f)=552$. In order to calculate the average of the two additional bags, one must find the sum of the two additional bags and divide by 2. Substituting $a+b+c+d$ with 340 in the equation $a+b+c+d+(e+f)=552$ gives $340+(e+f)=552$ which gives the sum $(e+f)=212$. Finally, dividing by 2 gives the average weight of the two additional bags, $\frac{(e+f)}{2}=106$.

Choices A, B, and C are incorrect and may be the result of a misinterpretation of the question or a conceptual error in understanding the concept of averages

QUESTION 28.

Choice A is correct. The coordinates of the vertex appear as constants in a quadratic equation when it is written in vertex form. Using the given roots $(-1,0)$ and $(2,0)$, one can expand the multiplied binomial factors $(x+1)(x-2)$ and get the equation in standard form, $f(x)=x^2-x-2$. The quadratic equation in standard form can be rewritten in vertex form by completing the square:

$$f(x)=x^2-x-2=(x^2-x+\frac{1}{4})-\frac{1}{4}-2=(x-\frac{1}{2})^2-\frac{9}{4}$$

In the form above, the quadratic equation displays the vertex, $(\frac{1}{2},\frac{9}{4})$, as coefficients.

Choices B, C, and D are incorrect and may result from errors in completing the square to convert from the standard form of a quadratic function to vertex form.

QUESTION 29.

Choice B is correct. Since the question asks about the slope of a line that intersects the function $f(x) = 1 - x^3$, it may be easier to look at the function $f(x) = -x^3$, since the y-intercept has no bearing on the slope of a line. Looking at the graph of $f(x) = -x^3$, one can see that the only way to attain 3 points of intersection with the cubic function and the line is if the line has a negative slope. Since the question asks for the greatest *integer* value of the slope and the greatest negative integer is -1, one should try the linear equation with a slope of -1, $y = -x$. Using the substitution method to solve the system of equations yields $-x = -x^3$, or $x^3 - x = 0$. Completely factoring the binomial gives $x(x+1)(x-1) = 0$ which displays three distinct roots 0, -1, and 1. Since -1 is the greatest negative integer possible, it is the greatest slope for which the system has three distinct solutions.

Choices A is incorrect because, although it intersects $f(x) = 1 - x^3$ three times, it is not the greatest integer slope that does. Choices C and D are incorrect because the graphs of the linear equations with slopes of 0 and 1, respectively, do not intersect the function $f(x) = 1 - x^3$ three times.

QUESTION 30.

Choice A is correct. The standard deviation is a measure of the spread of a distribution and can be thought of as the average distance from the mean. If a distribution has a low standard deviation, the average distance from the mean is low. This is a scenario where more data is collected closer to the mean, or closer to the center of the distribution. On the other hand, if a distribution has a high standard deviation, the averge distance to the mean is high. This is a scenario where data is more spread out or appears farther from the center of the distribution. A normal distribution, or a typical bell curve, would generally have a lower standard deviation than a distribution that is flat across or even higher on the outer edges because it has more data closer to the center which is closer to the mean of the distribution. Looking at the distributions of trees from the northern and southern parts of the county, it appears that the trees from the northern part of the county follow a normal distribution, or bell-curved shape, whereas the trees from the southern part of the county seem more spread out. This implies that the standard deviation of pine tree heights in the northern part of the county is less than the standard deviation of pine tree heights in the southern part of the county.

Choices B, C, and D are incorrect and may result from a misunderstanding of the visual attributes of the standard deviations of distributions presented in bar graphs.

QUESTION 31.

The correct answer is 3. Substituting .60 for *intensity* the equation yields $T_{HR} = (220 - Age)(.60)$ and by distributing the .60, the equation becomes $T_{HR} = 132 - .60(Age)$. This equation follows a linear model with a slope of $-.60$. This signifies a reduction of .60 beats per minute for every age increase of one year. So, an increase of 5 years would yield $-.60(5) = -3$, or a reduction of 3 beats per minute.

QUESTION 32.

The correct answer is .6 or $\frac{3}{5}$. First, one must convert the units so that they all match. Since the question is asking for an answer in inches, one should first convert 120 cubic centimeters into cubic inches. One cubic inch measures $1in.\times 1in.\times 1in.$ which is equivalent to $2.54cm\times 2.54cm\times 2.54cm$, or $16.387cm^3$. Dividing 120 by 16.387 gives $7.32in^3$. The volume of a rectangular solid is calculated using the formula $V = lwh$. Substituting 3 for length, 4 for width, and 7.32 for volume, gives the equation $(3)(4)h = (7.32)$ which simplifies to $12h = 7.32$, or $h = 0.61$. 0.61 rounded to the nearest tenth is .6. Either the fraction $\frac{3}{5}$ or its decimal equivalent, .6, may be gridded as the answer.

QUESTION 33.

The correct answer is 30. Since Nadia expects 4 people to attend, she plans to cut the pizza into 4 slices. Since a full pizza is $360°$, dividing by 4 yields $\frac{360°}{4} = 90°$. Nadia expected the central angle that defines each slice to be $90°$. Since 6 people actually attend, the pizza will be cut into six slices which gives $\frac{360°}{6} = 60°$. The difference between the central angle she expected and the central angle that actually occured is $90° - 60° = 30°$.

QUESTION 34.

The correct answer is 44. If one hose can fill the pond at 30 quarts per minute and the other hose can fill the pond at 20 quarts per minute, if both hoses are filling the pond for m minutes, the equation $30m + 20m = 2200$ can be solved to find m, the number of minutes that the hoses take to fill the pond together. Simplifying, one gets $50m = 2200$, or $m = 44$.

QUESTION 35.

The correct answer is 20. If there are 140 red and green candies in a bowl and $\frac{4}{7}$ of the candies are red, one can calculate the number of red candies, $\frac{4}{7}(140) = 80$, and the number of green candies, $\frac{3}{7}(140) = 60$. Since only green candies will be removed, the 80 red candies will remain untouched. To achieve a red to total ratio of $\frac{2}{3}$, the proportion $\frac{2}{3} = \frac{80}{total}$ can be solved to find the total number of candies that must remain in the bowl. Cross-multiplying gives $2total = 240$, or $total = 120$. In order to have the total reduced from 140 to 120, 20 green candies must be removed.

QUESTION 36.

The correct answer is 75. In the equation $PV = nRT$, if pressure remains constant and the number of moles of gas and the temperature are reduced to half, one can substitute $\frac{1}{2}n$ for n and $\frac{1}{2}T$ for T which yields the equation $PV_1 = (\frac{1}{2}n)R(\frac{1}{2}T)$, which simplifies to $PV_1 = \frac{1}{4}nRT$. Substituting PV for nRT yields $PV_1 = \frac{1}{4}PV$, or $V_1 = \frac{1}{4}V$. The new volume, V_1, must become $\frac{1}{4}$ of the old volume. Reducing to $\frac{1}{4}$ of the old volume is equivalent to a reduction of 75%.

QUESTION 37.

The correct answer is .5 or $\frac{1}{2}$. Since the account value increased by \$5 in the first year, the account value at the end of one year is $\$1,000 + \$5 = \$1,005$. Substituting 1,005 for the account value after 1 year, 1,000 for the initial account value, and 1 for the number of years into the equation $A_{Value} = I(1+\frac{r}{100})^t$ yields the equation $1,005 = 1,000(1+\frac{r}{100})^1$. Dividing by 1,000 yields $1.005 = 1+\frac{r}{100}$ and subtracting 1 gives $.005 = \frac{r}{100}$. Solving for r gives $r = .5$. Either the fraction $\frac{1}{2}$ or its decimal equivalent, .5, may be gridded as the answer.

QUESTION 38.

The correct answer is 1015. Calculating the account value after 4 years have passed, K, using an initial value of \$1,000 and a growth rate of .5% yields $K = 1,000(1+\frac{.5}{100})^4$ which is equivalent to $K = 1,000(1.005)^4$. Raising 1.005 to the fourth power and multiplying by 1,000 gives $K = 1,000(1.02) = 1,020$. Then, substituting 1,020 for the account value, .5 for r, and 1 for t yields $1,020 = I(1+\frac{.5}{100})^1$ which can be simplified to $1,020 = I(1.005)$, or $I = 1,014.93$. Rounding to the nearest dollar gives \$1,015. An initial account value of \$1,015 will yield the same account value after one year as a \$1,000 initial account value will yield after four years at the same growth rate. Disregard the comma when gridding your answer.