

Answer Key

Reading and Writing

Math

Module 1

Questions	Correct	Mark your correct answers
1.	C	
2.	D	
3.	D	
4.	C	
5.	D	
6.	A	
7.	A	
8.	B	
9.	D	
10.	A	
11.	A	
12.	D	
13.	B	
14.	C	
15.	B	
16.	D	
17.	D	
18.	D	
19.	B	
20.	C	
21.	C	
22.	D	
23.	C	
24.	B	
25.	B	
26.	D	
27.	B	

Module 2

Questions	Correct	Mark your correct answers
1.	C	
2.	B	
3.	D	
4.	D	
5.	D	
6.	D	
7.	C	
8.	B	
9.	D	
10.	C	
11.	A	
12.	C	
13.	C	
14.	B	
15.	D	
16.	A	
17.	D	
18.	C	
19.	A	
20.	B	
21.	C	
22.	B	
23.	A	
24.	C	
25.	A	
26.	C	
27.	C	

Module 1

Questions	Correct	Mark your correct answers
1.	A	
2.	B	
3.	B	
4.	8	
5.	D	
6.	B	
7.	31	
8.	A	
9.	A	
10.	7	
11.	C	
12.	C	
13.	3	
14.	B	
15.	A	
16.	1	
17.	B	
18.	B	
19.	-36	
20.	D	
21.	B	
22.	C	

Module 2

Questions	Correct	Mark your correct answers
1.	C	
2.	C	
3.	27°	
4.	A	
5.	C	
6.	3	
7.	C	
8.	D	
9.	39	
10.	B	
11.	C	
12.	$\frac{3}{2}$ or 1.5	
13.	B	
14.	D	
15.	D	
16.	$\frac{1}{30}$ or 0.0333	
17.	A	
18.	A	
19.	A	
20.	-28	
21.	D	
22.	D	

1. **Level:** Medium | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Words in Context

Key Explanation: Choice C is the best answer because the blank portion shows how hyraxes resemble guinea pigs. Choice C refers to something that is only on the outside or surface, so fits the context of saying that the hyrax and guinea pig look similar, but they are not really related.

Distractor Explanations: None of the other choices accurately explain how hyraxes resemble guinea pigs. Choice A refers to something that makes sense through reasoning, but one would reason that if the hyrax is related to an elephant, then it should look more like one. Choice B refers to something that happens by habit or tradition, but appearance is not based on habit. Choice D refers to something that happens in all cases or everywhere, so does not establish that some people see a general similarity.

2. **Level:** Medium | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Words in Context

Key Explanation: Choice D is the best answer because “frustrated” refers to what World War II and the termination era did to the purposes of the IRA. Choice D means “blocked” or “prevented,” which fits the context of showing that events prevented the goals of the IRA from being completely fulfilled; that is why it is still needed today.

Distractor Explanation: Choices A and C can be eliminated because they are emotional responses, but “the purposes of the IRA” are inanimate and cannot experience emotions. Choice A means

“irritated” and Choice D means “not happy with something.” Choice B is incorrect because “fulfilling” refers to something doing the act of making another thing happen. However, it does not fit the context because World War II and the termination era were not things that could “fulfill” or make the IRA’s goals happen. They were obstacles that stopped other things from fulfilling the purposes of the IRA.

3. **Level:** Hard | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Words in Context

Key Explanation: Choice D is the best answer because “provision” is something that is guaranteed by the Constitution, freedom of speech. It fits the context of saying that freedom of speech is a right or need to be guaranteed by the highest law of the country.

Distractor Explanation: None of the other choices adequately shows what is guaranteed by the Constitution. Choice A refers to the process of sharing something. Choice B refers to plans or preparations, but does not include the idea that they must occur. Choice C is a future event that might occur but cannot be accurately predicted.

4. **Level:** Medium | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Text Structure and Purpose

Key Explanation: Choice C is the best answer. The underlined sentence says that Sara flushed, which typically happens in anger or embarrassment. In this context, she appears embarrassed because she is not old or experienced enough—and was too “punctilious” or “careful”—to explain how she felt in a few words. The fact that she flushes highlights

her sense of awkwardness and embarrassment.

Distractor Explanation: **Choice A** is incorrect because the sentence only says that Sara flushed. It does not explain what she looked like; she could be tall, short, dark-haired or blonde, dressed nicely, etc. **Choice B** is incorrect because the underlined sentence only establishes that Sara blushes. It does not give a reason why; the following sentences show she could speak French but was reluctant to tell Miss Minchin so. **Choice D** is incorrect because there is no interaction between characters in the following sentences. The underlined portion is expanded upon with a reason for blushing, not actions.

5. **Level:** Hard | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Text Structure and Purpose

Key Explanation: **Choice D** is the best answer because the narrator describes his actions on the boat, “jumping from spar to spar” as similar to the jumping of a grasshopper. This work is because “they rather order me about some”; presumably “they” are the officers that are not “simple sailors.” He says that it is true that he has to hop around obeying orders, but says that “at first, this sort of thing is unpleasant enough” but that “this wears off in time.” Therefore, the analogy “anticipates” or “defends against” the argument that such work is “distasteful” or “unpleasant” because he says he is used to the role.

Distractor Explanation: **Choice A** is incorrect because “compensations” refers to payment, but the text does not contain references to money.

Choice B is incorrect because the question is asking for an argument that the grasshopper analogy is used to disprove. Since the grasshopper analogy is that sailors are hopping around, or

busy, the argument being disproved should be the opposite, that sailors are not busy. **Choice C** is incorrect because the analogy of the grasshopper does not show that it is necessary or not to obey orders; the narrator merely says he does and that it is distasteful at first but he gets used to it.

6. **Level:** Hard | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Text Structure and Purpose

Key Explanation: **Choice A** is the best answer because the phrase implies that Adam Patch still felt he was living in 1861, whereas really years had passed the times were changing. The phrase gives a reason for him to “weary” and become tired... he had been so wrapped up in reforms, but his causes were not current or relevant any more. His thoughts were still focused on events such as the Civil War rather than on everyday life or his grandson.

Distractor Explanation: **Choice B** is incorrect because the passage implies that Adam focused on things that interested him. The fact that the wife and son died in the past is not the reason that he thinks about them infrequently; he doesn’t really care about them as much as he does about things that happened earlier, like the Civil War. **Choice C** is incorrect because the fact that the times changed was the reason that his campaign against vices started to fade. The changing times is not why he started to fight against vice. **Choice D** is incorrect because someone can be interesting even if the times change. The reason that Adam was a bore was his actions during that time.

7. **Level:** Easy | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Central Ideas and Details

Key Explanation: Choice A is the best answer because the text says that naloxone breaks down quickly, “after about an hour.” This is “not completely desirable” or “unwanted” because it means that the drug needs to be carefully administered and the progress of the patient watched or the patient could “relapse” or “return to the original condition.”

Distractor Explanation: Choice B is incorrect because there is no discussion of price in the text. Choice C is incorrect because the passage does not say that naloxone has “no results” for some drugs. It only claims that it is less effective, meaning it has results that are not as strong, for “powerful synthetic opioids like fentanyl and carfentanil.” Choice D is incorrect because there is no evidence of side effects related to naloxone. The only negative effect implied is that it needs to be readministered because it wears off quickly.

8. **Level:** Easy | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Central Ideas and Details

Key Explanation: Choice B is the best answer. The text is summarizing a potentially confusing effect that involves bending light waves. The reader has presumably seen a rainbow, however, so that image might help the reader visualize light bending when it hits the atmosphere as being similar to light bending when it hits rain.

Distractor Explanations: Choice A is incorrect because “originate” means “begin,” but light does not begin in a rainbow. Choice C is incorrect because the example of the rainbow shows the rule or effect of Rayleigh Scattering, it is not an “exception” or “not part of” the rule. Choice D is incorrect because the idea of a rainbow does not tell the reader “why” or “the reason” blue scatters

more easily; a rainbow just offers an image which shows that colors separate in different ways when they hit something like rain or the atmosphere.

9. **Level:** Hard | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Central Ideas and Details

Key Explanation: Choice D is the best answer because the words “charming” and “jaunty” are often associated with cute, fun things. They imply that the yellow hat and black mantle were sweet or endearing things that a happy young girl might wear, for example, to a party. However, the girl is crying on a canal railing, so her cheerful clothes form a “contrast” or “opposite” impression.

Distractor Explanation: Choice A is incorrect because the passage indicates that the girl is relatively young; the narrator starts by calling her a “woman” and shifts to “girl” after he gets a closer look. Clothes described as “charming” and “jaunty” are suitable for a younger person, so do not “believe” or “contradict” that she is young. Choice B is not supported by the passage because there is no description of the temperature or that her clothing was inappropriate; for example, she was not shivering because she was too cold. Choice C is incorrect because the narrator noticed the woman’s action of leaning on a railing before noting her appearance. Her clothing is described as he takes a closer look.

10. **Level:** Medium | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Command of Evidence (Textual)

Key Explanation: Choice A is the best answer because the passage defines the informal sector of the economy as “that which is not regulated,

controlled, or taxed.” Therefore, a situation where goods are bartered between people would count as “informal” because there is no money changing hands and no taxes paid on the exchange.

Distractor Explanation: **Choice A** is incorrect because the projects sponsored by a foreign investor would most likely need to go through an approval process and the school would need to pass at least a basic inspection. **Choice A** would include regulations and controls, so would be considered formal. **Choice C** is incorrect because, while it might not be completely honest, there would still need to be nominal proof about how much tax money was spent and what it was used for. **Choice D** is weak because there is no evidence in the example to elaborate on the young man’s situation. For example, he could have filed all the correct paperwork, moved into a new apartment, and been paying income taxes from his new salary.

11. **Level:** Medium | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Command of Evidence
(Textual)

Key Explanation: **Choice A** is the best answer. The claim is that “such programs” are successful. There are two programs listed, making cycling safer and making bikes accessible. There are no specific examples of increasing safety, but the passage describes the details making bikes accessible by adding bike share depots in DC. **Choice A** shows that the program in DC, which started in 2010, probably has strong results, as ridership increased by over a percent in the five years after that policy was started.

Distractor Explanation: **Choice B** is incorrect because it only says that DC had low ridership, but there is no indication of change. The reader does

not know that the ridership increased after the program started. **Choice C** is incorrect because it focuses on Portland, but there is no indication that Portland did anything to make cycling safer or more accessible. **Choice C** also refers to DC, but the percentage of commuters is lower than that of Portland, so it could appear that the program was not very successful. **Choice D** is incorrect because the reader does not know whether the program helped make the number of commuters in DC greater. It is possible that all along, there have been more commuters than the other cities. It is even possible that ridership in DC decreased after the program started.

12. **Level:** Medium | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Command of Evidence
(Quantitative)

Key Explanation: **Choice D** is correct because it shows an example of the inconsistent growth between the years 2020 to 2022. The previous sentence in the text talks about how the customer preference for electric cars has not increased uniformly. **Choice D** further illustrates this idea.

Distractor Explanation: All the other choices are incorrect because the text must be completed with an example that illustrates the uneven rise in customer preference for battery-electric cars. **Choices A** and **B** both only state the number of electric cars registered between 2016-2019 and 2020, respectively. **Choice C** is incorrect because it does not offer a comparison that shows an uneven increase.

13. **Level:** Medium | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Inference

Key Explanation: **Choice B** is the best answer. The third sentence refers to “a molecular examination” which established genetic relationships with other

species. Therefore, the biologists must have had molecules from actual salamanders to work with. In other words, they must have found at least one specimen in the wild to compare with the four Thai *Tylototriton* species.

Distractor Explanation: All of the other choices are incorrect because a molecular examination only of the species that were available, not using *T. phukhaensis*, would not be able to determine the molecular characteristics of *T. phukhaensis* well enough to know what species are related or not. The other choices all give scenarios in which the scientists did not find examples of the new species for comparison.

14. **Level:** Easy | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Inference

Key Explanation: Choice C is the best answer because the text establishes that the disease does not have many patients: “Menkes is a rare X-linked disease.” As a direct result of that rarity, “few pharmaceutical companies are investing in research related to the disease.” In other words, the companies are not “investing” or “putting money” into research because it is rare. The logical implication is that the companies will not get enough profits back from their investment; the process of creating a cure is “not financially viable” or “will lose money.”

Distractor Explanation: Choice A is incorrect because the text does not condemn the decision of the pharmaceutical companies. The tone is neutral and stating the fact that companies have not done research on Menkes disease, rather than saying that the company should invest money even though they will not be able to recoup their losses. Choice B is incorrect because the text

does not discuss the stages of the disease or when the disease can be diagnosed. It is possible that the disease could be diagnosed from right after birth or even through prenatal testing before any symptoms have appeared. Choice D is incorrect because, while the text indicates that the disease is linked to the ATP7A gene, it says there is no cure and there is no mention of supplements.

15. **Level:** Medium | **Domain:** STANDARD ENGLISH CONVENTIONS
Skill/Knowledge: Boundaries

Key Explanation: Choice B is the best answer. The proper structure for joining a list of over two nouns with “and” is to place a comma after each of the nouns that precedes “and.” In this case, there should be a comma after “chili pepper,” “lemongrass,” “cilantro,” and “shallots.” No other punctuation is needed because “such as...lime” restricts the type of “ingredients” to specific ones that are ground together.

Distractor Explanation: Choices A and D are incorrect because there should be no comma after “and” in a list. The comma after “shallots” is sometimes omitted, but would only be acceptable if there were no other commas in the underlined portion. Choice C is incorrect because there should be no comma after “lime.” The following portion is necessary to the understanding of the main sentence, so should not be separated with any punctuation.

16. **Level:** Medium | **Domain:** STANDARD ENGLISH CONVENTIONS
Skill/Knowledge: Boundaries

Key Explanation: Choice D is the best answer. When a phrase is used as part of a sentence, the punctuation aside from the quotation marks

should adhere to usual structures. In this case, the quotation is part of a clause subordinated by the conjunction “while.” Replacing the quotation with XX, it is easier to see that the quote is the subject and “is used” is the verb, so no punctuation should divide the underlined portion: “While XX is frequently used...”

Distractor Explanation: Choice A is incorrect because the portion before the period is not a complete sentence because there is no active verb. Choices B and D are incorrect because no comma should divide the subject from the verb in a clause; the placement inside or outside the quote mark is irrelevant in this context.

17. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Boundaries

Key Explanation: Choice D is the best answer. There are two independent clauses that can stand on their own as sentences on either side of the underlined portion. Therefore, they should be divided into two separate sentences with a period.

Distractor Explanation: Choice A is incorrect because it is a comma splice between two independent clauses. Choices B and C can be eliminated because a single dash or colon can follow an independent clause, but the following portion needs to explain or add more detail to the previous sentence. In this case, the following portion changes to a different topic, from the 53rd year of independence to the struggle for freedom.

18. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice D is the best answer. The underlined portion refers to “is,” showing

that the claim has a possibility but not certainty of being true. Choice D is an adverb, which can be used to modify a verb.

Distractor Explanation: All of the other choices can be eliminated because they do not modify a verb. Choices A and C are adjectives, which modify nouns. Choice B is a noun.

19. **Level:** Medium | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice B is the best answer. “Most famous for the Monte Carlo Casino” is a modifier which needs to refer to the following noun. In this case, the modifier describes “the country” and shows what the country is most famous for.

Distractor Explanation: All of the other choices can be eliminated because the modifier “Most famous for the Monte Carlo Casino” refers to something other than the country. In Choice A, the modifier is followed by the generic “there.” In addition, “which is world-class” appears to refer to the preceding noun, “the country” rather than the “oceanographic museum.” In Choices C and D, the modifier refers to the museum; the placement of “world-class” does not affect the answer choice.

20. **Level:** Medium | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice C is the best answer. “To come down on” is a phrasal verb which means “to deal severely with,” so fits the context of saying that if police are severe on offenders, there is no need to make more laws.

Distractor Explanation: All of the other choices are incorrect because they are phrasal verbs with meanings that do not fit the context of explaining what police should do to the offenders. **Choice A** refers to leaving a place. **Choice B** refers to creating something. **Choice D** refers to catching an illness.

21. **Level:** Medium | **Domain:** STANDARD
ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: **Choice C** is the best answer. “Much XX–er than” is a standard idiom of comparison, which in this case shows that the speed of pollution entering the ocean is faster than the speed of pollution being removed from the ocean.

Distractor Explanation: All of the other choices can be eliminated because they do not complete the idiom “much XX–er than” using a standard word.

22. **Level:** Easy | **Domain:** EXPRESSION OF IDEAS
Skill/Knowledge: Transitions

Key Explanation: **Choice D** is the best answer because it is used to introduce an “example” or “illustration” that supports a claim. The part preceding the underline is a claim that people noticed that sampling occurred. The following portion is a specific illustration of that claim, a list of people who sampled each other’s music.

Distractor Explanation: None of the other choices adequately shows the relationship between the preceding and following sentences. **Choice A** refers to the final statement in a list or the result of an action. **Choices B** and **C** are used to provide different ideas that support the same claim rather than an example of the preceding claim.

23. **Level:** Easy | **Domain:** EXPRESSION OF IDEAS
Skill/Knowledge: Transitions

Key Explanation: **Choice C** is the best answer because it is used to introduce the conclusion of an argument. In this case, the text explains why the Stoclet House is important, and the conclusion is that the house qualifies to be a UNESCO World Heritage site.

Distractor Explanation: **Choice A** is incorrect because it is used to introduce something that comes later in a series, but the qualification to be a World Heritage site does not come after the building is created as a classic in its style and in good condition, it is because the building is in good condition. **Choice B** is incorrect because it shows something that would happen in a different situation, but in this case, the qualification and the described situation both occurred. **Choice D** is used to show a contrast or change in ideas, not continue a logical train of thought.

24. **Level:** Medium | **Domain:** EXPRESSION OF IDEAS
Skill/Knowledge: Transitions

Key Explanation: **Choice B** is the best answer because it refers to something that is wryly humorous because it was in error or had something other than the intended result. **Choice B** fits the context of saying that Messier named the cluster but lost it due to writing “erroneous” or “wrong” information about it.

Distractor Explanation: **Choice A** is incorrect because it is used to introduce the last item in a list or discussion, but the text continues the story with what happens several hundred years later. **Choice C** is incorrect because it signifies that the following is an example or clarification of the previous claim, but making an error is

not an example of cataloging stars. **Choice D** is used to show that the following is done in a way appropriate for the circumstances, so does not fit the context of making an error.

25. **Level:** Medium | **Domain:** EXPRESSION OF IDEAS

Skill/Knowledge: Rhetorical Synthesis

Key Explanation: **Choice B** is the best answer. The notes mention that “there is no evidence that the population is breeding” and that the small population of the African grey hornbill in Florida “may only persist due to continuing releases or escapes.”

Distractor Explanation: **Choice A** is incorrect because it does not explain why the bird will not rapidly multiply in Florida. **Choice C** is incorrect because the notes offer no comparison between the climate in sub-Saharan Africa and Florida. **Choice D** is incorrect because the notes do not mention that the African grey hornbill is only widespread in open woodland and savannah areas. Instead, it mentions that “it prefers open woodland and savannah.”

26. **Level:** Medium | **Domain:** EXPRESSION OF IDEAS

Skill/Knowledge: Rhetorical Synthesis

Key Explanation: **Choice D** is the best answer. The underlined sentence is a specific, probably familiar example of how historical data, in this case, viewing habits, can be used to make predictions or suggestions. The sentence gives the reader an easy point of reference to understand the abstract concept of predictive analysis.

Distractor Explanation: **Choices A and B** are incorrect because the underlined sentence should

remain in the text. It does not disrupt the logic and would not be better earlier in the paragraph, as it comes after the abstract idea is described.

Choice C is incorrect because the example is not necessarily related to the following sentence; it elaborates on the previous one.

27. **Level:** Medium | **Domain:** EXPRESSION OF IDEAS

Skill/Knowledge: Rhetorical Synthesis

Key Explanation: **Choice B** is the best answer. “Which is” subordinates the second sentence so it modifies the previous noun, “big tech companies,” while at the same time eliminating repeated words.

Distractor Explanation: **Choice A** is incorrect because it changes the meaning from big tech companies being overly powerful and a danger to antitrust cases being overly powerful and a danger. **Choice C** is incorrect because it retains the unnecessary repetition of “big tech companies” and complicates the sentence structure with “he says” set aside by commas. **Choice D** is incorrect because it repeats “cases” and adds an element of meaning that is not in the original sentences: “in his opinion” makes the big tech companies ones that he decides are big tech.

1. **Level:** Medium | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Words in Context

Key Explanation: Choice C is the best answer because in the sentence, the underlined word is what beach resorts create. Choice C refers to the trait of being attractive and interesting enough to entice people to come. It fits the context of saying that even if there were no other tourist destinations, beach resorts are very attractive and interesting to tourists.

Distractor Explanation: Choice A is incorrect because it refers to a large number of items collected by someone, but the beach resorts do not have a lot of things that they bought or amassed.

Choice B refers to the act of convincing someone to do something. However, the beaches do not try to make people come; they are just interesting enough that people want to visit. **Choice D** relates to a link or attachment rather than something that pulls from afar

2. **Level:** Easy | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Words in Context

Key Explanation: Choice B is the best answer. The blank needs an adjective that describes the painter named Johannes Vermeer. “Eminent” refers to someone or something famous in a given field. In this context, it shows that the painter Johannes Vermeer is well-known in the field of art.

Distractor Explanation: None of the other choices create a logical sentence. **Choice A** refers to something that is easy to see. Vermeer is from the seventeenth century, so although his art is famous, he is no longer visible. **Choice C** refers

to something glowing or shining, which does not accurately describe a person. **Choice D** refers to something complete or not modified, so it does not effectively describe a person.

3. **Level:** Hard | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Words in Context

Key Explanation: Choice D is the correct option. The author says that of the additions to the 1616 edition, many are clever but only sometimes are they improvements. Therefore, as used in the last sentence of the passage, “facile” refers to a superficial or shallow imitation of Marlowe’s style of writing.

Distractor Explanation: Choice A is incorrect because the sentence does not talk about the accomplishments of the imitator. In fact, the previous sentence points to how only some of the additions are improvements. Choices B and C are incorrect because there is no evidence to point out that all the additions to the 1616 edition are successful or effortless.

4. **Level:** Medium | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Text Structure and Purpose

Key Explanation: Choice D is the best answer because the underlined sentence explains that the photographs were of strangers. That detail can eliminate the weakness that the horses already knew the people and were reacting according to their experiences rather than that they were identifying an emotion from a picture of a face.

Distractor Explanations: Choice A is incorrect because the sentence does not say how the “subjects” or “people in the experiment” were “selected” or “chosen.” For example, they could

have answered an advertisement or they could have been students in a class. **Choice B** is incorrect because the sentence does not say how many people the horses know; they could know many people. **Choice C** is incorrect because the entire text shows that expression is important for interspecies communication, but the underlined sentence does not stress that point

5. **Level:** Hard | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Text Structure and Purpose

Key Explanation: **Choice D** is the best answer because the author gives many scientific reasons that life may exist, but does not describe the research that went into determining the “findings” or “results.” For example, he says, “Amino acids, just like those that make up every protein in our bodies, have been found in the tails of comets,” giving the findings of experiments on comets but not explaining how the amino acids were found. The same is true for his discussion of organic compounds in Martian soil, a giant cloud of space alcohol, and the discovery of thousands of habitable planets.

Distractor Explanation: **Choice A** is incorrect because “personal anecdotes” are stories from the author’s experience, but the author does not discuss any details from his life. **Choice B** is incorrect because there are no “analogies” or “comparisons used to teach” in the text. **Choice C** is incorrect because “unsubstantiated” means that there is no evidence to support the theories. However, the facts that the author brings up, such as the presence of organic compounds in Martian soil, is presumably based on research and supported by facts that are not discussed in the passage.

6. **Level:** Medium | **Domain:** CRAFT AND STRUCTURE

Skill/Knowledge: Cross-Text Connections

Key Explanation: **Choice D** is the best answer. The Sutton-Boveri theory is “that genes were located in specific places on the chromosomes.” The passage says that Morgan “criticized the theory” at first or was “initially skeptical,” but “after careful documentation,” determined that certain genes are located on the X chromosome, showing that he had changed his mind and thought that there were indeed at least some genes in specific places on chromosomes.

Distractor Explanation: **Choice A** is incorrect because there is no indication that details needed to be adjusted for the theory to be correct.

Choice B is incorrect because Morgan found “definitive” or “convincing” data that supported, not “contradicted” or “went against” the theory.

Choice C is incorrect because Morgan derived scientific findings that supported the theory, even though he originally thought it was not “plausible” or “realistic.”

7. **Level:** Medium | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Central Ideas and Details

Key Explanation: **Choice C** is the best answer. Giant anteaters have physically adapted by evolving “specialized tongues” that help them eat. They have also adapted behaviorally by living in an area where “their favored prey is common” and by learning to abandon the nest when soldier ants arrive.

Distractor Explanation: **Choice A** is incorrect because there is no indication that giant anteaters do not live in areas disturbed by humans; they

could still live in swamps, forests, and grasslands around people. **Choice B** is incorrect because the passage does not say that ants are “more vigilant” or that there are “fewer opportunities.” The passage only says that the ants are “vigilant” in protecting. **Choice D** is incorrect because the passage does not specify which food the anteaters prefer. It is possible that they might like grubs better, but they have fewer chances to eat them.

8. **Level:** Medium | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Central Ideas and Details

Key Explanation: **Choice B** is the best answer because the text states that “the purpose of their study was to address a central scientific problem in explaining the diversity of tree species in a forest.” In other words, the purpose was to “isolate factors” or “determine elements” that permit the “phenomenon” or “situation” of coexisting tree species to occur.

Distractor Explanation: **Choice A** is incorrect because “ramifications” are “consequences.” The study does not establish the consequences of the models; it is trying to explain why in reality there are coexisting species, whereas mathematical models have not solved that question. **Choice C** is incorrect because an “incident” refers to a specific event or occurrence, not an ongoing process. The researchers are trying to find a general explanation that holds valid for more than one specific event. **Choice D** is incorrect because the study does not point to “flaws” or “errors” in proposed theories. It is trying to find an answer to a question that was unexplainable at the time.

9. **Level:** Hard | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Command of Evidence (Textual)

Key Explanation: **Choice D** is the best answer. The claim is that Williams was “full of natural talent and energy.” **Choice D** gives the idea of energy through a comparison with a hurricane, a powerful weather phenomenon. The fact that the speaker was worried about his own chances in show business alludes to the idea that Williams was so talented that no one else had a chance.

Distractor Explanation: The other choices can be eliminated because they do not encompass both ideas of talent and energy. **Choice A** is incorrect because it only states that Williams was kind or helpful. **Choice B** shows that he was talented, but not that he was energetic. **Choice C** also implies that he was talented and less exciting when he was around, but does not convey the idea of energy.

10. **Level:** Easy | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Command of Evidence (Textual)

Key Explanation: **Choice C** is the best answer because “any opiate” would include both users of prescription opiates and users of non-prescription opiates. In Figure 1, any opiate refers to the combination of the bottom and middle sections of the column. The right-hand column for 2017 has a combined amount of about 48,000 deaths, since the second section of the bar reaches to just under the 50,000 line.

Distractor Explanation: **Choice A** is incorrect because there were 18,000 deaths by “any” or “all combined” drug overdoses in 1999, not

2017. In 2017, there were 18,000 deaths caused by prescription opiates, the bottom section, but not all drugs combined; the latter is over 70,000. **Choice B** is incorrect because “any type of opiate” would refer to both prescription and non-prescription, the bottom two sections of the columns. However, none of the columns have those two sections total 38,000. **Choice D** is incorrect because 75,000 is the approximate total number of deaths in 2017, not the total for prescription opiates, which is just the bottom section of the column.

11. **Level:** Medium | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Command of Evidence (Quantitative)

Key Explanation: **Choice A** is the best choice. The previous sentence in the text talks about the countries that recorded the highest growth in population. The sentence to be completed begins with “conversely”. Thus, an opposite example must be provided which mentions the countries with a decrease in population.

Distractor Explanation: **Choice B** is incorrect because it only mentions one country. Since the previous sentence in the text mentions the top 5 countries that recorded a population increase, the ideal choice would be an example that mentions the top 5 countries with a population decrease. **Choice C** is incorrect because it does not provide an example that it is the opposite of the previous sentence. **Choice D** is incorrect because the text does not mention anything about the number of deaths registered.

12. **Level:** Easy | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Inference

Key Explanation: **Choice C** is the best answer because the text says, “widespread off-label use of intravenous subanesthetic-dose ketamine for treatment-resistant depression has raised concerns about side effects, especially given its history as a drug of abuse.” “Especially” indicates that the main concern is that ketamine is associated with drug abuse or addiction problems.

Distractor Explanation: None of the other choices are supported by evidence from the passage. **Choice A** is incorrect because there is no discussion of it becoming less effective. **Choice B** is incorrect because, while there is a concern of side effects, there is no mention of the effects “in conjunction with” or “at the same time as” using other drugs. **Choice D** is incorrect because a “relapse” is a return to a former condition. There is no discussion in the passage about whether the patients become depressed again or not.

13. **Level:** Easy | **Domain:** INFORMATION AND IDEAS

Skill/Knowledge: Inferences

Key Explanation: **Choice C** is the best answer because Henri produced work that was “a new style” than that of the National Academy of Design, which he “disliked.” The passage says that his style had “depicted the seedy underside of urban life,” meaning he painted things that were not considered fashionable or proper; they were “undignified” or “not majestic.” Therefore, it is likely that the Academy artists “avoided” or “did not draw” such things.

Distractor Explanations: **Choice A** is incorrect because the text says Henri used a “bold, realistic style” and that the Academy artists used a

“highly-polished” style. Since Henri was trying to create a new way of painting, the two styles probably have little overlap. **Choice B** is incorrect because the text does not say that the artists were not in New York; it only implies that they did not draw sketches in the streets. **Choice D** is incorrect because “dirty snow” is only one example of Henri’s art. It is possible that the artists drew winter scenes, but they avoided the dirt and squalor in their pictures.

14. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Boundaries

Key Explanation: **Choice B** is the best answer. “In such a waterfall” is a prepositional phrase that indicates a situation. Phrases should be divided from the main clause in a sentence by a comma.

Distractor Explanation: **Choice A** is incorrect because without any punctuation, it is unclear where the prepositional phrase ends and the main clause begins. **Choices C** and **D** are incorrect because colons and semicolons should follow a complete independent clause, but the preceding portion cannot stand on its own as a sentence.

15. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Boundaries

Key Explanation: **Choice D** is the best answer. There are two ideas with subjects and verbs, so they can be divided into separate sentences.

Distractor Explanation: **Choice A** is incorrect because it is a comma splice between two independent clauses. **Choice B** is incorrect because “because” subordinates the following information. A semicolon should not be followed by a subordinate clause, only an independent

clause. **Choice C** is incorrect because “since” creates a subordinate clause which cannot stand on its own as a sentence.

16. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Boundaries

Key Explanation: **Choice A** is the best answer. The portion between the italics, “the Maori... tree,” modifies “kauri.” To better see the structure of the main clause, remove the portion between the italics. It is then clear that the subject “Forests filled with kauri” needs to be followed by a verb, in this case, the phrasal verb “date back.”

Distractor Explanation: **Choice B** is incorrect because it leaves the main clause without an active verb—“dating back...” is subordinated, but there is no complete clause before it. **Choices C** and **D** are incorrect because they include an extra noun. Two nouns should not be used in a row within a clause without subordinating one of them.

17. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: **Choice D** is the best answer. Research results are presented in the present tense as “universal truths.”

Distractor Explanation: All of the other choices can be eliminated because they do not use the standard form for showing currently accepted research results. **Choice A** is a progressive tense, though “research” can be used in the plural.

Choice B is a future tense. **Choice C** is the past tense, which is only acceptable if the results have subsequently been proven erroneous.

18. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice C is the best answer. The section between the commas, “_____ artwork...influences” is a clause that modifies the previous noun, Elizabeth Catlett. **Choice C** is used to show that the subject of the clause belongs to the preceding noun. Therefore, it effectively shows that the subject “artwork” belongs to “Catlett.”

Distractor Explanation: Choice A is incorrect because “her” creates an independent clause rather than a relative clause that modifies the previous word. **Choices B** and **D** are incorrect because they act as the subject of clause, adding more information about the preceding noun; they cannot be followed directly with another subject, “artwork.”

19. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice A is the best answer. The underlined portion needs to be a subject that is followed by the verb “composed.”

Distractor Explanation: Choice B is incorrect because it indicates possession and needs to be followed by a noun. **Choice C** is incorrect because it is an object rather than a subject. **Choice D** is incorrect because it shows possession and needs to be followed by a noun. Alternatively, it could be a contraction for “she is,” which does fit the past-tense context or the verb “composed.”

20. **Level:** Easy | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice B is the best answer. The underlined portion is the main verb of the sentence. The entire preceding portion, “dividing one full-time job between two employees,” is the subject. Though it may appear plural, the subject can be simplified to “dividing.” When a verb ending in “-ing” is used as a subject, it is considered singular, and **Choice B** is a singular verb.

Distractor Explanation: Choice A is incorrect because it is plural, so does not agree with the singular “dividing.” **Choices C** and **D** can be eliminated because they do not create a complete sentence; the underlined portion should be an active verb form.

21. **Level:** Medium | **Domain:** STANDARD ENGLISH CONVENTIONS

Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice C is the best answer. “They” is plural, so correctly refers to the plural noun “many names” from the previous sentence. “Range” is plural, so it agrees with the plural noun.

Distractor Explanation: Choices A and D can be eliminated because “ranges” is singular, so does not agree with the plural noun. **Choice B** is incorrect because it is a noun rather than a noun and verb. As a result, the sentence is a fragment with no active verb.

22. **Level:** Medium | **Domain:** EXPRESSION OF IDEAS

Skill/Knowledge: Transitions

Key Explanation: Choice B is the best answer because it is used to show a contrast or change in topic. It fits the context of saying that dandelions are viewed as weeds, but in reality, they can be eaten many ways.

Distractor Explanation: None of the other choices are used to indicate that there is a contrast of ideas. **Choice A** is incorrect because it is used to introduce the logical conclusion of an argument, but the idea that dandelions are edible is not a logical reason to view them as weeds. **Choice C** is used to add a specific detail that clarifies the previous claim. **Choice D** is used to add more reasons in support of the previous claim.

23. **Level:** Easy | **Domain:** EXPRESSION OF IDEAS
Skill/Knowledge: Transitions

Key Explanation: **Choice A** is the best answer because it is used to add another detail to develop a discussion. In this context, **Choice A** adds what happened to the finished painting after the discussion of what Picasso did while making the painting.

Distractor Explanation: **Choice B** is incorrect because it is used to introduce an opposing or conflicting idea, but the final sentence continues the theme of the painting being influential for the cause against war. **Choice C** is incorrect because it shows the logical result of a series of actions. Though the final sentence expands on the idea of the anti-war protests, it is not necessarily given that after showing people the painting, Picasso would exhibit the painting to raise funds. **Choice D** is incorrect because it is used to add an example of a previous claim, but the following sentence discusses a time sequence rather than giving more detail about the visitors who entered his studio.

24. **Level:** Medium | **Domain:** EXPRESSION OF IDEAS
Skill/Knowledge: Transitions

Key Explanation: **Choice C** is the best answer. The passage is structured with the first two sentences explaining the good that Ahmed did.

The portion following the underline has a different tone from receiving the Nobel Prize. **Choice C** is used to show something that happened at a later time, so fits the context of saying that first he was praised but later he was accused of certain problems.

Distractor Explanation: **Choice A** is incorrect because it is used to add more information on the same topic, so it does not effectively show that the praise changed to concern over Ahmed's actions. **Choice B** is incorrect because it means that the following is fitting or appropriate given the preceding information, but in this case, being accused of bad things is not appropriate for a winner of a Nobel Prize. **Choice D** is incorrect because it is used to introduce the logical result of the preceding argument, but the following is not a logical result of winning a peace prize.

25. **Level:** Hard | **Domain:** EXPRESSION OF IDEAS
Skill/Knowledge: Rhetorical Synthesis

Key Explanation: **Choice A** is the best answer. It concisely shows that the level of the appeal is "basic" or very deep and essential.

Distractor Explanation: All of the other choices can be eliminated as redundant; the extra words distract from the intended meaning. In **Choices B** and **D**, "basic" and "fundamental" are synonyms. In **Choice C**, "level" and "depth" have the same meaning in the context.

26. **Level:** Medium | **Domain:** EXPRESSION OF IDEAS
Skill/Knowledge: Rhetorical Synthesis

Key Explanation: **Choice C** is the best answer. The notes mention that he is most known for being the most-streamed classical artist of all time.

Distractor Explanation: Choice A is incorrect because this is not his most significant achievement. Choice B is also incorrect as the notes do not mention this as being his most significant achievement. Choice D is incorrect because the statement only describes his music projects and not a significant achievement.

27. **Level:** Medium | **Domain:** EXPRESSION OF STANDARD ENGLISH CONVENTIONS
Skill/Knowledge: Form, Structure, and Sense

Key Explanation: Choice B is the best answer as the singular verb “is” correctly agrees with the singular subject “number”.

Distractor Explanation: Choices A and C are incorrect because the verbs are plural. Choice D is incorrect because it is in the past tense and does not fit the context, which aims to describe an ongoing trend.

1. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: Linear equations in two variables | **Testing point:** Converting English to Algebra to create a two variable equation

Key Explanation: Choice A is correct. She burns 20 calories when she walks every minute. Therefore, she burned $20x$ calories after x minutes. She also burns 35 calories every minute she cycles and therefore burns $35y$ calories after y minutes. The equation would therefore be $20x + 35y = 340$. Subtracting $20x$ from both sides of this equation yields
 $35y = 340 - 20x$.

Distractor Explanation: Choice B is incorrect because it states that the difference between the calories burned from cycling and burned from walking is equal to 340. Choice C and Choice D are incorrect. The rate of 20 calories per minute can only be multiplied by x minutes of walking. And the rate of 35 calories per minute can only be multiplied by y minutes of cycling.

2. **Level:** Easy | **Domain:** PROBLEM-SOLVING AND DATA ANALYSIS

Skill/Knowledge: Two-variable data: models and scatterplots | **Testing point:** Identifying points on a scatter plot

Key Explanation: Choice B is the correct answer because the number of dots that have a higher value than the line of best fit are the dots above the line i.e 6.

Distractor Explanation: Choice A is incorrect as this is the number of dots on the graph. Choice C is incorrect as this is the number of dots below the line of best fit. Choice D is incorrect; it may be a conceptual error or lack of understanding of the question.

3. **Level:** Easy | **Domain:** ADVANCED MATH

Skill/Knowledge: Nonlinear functions | **Testing point:** Using the remainder theorem

Key Explanation: Choice B is correct. The remainder theorem states that if $f(x)$ is divided by $x-a$, the remainder would be $f(a)$. Therefore when $f(a) = 0$, then $x-a$ is a factor of the function $f(x)$. In this case, $f(3) = 0$, therefore $x-3$ is a factor of the equation $f(x)$.

Distractor Explanation: Choices A, C, and D are incorrect. Based on the table, dividing $(x+2)$, x , or $(x-5)$ from $f(x)$ will not yield a remainder of 0.

4. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: System of two linear equations in two variables. | **Testing point:** Solving for one variable in a system of linear equations

Key Explanation: Simplify the first equation by using the distributive property which yields $t - 5 + 2s - 6 = 8$. Adding 5 and 6 to both sides of the equation yields $t + 2s = 19$. Simplify the second equation by using the distributive property which yields $2t - 10 - 3s + 9 = -19$. Adding 10 and subtracting 9 from both sides of the equation yields $2t - 3s = -18$. To find the value of s , use the elimination method and multiply -2 by the first equation. This yields $-2t - 4s = -38$. Then, add the two equations which yield $-7s = -56$. Dividing -7 from both sides of the equation yields $s = 8$.

5. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: Linear equations in one variable
Testing point: Solving linear equations in one variable

Key Explanation: Choice D is correct. Simplify the equation by using distributive property, which yields

$$3x - 6 - 2x + 2 = -x + 2x + 4 - 8.$$

Combining like terms yields $x - 4 = x - 4$. This

shows that the equation is the same on both sides. So, any value of x makes the equation true. Therefore, the equation has infinitely many solutions.

Distractor Explanation: **Choice A** is incorrect because to have no solutions, solving the equation will result in a false statement. **Choice B** is incorrect because to have one solution, solving the equation will yield x equal to a number. **Choice C** is incorrect because linear equations do not have 2 solutions.

6. **Level:** Hard | **Domain:** ADVANCED MATH
Skill/Knowledge: Equivalent expressions |
Testing point: Converting between exponents and radicals

Key Explanation: **Choice B** is correct. To simplify the variable with different exponents, add the exponents of $g^{\frac{4}{5}}$ and $g^{\frac{2}{5}}$ which yields $g^{\frac{6}{5}}$. Making 2 have the same exponent as g yields $32^{\frac{1}{5}} \cdot g^{\frac{6}{5}}$.

Putting them inside the radical sign yields $\sqrt[5]{32g^6}$

Distractor Explanation: **Choice A** is incorrect because the 2 did not have any exponent and thus should have been left outside the root or converted to the fifth. **Choice C** and **Choice D** are incorrect and may result from interchanging the numerator and denominator of the exponent.

7. **Level:** Medium | **Domain:** PROBLEM-SOLVING AND DATA ANALYSIS
Skill/Knowledge: Inference from sample statistics and margin of error | **Testing point:** Finding the margin of error

Key Explanation: To find the margin of error, first find the midpoint of the sample mean mass.

This yields $\frac{120+182}{2} = 151$. The margin of error

would be the difference between the midpoint and either of the sample mean masses. Subtracting 151 from 182 yields 31.

8. **Level:** Hard | **Domain:** ALGEBRA
Skill/Knowledge: Linear functions | **Testing point:** Solving a linear function

Key Explanation: **Choice A** is correct. To find $f(6)$, first find the value of x which will be plugged into the equation $f(2x)$. Equating $2x$ to 6 and solving for x yields $x = 3$. Plugging 3 to $9x-7$ yields 20. Therefore, $f(6) = 20$.

Distractor Explanation: **Choice B** is incorrect and may result from plugging 6 directly into the equation. **Choice C** is incorrect and may result from substituting x with $2x$ and plugging 6 into the equation. **Choice D** is incorrect and may result from plugging 2 directly into the equation.

9. **Level:** Medium | **Domain:** PROBLEM-SOLVING AND DATA ANALYSIS
Skill/Knowledge: One-variable data: distributions and measures of center and spread |
Testing point: Finding the mean and median

Key Explanation: **Choice A** is correct because. The median of the above data set of 21 students

will be the $\frac{21+1}{2}$, which is the 11th shoe size,

which is then represented by 3. The mean shoe size can then be calculated by adding the products of the shoe size and their corresponding frequency and dividing the sum by the total number of students. This yields a sum of 67. Dividing the sum by 21 yields a mean of 3.19. Therefore, the mean will be larger than the median.

Distractor Explanation: Choice B and C are incorrect as they are both false statements.

Choice D is incorrect because there is sufficient information to answer the question.

10. **Level:** Medium | **Domain:** ADVANCED MATH
Skill/Knowledge: Equivalent expressions |
Testing point: Using exponent rules

Key Explanation: To solve for a , first make the bases equal. Converting 27^x to a base 3 yields 3^{3x} . Converting 81^{-x} to a base 3 yields $(3^4)^{-x}$ or 3^{-4x} . The equation will now become $3^{3x} \div 3^{-4x} = 3^{ax}$. On the right side of the equation, the bases are divided, which means that the exponents must be subtracted. Subtracting the exponents yields $3^{(3x - (-4x))} = 3^{ax}$ or simply $3^{7x} = 3^{ax}$. Equating the exponents yields $7x = ax$. Dividing both sides of the equation by x yields $7 = a$.

11. **Level:** Hard | **Domain:** GEOMETRY AND TRIGONOMETRY
Skill/Knowledge: Lines, angles, and triangles |
Testing point: Finding the sum of the Interior angles of a polygon

Key Explanation: Choice C is correct. The sum of interior angles in a polygon is represented by $180^\circ(n-2)$. A hexagon has 6 sides and therefore the sum of interior angles in the hexagon will be $180(6-2) = 720^\circ$. 720 degrees in radian form will be $\frac{720}{180} = 4\pi$. Therefore $b = 4$.

Distractor Explanation: Choice A is incorrect and may result in calculating $\frac{180}{720}$. **Choice B** is incorrect and may result in calculating

$\frac{720}{720}$. **Choice D** is incorrect and may result in

calculating $\frac{720}{360}$.

12. **Level:** Easy | **Domain:** PROBLEM-SOLVING AND DATA ANALYSIS
Skill/Knowledge: Percentages | **Testing point:** Finding the percentage increase

Key Explanation: Choice C is correct. If 80 is increased by 200%, that means that the new value will be 300% of 80 which is 240. An alternative solution is to find 200% of 80 and add it to 80 which yields 240.

Distractor Explanation: Choice A is incorrect because it is the percentage. **Choice B** is incorrect because it is the increase without adding the original. **Choice D** is incorrect because it is the sum of 80 and 200.

13. **Level:** Easy | **Domain:** ADVANCED MATH
Skill/Knowledge: Nonlinear functions | **Testing point:** Using the quadratic formula

Key Explanation: To solve for the quadratic equation, use the quadratic formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, \text{ where } a = 2, b = -4 \text{ and } c =$$

-7. Substituting the values to the formula yields

$$\frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(-7)}}{2(2)}. \text{ Simplifying this yields}$$

$$\frac{4 \pm \sqrt{72}}{4} \text{ or } 1 \pm \frac{\sqrt{72}}{4}. \text{ Simplifying } \sqrt{72} \text{ yields}$$

$$6\sqrt{2}. \text{ Therefore, the expression becomes } 1 \pm \frac{6\sqrt{2}}{4}$$

$$\text{or } 1 \pm \frac{3\sqrt{2}}{2}. \text{ Since the expression is now in the}$$

$$\text{same format as } 1 \pm \frac{a\sqrt{2}}{2}, \text{ then } a = 3.$$

14. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: Linear functions | **Testing point:** Interpretation of terms in a linear function

Key Explanation: Choice B is correct. This is because 262 is the y -intercept of the model and represents the number of houses on day 0, which is the beginning of October.

Distractor Explanation: Choice A is incorrect because the number of houses at the end of October is represented by $h(x)$. Choice C is incorrect as the number of houses sold per day would be 8. Choice D is incorrect as the number of houses sold on the first day of October is represented when $x = 8$.

15. **Level:** Medium | **Domain:** GEOMETRY AND TRIGONOMETRY

Skill/Knowledge: Right triangles and trigonometry | **Testing point:** Working with special triangles

Key Explanation: Choice A is correct. A $90^\circ - 60^\circ - 30^\circ$ triangle has a hypotenuse of $2x$, a shorter leg of x , and a longer leg of $x\sqrt{3}$. The area of this triangle can then be found by the formula

$\frac{1}{2} \times \text{base} \times \text{height}$. Substituting the base and the

height yields $\frac{1}{2} \times x \times x\sqrt{3}$ or $\frac{x^2\sqrt{3}}{2}$. The given

side AC is the hypotenuse of the triangle. So, $32 = 2x$ which yields $x = 16$. Substituting 16 to the

formula yields $\frac{16^2\sqrt{3}}{2}$ or $128\sqrt{3}$.

Distractor Explanation: Choice B and Choice D are incorrect and may result from using $\sqrt{2}$ instead of $\sqrt{3}$. Choice C is incorrect because this is one of the sides of the triangle.

16. **Level:** Easy | **Domain:** ADVANCED MATH

Skill/Knowledge: Equivalent expressions | **Testing point:** Matching coefficients

Key Explanation: Using distributive property on the left side of the equation yields

$$5xy + 3 - 6xy + 2xy^2 - 2 = axy^2 + bxy + c.$$

Combining like terms yields $2xy^2 - xy + 1 = axy^2 + bxy + c$. Comparing the coefficients on both sides of the equation, yields $a = 2$, $b = -1$, and $c = 1$

Therefore, $a + b = 1$.

17. **Level:** Easy | **Domain:** ADVANCED MATH

Skill/Knowledge: Nonlinear equations in one variable and systems of equations in two variables
Testing point: Finding the product of the roots of a quadratic equation

Key Explanation: Choice B is correct. In a quadratic equation ($ax^2 + bx + c = 0$), the product of the roots can be found by $\frac{c}{a}$. Using the given equation, $c = -24$ and $a = 3$. Thus, the product of the roots will be $\frac{-24}{3}$ or -8 .

Distractor Explanation: Choice A is incorrect as this is the value of a . Choice C is incorrect and may result from calculating $\frac{b}{a}$. Choice D is incorrect and may result from calculating the sum of the roots which is $\left(\frac{-b}{a}\right)$.

18. **Level:** Medium | **Domain:** ADVANCED MATH

Skill/Knowledge: Nonlinear functions | **Testing point:** Using the vertex form of a quadratics equation

Key Explanation: Choice B is correct. The general equation of a parabola is given by $y = a(x - h)^2$

$+k$, where (h, k) denotes the coordinate of the vertex. In this case, $h = 3$ and $k = 10$. Thus, the equation becomes $y = a(x-3)^2 + 10$. The sign of a denotes the orientation of the parabola. If a is positive, the parabola opens upward. If a is negative, the parabola opens downward. In this case, the parabola opens downward so the value of a must be negative. Therefore, the equation of the parabola is $y = -2(x-3)^2 + 10$.

Distractor Explanation: Choice A and Choice C are incorrect since their a is positive which would suggest that the graph opens upwards however the graph opens downwards. Choice D is incorrect and may result from using $(-3, 10)$ as the vertex instead of $(3, 10)$.

19. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: Linear equations in one variable

Testing point: Matching coefficients

Key Explanation: Using the distributive property, the equation becomes $6 - 6x = ax + b$ or $-6x + 6 = ax + b$. Comparing the coefficient and the constant on both sides of the equation yields $a = -6$ and $b = 6$. Therefore, the product of a and b is -36 .

20. **Level:** Easy | **Domain:** ADVANCED MATH

Skill/Knowledge: Nonlinear functions

Key Explanation: Choice B is correct.

When $x = 0$, $f(x) = -8$ at the coordinate $(0, -8)$.

21. **Level:** Medium | **Domain:** ALGEBRA

Skill/Knowledge: Linear equations in one variable

Testing point: Finding the value of x in a linear equation

Key Explanation: Choice B is correct. To find the value of x , multiply both sides of the equation by $\frac{4}{3}$.

This yields $(x-5) = 27 \times \frac{4}{3}$ or simply $(x-5) = 36$.

Distractor Explanation: Choice A is incorrect and may result from calculating the value of x .

Choice C is incorrect and may result from

multiplying $\frac{3}{4}$ to both sides of the equation

instead of $\frac{4}{3}$.

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

22. **Level:** Hard | **Domain:** ALGEBRA

Skill/Knowledge: Linear inequalities in one or two variables | **Testing point:** Finding solution to a system of linear inequalities

Key Explanation: Choice C is correct. To solve such questions, the best method would be to substitute the points to the inequalities and check if the statements are true or false.

Substituting $(3, 1)$ to the first inequality yields $1 > -2(3) - 1$ or $1 > -7$, which is true.

Substituting $(3, 1)$ to the second inequality

yields $3(1) < 3 + 9$ or $3 < 12$, which is also true. Therefore, the coordinate $(3, 1)$ lies inside the intersection of the two inequalities.

Distractor Explanation: Choice A is incorrect. Substituting $(-2, 1)$ to both inequalities will result in one false statement.

Choice B is incorrect. Substituting $(1, 4)$ to both inequalities will result in one false statement.

Choice D is incorrect. Substituting $(-3, 3)$ to both inequalities will result in false statements.

1. **Level:** Easy | **Domain:** ADVANCED MATH
Skill/Knowledge: Nonlinear equations in one variable and system of equations in two variables |
Testing point: Solving absolute value equations

Key Explanation: Choice C is correct. To calculate the two solutions (p & q), equate the contents of the absolute value symbol to both the positive and negative values of the number on the other side of the equation. To obtain the first solution (p), solve for x in the equation $3x - 1 = 2$. Adding 1 to both sides of the equation yields $3x = 3$. Dividing 3 from both sides of the equation yields $x = 1$. Thus, $p = 1$. To obtain the second solution (q), solve for x in the equation $3x - 1 = -2$. Adding 1 to both sides of the equation yields $3x = -1$. Dividing 3 from both sides of the equation yields $x = -\frac{1}{3}$. Thus, $q = -\frac{1}{3}$. Adding 1 and $-\frac{1}{3}$ yields $\frac{2}{3}$. Therefore, $p + q = \frac{2}{3}$.

Distractor Explanation: Choice A is incorrect and may result from multiplying the second solution (q) by -1 . Choice B and Choice D are incorrect as these are the two solutions to the equation.

2. **Level:** Medium | **Domain:** GEOMETRY AND TRIGONOMETRY
Skill/Knowledge: Circles | **Testing point:** Using equation of a circle

Key Explanation: Choice C is correct. To solve this question, plug each point into the equation of the circle. A coordinate that lies on the circle means that the equation will be equal on both ends. Plugging the point $(-3, 4)$, the equation becomes $(-3 - 3)^2 + 4^2 + 8(4) = 84$. Simplifying the equation, this yields $84 = 84$.

Therefore, point $(-3, 4)$ lies on the circle.

Distractor Explanation: Choice A is incorrect. Plugging the point $(1, 7)$ into the equation yields $109 = 84$. Therefore, it lies outside the circle.

Choice B is incorrect. Plugging the point $(-2, 5)$ into the equation yields $90 = 84$. Therefore, it lies outside the circle. Choice D is incorrect. Plugging the point $(3, -6)$ into the equation yields $-12 = 84$. Therefore, it does not lie on the circle.

3. **Level:** Easy | **Domain:** GEOMETRY AND TRIGONOMETRY
Skill/Knowledge: Right triangles and trigonometry | **Testing point:** Using trigonometry identities

Key Explanation: $\sin x = \cos (90 - x)$. So, if $\sin C$ and $\cos 63$ are equal, then the angles would add up to 90° . Therefore, $63^\circ + C = 90^\circ$. Subtracting 63° from both sides of the equation yields $C = 27^\circ$.

4. **Level:** Hard | **Domain:** ADVANCED MATH
Skill/Knowledge: Equivalent expressions |
Testing point: Working with complex numbers

Key Explanation: Choice A is correct. Rationalize the denominator of $\frac{2-2i}{3+4i}$ by multiplying the

fraction by the denominator's conjugate which is

$\frac{3-4i}{3-4i}$. This yields $\frac{6-6i-8i+8i^2}{9-16i^2}$. Substituting -1

to i^2 yields $-\frac{2}{25} - \frac{14}{25}i$. Matching the coefficients

yields $a = -\frac{2}{25}$ and $b = -\frac{14}{25}$.

Distractor Explanations: Choice B is incorrect as this would be the value of b . Choice C and Choice D are incorrect and may result from miscalculation or conceptual errors.

5. **Level:** Medium | **Domain:** ADVANCED MATH
Skill/Knowledge: Nonlinear equations in one variable and systems of equations in two variables
Testing point: Solving system of linear and quadratic equations

Key Explanation: Choice C is correct. To solve for x , we can equate the two equations.

This yields $2x - 2 = 2x^2 - 9x + 7$.

Subtracting $2x$ and adding 2 to both sides of the equation yields $2x^2 - 9x + 7 - 2x + 2 = 0$.

Combining like terms yields $2x^2 - 11x + 9 = 0$. To solve the quadratic equation use either the factor method or the quadratic formula. Using the factor method, get the two factors of $18x^2$ whose sum is $-11x$.

The two factors are $-2x$ and $-9x$ which makes the equation $2x^2 - 2x - 9x + 9 = 0$.

Grouping the first two terms together and the last two terms together yields $(2x^2 - 2x) - (9x - 9) = 0$

Factoring out the greatest common factor yields $2x(x - 1) - 9(x - 1) = 0$.

Factoring out the common binomial yields $(x - 1)(2x - 9) = 0$. Equating both factors to 0 yields the

two solutions, which are $x = 1$ and $x = \frac{9}{2}$ or 4.5

Distractor Explanation: Choice A is incorrect and may result from adding the two solutions.

Choice B is incorrect as it is the negative of one of the solutions. Choice D is incorrect and may result from getting the difference between the solutions.

6. **Level:** Hard | **Domain:** ADVANCED MATH
Skill/Knowledge: Nonlinear equations in one variable and systems of equations in two variables
Testing point: Solving absolute equation

Key Explanation: To obtain the solutions, first simplify the equation by factorization. Factoring out 2 from $|6x - 4|$ yields $2|3x - 2|$. Factoring out $|3x - 2|$ from $3|3x - 2| - 2|3x - 2| = 7$ yields

$(3 - 2)|3x - 2| = 7$ or $|3x - 2| = 7$. Then, equate the contents of the absolute value symbol to both the positive and negative values of the number on the other side of the equation. To obtain the first solution, solve for x in the equation $3x - 2 = 7$. Adding 2 to both sides of the equation yields $3x = 9$. Dividing 3 from both sides of the equation yields $x = 3$. To obtain the second solution, solve for x in the equation $3x - 2 = -7$. Adding 2 to both sides of the equation yields $3x = -5$. Dividing 3

from both sides of the equation yields $x = \frac{-5}{3}$.

Therefore, the positive solution to the equation is 3.

7. **Level:** Easy | **Domain:** ALGEBRA
Skill/Knowledge: Linear functions | **Testing point:** Creating equations from graphs

Key Explanation: Choice C is correct.

Calculating the slope of the given line using the

points $(-5, 0)$ and $(3, 0)$ yields $\frac{5}{3}$. A slope of a

line perpendicular to this will be the negative reciprocal of the slope of the given line.

Therefore, a line perpendicular to this should have

a slope of $\left(\frac{-3}{5}\right)$.

To get the slope of a line from the equation, convert the equation to slope-intercept form.

Dividing both sides of the equation by 5, Choice

C becomes $y = -\left(\frac{3}{5}\right)x + 3$.

Since the coefficient of x is $-\left(\frac{3}{5}\right)$, then this line is perpendicular to the given line.

Distractor Explanation: Choice A is incorrect as this is the equation of the line in the graph.

Choice B is incorrect as this is the equation of a line that has a slope of $\frac{3}{5}$. **Choice D** is incorrect as this is the equation of a line that has a slope of $\frac{5}{3}$ making it parallel to the given line.

8. **Level:** Easy | **Domain:** GEOMETRY AND TRIGONOMETRY

Skill/Knowledge: Circles | **Testing point:** Finding the circumference of a circle given its equation

Key Explanation: **Choice D** is correct. To find the circumference of a circle, first, find the radius of the circle or the diameter. Rewrite the given equation into the standard form for the equation of a circle, by completing the squares. This yields $x^2 + 6x + 9 + y^2 - 4y + 4 = 51 + 9 + 4$. Simplifying the equation yields $(x + 3)^2 + (y - 2)^2 = 64$. Since the equation is now in standard form, then $r^2 = 64$. Solving for r yields 8 as the radius. Using the formula of the circumference which is $2\pi r$ yields 16π .

Distractor Explanation: **Choice A** is incorrect and may result from solving for the area of the circle instead of the circumference. **Choice B** is incorrect and may result from using πr instead of $2\pi r$ to solve for the circumference. **Choice C** is incorrect and may result from using $\sqrt{51}$ as the radius of the circle.

9. **Level:** Medium | **Domain:** GEOMETRY AND TRIGONOMETRY

Skill/Knowledge: Lines, angles and triangles | **Testing point:** Using the exterior angle theorem

Key Explanation: According to the Exterior Angle Theorem, the exterior angle of a triangle is equal to the sum of the opposite and non-adjacent interior angles.

Therefore, $\angle ABC + \angle BAC = \angle ACD$.

The equation will now become $2x - 2 + x + 3 = 118$.

Combining like terms yields $3x + 1 = 118$.

Subtracting 1 from both sides of the equation yields $3x = 117$.

Dividing 3 from both sides of the equation yields $x = 39$.

10. **Level:** Easy | **Domain:** PROBLEM-SOLVING AND DATA ANALYSIS

Skill/Knowledge: Ratio, rates, proportional relationships, and units | **Testing point:** Creating and solving rate equation

Key Explanation: **Choice B** is correct. The question presents an inverse proportion problem where the number of carpenters (x) is inversely proportional to the number of days it requires to build a bed (y). Using the formula $xy = k$ and the given data $x = 4$ and $y = 3$ yields 12 as the value of k . Thus, the inverse proportion equation becomes $xy = 12$. To solve for the corresponding number of carpenters, substitute 2 with y which then yields $2x = 12$. Solving for x yields 6 as the number of carpenters needed to build the bed in 2 days.

Distractor Explanation: **Choice A** is incorrect as this represents the value of the constant k .

Choice C is incorrect as this is the product of four carpenters and 2 days. **Choice D** is incorrect as this is a miscalculation or conceptual error.

11. **Level:** Easy | **Domain:** ADVANCED MATH

Skill/Knowledge: Equivalent expressions | **Testing point:** Using the FOILing method to multiply expressions

Key Explanation: **Choice C** is correct. Using distributive property yields, $5xy(x - 2y) + 3x(x - 2y)$. Simplifying the expression yields $5x^2y + 3x^2 - 10xy^2 - 6xy$.

Distractor Explanation: Choice A and Choice D are incorrect and may result from applying the distributive property incorrectly. Choice B is incorrect and may result from a miscalculation error in multiplying $5xy$ and $-2y$.

12. **Level:** Medium | **Domain:** ALGEBRA

Skill/Knowledge: Systems of two linear equations in two variables | **Testing point:** Solving for a variable in a system of linear equations

Key Explanation: To solve for y , use the elimination method. Multiplying 2 to the second equation yields $10x + 4y = 16$. Adding the first and second equations yields $7x + 10x - 4y + 4y = 1 + 16$. Combining like terms yield $17x = 17$. Dividing 17 from both sides of the equation yields $x = 1$. Substituting the value of x to the first equation yields $7(1) - 4y = 1$ or $7 - 4y = 1$. Subtracting 7 from both sides of the equation yields $-4y = -6$. Dividing -4 from both sides of the equation yields

$$y = \frac{3}{2} \text{ or } 1.5.$$

13. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: Linear inequalities in one or two variables | **Testing point:** Solving for x in an inequality

Key Explanation: Choice B is correct. Adding x to both sides of the equation yields $-2x + x \leq 8 - x + x$ or $-x \leq 8$.

Dividing both sides of the equation by -1 yields $x \geq -8$. Therefore, x is greater than or equal to -8 . And -10 is the only option that is less than -8 .

Distractor Explanation: Choices A, C, and D are incorrect. These values will make the inequality true and are considered solutions.

14. **Level:** Easy | **Domain:** PROBLEM-SOLVING AND DATA ANALYSIS

Skill/Knowledge: Probability and conditional probability | **Testing point:** Finding the probability of an event

Key Explanation: Choice D is correct. The unfair coin is tossed 20 times and 14 of these land on heads making the probability of the unfair

coin landing on heads $\frac{14}{20} = 0.7$. Therefore the

probability of the coin landing on heads the 21st time will be 0.7.

Distractor Explanation: Choice A is incorrect as this is the probability of landing on heads on a fair coin. Choice B is incorrect and may result from a miscalculation or conceptual error. Choice C is incorrect as it gives the probability of the unfair coin landing on tails.

15. **Level:** Medium | **Domain:** ALGEBRA

Skill/Knowledge: Systems of two linear equations in two variables | **Testing point:** Solving for x and y in a system of linear equations

Key Explanation: Choice D is correct. Solve for x and y either by substitution or by elimination. Using the elimination method, multiply 3 by both sides of the second equation. This yields $(5x + y = -6) 3$ or $15x + 3y = -18$. Subtracting the second equation from the first equation yields $-17x = 34$. Dividing both sides of the equation by -17 yields $x = -2$. Substituting the value of x to the second equation yields $5(-2) + y = -6$. Simplifying the equation yields $y = 4$. Subtracting y from x yields $-2, -4, \text{ or } -6$.

Distractor Explanation: Choice A is incorrect and may result from subtracting x from y . Choice B is incorrect because it is the value of y . Choice C is incorrect as it is the value of x .

16. **Level:** Easy | **Domain:** ADVANCED MATH

Skill/Knowledge: Nonlinear functions |

Testing point: Converting the unit on exponential functions

Key Explanation: Since the equations are still equal, then $1,200(1.03)^m = 1,200(1.03)^{ad}$. Dividing both sides of the equation by 1,200 yields $(1.03)^m = (1.03)^{ad}$. Since the bases are equal, equate the exponents which yield $m = ad$. Since 1 month = 30 days, then $1 = a(30)$. Dividing 30 from both sides of the equation yields $\frac{1}{30} = a$.

17. **Level:** Easy | **Domain:** GEOMETRY AND TRIGONOMETRY

Skill/Knowledge: Area and volume | **Testing point:** Finding the volume of a cylinder

Key Explanation: Choice A is correct. The volume of a cylinder is given by the formula $\pi r^2 h$. Using the given data, $h = 2r$. Therefore, $h = 2(6) = 12$. Therefore, the volume will be $\pi(6)^2(12) = 432\pi$.

Distractor Explanation: Choice B is incorrect and may result from interchanging the values of r and h . Choice C is incorrect and may result from calculating the surface area of the cylinder instead of volume. Choice D is incorrect and may result from conceptual or calculation errors.

18. **Level:** Easy | **Domain:** GEOMETRY AND TRIGONOMETRY

Skill/Knowledge: Circles | **Testing point:** Using circle theorems

Key Explanation: Choice A is correct. An angle subtended at any point of the circle is half the angle subtended at the center. This means that $\angle DOE = 2 \angle DRE$. Therefore, $\angle DOE = 2(35^\circ) = 70^\circ$.

Distractor Explanation: Choice B is incorrect because it implies that the angles are equal.

Choice C and D are incorrect and this may be due to conceptual or calculation errors

19. **Level:** Easy | **Domain:** ADVANCED MATH

Skill/Knowledge: Equivalent expressions |

Testing point: Factoring using the difference of two squares

Key Explanation: Choice A is correct. This question can be solved using factorization. Using the difference of squares, $x^2 - a^2$ becomes $(x + a)(x - a)$.

Transforming the numerator of $4x^2 - 3$ to the format $x^2 - a^2$ yields $(2x)^2 - (\sqrt{3})^2$. Factoring the expression yields $(2x + \sqrt{3})(2x - \sqrt{3})$.

This would result to $\frac{(2x + \sqrt{3})(2x - \sqrt{3})}{(2x + \sqrt{3})}$.

Canceling out the binomial $2x + \sqrt{3}$ from both numerator and denominator yields $2x - \sqrt{3}$.

Distractor Explanation: Choice B is incorrect and would result if the student mistook the denominator for a minus sign. Choice C and Choice D are incorrect and may result from conceptual or calculation errors.

20. **Level:** Hard | **Domain:** ALGEBRA

Skill/Knowledge: Systems of two linear equations in two variables | **Testing point:** Working with systems of equations with Infinite solutions

Key Explanation: Equations that have infinite solutions are equations that are the same line just written differently. They have the same slope and the same y -intercept.

In the above equation, neither are similar. To

make them similar, multiply the top equation by -2 which yields $-18x + 28y = 6$. Comparing the coefficients of the first and second equations yields $a = -18$ and $b = -28$.

21. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: Linear equations in two variables | **Testing point:** Matching coefficients

Key Explanation: Choice D is correct. To find the value of a , we have to first group like terms together.

Adding $4x$ to both sides of the equation yields $3x$

$$+ 5y + 4x = ax - 4x - by + 4x$$

or simply $7x + 5y = ax - by$. This makes $a = 7$ and $b = -5$

Distractor Explanation: Choice A is incorrect because this would be the value of a if the $-4x$ had been ignored

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

Choice C is incorrect because this would be the value of b instead.

22. **Level:** Easy | **Domain:** ALGEBRA

Skill/Knowledge: Linear inequalities in one or two variables | **Testing point:** Solving for x in an inequality

Key Explanation: Choice D is correct. Using the distributive property yields $3x + 2 < -5x - 30$.

Adding $5x$ and subtracting 2 from both sides of the equation yields $3x + 5x < -30 - 2$ or $8x < -32$.

Dividing 8 from both sides of the equation yields $x < -4$. Since -5 is less than -4 , then it is a solution to the inequality.

Distractor Explanation: Choice A and Choice B are incorrect because they are both greater than -4 . Choice C is incorrect because the value of x must be less than and not equal to -4 .