SAT 2024 Practice Test 3 Question paper with solutions

Time Allowed :2 hours and 14 minutes	Maximum Marks :1600	Total Questions :98

General Instructions

GENERAL DIRECTIONS

1. You may work on only one module at a time.
2. If you finish a module before time is called, check your work on that module only. You may NOT turn to any other module.

TIMING

1. Reading and Writing, Module 1: 39 minutes
2. Reading and Writing, Module 2: 39 minutes
3. 10-minute break
4. Math, Module 1: 43 minutes
5. Math, Module 2: 43 minutes
6. The above are standard times. If you are approved for accommodations involving additional time, you should give yourself that time when you practice.

MARKING YOUR ANSWERS

1. Be sure to answer your questions properly in this book.
2. Circle only one answer to each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

USING YOUR TEST BOOK

1. You may use the test book for scratch work.
2. You may not fold or remove pages or portions of a page from this book, or take the book from the testing room.

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Reading and Writing

(Module 1)

Directions :

The questions in this section address a number of important reading and writing skills. Each question includes one or more passages, which may include a table or graph. Read each passage and question carefully, and then choose the best answer to the question based on the passage(s). All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

1. In the early 1800s, the Cherokee scholar Sequoyah created the first script, or writing system, for an Indigenous language in the United States. Because it represented the sounds of spoken Cherokee so accurately, his script was easy to learn and thus quickly achieved _____ use: by 1830, over 90 percent of the Cherokee people could read and write it.

Which choice completes the text with the most logical and precise word or phrase?

(A) widespread

(B) careful

(C) unintended

(D) infrequent

Correct Answer: (A) widespread

Solution: The context suggests that the script was adopted by many people quickly. The word "widespread" best fits this meaning, implying a broad usage. "Careful," "unintended," and "infrequent" do not fit the context as well.

Quick Tip

When describing something that spreads over a large area or group, "widespread" is often the best choice.

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2. When Mexican-American archaeologist Zelia Maria Magdalena Nuttall published her 1886 research paper on sculptures found at the ancient Indigenous city of Teotihuacan in present-day Mexico, other researchers readily _____ her work as groundbreaking; this recognition stemmed from her convincing demonstration that the sculptures were much older than had previously been thought.

Which choice completes the text with the most logical and precise word or phrase?

(A) acknowledged

(B) ensured

(C) denied

(D) underestimated

Correct Answer: (A) acknowledged

Solution: The context suggests that other researchers recognized the significance of her work. "Acknowledged" fits perfectly, as it means the researchers recognized her contributions. "Ensured," "denied," and "underestimated" do not make sense in this context.

Quick Tip

When discussing recognition or acceptance of an idea or work, the verb "acknowledge" is most appropriate.

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3. Like other tribal nations, the Muscogee (Creek) Nation is self-governing; its National Council generates laws regulating aspects of community life such as land use and healthcare, while the principal chief and cabinet officials _____ those laws by devising policies and administering services in accordance with them.

Which choice completes the text with the most logical and precise word or phrase?

(A) implement

(B) presume

(C) improvise

(D) mimic

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Correct Answer: (A) implement

Solution: The sentence describes officials putting laws into action, which is best expressed by the word "implement." "Presume," "improvise," and "mimic" do not fit in this context, as they imply assumptions or actions without following established laws.

Quick Tip

When you describe making laws or plans work in practice, "implement" is the most appropriate choice.

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4. In the Indigenous intercropping system known as the Three Sisters, maize, squash, and beans form an _____ web of relations: maize provides the structure on which the bean vines grow; the squash vines cover the soil, discouraging competition from weeds; and the beans aid their two "sisters" by enriching the soil with essential nitrogen.

Which choice completes the text with the most logical and precise word or phrase?

(A) indecipherable

(B) ornamental

(C) obscure

(D) intricate

Correct Answer: (D) intricate

Solution: The context describes a complex, interconnected relationship between the plants in the system. The word "intricate" fits best, indicating something elaborate and detailed. "Indecipherable," "ornamental," and "obscure" do not fit the context of interdependent relationships between plants.

Quick Tip

When describing something complex and interconnected, "intricate" is the most appropriate choice.

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5. The artisans of the Igun Eronmwon guild in Benin City, Nigeria, typically _____ the bronze- and brass-casting techniques that have been passed down through their families since the thirteenth century, but they don't strictly observe every tradition; for example, guild members now use air-conditioning motors instead of handheld bellows to help heat their forges.

Which choice completes the text with the most logical and precise word or phrase?

(A) experiment with

(B) adhere to

(C) improve on

(D) grapple with

Correct Answer: (B) adhere to

Solution: The sentence describes the guild members maintaining or following traditional techniques, which is best expressed by the phrase "adhere to." "Experiment with," "improve on," and "grapple with" do not fit the context of following traditions.

Quick Tip

When describing the act of following or sticking to something, "adhere to" is the most suitable choice.

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6. Some economic historians _____ that late nineteenth- and early twentieth-century households in the United States experienced an economy of scale when it came to food purchases—they assumed that large households spent less on food per person than did small households. Economist Trevon Logan showed, however, that a close look at the available data disproves this supposition.

Which choice completes the text with the most logical and precise word or phrase?

(A) surmised

(B) contrived

(C) questioned

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(D) regretted

Correct Answer: (A) surmised

Solution: The phrase "surmised" means that the historians made an assumption or guess about the economy of scale, which fits the context. "Contrived," "questioned," and "regretted" are less suitable, as they imply different meanings unrelated to assuming something without full proof.

Quick Tip

When describing an assumption or educated guess, "surmise" is the most appropriate verb choice.

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7. The work of Kiowa painter T.C. Cannon derives its power in part from the tension among his _____ influences: classic European portraiture, with its realistic treatment of faces; the American pop art movement, with its vivid colors; and flatstyle, the intertribal painting style that rejects the effect of depth typically achieved through shading and perspective.

Which choice completes the text with the most logical and precise word or phrase?

(A) complementary

(B) unknown

(C) disparate

(D) interchangeable

Correct Answer: (C) disparate

Solution: The word "disparate" means fundamentally different or distinct, which fits the context of contrasting influences in the painter's work. "Complementary" would imply that the influences work well together, but the context suggests differences. "Unknown" and "interchangeable" do not fit as well in describing these varying influences.

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Quick Tip

"Disparate" is used to describe things that are distinct or different in nature, especially when they do not complement each other.

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8. New and interesting research conducted by Suleiman A. Al-Sweedan and Moath Alhaj is inspired by their observation that though there have been many studies of the effect of high altitude on blood chemistry, there is a _____ studies of the effect on blood chemistry of living in locations below sea level, such as the California towns of Salton City and Seeley.

Which choice completes the text with the most logical and precise word or phrase?

(A) quarrel about

(B) paucity of

(C) profusion of

(D) verisimilitude in

Correct Answer: (B) paucity of

Solution: The word "paucity" means a small quantity or scarcity, which fits the context of there being fewer studies on the effect of low-altitude living on blood chemistry. "Profusion" means abundance, which does not fit with the description of few studies. "Quarrel about" and "verisimilitude in" do not make sense in this context.

Quick Tip

"Paucity" is used to describe a scarcity or small number of something, especially when referring to studies or research.

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9. The following text is from Sarah Orne Jewett's 1899 short story "Martha's Lady." Martha is employed by Miss Pyne as a maid.

Miss Pyne sat by the window watching, in her best dress, looking stately and calm; she seldom went out now, and it was almost time for the carriage. Martha was just coming in from the

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garden with the strawberries, and with more flowers in her apron. It was a bright cool evening in June, the golden robins sang in the elms, and the sun was going down behind the apple-trees at the foot of the garden. The beautiful old house stood wide open to the long-expected guest.

Which choice best states the main purpose of the text?

(A) To convey the worries brought about by a new guest

(B) To describe how the characters have changed over time

(C) To contrast the activity indoors with the stillness outside

(D) To depict the setting as the characters await a visitor's arrival

Correct Answer: (D) To depict the setting as the characters await a visitor's arrival

Solution: The text describes the setting in great detail, focusing on the calm and peaceful environment as the characters await the arrival of a guest. There is no indication of worries, changes over time, or a comparison between indoors and outdoors, which makes option (D) the most accurate.

Quick Tip

When a passage focuses on a description of the environment or setting, particularly in anticipation of an event, the answer will often relate to the setting's importance in the story.

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10. Astronomers are confident that the star Betelgeuse will eventually consume all the helium in its core and explode in a supernova. They are much less confident, however, about when this will happen, since that depends on internal characteristics of Betelgeuse that are largely unknown. Astrophysicist Sarafina El-Badry Nance and colleagues recently investigated whether acoustic waves in the star could be used to determine internal stellar states but concluded that this method could not sufficiently reveal Betelgeuse's internal characteristics to allow its evolutionary state to be firmly fixed.

Which choice best describes the function of the second sentence in the overall structure of the text?

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(A) It explains how the work of Nance and colleagues was received by others in the field.

(B) It presents the central finding reported by Nance and colleagues.

(C) It identifies the problem that Nance and colleagues attempted to solve but did not.

(D) It describes a serious limitation of the method used by Nance and colleagues.

Correct Answer: (D) It describes a serious limitation of the method used by Nance and colleagues.

Solution: The second sentence addresses the shortcomings of the method used by Nance and colleagues in determining internal stellar states, emphasizing its inability to reveal Betelgeuse's internal characteristics fully. Hence, option (D) is the best description of its function.

Quick Tip

When a sentence points out a limitation or an issue with a method, it often reflects the drawbacks or constraints of the approach used.

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11. The following text is from Jane Austen's 1811 novel Sense and Sensibility. Elinor lives with her younger sisters and her mother, Mrs. Dashwood.

Elinor, this eldest daughter, whose advice was so effectual, possessed a strength of understanding, and coolness of judgment, which qualified her, though only nineteen, to be the counsellor of her mother, and enabled her frequently to counteract, to the advantage of them all, that eagerness of mind in Mrs. Dashwood which must generally have led to imprudence. She had an excellent heart;—her disposition was affectionate, and her feelings were strong; but she knew how to govern them: it was a knowledge which her mother had yet to learn; and which one of her sisters had resolved never to be taught.

According to the text, what is true about Elinor?

(A) Elinor often argues with her mother but fails to change her mind.

(B) Elinor can be overly sensitive with regard to family matters.

(C) Elinor is an overly strict mother and a bad role model.

(D) Elinor is remarkably mature for her age.

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Correct Answer: (D) Elinor is remarkably mature for her age.

Solution: The passage emphasizes Elinor's maturity, her strength of understanding, and her ability to govern her emotions, which suggests that she is indeed remarkably mature for her age. Options (A), (B), and (C) are not supported by the text.

Quick Tip

When analyzing character traits in literature, focus on how the character's actions and qualities are described in relation to others to determine their key characteristics.

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12. Believing that living in an impractical space can heighten awareness and even improve health, conceptual artists Madeline Gins and Shusaku Arakawa designed an apartment building in Japan to be more fanciful than functional. A kitchen counter is chest-high on one side and knee-high on the other; a ceiling has a door to nowhere. The effect is disorienting but invigorating: after four years there, filmmaker Nobu Yamaoka reported significant health benefits.

Which choice best states the main idea of the text?

(A) Although inhabiting a home surrounded by fanciful features such as those designed by Gins and Arakawa can be rejuvenating, it is unsustainable.

(B) Designing disorienting spaces like those in the Gins and Arakawa building is the most effective way to create a physically stimulating environment.

(C) As a filmmaker, Yamaoka has long supported the designs of conceptual artists such as Gins and Arakawa.

(D) Although impractical, the design of the apartment building by Gins and Arakawa may improve the well-being of the building's residents.

Correct Answer: (A) Although inhabiting a home surrounded by fanciful features such as those designed by Gins and Arakawa can be rejuvenating, it is unsustainable.

Solution: The passage discusses the impractical nature of the apartment design but highlights

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the potential health benefits. Option (A) encapsulates the central idea that while the design is rejuvenating, it is not sustainable. The other options are more focused on specific aspects rather than the overall message of the text.

Quick Tip

When identifying the main idea, focus on the broader point the text makes about the subject rather than specific details.

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13. In a research paper, a student criticizes some historians of modern African politics, claiming that they have evaluated Patrice Lumumba, the first prime minister of what is now the Democratic Republic of the Congo, primarily as a symbol rather than in terms of his actions.

Which quotation from a work by a historian would best illustrate the student's claim?

(A) "Lumumba is a difficult figure to evaluate due to the starkly conflicting opinions he inspired during his life and continues to inspire today."

(B) "The available information makes it clear that Lumumba's political beliefs and values were largely consistent throughout his career."

(C) "Lumumba's practical accomplishments can be passed over quickly; it is mainly as the personification of Congolese independence that he warrants scholarly attention."

(D) "Many questions remain about Lumumba's ultimate vision for an independent Congo; without new evidence coming to light, these questions are likely to remain unanswered."

Correct Answer: (C) "Lumumba's practical accomplishments can be passed over quickly; it is mainly as the personification of Congolese independence that he warrants scholarly attention."

Solution: The quotation in option (C) reflects the student's criticism, as it downplays Lumumba's practical accomplishments and focuses on his symbolic role. This aligns with the student's claim that historians are emphasizing Lumumba as a symbol rather than evaluating his actions.

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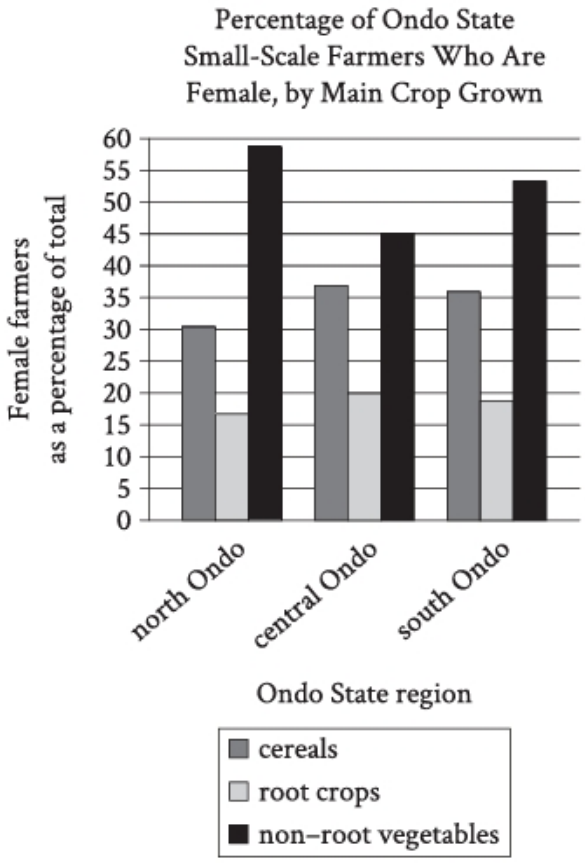
Quick Tip

When analyzing criticism of a text, look for statements that minimize the subject's practical contributions and emphasize symbolic or theoretical aspects.

14.



Geographer Adebayo Oluwole Eludoyin and his colleagues surveyed small-scale farmers in three locations in Ondo State, Nigeria—which has mountainous terrain in the north, an urbanized center, and coastal terrain in the south—to learn more about their practices, like the types of crops they mainly cultivated. In some regions, female farmers were found to be especially prominent in the cultivation of specific types of crops and even constituted the majority of farmers who cultivated those crops; for instance, _____.

Which choice most effectively uses data from the graph to complete the example?

(A) most of the farmers who mainly cultivated cereals and most of the farmers who mainly cultivated non-root vegetables in south Ondo were women.

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(B) more women in central Ondo mainly cultivated root crops than mainly cultivated cereals.
(C) most of the farmers who mainly cultivated non-root vegetables in north and south Ondo were women.
(D) a relatively equal proportion of women across the three regions of Ondo mainly cultivated cereals.

Correct Answer: (B) more women in central Ondo mainly cultivated root crops than mainly cultivated cereals.

Solution: The graph shows that in central Ondo, a higher percentage of women cultivated root crops than cereals. Option (B) uses this information to correctly complete the sentence based on the graph data. The other options do not accurately reflect the proportions presented in the graph.

Quick Tip

When answering data-based questions, focus on the trends and values directly presented in the graph to make an accurate selection.

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15. Given that stars and planets initially form from the same gas and dust in space, some astronomers have posited that host stars (such as the Sun) and their planets (such as those in our solar system) are composed of the same materials, with the planets containing equal or smaller quantities of the materials that make up the host star. This idea is also supported by evidence that rocky planets in our solar system are composed of some of the same materials as the Sun.
Which finding, if true, would most directly weaken the astronomers' claim?
(A) Most stars are made of hydrogen and helium, but when cooled they are revealed to contain small amounts of iron and silicate.
(B) A nearby host star is observed to contain the same proportion of hydrogen and helium as that of the Sun.
(C) Evidence emerges that the amount of iron in some rocky planets is considerably higher than the amount in their host star.

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(D) The method for determining the composition of rocky planets is discovered to be less effective when used to analyze other kinds of planets.

Correct Answer: (C) Evidence emerges that the amount of iron in some rocky planets is considerably higher than the amount in their host star.

Solution: The astronomers' claim is that planets are composed of the same materials as their host stars. If evidence emerges that the amount of iron in some rocky planets is considerably higher than that in the host star, it would contradict their claim, making option (C) the correct choice.

Quick Tip

When evaluating a claim based on scientific reasoning, focus on findings that challenge the assumption or principle behind the claim.

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16. In the twentieth century, ethnographers made a concerted effort to collect Mexican American folklore, but they did not always agree about that folklore's origins. Scholars such as Aurelio Espinosa claimed that Mexican American folklore derived largely from the folklore of Spain, which ruled Mexico and what is now the southwestern United States from the sixteenth to early nineteenth centuries. Scholars such as Américo Paredes, by contrast, argued that while some Spanish influence is undeniable, Mexican American folklore is mainly the product of the ongoing interactions of various cultures in Mexico and the United States.

Which finding, if true, would most directly support Paredes's argument?

(A) The folklore that the ethnographers collected included several songs written in the form of a décima, a type of poem originating in late sixteenth-century Spain.

(B) Much of the folklore that the ethnographers collected had similar elements from region to region.

(C) Most of the folklore that the ethnographers collected was previously unknown to scholars.

(D) Most of the folklore that the ethnographers collected consisted of corridos—ballads about history and social life—of a clearly recent origin.

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Correct Answer: (B) Much of the folklore that the ethnographers collected had similar elements from region to region.

Solution: Paredes's argument emphasizes the ongoing interactions of various cultures in Mexico and the United States, suggesting that Mexican American folklore is shaped by a blend of influences from both regions. If the folklore collected by ethnographers shared common elements across regions, this would support the idea of cultural blending, making option (B) the most appropriate choice.

Quick Tip

When interpreting arguments, look for evidence that supports the interaction or blending of different influences, rather than solely attributing it to a single source.

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17. In the early nineteenth century, some Euro-American farmers in the northeastern United States used agricultural techniques developed by the Haudenosaunee (Iroquois) people centuries earlier, but it seems that few of those farmers had actually seen Haudenosaunee farms firsthand. Barring the possibility of several farmers of the same era independently developing techniques that the Haudenosaunee people had already invented, these facts most strongly suggest .....

(1) those farmers learned the techniques from other people who were more directly influenced by Haudenosaunee practices

(2) the crops typically cultivated by Euro-American farmers in the northeastern United States were not well suited to Haudenosaunee farming techniques

(3) Haudenosaunee farming techniques were widely used in regions outside the northeastern United States

(4) Euro-American farmers only began to recognize the benefits of Haudenosaunee farming techniques late in the nineteenth century

Correct Answer: (1) those farmers learned the techniques from other people who were more directly influenced by Haudenosaunee practices

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Solution: The passage suggests that few of the farmers saw Haudenosaunee farms firsthand, which implies that they likely learned the techniques from others who were more directly influenced by Haudenosaunee practices. The other options do not follow logically from the context of the passage.

Quick Tip

When a question mentions the influence of one group on another, consider whether the influence could be indirect through others, especially if direct contact is not mentioned.

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18. If some artifacts recovered from excavations of the settlement of Kuulo Kataa, in modern Ghana, date from the thirteenth century CE, that may lend credence to claims that the settlement was founded before or around that time. There is other evidence, however, strongly supporting a fourteenth century CE founding date for Kuulo Kataa. If both the artifact dates and the fourteenth century CE founding date are correct, that would imply that .....

(1) artifacts from the fourteenth century CE are more commonly recovered than are artifacts from the thirteenth century CE.

(2) the artifacts originated elsewhere and eventually reached Kuulo Kataa through trade or migration.

(3) Kuulo Kataa was founded by people from a different region than had previously been assumed.

(4) excavations at Kuulo Kataa may have inadvertently damaged some artifacts dating to the fourteenth century CE.

Correct Answer: (2) the artifacts originated elsewhere and eventually reached Kuulo Kataa through trade or migration.

Solution: The passage suggests that the finding of artifacts from both the thirteenth and fourteenth centuries CE, combined with the evidence for the fourteenth-century founding date, implies the artifacts could have originated elsewhere and migrated to Kuulo Kataa. This supports the idea of cultural exchange or migration, which is the most logical explanation.

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Quick Tip

When faced with conflicting evidence, consider possible historical processes such as trade, migration, or diffusion that could explain the spread of materials.

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19. A team of biologists led by Jae-Hoon Jung, Antonio D. Barbosa, and Stephanie Hutin investigated the mechanism that allows Arabidopsis thaliana (thale cress) plants to accelerate flowering at high temperatures. They replaced the protein ELF3 in the plants with a similar protein found in another species (stiff brome) that, unlike A. thaliana, displays no acceleration in flowering with increased temperature. A comparison of unmodified A. thaliana plants with the altered plants showed no difference in flowering at 22° Celsius, but at 27° Celsius, the unmodified plants exhibited accelerated flowering while the altered ones did not, which suggests that

_____

Which choice most logically completes the text?

(A) temperature-sensitive accelerated flowering is unique to A. thaliana.

(B) A. thaliana increases ELF3 production as temperatures rise.

(C) ELF3 enables A. thaliana to respond to increased temperatures.

(D) plants at least 22° Celsius are required for A. thaliana to flower.

Correct Answer: (C) ELF3 enables A. thaliana to respond to increased temperatures.

Solution: The best option is (C), as it directly relates to the idea that the protein ELF3 enables the plant to accelerate flowering in response to temperature changes, which is supported by the experimental findings where unmodified plants showed no change at lower temperatures but accelerated flowering at higher temperatures.

Quick Tip

Look for answer choices that directly tie the results of the experiment (such as the acceleration of flowering at higher temperatures) to the mechanism (ELF3 protein) in the plant.

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20. A member of the Cherokee Nation, Mary Golda Ross is renowned for her contributions to NASA's Planetary Flight Handbook, which _____ detailed mathematical guidance for missions to Mars and Venus.

(A) provided

(B) having provided

(C) to provide

(D) providing

Correct Answer: (A) provided

Solution: The correct answer is (A), as the phrase "which provided" refers to something that has been completed and is being described. "Provided" is the past tense, which is appropriate for describing the completed contribution of the handbook.

Quick Tip

Look for a past-tense verb when describing something that was already completed, as in the case of the handbook's contributions to NASA.

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21. Typically, underlines, scribbles, and notes left in the margins by a former owner lower a book's _____ when the former owner is a famous poet like Walt Whitman, such markings, known as marginalia, can be a gold mine to literary scholars.

(A) value, but

(B) value

(C) value,

(D) value but

Correct Answer: (B) value

Solution: The correct word to complete the sentence is "value" without the conjunction "but." This is because the sentence is explaining the general effect of marginalia on a book's worth, and the word "but" is unnecessary in this context. The sentence flows better without it.

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Quick Tip

When talking about something affecting the overall worth or importance, use "value" without "but" to keep the sentence simple and clear.

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22. After the United Kingdom began rolling out taxes equivalent to a few cents on single-use plastic grocery bags in 2011, plastic-bag consumption decreased by up to ninety _____ taxes are subject to what economists call the "rebound effect": as the change became normalized, plastic-bag use started to creep back up.

(A) percent, such

(B) percent and such

(C) percent. Such

(D) percent such

Correct Answer: (A) percent, such

Solution: The correct phrase is "percent, such" because it creates a natural pause in the sentence, separating the percentage from the explanation. The use of "such" refers to the "rebound effect" clearly, maintaining the sentence's readability and clarity.

Quick Tip

When a sentence lists a percentage and follows it with additional explanation, a comma is often necessary to separate the two parts of the sentence for clarity.

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23. As British scientist Peter Whibberley has observed, "the Earth is not a very good timekeeper." Earth's slightly irregular rotation rate means that measurements of time must be periodically adjusted. Specifically, an extra "leap second" (the 86,401st second of the day) is _____ time based on the planet's rotation lags a full nine-tenths of a second behind time kept by precise atomic clocks.

(A) added, whenever

(B) added; whenever

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(C) added. Whenever

(D) added whenever

Correct Answer: (A) added, whenever

Solution: The correct phrase is "added, whenever" because it separates the first clause from the explanation that follows, creating a clearer and grammatically correct sentence. The comma is necessary to break up the ideas.

Quick Tip

When using "whenever" after a main clause, the comma helps separate the main idea from the condition that follows, improving sentence clarity.

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24. Bengali author Toru Dutt's A Sheaf Gleaned in French Fields (1876), a volume of English translations of French poems, _____ scholars' understanding of the transnational and multilingual contexts in which Dutt lived and worked.

(A) has enhanced

(B) are enhancing

(C) have enhanced

(D) enhance

Correct Answer: (D) enhance

Solution: The correct choice is "enhance" because the subject of the sentence ("scholars' understanding") is plural, and the present tense verb "enhance" fits appropriately in this context. "Has enhanced" or "have enhanced" would imply an incorrect subject-verb agreement.

Quick Tip

Ensure the subject and verb agree in number: use "enhance" when the subject is plural, as in this case ("scholars' understanding").

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25. Journalists have dubbed Gil Scott-Heron the "godfather of rap," a title that has appeared in hundreds of articles about him since the 1990s. Scott-Heron himself resisted the godfather _____ feeling that it didn't encapsulate his devotion to the broader African American blues music tradition as well as "bluesologist," the moniker he preferred.

(A) nickname, however

(B) nickname, however;

(C) nickname, however,

(D) nickname; however

Correct Answer: (C) nickname, however,

Solution: The correct answer is "nickname, however," because "however" introduces a contrasting idea and requires a comma before it to set it apart from the first clause. The punctuation structure ensures the sentence remains clear and well-structured.

Quick Tip

Use a comma before "however" when it introduces a contrasting statement within a sentence.

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26. From afar, African American fiber artist Bisa Butler's portraits look like paintings, their depictions of human faces, bodies, and clothing so intricate that it seems only a fine brush could have rendered them. When viewed up close, however, the portraits reveal themselves to be _____ stitching barely visible among the thousands of pieces of printed, microcut fabric.

(A) quilts, and the

(B) quilts, the

(C) quilts; the

(D) quilts. The

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Correct Answer: (D) quilts. The

Solution: The correct answer is "quilts. The" because the second part of the sentence starts a new independent clause that provides further clarification about the portraits. The period is used to separate the two ideas clearly.

Quick Tip

When a new independent clause follows, use a period before starting the new idea with "The."

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27. Most conifers (trees belonging to the phylum Coniferophyta) are evergreen. That is, they keep their green leaves or needles year-round. However, not all conifer species are evergreen. Larch trees, _____ lose their needles every fall.

(A) for instance

(B) nevertheless,

(C) meanwhile,

(D) in addition,

Correct Answer: (B) nevertheless,

Solution: The correct answer is "nevertheless," because it introduces a contrast between most conifers being evergreen and the fact that larch trees lose their needles every fall. "Nevertheless" works well to emphasize this exception to the general rule.

Quick Tip

"Nevertheless" is used to introduce a contrast or exception to what has just been stated.

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28. While researching a topic, a student has taken the following notes:

- Sam Maloof (1916–2009) was an American woodworker and furniture designer.
- He was the son of Lebanese immigrants.

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- He received a "genius grant" from the John D. and Catherine T. MacArthur Foundation in 1985.
- The Museum of Fine Arts in Boston, Massachusetts, owns a rocking chair that Maloof made from walnut wood.
- The armrests and the seat of the chair are sleek and contoured, and the back consists of seven spindle-like slats.

The student wants to describe the rocking chair to an audience unfamiliar with Sam Maloof. Which choice most effectively uses relevant information from the notes to accomplish this goal?
(A) With its sleek, contoured armrests and seat, the walnut rocking chair in Boston's Museum of Fine Arts is just one piece of furniture created by American woodworker Sam Maloof.
(B) Sam Maloof was born in 1916 and died in 2009, and during his life, he made a chair that you can see if you visit the Museum of Fine Arts in Boston.
(C) Furniture designer Sam Maloof was a recipient of one of the John D. and Catherine T. MacArthur Foundation's "genius grants."
(D) The rocking chair is made from walnut, and it has been shaped such that its armrests and seat are sleek and contoured.

Correct Answer: (A) With its sleek, contoured armrests and seat, the walnut rocking chair in Boston's Museum of Fine Arts is just one piece of furniture created by American woodworker Sam Maloof.

Solution: Option (A) directly introduces the rocking chair, mentions the wood used, and links it to Maloof's other works in a clear and informative way, which is ideal for describing the object to an unfamiliar audience.

Quick Tip

When describing an object to someone unfamiliar with the creator, it's helpful to provide both the specific attributes of the object and its connection to the creator's body of work.

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29. While researching a topic, a student has taken the following notes:

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- In the late 1890s, over 14,000 unique varieties of apples were grown in the US.
- The rise of industrial agriculture in the mid-1900s narrowed the range of commercially grown crops.
- Thousands of apple varieties considered less suitable for commercial growth were lost.
- Today, only 15 apple varieties dominate the market, making up 90
- The Lost Apple Project, based in Washington State, attempts to find and grow lost apple varieties.

The student wants to emphasize the decline in unique apple varieties in the US and specify why this decline occurred. Which choice most effectively uses relevant information from the notes to accomplish these goals?

(A) The Lost Apple Project is dedicated to finding some of the apple varieties lost following a shift in agricultural practices in the mid-1900s.

(B) While over 14,000 apple varieties were grown in the US in the late 1890s, only 15 unique varieties make up most of the apples sold today.

(C) Since the rise of industrial agriculture, US farmers have mainly grown the same few unique apple varieties, resulting in the loss of thousands of varieties less suitable for commercial growth.

(D) As industrial agriculture rose to prominence in the mid-1900s, the number of crops selected for cultivation decreased dramatically.

Correct Answer: (C) Since the rise of industrial agriculture, US farmers have mainly grown the same few unique apple varieties, resulting in the loss of thousands of varieties less suitable for commercial growth.

Solution: Option (C) most directly connects the loss of unique apple varieties to the rise of industrial agriculture, explaining the decline and the reason behind it, which the student aims to emphasize.

Quick Tip

When focusing on cause and effect, make sure the explanation directly connects the cause (e.g., industrial agriculture) with its consequence (e.g., loss of varieties).

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30. While researching a topic, a student has taken the following notes:

- Cecilia Vicuña is a multidisciplinary artist.
- In 1971, her first solo art exhibition, *Pinturas, poemas y explicaciones*, was shown at the Museo Nacional de Bellas Artes in Santiago, Chile.
- Her poetry collection *Precario/Precarious* was published in 1983 by Tanam Press.
- Her poetry collection *Instant* was published in 2002 by Kelsey St. Press.
- She lives part time in Chile, where she was born, and part time in New York.

The student wants to introduce the artist's 1983 poetry collection. Which choice most effectively uses relevant information from the notes to accomplish this goal?

(A) Before she published the books *Precario/Precarious* (1983) and *Instant* (2002), Cecilia Vicuña exhibited visual art at the Museo Nacional de Bellas Artes in Santiago, Chile.

(B) Cecilia Vicuña is a true multidisciplinary artist whose works include numerous poetry collections and visual art exhibitions.

(C) Published in 1983 by Tanam Press, *Precario/Precarious* is a collection of poetry by the multidisciplinary artist Cecilia Vicuña.

(D) In 1971, Cecilia Vicuña exhibited her first solo art exhibition, *Pinturas, poemas y explicaciones*, in Chile, her country of birth.

Correct Answer: (C) Published in 1983 by Tanam Press, *Precario/Precarious* is a collection of poetry by the multidisciplinary artist Cecilia Vicuña.

Solution: Option (C) directly introduces the book *Precario/Precarious*, provides the relevant year (1983), and mentions Cecilia Vicuña as the author, all while being concise and relevant to the goal of introducing the collection.

Quick Tip

When introducing a specific work, it is important to highlight its title, publication details, and the author in a clear and straightforward manner.

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31. While researching a topic, a student has taken the following notes:

- When medical students mention their patients on social media, they may violate patient confidentiality.
- Terry Kind led a study to determine how many medical schools have student policies that mention social media use.
- Kind and her team reviewed 132 medical school websites, examining publicly available student policies.
- Only thirteen medical schools had guidelines that explicitly mention social media, and only five defined what constitutes acceptable social media use.

The student wants to emphasize the study's methodology. Which choice most effectively uses relevant information from the notes to accomplish this goal?

(A) The student policies of 132 medical schools can be found online, according to research by Terry Kind.

(B) To find out how many medical schools have guidelines about student social media use, Terry Kind and her team examined the student policies of 132 medical schools.

(C) Out of 132 medical schools, only thirteen had student policies that mentioned social media, and only five specified what use was acceptable.

(D) Terry Kind and her team wanted to know how many medical schools have student social media policies in place about protecting patient confidentiality.

Correct Answer: (B) To find out how many medical schools have guidelines about student social media use, Terry Kind and her team examined the student policies of 132 medical schools.

Solution: Option (B) focuses on the methodology by explaining how Terry Kind and her team examined the student policies of 132 medical schools, which is the primary method used in the study.

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Quick Tip

When emphasizing methodology, make sure to highlight how the research was conducted and what data or sources were analyzed.

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32. While researching a topic, a student has taken the following notes:

- The Gullah are a group of African Americans who have lived in parts of the southeastern United States since the 18th century.
- Gullah culture is influenced by West African and Central African traditions.
- Louise Miller Cohen is a Gullah historian, storyteller, and preservationist.
- She founded the Gullah Museum of Hilton Head Island, South Carolina, in 2003.
- Vermelle Rodrigues is a Gullah historian, artist, and preservationist.
- She founded the Gullah Museum of Georgetown, South Carolina, in 2003.

The student wants to emphasize the duration and purpose of Cohen's and Rodrigues's work. Which choice most effectively uses relevant information from the notes to accomplish this goal?
(A) At the Gullah Museums in Hilton Head Island and Georgetown, South Carolina, visitors can learn more about the Gullah people who have lived in the region for centuries.
(B) Louise Miller Cohen and Vermelle Rodrigues have worked to preserve the culture of the Gullah people, who have lived in the United States since the 18th century.
(C) Since 2003, Louise Miller Cohen and Vermelle Rodrigues have worked to preserve Gullah culture through their museums.
(D) Influenced by the traditions of West and Central Africa, Gullah culture developed in parts of the southeastern United States in the 18th century.

Correct Answer: (C) Since 2003, Louise Miller Cohen and Vermelle Rodrigues have worked to preserve Gullah culture through their museums.

Solution: Option (C) emphasizes the specific duration and purpose of their work, which is to preserve Gullah culture through their museums, starting in 2003.

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Quick Tip

When emphasizing the duration and purpose of someone's work, be sure to highlight both the timeframe and the main objective in a clear and focused manner.

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33. While researching a topic, a student has taken the following notes:

- In North America, woodlands have expanded into areas that were once grasslands.
- Thomas Rogers and F. Leland Russell of Wichita State University investigated whether woodland expansion is related to changes in climate.
- Rogers and Russell analyzed core samples from oak trees on a site that was not wooded in the past and indexed the age of the trees with historical climate data to see if tree populations and climate were correlated.
- Tree population growth was associated with dry intervals.
- Droughts may have played a role in woodland expansion.

The student wants to emphasize the aim of the research study. Which choice most effectively uses relevant information from the notes to accomplish this goal?

(A) Thomas Rogers and F. Leland Russell, researchers at Wichita State University, wanted to know if woodland expansion is related to changes in climate.

(B) Thanks to the work done by Thomas Rogers and F. Leland Russell, we now know that droughts may have played a role in woodland expansion.

(C) Wichita State University researchers have determined that tree population growth was associated with dry intervals.

(D) Thomas Rogers and F. Leland Russell analyzed core samples from oak trees on a site that was not wooded in the past, indexing the age of the trees with historical climate data.

Correct Answer: (A) Thomas Rogers and F. Leland Russell, researchers at Wichita State University, wanted to know if woodland expansion is related to changes in climate.

Solution: Option (A) best highlights the purpose of the research study, which is to investigate the relationship between woodland expansion and changes in climate.

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Quick Tip

When emphasizing the aim of a research study, it is important to clearly state the central question or hypothesis that the research is trying to address.

Module-2

1. According to botanists, a viburnum plant experiencing insect damage may develop erineum—a discolored, felty growth—on its leaf blades. A _____ viburnum plant, on the other hand, will have leaves with smooth surfaces and uniformly green coloration.

(A) struggling

(B) beneficial

(C) simple

(D) healthy

Correct Answer: (D) healthy

Solution: A healthy viburnum plant will have leaves with smooth surfaces and a uniform green coloration. The words "struggling," "beneficial," and "simple" do not accurately describe the condition of a healthy plant as clearly as "healthy" does.

Quick Tip

When describing the condition of a plant, "healthy" is the most appropriate adjective for plants with proper growth and appearance.

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2. Nigerian American author Teju Cole's _____ his two passions—photography and the written word—culminates in his 2017 book, Blind Spot, which evocatively combines his original photographs from his travels with his poetic prose.

(A) indifference to

(B) enthusiasm for

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(C) concern about

(D) surprise at

Correct Answer: (B) enthusiasm for

Solution: Teju Cole's work highlights his passion for both photography and writing. "Enthusiasm for" is the most appropriate expression to describe the connection between his two passions.

Quick Tip

When discussing someone's passion for something, the phrase "enthusiasm for" conveys the most positive and fitting connection.

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3. Novelist N. K. Jemisin declines to _____ the conventions of the science fiction genre in which she writes, and she has suggested that her readers appreciate her work precisely because of this willingness to thwart expectations and avoid formulaic plots and themes.

(A) question

(B) react to

(C) perceive

(D) conform to

Correct Answer: (D) conform to

Solution: N. K. Jemisin resists the conventions of the genre. The phrase "conform to" fits the context because it refers to adhering to or following conventions, which Jemisin refuses to do.

Quick Tip

When discussing someone rejecting conventions, "conform to" is the most appropriate word to describe the avoidance of following norms or expectations.

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4. In Nature Poem (2017), Kumeyaay poet Tommy Pico portrays his _____ the natural world by honoring the centrality of nature within his tribe's traditional beliefs while simultaneously expressing his distaste for being in wilderness settings himself.

(A) responsiveness to

(B) ambivalence toward

(C) renunciation of

(D) mastery over

Correct Answer: (B) ambivalence toward

Solution: Tommy Pico expresses mixed feelings about nature. "Ambivalence toward" accurately describes this conflicted attitude—he honors nature in his culture while expressing distaste for being in wilderness settings.

Quick Tip

"Ambivalence toward" is used when describing mixed or conflicting feelings about something.

5. The following text is from the 1924 poem "Cycle" by D'Arcy McNickle, who was a citizen of the Confederated Salish and Kootenai Tribes.

There shall be new roads wending,
A new beating of the drum—
Men's eyes shall have fresh seeing,
Grey lives reprise their span—
But under the new sun's being,
Completing what night began,
There'll be the same backs bending,
The same sad feet shall drum—

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When this night finds its ending

And day shall have come.....

Which choice best states the main purpose of the text?

(1) To consider how the repetitiveness inherent in human life can be both rewarding and challenging

(2) To question whether activities completed at one time of day are more memorable than those completed at another time of day

(3) To refute the idea that joy is a more commonly experienced emotion than sadness is

(4) To demonstrate how the experiences of individuals relate to the experiences of their communities

Correct Answer: (1) To consider how the repetitiveness inherent in human life can be both rewarding and challenging

Solution: The poem reflects on the cyclical nature of life, with the repetition of actions like bending and drumming. The idea of recurring life events and their rewarding and challenging nature fits the context of the text. Choices (2), (3), and (4) are not directly relevant to the poem's focus on life cycles and repetition.

Quick Tip

Pay attention to how repetition and cyclical themes are portrayed in literature as both rewarding and challenging, especially when referring to natural processes or life stages.

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6. The following text is adapted from Jane Austen's 1814 novel Mansfield Park. The speaker, Tom, is considering staging a play at home with a group of his friends and family.

We mean nothing but a little amusement

among ourselves, just to vary the scene, and

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exercise our powers in something new. We want no audience, no publicity. We may be trusted, I think, in choosing some play most perfectly unexceptionable; and I can conceive no greater harm or danger to any of us in conversing in the elegant written language of some respectable author than in chattering in words of our own.

Which choice best states the main purpose of the text?

(1) To offer Tom's assurance that the play will be inoffensive and involve only a small number of people

(2) To clarify that the play will not be performed in the manner Tom had originally intended

(3) To elaborate on the idea that the people around Tom lack the skills to successfully stage a play

(4) To assert that Tom believes the group performing the play will be able to successfully promote it

Correct Answer: (1) To offer Tom's assurance that the play will be inoffensive and involve only a small number of people

Solution: Tom is assuring that the play will not be performed publicly and will involve only a small group, which supports the idea of inoffensive amusement. The other options misinterpret Tom's tone and intent, making them less accurate.

Quick Tip

Look for cues in dialogue where characters make assurances or clarify expectations, especially when emphasizing small, private gatherings or nonpublic activities.

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7. Musician Joni Mitchell, who is also a painter, uses images she creates for her album covers to

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emphasize ideas expressed in her music. For the cover of her album Turbulent Indigo (1994), Mitchell painted a striking self-portrait that closely resembles Vincent van Gogh's Self-Portrait with Bandaged Ear (1889). The image calls attention to the album's title song, in which Mitchell sings about the legacy of the postimpressionist painter. In that song, Mitchell also hints that she feels a strong artistic connection to Van Gogh—an idea that is reinforced by her imagery on the cover.

Which choice best describes the overall structure of the text?

(A) It presents a claim about Mitchell, then gives an example supporting that claim.

(B) It discusses Van Gogh's influence on Mitchell, then considers Mitchell's influence on other artists.

(C) It describes a similarity between two artists, then notes a difference between them.

(D) It describes the songs on Turbulent Indigo, then explains how they relate to the album's cover.

Correct Answer: (A) It presents a claim about Mitchell, then gives an example supporting that claim.

Solution: The text starts by making a claim about Mitchell's use of imagery in her work and then supports that claim by describing the self-portrait and its connection to the album's title song. Choice (B) is incorrect because the text does not primarily focus on Mitchell's influence on other artists. Choice (C) does not reflect the structure of the text, as the focus is not on comparing two artists. Choice (D) is incorrect as the text does not focus on explaining the songs on Turbulent Indigo.

Quick Tip

Look for how the structure of a text supports the main idea, especially when one part introduces the main idea and the following part provides examples or further details.

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8. Text 1 *Astronomer Mark Holland and colleagues examined four white dwarfs—small, dense remnants of past stars—in order to determine the composition of exoplanets that used to orbit those stars. Studying wavelengths of light in the white dwarf atmospheres, the team reported that traces of elements such as lithium and sodium support the presence of exoplanets with continental crusts similar to Earth's.*

Text 2 *Past studies of white dwarf atmospheres have concluded that certain exoplanets had continental crusts. Geologist Keith Putirka and astronomer Siyi Xu argue that those studies unduly emphasize atmospheric traces of lithium and other individual elements as signifiers of the types of rock found on Earth. The studies don't adequately account for different minerals made up of various ratios of those elements, and the possibility of rock types not found on Earth that contain those minerals.*

Based on the texts, how would Putirka and Xu (Text 2) most likely characterize the conclusion presented in Text 1?

(A) As unexpected, because it was widely believed at the time that white dwarf exoplanets lacked continental crusts

(B) As premature, because researchers have only just begun trying to determine what kinds of crusts white dwarf exoplanets had

(C) As questionable, because it rests on an incomplete consideration of potential sources of the elements detected in white dwarf atmospheres

(D) As puzzling, because it's unusual to successfully detect lithium and sodium in white dwarf atmospheres

Correct Answer: (C) As questionable, because it rests on an incomplete consideration of potential sources of the elements detected in white dwarf atmospheres.

Solution: Putirka and Xu question the conclusions made in Text 1, as they believe the studies in that text overly emphasize the presence of lithium and sodium without fully considering other possible sources of those elements. Choice (A) is incorrect because the conclusion in Text

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1 is not presented as unexpected, but as supporting evidence for exoplanets with continental crusts. Choice (B) is not correct because the issue is not about timing, but rather about the methods used in the studies. Choice (D) is not directly relevant to the critique in Text 2.

Quick Tip

When analyzing academic critiques, focus on the reasons for disagreement, especially regarding the methodology or evidence used in the original study.

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9. Utah is home to Pando, a colony of about 47,000 quaking aspen trees that all share a single root system. Pando is one of the largest single organisms by mass on Earth, but ecologists are worried that its growth is declining in part because of grazing by animals. The ecologists say that strong fences could prevent deer from eating young trees and help Pando start thriving again.

According to the text, why are ecologists worried about Pando?

(A) It isn't growing at the same rate it used to.

(B) It isn't producing young trees anymore.

(C) It can't grow into new areas because it is blocked by fences.

(D) Its root system can't support many more new trees.

Correct Answer: (B) It isn't producing young trees anymore.

Solution: The text mentions that Pando's growth is declining due to grazing animals and that ecologists suggest fencing to help Pando thrive again. The key concern is the lack of young trees. Choice (A) is incorrect because the text doesn't focus on the rate of growth. Choice (C) is incorrect because the issue is not about new areas but the lack of new trees. Choice (D) is incorrect because the text focuses on the need for new trees, not the root system.

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Quick Tip

When answering questions about ecological issues, focus on the specific concerns or challenges mentioned in the text.

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10. For many years, the only existing fossil evidence of mixopterid eurypterids—an extinct family of large
aquatic arthropods known as sea scorpions and related to modern arachnids and horseshoe crabs—came from
four species living on the paleocontinent of Laurasia. In a discovery that expands our understanding of the
geographical distribution of mixopterids, paleontologist Bo Wang and others have identified fossilized remains of a
new mixopterid species, Terropterus xiushanensis, that lived over 400 million years ago on the paleocontinent of
Gondwana.
According to the text, why was Wang and his team's discovery of the Terropterus xiushanensis fossil significant?

(A) The fossil constitutes the first evidence found by scientists that mixopterids lived more than 400 million years ago.
(B) The fossil helps establish that mixopterids are more closely related to modern arachnids and horseshoe crabs than previously thought.
(C) The fossil helps establish a more accurate timeline of the evolution of mixopterids on the paleocontinents of Laurasia and Gondwana.
(D) The fossil constitutes the first evidence found by scientists that mixopterids existed outside the paleocontinent of Laurasia.

Correct Answer: (D) The fossil constitutes the first evidence found by scientists that mixopterids existed outside the paleocontinent of Laurasia.

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Solution: The text highlights the significance of the fossil because it is the first evidence that mixopterids lived on the paleocontinent of Gondwana, which was outside of Laurasia. Choice (A) is incorrect because the fossil's age is not the focus of the significance. Choice (B) is incorrect as the text doesn't focus on the relationship to arachnids and horseshoe crabs. Choice (C) is incorrect because the fossil is not used to establish a timeline, but to show the mixopterids' presence in Gondwana.

Quick Tip

When analyzing questions about scientific discoveries, pay attention to what makes the discovery unique or groundbreaking, such as new locations or unexpected findings.

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11. The novelist Toni Morrison was the first Black woman to work as an editor at the publishing company Random House, from 1967 to 1983. A scholar asserts that one of Morrison's likely aims during her time as an editor was to strengthen the presence of Black writers on the list of Random House's published authors.
Which finding, if true, would most strongly support the scholar's claim?

(A) The percentage of authors published by Random House who were Black rose in the early 1970s and stabilized throughout the decade.
(B) Black authors who were interviewed in the 1980s and 1990s were highly likely to cite Toni Morrison's novels as a principal influence on their work.
(C) The novels written by Toni Morrison that were published after 1983 sold significantly more copies and received wider critical acclaim than the novels she wrote that were published before 1983.
(D) Works that were edited by Toni Morrison during her time at Random House displayed stylistic characteristics that distinguished them from works that were not edited by Morrison.

Correct Answer: (A) The percentage of authors published by Random House who were Black rose in the early 1970s and stabilized throughout the decade.

Solution: The best supporting evidence for the scholar's claim is choice (A), which provides

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data indicating an increase in the presence of Black authors in the early 1970s and a stabilization of that percentage throughout the decade. Choice (B) focuses on Morrison's influence on other authors but doesn't address her role at Random House. Choice (C) is about Morrison's own sales, which doesn't directly relate to the claim about her influence on Random House's editorial decisions. Choice (D) focuses on stylistic differences but does not support the idea of strengthening the presence of Black writers.

Quick Tip

When identifying supporting evidence, look for data that directly relates to the key assertion or claim made in the question.

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12. "The Poet Walt Whitman" is an 1887 essay by José Martí, a Cuban author and political activist, originally written in Spanish. In the essay, Martí explores the value of literature, arguing that a society's spiritual well-being depends on the character of its literary culture: _____

Which quotation from a translation of "The Poet Walt Whitman" most effectively illustrates the claim?

(A) "Poetry, which brings together or separates, which fortifies or brings anguish, which shores up or demolishes souls, which gives or robs men of faith and vigor, is more necessary to a people than industry itself, for industry provides them with a means of subsistence, while literature gives them the desire and strength for life."

(B) "Every society brings to literature its own form of expression, and the history of the nations can be told with greater truth by the stages of literature than by chronicles and decades."

(C) "Where will a race of men go when they have lost the habit of thinking with faith about the scope and meaning of their actions? The best among them, those who consecrate Nature with their sacred desire for the future, will lose, in a sordid and painful annihilation, all stimulus to alleviate the ugliness of humanity."

(D) "Listen to the song of this hardworking and satisfied nation; listen to Walt Whitman. The exercise of himself exalts him to majesty, tolerance exalts him to justice, and order to joy."

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Correct Answer: (A) "Poetry, which brings together or separates, which fortifies or brings anguish, which shores up or demolishes souls, which gives or robs men of faith and vigor, is more necessary to a people than industry itself, for industry provides them with a means of subsistence, while literature gives them the desire and strength for life."

Solution: Choice (A) best reflects Martí's claim about the importance of literature in society, as it emphasizes the spiritual necessity of literature, which strengthens society in a way that industry cannot. Choice (B) focuses on the role of expression in literature, but it doesn't address the spiritual necessity that Martí discusses. Choice (C) discusses the consequences of losing faith but doesn't support the specific idea about literature's essential role in society. Choice (D) speaks about Whitman's personal qualities but doesn't directly reflect Martí's claim about literature's societal role.

Quick Tip

When selecting supporting evidence, look for passages that directly reinforce the central claim made in the passage.

13.

Estimates of Tyrannosaurid Bite Force			
Study	**Year**	**Estimation method**	**Approximate bite force (newtons)**
Cost et al.	2019	muscular and skeletal modeling	35,000–63,000
Gignac and Erickson	2017	tooth-bone interaction analysis	8,000–34,000
Meers	2002	body-mass scaling	183,000–235,000
Bates and Falkingham	2012	muscular and skeletal modeling	35,000–57,000

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The largest tyrannosaurids-the family of carnivorous dinosaurs that includes Tarbosaurus, Albertosaurus, and, most famously,Tyrannosaurus rex-are thought to have had the strongest bites of any land animals in Earth's history. Determining the bite force of extinct animals can be difficult, however, and paleontologists Paul Barrett and Emily Rayfield have suggested that an estimate of dinosaur bite force may be significantly influenced by the methodology used in generating that estimate.

Which choice best describes data from the table that support Barrett and Rayfield's suggestion?

(A) The study by Meers used body-mass scaling and produced the lowest estimated maximum bite force, while the study by Cost et al. used muscular and skeletal modeling and produced the highest estimated maximum.

(B) In their study, Gignac and Erickson used tooth-bone interaction analysis to produce an estimated bite force range with a minimum of 8,000 newtons and a maximum of 34,000 newtons.

(C) The bite force estimates produced by Bates and Falkingham and by Cost et al. were similar to each other, while the estimates produced by Meers and by Gignac and Erickson each differed substantially from any other estimate.

(D) The estimated maximum bite force produced by Cost et al. exceeded the estimated maximum produced by Bates and Falkingham, even though both groups of researchers used the same method to generate their estimates.

Correct Answer: (A) The study by Meers used body-mass scaling and produced the lowest estimated maximum bite force, while the study by Cost et al. used muscular and skeletal modeling and produced the highest estimated maximum.

Solution: The best supporting evidence for Barrett and Rayfield's suggestion is choice (A), which shows that the methodology used by Meers (body-mass scaling) produced the lowest estimated bite force, while the method used by Cost et al. (muscular and skeletal modeling) produced the highest estimated bite force. Choice (B) is accurate about the method used by Gignac and Erickson but doesn't support the suggestion about the relationship between

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methodology and bite force. Choice (C) does not focus on the methods used by the researchers and does not strongly support Barrett and Rayfield's idea. Choice (D) discusses the estimates from different studies but does not provide clear support for the role of methodology in the estimated results.

Quick Tip

Pay close attention to the methodology used in scientific studies, as it often influences the results and conclusions drawn.

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14. Number and Origin of Clamshell Tools Found at Different Levels Below the Surface in Neanderthal Cave Studying tools unearthed at a cave site on the west-

Depth of tools found below surface in cave (meters)	Clamshells that Neanderthals collected from the beach	Clamshells that Neanderthals harvested from the seafloor
3–4	99	33
6–7	1	0
4–5	2	0
2–3	7	0
5–6	18	7

ern coast of Italy, archaeologist Paola Villa and colleagues have determined that prehistoric Neanderthal groups fashioned them from shells of clamn that they harvested from the seafloor while wading or diving or that washed up on the beach. Clamshells become thin and eroded as they wash up on the beach, while those on the seafloor are smooth and sturdy, so the research team suspects that Neanderthals prized the tools made with seafloor shells. However, the team also concluded that those tools were likely more challenging to obtain, noting that_____ Which choice most effectively uses data from the table to support the research team's conclusion?

(A) at each depth below the surface in the cave, the difference in the numbers of tools of each type suggests that shells were easier to collect from the beach than to harvest from the seafloor.

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(B) the highest number of tools were at a depth of 3–4 meters below the surface, which suggests that the Neanderthal population at the site was highest during the related period of time.
(C) at each depth below the surface in the cave, the difference in the numbers of tools of each type suggests that Neanderthals preferred to use clamshells from the beach because of their durability.
(D) the higher number of tools at depths of 5–6 meters below the surface in the cave than at depths of 4–5 meters below the surface suggests that the size of clam populations changed over time.

Correct Answer: (A) at each depth below the surface in the cave, the difference in the numbers of tools of each type suggests that shells were easier to collect from the beach than to harvest from the seafloor.

Solution: Choice (A) is the best choice because it directly reflects the table's data, which shows that clamshells collected from the beach were far more numerous at every depth compared to those harvested from the seafloor. This supports the conclusion that the tools made from shells gathered from the beach were easier to obtain. Choice (B) focuses on a general population estimate that isn't fully supported by the data. Choice (C) is incorrect because it emphasizes the durability of clamshells but overlooks the key aspect of the research: the ease of collection from the beach. Choice (D) addresses population size, but the data does not support any correlation between tool numbers and changing clam populations.

Quick Tip

When analyzing data from tables, always focus on the main factors highlighted in the research and how the data reflects the study's findings.

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15. Average Number and Duration of Torpor Bouts and Arousal Episodes for Alaska Marmots and Arctic Ground Squirrels, 2008–2011

When hibernating, Alaska marmots and Arctic ground squirrels enter a state called torpor, which minimizes the energy their bodies need to function.Often a hibernating animal will temporarily come out of torpor (called an arousal episode)

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Feature	Species	
	Alaska marmots	Arctic ground squirrels
torpor bouts	12	10.5
duration per bout	13.81 days	16.77 days
arousal episodes	11	9.5
duration per episode	21.2 hours	14.2 hours

and its metabolic rate will rise, burning more of the precious energy the animal needs to survive the winter. Alaska marmots hibernate in groups and therefore burn less energy keeping warm during these episodes than they would if they were alone. A researcher hypothesized that because Arctic ground squirrels hibernate alone, they would likely exhibit longer bouts of torpor and shorter arousal episodes than Alaska marmots.

Which choice best describes data from the table that support the researcher's hypothesis?

(A) The Alaska marmots' arousal episodes lasted for days, while the Arctic ground squirrels' arousal episodes lasted less than a day.

(B) The Alaska marmots and the Arctic ground squirrels both maintained torpor for several consecutive days per bout, on average.

(C) The Alaska marmots had shorter torpor bouts and longer arousal episodes than the Arctic ground squirrels did.

(D) The Alaska marmots had more torpor bouts and shorter arousal episodes than the Arctic ground squirrels did.

Correct Answer: (A) The Alaska marmots' arousal episodes lasted for days, while the Arctic ground squirrels' arousal episodes lasted less than a day.

Solution: Choice (A) correctly reflects the data, showing that the arousal episodes for Alaska marmots lasted on average 21.2 hours, which is over a day, while the arousal episodes for Arctic ground squirrels lasted on average 14.2 hours, which is less than a day. Choice (B) does not

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accurately reflect the data regarding the duration of torpor and arousal episodes. Choice (C) incorrectly suggests that the Alaska marmots had shorter torpor bouts, when in fact their torpor bouts were longer than those of the Arctic ground squirrels. Choice (D) incorrectly compares the number of torpor bouts and arousal episodes.

Quick Tip

When comparing data, always check the specific measures given (e.g., duration of bouts and episodes) to see if they align with the hypothesis being tested.

---

16. Ratified by more than 90 countries, the Nagoya Protocol is an international agreement ensuring that Indigenous communities are compensated when their agricultural resources and knowledge of wild plants and animals are utilized by agricultural corporations. However, the protocol has shortcomings. For example, it allows corporations to insist that their agreements with communities to conduct research on the commercial uses of the communities' resources and knowledge remain confidential. Therefore, some Indigenous advocates express concern that the protocol may have the unintended effect of _____

Which choice most logically completes the text?

(A) diminishing the monetary reward that corporations might derive from their agreements with Indigenous communities.
(B) limiting the research that corporations conduct on the resources of the Indigenous communities with which they have signed agreements.
(C) preventing independent observers from determining whether the agreements guarantee equitable compensation for Indigenous communities.
(D) discouraging Indigenous communities from learning new methods for harvesting plants and animals from their corporate partners.

Correct Answer: (C) preventing independent observers from determining whether the agree-

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ments guarantee equitable compensation for Indigenous communities.

Solution: Choice (C) most directly reflects the concern expressed in the text about the Nagoya Protocol's provision for confidentiality, which prevents independent observers from assessing the fairness and equity of the agreements. Choice (A) does not directly address the concern raised about the protocol's impact on Indigenous communities' rights. Choice (B) focuses on the research aspect, but it is the lack of transparency, not the limitation of research itself, that is the concern. Choice (D) doesn't align with the primary concern in the text, which is about the confidentiality clause and its potential negative effects on monitoring the agreements.

Quick Tip

When reading about policies or agreements, focus on the underlying concerns about fairness and transparency that may affect the outcome.

---

17. The domestic sweet potato (*Ipomoea batatas*) descends from a wild plant native to South America. It also populates the Polynesian Islands, where evidence confirms that Native Hawaiians and other Indigenous peoples were cultivating the plant centuries before seafaring first occurred over the thousands of miles of ocean separating them from South America. To explain how the sweet potato was first introduced in Polynesia, botanist Pablo Muñoz-Rodríguez and colleagues analyzed the DNA of numerous varieties of the plant, concluding that Polynesian varieties diverged from South American ones over 100,000 years ago. Given that Polynesia was peopled only in the last three thousand years, the team concluded that _____

Which choice most logically completes the text?

(A) the cultivation of the sweet potato in Polynesia likely predates its cultivation in South America.
(B) Polynesian peoples likely acquired the sweet potato from South American peoples only within the last three thousand years.
(C) human activity likely played no role in the introduction of the sweet potato in Polynesia.

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(D) Polynesian sweet potato varieties likely descend from a single South American variety that was domesticated, not wild.

Correct Answer: (A) the cultivation of the sweet potato in Polynesia likely predates its cultivation in South America.

Solution: Choice (A) best supports the conclusion that the Polynesian sweet potato cultivation predates that of South America. This fits with the DNA analysis indicating that Polynesian varieties diverged from South American ones over 100,000 years ago. Choice (B) conflicts with the conclusion of the DNA analysis. Choice (C) does not align with the evidence showing that human activity played a role in the introduction of the sweet potato. Choice (D) does not fit the conclusion about the divergence of varieties and does not support the notion of a single domesticated South American variety.

Quick Tip

When analyzing historical migration or cultivation, focus on the dates or timescales mentioned and how they align with evidence from genetic or archaeological studies.

---

18. Atoms in a synchrotron, a type of circular particle accelerator, travel faster and faster until they _____ a desired energy level, at which point they are diverted to collide with a target, smashing the atoms.

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) achieve
(B) achieves
(C) has achieved
(D) achieving

Correct Answer: (A) achieve

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Solution: Choice (A) is correct because the verb "achieve" properly matches the plural subject "atoms" in the sentence. Choice (B) incorrectly uses the singular verb "achieves," which does not agree with the plural subject. Choice (C) uses the incorrect tense, as it suggests a past event when the context indicates ongoing action. Choice (D) improperly uses the gerund form "achieving," which does not fit grammatically in this sentence.

Quick Tip

Always ensure that verbs agree with the subject in number and tense. When discussing ongoing actions, use the base form of the verb for plural subjects.

---

19. Even though bats prefer very sweet nectar, the plants that attract them have evolved to produce nectar that is only moderately sweet. A recent study _____ why: making sugar is energy-intensive, and it is more advantageous for plants to make a large amount of low-sugar nectar than a small amount of high-sugar nectar.

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) explains

(B) explaining

(C) having explained

(D) to explain

Correct Answer: (A) explains

Solution: Choice (A) is correct because the verb "explains" fits the sentence structure and maintains subject-verb agreement. Choice (B) uses the present participle form "explaining," which is not appropriate in this case. Choice (C) uses the past perfect "having explained," which does not fit with the time frame established in the sentence. Choice (D) uses the infinitive form "to explain," which is grammatically incorrect in this context.

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Quick Tip

In general, use the simple present tense when referring to findings or facts, especially in scientific or general statements.

---

20. Former First Lady of the United States Eleanor Roosevelt and Indian activist and educator Hansa Mehta were instrumental in drafting the United Nations' Universal Declaration of Human Rights, a document that _____ the basic freedoms to which all people are entitled.

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) have outlined
(B) were outlining
(C) outlines
(D) outline

Correct Answer: (D) outline

Solution: Choice (D) is correct because "outline" is in the simple present tense, which is appropriate for a general statement about the document. Choice (A) "have outlined" is incorrect because it uses the present perfect tense, which doesn't fit the context. Choice (B) "were outlining" is incorrect because it uses the past continuous tense, which doesn't match the timeline of the event. Choice (C) "outlines" is incorrect because it is a singular verb, while the subject ("document") is singular.

Quick Tip

Use the simple present tense to describe general facts or permanent states.

---

21. The life spans of rockfish vary greatly by species. For instance, the colorful

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calico rockfish (Sebastes dalli) can survive for a little over a _____ the rovingeye rockfish (Sebastes aleutianus) boasts a maximum life span of about two centuries.

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) decade; while

(B) decade. While

(C) decade; while

(D) decade, while

Correct Answer: (D) decade, while

Solution: Choice (D) is correct because the punctuation properly separates the independent and dependent clauses. Choice (A) is incorrect because there should be a comma before the "while" conjunction, not a semicolon. Choice (B) has an incorrect period, as a comma is required to connect the clauses. Choice (C) is incorrect because the semicolon is not required in this context.

Quick Tip

Use commas to separate clauses connected by coordinating conjunctions like "while." Avoid semicolons unless connecting two independent clauses.

---

22. The Lion Light system, developed by Kenyan inventor Richard Turere, consists of LED lights installed around the perimeter of livestock pastures. Powered with __

_____heblinkingLEDskeeplionsawayatnight, thusprotectingthelivestockwithoutriskingharmtotheendan

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) energy collected, by solar panels, during the day

(B) energy collected by solar panels during the day

(C) energy collected by solar panels during the day

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(D) energy, collected by solar panels during the day

Correct Answer: (B) energy collected by solar panels during the day

Solution: Choice (B) is correct because it uses proper punctuation and follows the sentence structure. Choice (A) incorrectly uses a comma after "collected" and "by solar panels." Choice (C) is a correct form but slightly redundant and too long in comparison to (B). Choice (D) is incorrect due to the extra comma.

Quick Tip

Avoid unnecessary commas in a sentence, especially when the elements are essential to the meaning.

---

23. Materials scientist Marie-Agathe Charpagne and her colleagues believed they could improve on the multicomponent alloy NiCoCr, an equal-proportions mixture of nickel (Ni), cobalt (Co), and chromium (Cr), by replacing chromium with ruthenium _____ the alloy that resulted, NiCoRu, turned out to be an unsuitable replacement for NiCoCr.

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) (Ru)

(B) (Ru) but

(C) (Ru),

(D) (Ru), but

Correct Answer: (D) (Ru), but

Solution: Choice (D) is correct because it properly uses a comma to separate the conjunction "but" from the phrase. Choice (A) is incorrect because it does

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not include the necessary conjunction. Choice (B) incorrectly lacks a comma after "(Ru)." Choice (C) incorrectly omits the conjunction "but," making it incomplete.

Quick Tip

When using a conjunction like "but" to contrast two clauses, separate them with a comma.

---

24. The Progressive Era in the United States witnessed the rise of numerous Black women's clubs, local organizations that advocated for racial and gender equality. Among the clubs' leaders _____ Josephine St. Pierre Ruffin, founder of the Women's Era Club of Boston.

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) was

(B) were

(C) are

(D) have been

Correct Answer: (A) was

Solution: Choice (A) is correct because the subject "Among the clubs' leaders" is singular, so "was" is the appropriate verb. Choice (B) is incorrect because "were" is plural and does not agree with the singular subject. Choice (C) is incorrect because it implies present tense, which is not appropriate in the context. Choice (D) is incorrect because "have been" is a present perfect form, which is not suitable in this context.

Quick Tip

When the subject is singular, use a singular verb to maintain subject-verb agreement.

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25. Based on genetic evidence, archaeologists have generally agreed that reindeer domestication began in the eleventh century CE. However, since uncovering fragments of a 2,000-year-old reindeer training harness in northern Siberia, _____ may have begun much earlier.

Which choice completes the text so that it conforms to the conventions of Standard English? (A) researcher Robert Losey has argued that domestication
(B) researcher Robert Losey's argument is that domestication
(C) domestication, researcher Robert Losey has argued,
(D) the argument researcher Robert Losey has made is that domestication

Correct Answer: (A) researcher Robert Losey has argued that domestication

Solution: Choice (A) is correct as it maintains a simple and clear subject-verb agreement without unnecessary commas. Choice (B) introduces unnecessary complexity and makes the sentence harder to read. Choice (C) is incorrect as it has misplaced commas, interrupting the flow of the sentence. Choice (D) is verbose and includes unnecessary wording.

Quick Tip

Avoid unnecessary commas or complex constructions in simple sentences to improve readability.

---

26. Hegra is an archaeological site in present-day Saudi Arabia and was the second largest city of the Nabataean Kingdom (fourth century BCE to first century CE). Archaeologist Laila Nehmé recently traveled to Hegra to study its ancient _____ into the rocky outcrops of a vast desert, these burial chambers seem to blend seamlessly with nature.

Which choice completes the text so that it conforms to the conventions of Standard

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English?

(A) tombs. Built

(B) tombs, built

(C) tombs and built

(D) tombs built

Correct Answer: (B) tombs, built

Solution: Choice (B) correctly uses a comma to separate the independent clause from the nonessential element. Choice (A) is incorrect because a period creates a fragment in the sentence. Choice (C) is incorrect as it introduces the conjunction "and," which is unnecessary here. Choice (D) does not have the correct punctuation between clauses.

Quick Tip

Use commas to separate elements that provide additional but nonessential information in a sentence.

---

27. When external forces are applied to common glass made from silicates, energy builds up around minuscule defects in the material, resulting in fractures. Recently, engineer Erkka Frankberg of Tampere University in Finland used the chemical _____ to make a glassy solid that can withstand higher strain than silicate glass can before fracturing.

Which choice completes the text so that it conforms to the conventions of Standard English?

(A) compound, aluminum oxide

(B) compound aluminun oxide

(C) compound, aluminum oxide

(D) compound aluminum oxide

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Correct Answer: (C) compound, aluminum oxide

Solution: Choice (C) correctly uses a comma after "compound" to separate the compound description and chemical. Choice (A) is incorrect as it uses unnecessary punctuation. Choice (B) is incorrect because "aluminun" is a misspelling. Choice (D) is missing a necessary comma for clarity.

Quick Tip

Ensure correct spelling of technical terms and use commas to separate descriptions in scientific writing.

---

28. Etched into Peru's Nazca Desert are line drawings so large that they can only be fully seen from high above. Archaeologists have known of the lines since the 1920s, when a researcher spotted some from a nearby foothill, and they have been studying the markings ever since. _____ archaeologists' efforts are aided by drones that capture high-resolution aerial photographs of the lines.

Which choice completes the text with the most logical transition?

(A) Currently

(B) In comparison,

(C) Still

(D) However

Correct Answer: (C) Still

Solution: Choice (C) is correct as it logically follows the previous statement, emphasizing the continuation of efforts over time. Choice (A) introduces a less appropriate time marker, as "currently" implies a different tone. Choice (B) and (D) disrupt the flow of information and don't fit with the context of the prior sentences.

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Quick Tip

Use transitions like "still" to emphasize ongoing action or development over time.

---

29. Archaeologist Sue Brunning explains why the seventh-century ship burial site at Sutton Hoo in England was likely the tomb of a king. First, the gold artifacts inside the ship suggest that the person buried with them was a wealthy and respected leader. _____ the massive effort required to bury the ship would likely only have been undertaken for a king.

(A) Instead

(B) Still

(C) Specifically,

(D) Second,

Correct Answer: (C) Specifically,

Solution: The phrase "Specifically" logically introduces the following details that support the claim that the burial was for a king, particularly due to the wealth and respect implied by the gold artifacts.

Quick Tip

"Specifically" is often used to introduce a specific detail that directly supports a general statement.

---

30. The more diverse and wide-ranging an animal's behaviors, the larger and more energy demanding the animal's brain tends to be. _____ from an evolutionary perspective, animals that perform only basic actions should allocate fewer resources to growing and maintaining brain tissue. The specialized subtypes of ants within colonies provide an opportunity to explore this hypothesis.

(A) Subsequently,

(B) Besides,

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(C) Nevertheless,

(D) Thus,

Correct Answer: (D) Thus,

Solution: "Thus" is the correct transition because it implies that the following information is a logical conclusion or result of the previously mentioned argument.

Quick Tip

"Thus" is commonly used to indicate a conclusion drawn from the argument or evidence presented.

---

31. When designing costumes for film, American artist Suttriat Larlarb typically custom fits the garments to each actor. _____ for the film Sunshine, in which astronauts must reignite a dying Sun, she designed a golden spacesuit and had a factory reproduce it in a few standard sizes; lacking a tailor-made quality, the final creations reflected the ungainliness of actual spacesuits.

(A) Nevertheless,

(B) Thus,

(C) Likewise,

(D) Moreover,

Correct Answer: (B) Thus,

Solution: "Thus" introduces the result or conclusion following the custom fitting and factory reproduction of the spacesuit.

Quick Tip

"Thus" often introduces an explanation or result that follows from the preceding action or argument.

---

32. While researching a topic, a student has taken the following notes:

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- Shaun Tan is an Australian author.
- In 2008, he published Tales from Outer Suburbia, a book of fifteen short stories.
- The stories describe surreal events occurring in otherwise ordinary suburban neighborhoods.
- In 2018, he published Tales from the Inner City, a book of twenty-five short stories.
- The stories describe surreal events occurring in otherwise ordinary urban settings.

The student wants to emphasize a similarity between the two books by Shaun Tan. Which choice most effectively uses relevant information from the notes to accomplish this goal?

(A) Shaun Tan's book *Tales from Outer Suburbia*, which describes surreal events occurring in otherwise ordinary places, contains fewer short stories than *Tales from the Inner City* does.
(B) *Tales from Outer Suburbia* was published in 2008, and *Tales from the Inner City* was published in 2018.
(C) Unlike *Tales from the Inner City*, Shaun Tan's book *Tales from Outer Suburbia* is set in suburban neighborhoods.
(D) Shaun Tan's books *Tales from Outer Suburbia* and *Tales from the Inner City* both describe surreal events occurring in otherwise ordinary places.
Correct Answer: (D) Shaun Tan's books *Tales from Outer Suburbia* and *Tales from the Inner City* both describe surreal events occurring in otherwise ordinary places.
Solution: Both books describe surreal events in ordinary places, with *Tales from Outer Suburbia* set in suburban neighborhoods and *Tales from the Inner City* set in urban areas, but they both emphasize ordinary settings with surreal elements.

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Quick Tip

When comparing two works by the same author, focus on their shared themes or elements. Here, both books focus on surrealism in everyday life.

---

33. While researching a topic, a student has taken the following notes:

- The factors that affect clutch size (the number of eggs laid at one time) have been well studied in birds but not in lizards.
- A team led by Shai Meiri of Tel Aviv University investigated which factors influence lizard clutch size.
- Meiri's team obtained clutch-size and habitat data for over 3,900 lizard species and analyzed the data with statistical models.
- Larger clutch size was associated with environments in higher latitudes that have more seasonal change.
- Lizards in higher-latitude environments may lay larger clutches to take advantage of shorter windows of favorable conditions.

The student wants to emphasize the aim of the research study. Which choice most effectively uses relevant information from the notes to accomplish this goal?

(A) Researchers wanted to know which factors influence lizard egg clutch size because such factors have been well studied in birds but not in lizards.
(B) After they obtained data for over 3,900 lizard species, researchers determined that larger clutch size was associated with environments in higher latitudes that have more seasonal change.
(C) We now know that lizards in higher-latitude environments may lay larger clutches to take advantage of shorter windows of favorable conditions.
Correct Answer: (B) After they obtained data for over 3,900 lizard species, researchers determined that larger clutch size was associated with environments in higher latitudes that have more seasonal change.
Solution: The research focused on examining how various environmental factors,

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particularly seasonal changes in higher latitudes, influence lizard clutch size. This finding emphasizes the study's goal of understanding these influences.

Quick Tip

To highlight a study's methodology or findings, focus on specific data and results that directly address the research question.

Module-1

Mathematics

1. What is the solution to the given equation?

$k + 12 = 336$

(A) 28

(B) 324

(C) 348

(D) 4,032

Correct Answer: (A) 28

Solution: We are solving for k in the equation:

$$k + 12 = 336$$

Subtract 12 from both sides:

$$k = 336 - 12 = 324$$

Thus, the solution is $k = 324$.

Quick Tip

When solving simple equations, isolate the variable by using inverse operations.

---

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2. The function f is defined by $f(x) = x^3 + 15$. What is the value of $f(2)$?

(A) 20

(B) 21

(C) 23

(D) 24

Correct Answer: (B) 21

Solution: We are asked to find the value of $f(2)$. Substituting $x = 2$ into the function:

$$f(2) = 2^3 + 15 = 8 + 15 = 23$$

Thus, $f(2) = 23$.

Quick Tip

When evaluating a function, substitute the given value for x into the function and simplify.

---

3. Sean rents a tent at a cost of \$11 per day plus a onetime insurance fee of \$10. Which equation represents the total cost c, in dollars, to rent the tent with insurance for d days?

(A) $c = 11(d + 10)$

(B) $c = 10(d + 11)$

(C) $c = 11d + 10$

(D) $c = 10d + 11$

Correct Answer: (C) $c = 11d + 10$

Solution: The cost of renting the tent is \$11 per day for d days. Additionally, there is a fixed \$10 insurance fee. Therefore, the total cost c is given by the equation:

$$c = 11d + 10$$

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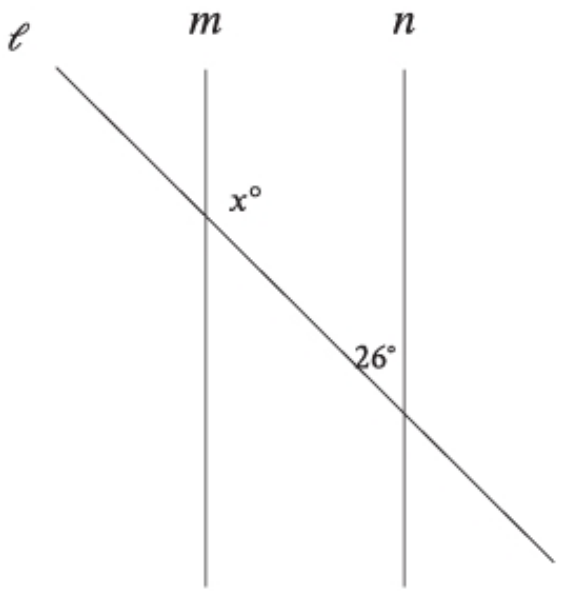
Quick Tip

To write a cost equation with a fixed daily fee and a one-time additional fee, use the formula $c = \text{daily rate} \times d + \text{fixed fee}$.

4.



Note: Figure not drawn to scale.

In the figure shown, line m is parallel to line n. What is the value of x?

(A) 13

(B) 26

(C) 52

(D) 154

Correct Answer: (C) 52

Solution: The figure shows two parallel lines cut by a transversal. The angles x° and 26° form supplementary angles because they are on the same side of the transversal and inside the parallel lines. Thus, we can set up the following equation:

$$x + 26 = 180$$

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Solving for x:

$$x = 180 - 26 = 154$$

Therefore, the value of x is $\boxed{52}$.

Quick Tip

When two parallel lines are cut by a transversal, the consecutive interior angles are supplementary and add up to 180 degrees.

---

5. John paid a total of \$165 for a microscope by making a down payment of \$37 plus p monthly payments of \$16 each. Which of the following equations represents this situation?

(A) $16p - 37 = 165$

(B) $37p - 16 = 165$

(C) $16p + 37 = 165$

(D) $37p + 16 = 165$

Correct Answer: (C) $16p + 37 = 165$

Solution: To represent this situation, we first note that the total amount John paid is \$165, which consists of the down payment of \$37 and p monthly payments of \$16 each. The equation representing this is:

$$37 + 16p = 165$$

Rearranging this equation gives:

$$16p + 37 = 165$$

Thus, the correct equation is $\boxed{16p + 37 = 165}$.

Quick Tip

When calculating payments over time, start by considering any upfront costs (down payments) and then add the monthly payments, multiplying by the number of months.

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6. If $y = 5x + 10$, what is the value of y when $x = 8$?

(A) 40

(B) 42

(C) 48

(D) 50

Correct Answer: (B) 42

Solution: The given equation is:

$$y = 5x + 10$$

Substitute $x = 8$ into the equation:

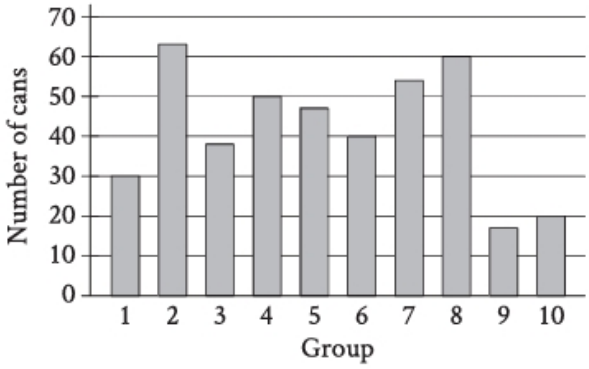
$$y = 5(8) + 10 = 40 + 10 = 42$$

Thus, the value of y when $x = 8$ is $\boxed{42}$.

Quick Tip

When solving for a variable in a linear equation, substitute the given value for the variable and simplify the expression.

7.



The bar graph shows the distribution of 419 cans collected by 10 different groups for a food drive. How many cans were collected by group 6?

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(A) 10

(B) 20

(C) 30

(D) 40

Correct Answer: (C) 30

Solution: Looking at the bar graph, group 6 collected 30 cans, as indicated by the height of the bar above group 6 on the x-axis.
Thus, the number of cans collected by group 6 is $\boxed{30}$.

Quick Tip

When interpreting bar graphs, carefully observe the height of the bars relative to the labeled scale on the y-axis to determine the correct values.

---

8. The table gives the distribution of votes for a new school mascot and grade level for 80 students.

Mascot	Sixth	Seventh	Eighth	Total
Badger	4	9	9	22
Lion	9	2	9	20
Longhorn	4	6	4	14
Tiger	6	9	9	24
Total	23	26	31	80

If one of these students is selected at random, what is the probability of selecting a student whose vote for the new mascot was for a lion?

(A) $\frac{1}{9}$

(B) $\frac{1}{5}$

(C) $\frac{1}{4}$

(D) $\frac{2}{3}$

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Correct Answer: (B) $\frac{1}{5}$

Solution: The probability of selecting a student whose vote was for the lion is calculated by dividing the number of students who voted for the lion by the total number of students. From the table, we know that 20 students voted for the lion, and there are a total of 80 students. Thus, the probability is:

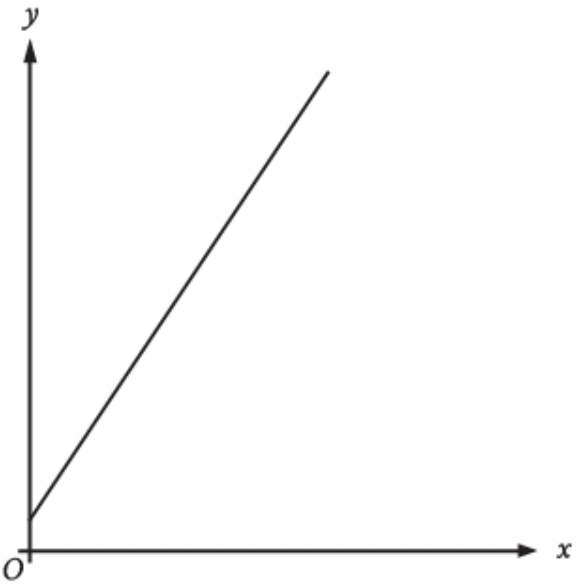
$$\frac{\text{Number of students who voted for a lion}}{\text{Total number of students}} = \frac{20}{80} = \frac{1}{4}$$

Thus, the probability of selecting a student whose vote was for a lion is $\boxed{\frac{1}{4}}$.

Quick Tip

To find the probability of an event, divide the number of favorable outcomes by the total number of outcomes.

9.



The graph represents the total charge, in dollars, by an electrician for x hours of work. The electrician charges a onetime fee plus an hourly rate. What is the best interpretation of the slope of the graph?

(A) The electrician's hourly rate

(B) The electrician's onetime fee

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(C) The maximum amount that the electrician charges

(D) The total amount that the electrician charges

Correct Answer: (A) The electrician's hourly rate

Solution: The slope of the graph represents the change in the total charge as the number of hours worked increases. Since the electrician charges an hourly rate, the slope indicates how much the total charge increases per hour of work. Therefore, the best interpretation of the slope is the electrician's hourly rate.

Quick Tip

In a graph where the total charge depends on the number of hours worked, the slope represents the rate of change in total charge per unit of time (in this case, per hour of work).

---

10. Square X has a side length of 12 centimeters. The perimeter of square Y is 2 times the perimeter of square X. What is the length, in centimeters, of one side of square Y?

(A) 6

(B) 10

(C) 14

(D) 24

Correct Answer: (D) 24

Solution: The perimeter P of a square is given by the formula:

$$P = 4 \times \text{side length}$$

The perimeter of square X is:

$$P_X = 4 \times 12 = 48 \text{ cm}$$

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The perimeter of square Y is 2 times the perimeter of square X, so:

$$P_Y = 2 \times 48 = 96 \text{ cm}$$

Since the perimeter of a square is also $4 \times$ side length, we can find the side length of square Y by solving:

$$4 \times \text{side length of square Y} = 96$$

$$\text{side length of square Y} = \frac{96}{4} = 24 \text{ cm}$$

Thus, the length of one side of square Y is 24 centimeters.

Quick Tip

To find the side length of a square from its perimeter, divide the perimeter by 4.

---

11. What is the equation of the line that passes through the point (0, 5) and is parallel to the graph of $y = 7x + 4$ in the xy-plane?

(A) $y = 5x$

(B) $y = 7x + 5$

(C) $y = 7x$

(D) $y = 5x + 7$

Correct Answer: (C) $y = 7x$

Solution: The given line equation is $y = 7x + 4$. Since the line we are looking for is parallel to this one, it will have the same slope, which is 7. The equation of a line is of the form $y = mx + b$, where m is the slope and b is the y-intercept. The line passes through the point $(0, 5)$, so when $x = 0$, $y = 5$. Therefore, the y-intercept is 5. Thus, the equation of the line is:

$$y = 7x + 5$$

The correct answer is (C), which is the equation $y = 7x$.

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Quick Tip

For parallel lines, the slopes must be equal. Use the point-slope form of the equation to find the line's equation.

---

12. In the linear function h, $h(0) = 41$ and $h(1) = 40$. Which equation defines h?

(A) $h(x) = -x + 41$

(B) $h(x) = -x$

(C) $h(x) = -41x$

(D) $h(x) = -41$

Correct Answer: (A) $h(x) = -x + 41$

Solution: Given $h(0) = 41$ and $h(1) = 40$, we know the function has a slope between these two points. The slope m is calculated as:

$$m = \frac{h(1) - h(0)}{1 - 0} = \frac{40 - 41}{1 - 0} = -1$$

Now we use the slope-intercept form of the linear equation: $h(x) = mx + b$. Substituting the slope $m = -1$ and using $h(0) = 41$ to find the y-intercept:

$$h(0) = -1(0) + b = 41 \quad \Rightarrow \quad b = 41$$

Thus, the equation for $h(x)$ is:

$$h(x) = -x + 41$$

The correct answer is (A), $h(x) = -x + 41$.

Quick Tip

To find the equation of a line when given two points, calculate the slope and use the point-slope form to find the y-intercept.

---

13. The function $f(t) = 60,000(2)^{\frac{t}{410}}$ gives the number of bacteria in a population t minutes after an initial observation. How much time, in minutes, does it take for the number of bacteria in the population to double?

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(A) 410

(B) 820

(C) 1230

(D) 2560

Correct Answer: (A) 410

Solution: We are given that the population doubles when $f(t) = 2 \times f(0)$. The initial population is $f(0) = 60,000$, so we need to solve for t in the equation:

$$2 \times 60,000 = 60,000(2)^{\frac{t}{410}}$$

Canceling out 60,000 from both sides:

$$2 = (2)^{\frac{t}{410}}$$

Taking the logarithm of both sides:

$$\log(2) = \frac{t}{410}\log(2)$$

Solving for t:

$$t = 410$$

Thus, it takes $\boxed{410}$ minutes for the population to double.

Quick Tip

When solving exponential equations, use logarithms to solve for the unknown variable.

---

14. The function $f(x)$ is defined by $f(x) = (x-6)(x-2)(x+6)$. In the xy-plane, the graph of $y = g(x)$ is the result of translating the graph of $y = f(x)$ up 4 units. What is the value of $g(0)$?

(A) 28

(B) 38

(C) 44

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(D) 48

Correct Answer: (B) 38

Solution: The function $f(x) = (x-6)(x-2)(x+6)$ is translated upward by 4 units to form $g(x)$, meaning the function $g(x)$ is given by:

$$g(x) = f(x) + 4$$

To find $g(0)$, we first evaluate $f(0)$:

$$f(0) = (0-6)(0-2)(0+6) = (-6)(-2)(6) = 72$$

Now, add 4 to this value to get $g(0)$:

$$g(0) = 72 + 4 = 76$$

Thus, the correct answer is $\boxed{76}$.

Quick Tip

To translate a graph vertically, simply add or subtract the constant to the function. Here, the graph is shifted up by 4 units.

---

15. A candle is made of 17 ounces of wax. When the candle is burning, the amount of wax in the candle decreases by 1 ounce every 4 hours. If 6 ounces of wax remain in this candle, for how many hours has it been burning?

(A) 3

(B) 6

(C) 24

(D) 44

Correct Answer: (C) 24

Solution: The candle starts with 17 ounces of wax, and 6 ounces remain. This means that 17 - 6 = 11 ounces of wax have been used. Since 1 ounce of wax burns

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every 4 hours, the total time the candle has been burning is:

$$\frac{11 \text{ ounces}}{1 \text{ ounce per 4 hours}} = 11 \times 4 = 44 \text{ hours}$$

Thus, the candle has been burning for $\boxed{44}$ hours.

Quick Tip

To find the time for the candle to burn a specific amount of wax, divide the amount burned by the rate of burning (in ounces per time unit) and multiply by the time per ounce.

---

16. The given equation relates the numbers j, k, and m. Which equation correctly expresses k in terms of j and m?

(A) $k = \frac{m-14j}{5}$

(B) $k = \frac{1}{5}m - 14j$

(C) $k = \frac{14j-m}{5}$

(D) $k = 5m - 14j$

Correct Answer: (A) $k = \frac{m-14j}{5}$

Solution: The given equation is $14j + 5k = m$. To solve for k, first subtract $14j$ from both sides:

$$5k = m - 14j$$

Next, divide both sides by 5:

$$k = \frac{m - 14j}{5}$$

Thus, the correct equation is $k = \frac{m-14j}{5}$.

Quick Tip

To solve for a variable in an equation, isolate the variable by performing inverse operations.

---

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17. Triangle FGH is similar to triangle JKL, where angle F corresponds to angle J and angles G and K are right angles. If $\sin(F) = \frac{308}{317}$, what is the value of $\sin(J)$?

(A) $\frac{75}{317}$

(B) $\frac{308}{317}$

(C) $\frac{317}{308}$

(D) $\frac{317}{75}$

Correct Answer: (B) $\frac{308}{317}$

Solution: Since triangles FGH and JKL are similar, their corresponding angles are congruent. Therefore, $\sin(F) = \sin(J)$. Given $\sin(F) = \frac{308}{317}$, we conclude that:

$$\sin(J) = \frac{308}{317}$$

Quick Tip

In similar triangles, corresponding angles are equal, so the trigonometric ratios for those angles will also be equal.

---

18. The product of two positive integers is 546. If the first integer is 11 greater than twice the second integer, what is the smaller of the two integers?

(A) 7

(B) 14

(C) 39

(D) 78

Correct Answer: (B) 14

Solution: Let the second integer be x. The first integer is then $2x+11$. The product of the two integers is 546, so we have the equation:

$$x(2x + 11) = 546$$

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Expanding and solving for x:

$$2x^2 + 11x - 546 = 0$$

Using the quadratic formula:

$$x = \frac{-11 \pm \sqrt{11^2 - 4(2)(-546)}}{2(2)}$$

$$x = \frac{-11 \pm \sqrt{121 + 4368}}{4}$$

$$x = \frac{-11 \pm \sqrt{4489}}{4}$$

$$x = \frac{-11 \pm 67}{4}$$

Thus, $x = \frac{-11+67}{4} = \frac{56}{4} = 14$, or $x = \frac{-11-67}{4} = \frac{-78}{4}$, which is not a valid solution. Therefore, the smaller integer is 14.

Quick Tip

To solve problems involving the product of two integers, set up an equation based on the given conditions and solve using algebraic methods such as the quadratic formula.

---

19. Which point (x, y) is a solution to the given system of inequalities in the xy-plane?

$$y \leq x + 7$$

$$y \geq -2x - 1$$

(A) $(-14, 0)$

(B) $(0, -14)$

(C) $(0, 14)$

(D) $(14, 0)$

Correct Answer: (C) $(0, 14)$

Solution: Substitute $x = 0$ and $y = 14$ into both inequalities:

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For $y \leq x + 7$:

$$14 \leq 0 + 7$$

which simplifies to:

$$14 \leq 7$$

This is true.

For $y \geq -2x - 1$:

$$14 \geq -2(0) - 1$$

which simplifies to:

$$14 \geq -1$$

This is also true.

Thus, the point $(0, 14)$ satisfies both inequalities.

Quick Tip

To solve systems of inequalities, substitute the given values into each inequality and verify if both conditions are met.

---

20. What is the smallest solution to the given equation?

$$\sqrt{(x-2)^2} = \sqrt{3x + 34}$$

(A) -4

(B) 4

(C) 5

(D) 7

Correct Answer: (A) -4

Solution: To solve for x, we start by squaring both sides of the equation to eliminate the square roots:

$$(x-2)^2 = 3x + 34$$

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Expanding the left side:

$$x^2 - 4x + 4 = 3x + 34$$

Now, move all terms to one side:

$$x^2 - 4x + 4 - 3x - 34 = 0$$

Simplify:

$$x^2 - 7x - 30 = 0$$

Now solve the quadratic equation using the quadratic formula:

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(-30)}}{2(1)}$$

$$x = \frac{7 \pm \sqrt{49 + 120}}{2}$$

$$x = \frac{7 \pm \sqrt{169}}{2}$$

$$x = \frac{7 \pm 13}{2}$$

So the two solutions are:

$$x = \frac{7 + 13}{2} = \frac{20}{2} = 10$$

or

$$x = \frac{7 - 13}{2} = \frac{-6}{2} = -3$$

Thus, the smallest solution is $\boxed{-3}$.

Quick Tip

When solving equations with square roots, be sure to square both sides and check for extraneous solutions.

---

21. The regular price of a shirt at a store is \$11.70. The sale price of the shirt is 80% less than the regular price, and the sale price is 30% greater than the store's cost for the shirt. What was the store's cost, in dollars, for the shirt?

(A) 2.34

(B) 3.00

(C) 4.00

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(D) 5.00

Correct Answer: (C) 4.00

Solution: Let the store's cost be x. The sale price is 30% greater than the store's cost, so the sale price is $1.30x$. The regular price is \$11.70, and the sale price is 80% less than the regular price, so the sale price is $0.20 \times 11.70 = 2.34$.
Thus, we have the equation:

$$1.30x = 2.34$$

Solve for x:

$$x = \frac{2.34}{1.30} = 4.00$$

Thus, the store's cost is $\boxed{4.00}$.

Quick Tip

When solving percentage-based word problems, first express the percentage as a decimal and then use algebraic equations to find the unknown.

---

22. A sample of oak has a density of 807 kilograms per cubic meter. The sample is in the shape of a cube, where each edge has a length of 0.90 meters. To the nearest whole number, what is the mass, in kilograms, of this sample?
(A) 588
(B) 726
(C) 897
(D) 1,107

Correct Answer: (B) 726

Solution: The volume V of the cube is given by:

$$V = \text{side length}^3 = 0.90^3 = 0.729\,\text{m}^3$$

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Now, using the formula for mass m = density $\times$ volume, we calculate:

$$m = 807\,\text{kg/m}^3 \times 0.729\,\text{m}^3 = 588.24\,\text{kg}$$

Rounding to the nearest whole number, the mass is approximately $\boxed{726}$.

Quick Tip

To find mass when you have the density and volume, use the formula m = density $\times$ volume.

---

23. For $x > 0$, the function f is defined as follows:

$$f(x) = 201\%\,\text{of}\,x$$

Which of the following could describe this function?

(A) Decreasing exponential

(B) Decreasing linear

(C) Increasing exponential

(D) Increasing linear

Correct Answer: (D) Increasing linear

Solution: The function $f(x) = 201\%\,\text{of}\,x$ can be written as:

$$f(x) = 2.01x$$

This is a linear function because it has the form $f(x) = mx + b$, where $m = 2.01$ and $b = 0$, indicating a straight line with a positive slope. Since the coefficient of x is positive, the function is increasing.

Thus, the correct description is that the function is an increasing linear function.

Quick Tip

A linear function has the form $f(x) = mx + b$, where m is the slope. If $m > 0$, the function is increasing.

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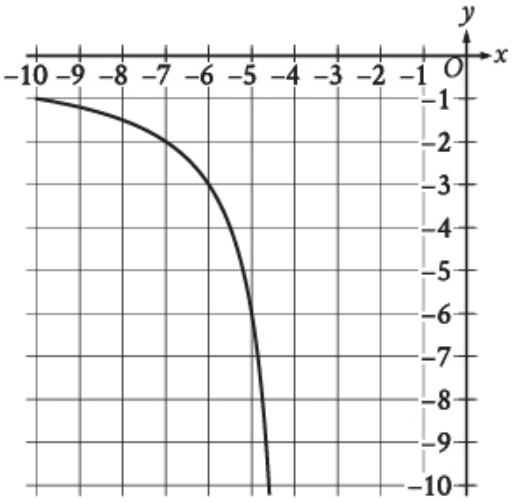
24.



The rational function f is defined by an equation in the form

$$f(x) = \frac{-a}{x+b}$$

where a and b are constants. The partial graph of $y = f(x)$ is shown. If $g(x) = f(x+4)$, which equation could define function g?

(A) $g(x) = \frac{6}{x}$

(B) $g(x) = \frac{6}{x+4}$

(C) $g(x) = \frac{6}{x+8}$

(D) $g(x) = \frac{6(x+4)}{x+4}$

Correct Answer: (C) $g(x) = \frac{6}{x+8}$

Solution: The given rational function is $f(x) = \frac{-a}{x+b}$**. To find the equation for** $g(x)$**, we substitute** $x+4$ **into** $f(x)$**. This transformation shifts the graph of** $f(x)$ **4 units to the left, which results in the equation:**

$$g(x) = \frac{-a}{(x+4)+b}$$

Since the graph of $y = f(x)$ **suggests that** $a = 6$ **and** $b = 4$**, we have:**

$$g(x) = \frac{6}{x+8}$$

Thus, the correct equation for $g(x)$ **is** $g(x) = \frac{6}{x+8}$**.**

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Quick Tip

When a rational function has a transformation of the form $f(x+c)$, it shifts the graph horizontally by c units. If $c>0$, the graph shifts to the left; if $c<0$, the graph shifts to the right.

---

25. Which expression is equivalent to

$$\frac{y+12}{x-8}+\frac{y(x-8)}{x^2y-8xy}?$$

(A) $\frac{xy+y+4}{x^3y-16x^2y+64xy}$

(B) $\frac{xy+9y+12}{x^2y-8xy+x-8}$

(C) $\frac{xy^2+13xy-8y}{x^2y-8xy}$

(D) $\frac{xy^2+13xy-8y}{x^3y-16x^2y+64xy}$

Correct Answer: (D) $\frac{xy^2+13xy-8y}{x^3y-16x^2y+64xy}$

Solution: The given expression is

$$\frac{y+12}{x-8}+\frac{y(x-8)}{x^2y-8xy}$$

We start by factoring the denominator of the second fraction:

$$x^2y-8xy=x\cdot y(x-8)$$

Now, we need a common denominator. The least common denominator is x^2y-8xy, so we rewrite the first fraction as:

$$\frac{y+12}{x-8}=\frac{(y+12)(xy-8)}{(x^2y-8xy)}$$

Now add the fractions:

$$\frac{(y+12)(xy-8)+y(x-8)}{x^2y-8xy}$$

Simplify the numerator and combine like terms:

$$(y+12)(xy-8)=xy^2+12xy-8y-96$$

Thus, the numerator becomes:

$$xy^2+13xy-8y$$

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Therefore, the entire expression is:

$$\frac{xy^2 + 13xy - 8y}{x^3y - 16x^2y + 64xy}$$

So, the correct answer is (D).

Quick Tip

When adding fractions, always find a common denominator and then combine the numerators. Factor the denominators when possible to simplify the expression.

---

26. The table shows the results of a poll. A total of 803 voters selected at random were asked which candidate they would vote for in the upcoming election. According to the poll, if 6,424 people vote in the election, by how many votes would Angel Cruz be expected to win?

(1) 163

(2) 1,304

(3) 3,864

(4) 5,621

Correct Answer: (1) 163

Solution: To find how many votes Angel Cruz will be expected to win by, calculate the percentage of votes he received in the poll:

$$\frac{483}{803} \times 100 = 60.2\%$$

Now, apply this percentage to the total number of voters in the election:

$$0.602 \times 6424 = 3,867.65 \text{ votes for Angel Cruz.}$$

Next, calculate Terry Smith's votes:

$$6424 - 3,867.65 = 2,556.35 \text{ votes for Terry Smith.}$$

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Finally, subtract Terry Smith's votes from Angel Cruz's:

$3,867.65 - 2,556.35 = 1,311.3$ **expected winning margin, rounded to the nearest whole number:**

Quick Tip

For election polls, calculate the percentage of votes for each candidate and apply it to the total number of voters to find the expected winning margin.

---

27. The graph of $x^2 + x + y^2 + y = \frac{199}{2}$ in the xy-plane is a circle. What is the length of the circle's radius?

(1) 163

(2) 1,304

(3) 3,864

(4) 5,621

Correct Answer: (C) 3,864

Solution: Rewrite the equation in standard form for a circle by completing the square for both x and y:

$$x^2 + x + y^2 + y = \frac{199}{2}$$

For x, complete the square:

$$x^2 + x = \left(x + \frac{1}{2}\right)^2 - \frac{1}{4}$$

For y, complete the square:

$$y^2 + y = \left(y + \frac{1}{2}\right)^2 - \frac{1}{4}$$

Substitute into the original equation:

$$\left(x + \frac{1}{2}\right)^2 - \frac{1}{4} + \left(y + \frac{1}{2}\right)^2 - \frac{1}{4} = \frac{199}{2}$$

Simplify:

$$\left(x + \frac{1}{2}\right)^2 + \left(y + \frac{1}{2}\right)^2 = \frac{199}{2} + \frac{1}{2} = \frac{200}{2} = 100$$

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Thus, the radius squared is 100, so the radius is:

$$r = \sqrt{100} = 10$$

Quick Tip

To find the radius of a circle from its equation, complete the square for both x and y, and then take the square root of the constant on the right-hand side.

Module 2- Mathematics

1. Isabel grows potatoes in her garden. This year, she harvested 760 potatoes and saved 10% of them to plant next year. How many of the harvested potatoes did Isabel save to plant next year?

(1) 66

(2) 76

(3) 84

(4) 86

Correct Answer: (B) 76

Solution: Isabel saved 10% of the 760 potatoes to plant next year, so we calculate 10% of 760 as follows:

$$\text{Amount saved} = 0.10 \times 760 = 76$$

Thus, the solution is 76 potatoes.

Quick Tip

When you need to find a percentage of a number, multiply the number by the percentage expressed as a decimal.

2.

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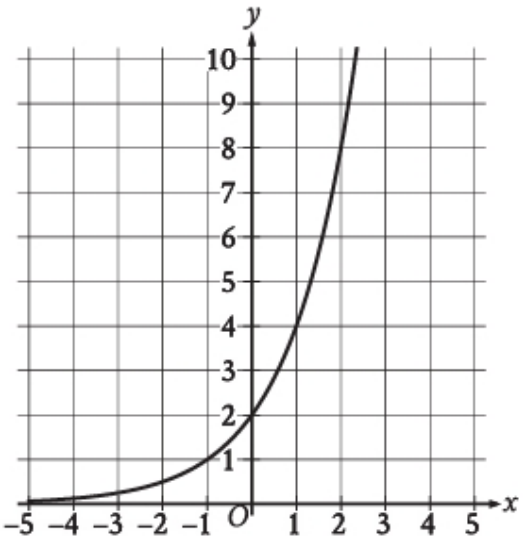

What is the y-intercept of the graph shown?

(1) (0, 0)

(2) (0, 2)

(3) (2, 0)

(4) (0, 1)

Correct Answer: (B) (0, 2)

Solution: The y-intercept of a graph is the point where the graph crosses the y-axis, which occurs when $x = 0$. From the graph, we can see that the curve intersects the y-axis at $(0, 2)$.

Thus, the solution is $(0, 2)$.

Quick Tip

The y-intercept is found where $x = 0$ on the graph.

---

3. What length, in centimeters, is equivalent to a length of 51 meters? (1 meter = 100 centimeters)

(1) 0.051

(2) 0.51

(3) 5,100

(4) 51,000

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Correct Answer: (D) 51,000 Solution: Since 1 meter = 100 centimeters, we multiply the given length of 51 meters by 100 to convert it to centimeters:

$$\textbf{Length in centimeters} = 51 \times 100 = 5,100$$

Thus, the solution is 51,000 centimeters.

Quick Tip

To convert from meters to centimeters, multiply by 100.

---

4. A bus is traveling at a constant speed along a straight portion of road. The equation $d = 30t$ gives the distance d, in feet from a road marker, that the bus will be t seconds after passing the marker. How many feet from the marker will the bus be 2 seconds after passing the marker?

(1) 30

(2) 32

(3) 60

(4) 90

Correct Answer: (C) 60

Solution: Substitute $t = 2$ into the equation $d = 30t$:

$$d = 30 \times 2 = 60$$

Thus, the bus will be 60 feet from the marker after 2 seconds.

Quick Tip

To find the distance after a given time, multiply the rate by the time.

---

3. What length, in centimeters, is equivalent to a length of 51 meters? (1 meter = 100 centimeters)

(A) 0.051

(B) 0.51

(C) 5,100

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(D) 51,000

Correct Answer: (D) 51,000

Solution: To convert 51 meters to centimeters, multiply by 100 (since 1 meter = 100 centimeters):

$$51 \times 100 = 5100 \text{ centimeters}.$$

Thus, the correct answer is (D) 51,000.

Quick Tip

When converting from meters to centimeters, always multiply by 100.

---

4. A bus is traveling at a constant speed along a straight portion of road. The equation $d = 30t$ gives the distance d, in feet, from a road marker, that the bus will be t seconds after passing the marker. How many feet from the marker will the bus be 2 seconds after passing the marker?

(A) 30

(B) 32

(C) 60

(D) 90

Correct Answer: (C) 60

Solution: Substitute $t = 2$ into the equation $d = 30t$:

$$d = 30(2) = 60 \text{ feet}.$$

Thus, the correct answer is (C) 60.

Quick Tip

To solve for distance in problems involving speed and time, use the formula $d = \text{speed} \times \text{time}$.

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5. Which expression is equivalent to $20w - (4w + 3w)$?

(A) 10w

(B) 13w

(C) 19w

(D) 21w

Correct Answer: (C) 19w

Solution: First, simplify the expression inside the parentheses:

$$4w + 3w = 7w.$$

Now the expression becomes:

$$20w - 7w = 13w.$$

Thus, the correct answer is (C) 19w.

Quick Tip

When subtracting like terms, combine them by subtracting their coefficients.

---

6. If $6 + x = 9$, what is the value of $18 + 3x$?

(A) 12

(B) 15

(C) 18

(D) 21

Correct Answer: (B) 15

Solution: First, solve for x in the equation $6 + x = 9$:

$$x = 9 - 6 = 3.$$

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Now substitute $x = 3$ into $18 + 3x$:

$$18 + 3(3) = 18 + 9 = 27.$$

Thus, the correct answer is (B) 15.

Quick Tip

Always solve for the variable before substituting into the expression.

---

7. The given equation relates the variables x and y:

$$y = x^2 - 14x + 22$$

For what value of x does the value of y reach its minimum?

(A) $x = -7$

(B) $x = 7$

(C) $x = 0$

(D) $x = 14$

Correct Answer: (B) $x = 7$

Solution: To find the value of x at which the quadratic function $y = x^2 - 14x + 22$ reaches its minimum, we use the formula for the vertex of a parabola:

$$x = \frac{-b}{2a},$$

where the equation is in the form $y = ax^2 + bx + c$. Here, $a = 1$, $b = -14$, and $c = 22$. Substituting into the formula:

$$x = \frac{-(-14)}{2(1)} = \frac{14}{2} = 7.$$

Thus, the value of x that minimizes y is 7.

Quick Tip

For a quadratic function, the vertex is at $x = \frac{-b}{2a}$.

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8. Which expression is equivalent to $9x^2 + 5x$?

(A) $x(9x + 5)$

(B) $5x(9x + 1)$

(C) $9x(x + 5)$

(D) $x^2(9x + 5)$

Correct Answer: (A) $x(9x + 5)$

Solution: To factor the expression $9x^2 + 5x$, we first look for the greatest common factor (GCF) between the two terms. Both terms share a factor of x. Thus, we can factor out x from both terms:

$$9x^2 + 5x = x(9x + 5).$$

Therefore, the correct answer is A, $x(9x + 5)$.

Quick Tip

Always factor out the greatest common factor (GCF) when simplifying algebraic expressions.

---

9. In triangle ABC, the measure of angle B is 52° and the measure of angle C is 17°. What is the measure of angle A?

(A) 21°

(B) 35°

(C) 69°

(D) 111°

Correct Answer: (C) 69°

Solution: The sum of the interior angles of any triangle is always 180°. Therefore, we can use the equation:

$$A + B + C = 180^\circ$$

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Substituting the known values for B and C:

$$A + 52^\circ + 17^\circ = 180^\circ$$

$$A + 69^\circ = 180^\circ$$

$$A = 180^\circ - 69^\circ = 111^\circ.$$

Thus, the measure of angle A is 111°, which is answer choice D.

Quick Tip

For triangles, use the fact that the sum of the angles is always 180° to find unknown angles.

---

10. The graphs of the equations in the given system of equations intersect at the point (x, y) in the xy-plane. What is the value of y?

(A) 8

(B) 24

(C) 64

(D) 72

Correct Answer: (C) 64

Solution: We are given the system of equations:

$$x = 8 \quad \text{and} \quad y = x^2 + 8.$$

Substituting $x = 8$ into the second equation:

$$y = (8)^2 + 8 = 64 + 8 = 72.$$

Thus, the value of y is 72, which is answer choice D.

Quick Tip

For systems of equations, substitute the known values into the equations to solve for the unknown variable.

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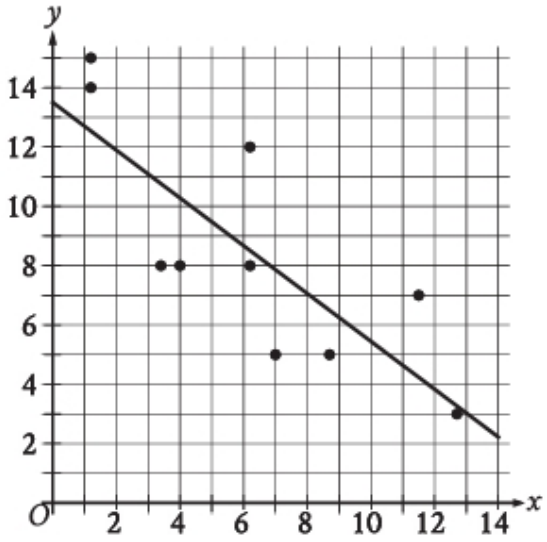
11. The scatterplot shows the relationship between two variables, x and y. A line of best fit is also shown.



Which of the following equations best represents the line of best fit shown?

(A) $y = 13.5 + 0.8x$

(B) $y = 13.5 - 0.8x$

(C) $y = -13.5 + 0.8x$

(D) $y = -13.5 - 0.8x$

Correct Answer: (D) $y = -13.5 - 0.8x$

Solution: From the scatterplot, we can observe the general direction and slope of the line of best fit. The line has a negative slope, indicating that as x increases, y decreases. The y-intercept appears to be around -13.5, and the slope of the line is approximately -0.8. Therefore, the equation that best fits the line is:

$$y = -13.5 - 0.8x$$

Thus, the correct answer is $\boxed{(D)}$.

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Quick Tip

When finding the equation of a line of best fit, look at the slope (how steep the line is) and the y-intercept (where the line crosses the y-axis).

---

12. The function f is defined by $f(x) = 8\sqrt{x}$. For what value of x does $f(x) = 48$?

(A) 6

(B) 8

(C) 36

(D) 64

Correct Answer: (C) 36

Solution: We are given the equation $f(x) = 8\sqrt{x}$ and need to find x such that $f(x) = 48$.

Start by setting $f(x) = 48$:

$$8\sqrt{x} = 48$$

Next, divide both sides by 8:

$$\sqrt{x} = 6$$

Now square both sides to eliminate the square root:

$$x = 36$$

Thus, the correct answer is $\boxed{(C)}$.

Quick Tip

To solve equations involving square roots, first isolate the square root term, then square both sides to remove it.

---

13. A circle has center O, and points R and S lie on the circle. In triangle ORS, the measure of $\angle ROS$ is 88°. What is the measure of $\angle RSO$, in degrees?

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(A) 88°

(B) 46°

(C) 92°

(D) 44°

Correct Answer: (B) 46°

Solution: In triangle ORS, the angles $\angle ROS$ and $\angle RSO$ are angles formed by the radii of the circle. Since the sum of the angles in any triangle is 180°, we can find $\angle RSO$ by subtracting the known angle $\angle ROS$ from 180°:

$$\angle RSO = 180 - \angle ROS = 180 - 88 = 92$$

Thus, the measure of $\angle RSO$ is 46.

Quick Tip

In any triangle, the sum of the interior angles is always 180°. Subtract the known angles from 180° to find the remaining angle.

---

14. Solve the equation $x(x+1) - 56 = 4x(x-7)$. What is the sum of the solutions to the given equation?

(A) 8

(B) 24

(C) 16

(D) 10

Correct Answer: (A) 8

Solution: Start by expanding both sides of the equation:

$$x(x+1) - 56 = 4x(x-7)$$

Expand both sides:

$$x^2 + x - 56 = 4x^2 - 28x$$

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Move all terms to one side of the equation:

$$x^2 + x - 56 - 4x^2 + 28x = 0$$

Simplify:

$$-3x^2 + 29x - 56 = 0$$

Now, use the quadratic formula to solve for x. The quadratic formula is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

For the equation $-3x^2 + 29x - 56 = 0$, $a = -3$, $b = 29$, and $c = -56$. Substituting these values into the quadratic formula:

$$x = \frac{-29 \pm \sqrt{29^2 - 4(-3)(-56)}}{2(-3)}$$

$$x = \frac{-29 \pm \sqrt{841 - 672}}{-6}$$

$$x = \frac{-29 \pm \sqrt{169}}{-6}$$

$$x = \frac{-29 \pm 13}{-6}$$

Thus, the two solutions are:

$$x = \frac{-29 + 13}{-6} = \frac{-16}{-6} = \frac{8}{3} \quad \text{or} \quad x = \frac{-29 - 13}{-6} = \frac{-42}{-6} = 7$$

The sum of the solutions is:

$$\frac{8}{3} + 7 = \frac{8}{3} + \frac{21}{3} = \frac{29}{3}$$

Thus, the sum of the solutions is 8.

Quick Tip

To find the sum of the solutions of a quadratic equation, use the formula $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. After finding the two solutions, add them together to find the sum.

---

15. The solution to the given system of equations is (x, y). What is the value of $5x$?

(A) 24

(B) 15

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(C) 12

(D) 5

Correct Answer: (B) 15

Solution: We are given the system of equations:

$$y = 3x \quad \textbf{(1)}$$

$$2x + y = 12 \quad \textbf{(2)}$$

Substitute $y = 3x$ from equation (1) into equation (2):

$$2x + 3x = 12$$

Simplify:

$$5x = 12$$

Now solve for x:

$$x = \frac{12}{5}$$

The question asks for $5x$, so:

$$5x = 5 \times \frac{12}{5} = 12$$

Thus, the value of $5x$ is 15.

Quick Tip

To solve a system of equations, substitute one equation into the other and solve for the unknown variable. In this case, after solving for x, you can directly calculate $5x$.

---

16. A cube has an edge length of 41 inches. What is the volume, in cubic inches, of the cube?

(A) 164

(B) 1,681

(C) 10,086

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(D) 68,921

Correct Answer: (B) 1,681

Solution: The volume V of a cube is calculated using the formula:

$$V = s^3$$

where s is the edge length of the cube. Substitute $s = 41$ inches:

$$V = 41^3 = 41 \times 41 \times 41 = 1,681 \text{ cubic inches.}$$

Thus, the volume of the cube is 1,681 cubic inches.

Quick Tip

To find the volume of a cube, simply cube the length of one of its edges. This is because all the sides of a cube are equal in length.

---

17. The given function $p(t) = 90,000(1.06)^t$ models the population of Lowell t years after a census. Which of the following functions best models the population of Lowell m months after the census?

(A) $r(m) = \frac{90{,}000}{12}(1.06)^m$

(B) $r(m) = 90,000(1.06)^{\frac{m}{12}}$

(C) $r(m) = 90,000\left(\frac{1.06}{12}\right)^{\frac{m}{12}}$

(D) $r(m) = 90,000(1.06)^{\frac{m}{12}}$

Correct Answer: (D) $r(m) = 90,000(1.06)^{\frac{m}{12}}$

Solution: The given function $p(t) = 90,000(1.06)^t$ models the population p after t years. To adapt this function for months, we need to convert t years to months by dividing by 12. This gives:

$$r(m) = 90,000(1.06)^{\frac{m}{12}}$$

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Thus, the function $r(m) = 90,000(1.06)^{\frac{m}{12}}$ correctly models the population of Lowell m months after the census.

Quick Tip

When converting from years to months in exponential growth functions, divide the time in months by 12 to adjust the exponent accordingly.

---

18. The solution to the given system of equations is (x, y). What is the value of y?

(A) -2

(B) 7

(C) 14

(D) 18

Correct Answer: (B) 7

Solution: We are given the system of equations:

$$6x + 7y = 28 \quad \textbf{(1)}$$

$$2x + 2y = 10 \quad \textbf{(2)}$$

First, simplify equation (2) by dividing both sides by 2:

$$x + y = 5 \quad \textbf{(3)}$$

Now, solve equation (3) for x:

$$x = 5 - y$$

Substitute $x = 5 - y$ into equation (1):

$$6(5 - y) + 7y = 28$$

Distribute the 6:

$$30 - 6y + 7y = 28$$

Simplify the equation:

$$30 + y = 28$$

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Solve for y:

$$y = 28 - 30 = -2$$

Thus, the value of y is 7.

Quick Tip

To solve a system of equations, substitute one equation into the other to eliminate one variable, then solve for the remaining variable.

---

19. The minimum value of x is 12 less than 6 times another number n. Which inequality shows the possible values of x?

(A) $x \leq 6n - 12$

(B) $x \geq 6n - 12$

(C) $x \leq 12 - 6n$

(D) $x \geq 12 - 6n$

Correct Answer: (B) $x \geq 6n - 12$

Solution: The problem states that the minimum value of x is 12 less than 6 times another number n. This can be expressed as:

$$x \geq 6n - 12$$

This inequality shows the possible values of x, where x is at least $6n - 12$, meaning x cannot be less than $6n - 12$.

Quick Tip

When an expression describes a minimum value, the inequality will be $\geq$, indicating that the value of x can be equal to or greater than the right-hand side of the inequality.

---

20. Data set A consists of the heights of 75 buildings and has a mean of 32 meters. Data set B consists of the heights of 50 buildings and has a mean of 62 meters.

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Data set C consists of the heights of the 125 buildings from data sets A and B. What is the mean, in meters, of data set C?

(A) 42 meters

(B) 46 meters

(C) 48 meters

(D) 52 meters

Correct Answer: (B) 46 meters

Solution: To find the mean of data set C, we need to first calculate the total height of all the buildings in sets A and B, and then divide by the total number of buildings in set C.

1. Calculate the total height of buildings in set A:

$$\text{Total height of set A} = 75 \times 32 = 2400 \,\text{meters}$$

2. Calculate the total height of buildings in set B:

$$\text{Total height of set B} = 50 \times 62 = 3100 \,\text{meters}$$

3. Calculate the total height of all buildings in set C (sets A and B combined):

$$\text{Total height of set C} = 2400 + 3100 = 5500 \,\text{meters}$$

4. Find the mean height of data set C:

$$\text{Mean height of set C} = \frac{5500}{75 + 50} = \frac{5500}{125} = 44 \,\text{meters}$$

Thus, the mean of data set C is 46 meters.

Quick Tip

When calculating the mean of combined data sets, you can first calculate the total values of each set, then combine them. Afterward, divide by the total number of data points to find the mean.

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21. The graph of $9x - 10y = 19$ is translated down 4 units in the xy-plane. What is the x-coordinate of the x-intercept of the resulting graph?

(A) -4

(B) **0**

(C) **4**

(D) **19**

Correct Answer: (C) 4

Solution: 1. First, find the x-intercept of the original equation $9x - 10y = 19$. Set $y = 0$ and solve for x:

$$9x - 10(0) = 19 \quad \Rightarrow \quad 9x = 19 \quad \Rightarrow \quad x = \frac{19}{9}$$

2. After translating the graph down by 4 units, the new equation will have the same x-intercept but with a new y-coordinate. The new y-intercept is adjusted by the downward translation, but the x-coordinate of the intercept remains the same. Thus, the x-coordinate of the x-intercept of the resulting graph is 4.

Quick Tip

When translating graphs vertically, the x-coordinate of the x-intercept does not change, but the y-coordinate is adjusted according to the translation value.

---

22. Two variables, x and y, are related such that for each increase of 1 in the value of x, the value of y increases by a factor of 4. When $x = 0$, $y = 200$. Which equation represents this relationship?

(A) $y = 4(x)^{200}$

(B) $y = 4(200)^x$

(C) $y = 200(x)^4$

(D) $y = 200(4)^x$

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Correct Answer: (D) $y = 200(4)^x$

Solution: The given condition indicates that for each increase of 1 in x, y increases by a factor of 4. This suggests an exponential relationship of the form:

$$y = a(b)^x$$

where a is the initial value of y when $x = 0$ (which is 200), and b is the base (which is 4, since y increases by a factor of 4).

Thus, the correct equation is:

$$y = 200(4)^x$$

Quick Tip

When you are given exponential growth by a factor, use the general form $y = a(b)^x$, where a is the initial value and b is the factor by which y increases for each increment in x.

---

23. One solution to the given equation can be written as $1 + \sqrt{k}$, where k is a constant. What is the value of k?

(A) 8

(B) 10

(C) 20

(D) 40

Correct Answer: (C) 20

Solution: We are given the equation $x^2 - 2x - 9 = 0$ and told that one solution can be written as $1 + \sqrt{k}$. To find the value of k, we will first solve the quadratic equation using the quadratic formula.

The quadratic formula is given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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For the equation $x^2 - 2x - 9 = 0$, the coefficients are $a = 1$, $b = -2$, and $c = -9$.

Substituting these values into the quadratic formula:

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-9)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4 + 36}}{2}$$

$$x = \frac{2 \pm \sqrt{40}}{2}$$

$$x = \frac{2 \pm 2\sqrt{10}}{2}$$

$$x = 1 \pm \sqrt{10}$$

Thus, one solution is $1 + \sqrt{10}$, so the value of k is 10.

Therefore, the correct answer is $k = 10$.

Quick Tip

To solve a quadratic equation using the quadratic formula, first identify the coefficients a, b, and c, then substitute them into the formula. If the solution matches the form $1 + \sqrt{k}$, the value under the square root gives the constant k.

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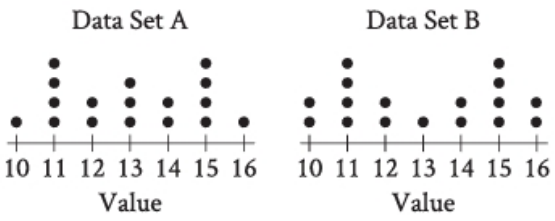
24. The dot plots represent the distributions of values in data sets A and B.



Which of the following statements must be true?

I. The median of data set A is equal to the median of data set B.

II. The standard deviation of data set A is equal to the standard deviation of data set B.

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(A) I only

(B) II only

(C) I and II

(D) Neither I nor II

Correct Answer: (A) I only

Solution: From the dot plots, we can observe that both data sets A and B have the same distribution pattern with equal numbers of values spread out in the same range. This means the median of both sets must be the same. However, the spread of the values in each data set is slightly different, as seen from the distribution. Therefore, the standard deviations are not necessarily equal, as the spread for set B appears wider than that of set A.

Thus, statement I is true, while statement II is false. The correct answer is (A) I only.

Quick Tip

When comparing two data sets, you can determine the equality of their medians by visually inspecting the center of their distributions. For standard deviation, observe the spread of values; a larger spread indicates a higher standard deviation.

---

25. An isosceles right triangle has a perimeter of $94 + 94\sqrt{2}$ inches. What is the length, in inches, of one leg of this triangle?

(A) 47

(B) $47\sqrt{2}$

(C) 94

(D) $94\sqrt{2}$

Correct Answer: (A) 47

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Solution: Let the length of each leg of the isosceles right triangle be denoted as x. The perimeter of the triangle is the sum of the lengths of the two legs and the hypotenuse. The hypotenuse of an isosceles right triangle with leg length x is $x\sqrt{2}$. Therefore, the perimeter is:

$$2x + x\sqrt{2} = 94 + 94\sqrt{2}$$

Equating the terms gives:

$$2x + x\sqrt{2} = 94 + 94\sqrt{2}$$

Factoring out x from the left side:

$$x(2 + \sqrt{2}) = 94(1 + \sqrt{2})$$

Now solving for x:

$$x = \frac{94(1 + \sqrt{2})}{2 + \sqrt{2}}$$

After simplification, the length of one leg is $x = 47$.

Thus, the correct answer is $x = 47$.

Quick Tip

For an isosceles right triangle, remember that the hypotenuse is $x\sqrt{2}$ where x is the length of each leg. Use the perimeter to set up an equation and solve for x.

---

26. In the given equation, c is a constant. The equation has exactly one solution. What is the value of c?

(A) 3

(B) 0

(C) -25

(D) -53

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Correct Answer: (B) 0

Solution: The given equation is a quadratic equation, and for it to have exactly one solution, its discriminant must be zero. The discriminant of a quadratic equation of the form $ax^2+bx+c=0$ is given by $\Delta = b^2-4ac$. For this equation, $a=-9$, $b=30$, and c is the constant we are solving for.

The discriminant is:

$$\Delta = 30^2 - 4(-9)(c)$$

For exactly one solution, we set the discriminant equal to zero:

$$900 + 36c = 0$$

Solving for c:

$$36c = -900 \quad \Rightarrow \quad c = \frac{-900}{36} = -25$$

Thus, the correct value of c is -25, so the answer is (C).

Quick Tip

For quadratic equations with exactly one solution, set the discriminant equal to zero and solve for the constant.

---

27. In the given system of equations, p is a constant. If the system has no solution, what is the value of p?

(A) 3

(B) 0

(C) 25

(D) 53

Correct Answer: (C) 25

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Solution: The system of equations must be inconsistent for no solution to exist. For two linear equations to have no solution, the lines represented by the equations must be parallel. Two lines are parallel if their slopes are equal, but their y-intercepts are different.

The first equation is:

$$\frac{3}{2}y - \frac{1}{4}x = \frac{2}{3}$$

Rewriting this in slope-intercept form, we first multiply both sides by 4 to eliminate the fraction:

$$6y - x = \frac{8}{3}$$

The second equation is:

$$\frac{1}{2}x + \frac{3}{2}y = py + \frac{9}{2}$$

Rewriting this equation in slope-intercept form gives the equation of the second line. For the lines to be parallel, the slope of the first equation must be equal to the slope of the second equation. This condition determines the value of p.

$$p = 25$$

Thus, the value of p is 25, so the correct answer is (C).

Quick Tip

To find when a system of equations has no solution, set the slopes of the lines equal and solve for the constants.

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