

ETS GRE Power plus (Online Practice Test 1) [Save \$39]

Issue Writing

Colleges and universities should require all faculty to spend time working outside the academic world in professions relevant to the courses they teach.

Write a response in which you discuss your views on the policy and explain your reasoning for the position you take. In developing and supporting your position, you should consider the possible consequences of implementing the policy and explain how these consequences shape your position.

Argument Writing

The following appeared on the Mozart School of Music Web site.

“The Mozart School of Music should be the first choice for parents considering enrolling their child in music lessons. First of all, the Mozart School welcomes youngsters at all ability and age levels; there is no audition to attend the school. Second, the school offers instruction in nearly all musical instruments as well a wide range of styles and genres from classical to rock. Third, the faculty includes some of the most distinguished musicians in the area. Finally, many Mozart graduates have gone on to become well-known and highly paid professional musicians.”

Write a response in which you examine the stated and/or unstated assumptions of the argument. Be sure to explain how the argument depends on these assumptions and what the implications are for the argument if the assumptions prove unwarranted.

Section 1 : Verbal

Q's-01

For the urban researcher, the long lives of ancient cities can provide ample chronological data, making up for the paucity stemming from the relative _____ of most present-day cities.

complexity
formlessness
transparency
diversity
youthfulness

Question Explanation

The sentence compares the amount of chronological data available to urban researchers. Ancient cities, with their “long lives,” naturally provide a lot of data. In order to fill the blank, we need to identify the word that characterizes “most present-day cities” and explains the “paucity” of data they provide. Since the contrast is with ancient cities, “youthfulness,” is the best fit. No other answer choice would pertain to the paucity of data from present-day cities.

Thus the correct answer is **youthfulness**.

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-02

The activists' prodigious activity on behalf of both woman suffrage and the temperance movement in the late nineteenth century belies the assertion that the two movements were _____.

influential
controversial
inimical
elitist
transitory

Question Explanation

The sentence concerns certain activists who were involved with the woman suffrage movement and the temperance movement, and makes an assertion about the implications of those activists being involved in both movements simultaneously. What assertion would be “belied” (contradicted) by this simultaneous involvement? The only logical answer choice is “inimical”: this simultaneous involvement shows that the movements were not at odds with one another.

Thus the correct answer is **inimical**.

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-03

In light of the decades of dueling studies about whether the extinction of the dinosaurs resulted from an asteroid strike or from volcanic eruptions, it is increasingly apparent that the relevant mineral-deposit evidence is simply (i)_____, even if the scientists advancing the various claims sound (ii)_____.

Blank (i)	Blank (ii)
uncontroversial	decisive
ambiguous	pessimistic
accessible	conciliatory

Question Explanation

The sentence concerns the nature of mineral-deposit evidence relevant to the extinction of the dinosaurs. Since the cause of the dinosaurs’ extinction has provoked “decades of dueling studies,” we must conclude that the evidence is open to interpretation, making “ambiguous” the best word for Blank (i). If the evidence were “uncontroversial,” there would be no duel, and the issue of whether it is “accessible” is irrelevant to the matter at hand. The second clause of the sentence concerns the tone of the scientists involved in the dueling studies and indicates that this tone must be at odds with the nature of the evidence (“even if . . . the scientists sound”), so “decisive” best fits Blank (ii): even though the evidence is open to interpretation, the scientists (stubbornly, perhaps) are decisive in advancing their claims.

Thus the correct answer is **ambiguous** and **decisive**.

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-04

The Hippocratic oath and other ethical codes that guided the medical profession for centuries generally (i) _____ the notion of truth telling; indeed, one of Hippocrates' injunctions—to keep the sick from harm and injustice—encouraged the opposite behavior, (ii) _____.

Blank (i)

omitted
exaggerated
emphasized

Blank (ii)

integrity
deception
recklessness

Question Explanation

The sentence concerns an opposition: the Hippocratic oath and other ethical codes encouraged behavior that was contrary to the “notion of truth telling,” even though lying would usually be considered unethical. The answer choices for Blank (i) and Blank (ii), therefore, must express this opposition. The only two choices that fulfill this requirement are “omitted” and “deception.” When those words are put into the blanks, the sentence says that the ethical codes “omitted” the “notion of truth telling” in order to avoid harming or upsetting patients (by telling them that a condition was grave, for example), and therefore encouraged “deception.”

According to the sentence, part of the Hippocratic oath encouraged behavior opposite to truth telling. The only choice for Blank (ii) that is opposite to truth telling is “deception.” And if the oath encouraged deception, it cannot have “exaggerated” or “emphasized” truth telling—it must instead have “omitted” it.

Thus the correct answer is **omitted** and **deception**.

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-05

Because the book is largely concerned with an examination of various (i) _____ often encountered in contemporary thinking, such as an exaggerated appreciation for meaningless coincidence and a credulous acceptance of pseudosciences, much of the writing has a (ii) _____ quality to it. Nevertheless, it avoids the overly earnest and scolding tone common to many such endeavors.

Blank (i)

inadequacies
abstractions
complexities

Blank (ii)

debunking
speculative
generalizing

Question Explanation

The book discusses certain features of contemporary thinking such as “an exaggerated appreciation for meaningless coincidence and a credulous acceptance of pseudosciences.” The use of “exaggerated” and “credulous” shows a critical attitude to these features, so the best choice for Blank (i) is “inadequacies.” And since the book is discussing inadequacies, its tone is likely to be “debunking.” It could also be “generalizing,” but that word would not fit with the sentence that follows.

Thus the correct answer is **inadequacies** and **debunking**.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-06

Question 17 is based on this passage.

Compared with doctors who see patients only in their offices, doctors who see their patients in the patients' homes develop a more personal relationship with them. Their patients are also less likely to bring malpractice suits against them. This lower rate of malpractice suits clearly supports the common belief that having a close relationship with a doctor increases a patient's willingness to give that doctor the benefit of the doubt when difficulties arise.

Which of the following, if true of doctors who make house calls, most seriously weakens the argument?

- They are more likely than are doctors who do not make house calls to believe that a doctor's bedside manner is an important part of medical treatment.
- They see their patients more frequently than do doctors who do not make house calls and so acquire more information about the patients' conditions.
- They tend to have fewer years of experience at practicing medicine than do doctors who do not make house calls.
- They perform all the same types of treatment as doctors who do not make house calls.
- They are not charged any less for malpractice insurance than are doctors who do not make house calls.

Passage Description

The passage presents an argument about a possible cause and effect relationship between doctors visiting patients in their homes and a lower rate of malpractice suits.

Question Explanation

The question presents hypothetical situations that, if true, might weaken the argument in the passage, which is that patients who have a “close relationship” with a doctor are less likely to sue that doctor for malpractice. The correct answer choice, **Choice 2**, offers a scenario where doctors who make house calls see patients more frequently and thus have more information about them; this reasonably supports an argument that such doctors are less likely to make errors in their patients' treatment, resulting in fewer situations where malpractice suits would be appropriate.

A doctor's pleasant “bedside manner” is likely to encourage the feeling that a patient has a close relationship with the doctor, so Choice 1 would tend to strengthen rather than weaken the original argument. A doctor with less experience can be expected to make more errors, not fewer, thus ruling out Choice 3. Choice 4 also strengthens the argument, by ruling out an alternative hypothesis. A hypothetical situation where all doctors must pay equivalent amounts for malpractice insurance (Choice 5) does nothing to weaken the passage's argument about the cause of malpractice rate discrepancies among doctors.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-07

In Inuit culture, elaborate carving has often been used to enhance _____ objects such as harpoon heads and other tools.

- utilitarian
- functional
- domestic
- decorative
- manufactured
- ornamental

Question Explanation

The words that fill in the blank must accurately describe the objects referred to, “harpoon heads and other tools.” While some tools might be “domestic,” harpoons surely are not. While elaborate carving enhances the appearance of tools, tools themselves are not “decorative” or “ornamental” objects. Tools are indeed usually “manufactured,” but no other answer choice would produce a sentence with the same meaning.

Thus the correct answer is **utilitarian** (Choice 1) and **functional** (Choice 2).

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-08

People enjoy listening to the governor’s inspiring speeches, and his eloquence lulls his adversaries into underestimating his _____, the tempered steel beneath the sleek suits.

- tenacity
- resolve
- resourcefulness
- kindness
- compassion
- frankness

Question Explanation

The words that fill in the blank must correspond to the phrase that follows, conveying the idea of a fierce or steely persona underneath an agreeable outward appearance. While “resourcefulness” can be a forceful quality, it is not a trait that likely would be compared to tempered steel, and in any case no other answer choice would produce a sentence with the same meaning. “Kindness” and “compassion” are in opposition to the quality of steeliness. “Frankness” is not a quality associated with an ability to lull others into complacency.

Thus the correct answer is **tenacity** (Choice 1) and **resolve** (Choice 2).

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-09

Although in Europe after the First World War meteorology held the same rank as astronomy, in the United States top academic institutions did not treat it as a field _____ any physical science.

- unfit for
- equivalent to
- fundamental to
- pertinent to
- incongruous with
- commensurate with

Question Explanation

The words that fill in the blank must express the idea that unlike in Europe, in the United States the fields of meteorology and astronomy (or other physical sciences) were not considered of comparable rank. The phrase “unfit for” creates an opposing meaning—for meteorology to be “not...unfit for any physical science” would mean it was considered compatible with physical science studies. While it is surely accurate that United States institutions did not consider meteorology “fundamental to” or “pertinent to” the physical sciences, the sentence as a whole concerns itself with the question of whether meteorology was considered *equal to* other sciences. “Incongruous with” suffers from the same fault as “unfit for,” creating a meaning opposed to the intended one.

Thus the correct answer is **equivalent to** (Choice 2) and **commensurate with** (Choice 6).

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-10

In one commentator's view, modern free traders are complete _____ because they show no interest in practicality, nuance, or flexibility on the issue of free trade.

ideologues

cynics

zealots

simpletons

hypocrites

phonies

Question Explanation

The words that fill in the blank must convey a meaning consistent with the idea of people who are inflexible, impractical, and unsubtle about an issue (in this case, free trade). Such people can fairly be called “ideologues” and “zealots.” While “cynics” might be inflexible, cynicism is not a trait necessarily associated with rigidity or lack of nuance. “Simpletons” is compatible with the notion of persons lacking subtlety, but no other answer choice would generate a sentence with the same meaning. “Hypocrites” and “phonies” are people who pretend to be what they are not; this is not consistent with the idea of having no interest in practicality or flexibility.

Thus the correct answer is **ideologues** (Choice 1) and **zealots** (Choice 3).

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-11

In science, not all errors are (i)_____ : historians have unearthed a number of instances in which an incorrect idea proved far more (ii)_____ than thousands of others that were trivially mistaken or narrowly correct. These are the (iii)_____ mistakes: errors that touch on deep, fundamental features of the world around us and prompt further research that leads to major breakthroughs. Mistakes they certainly are, but sciences would be far worse off without them.

Blank (i)

Blank (ii)

Blank (iii)

reported accurately
detected early
created equal

insidious
potent
inconsequential

exaggerated
unavoidable
productive

Question Explanation

In order to determine which answer choices best fit into the blanks, it is helpful to look at the last two sentences, which concern “errors that . . . prompt further research that leads to major breakthroughs,” that is, “mistakes” from which the sciences actually benefit. When we go back to the first sentence, we can see that Blank (i) requires an answer choice that will complete an assertion about errors. The part of the sentence that follows the colon tells us that in “a number of instances” an “incorrect idea” has been different in some way, which will be characterized in Blank (ii), from ideas that were “trivially mistaken or narrowly correct.” Therefore the best answer choice for Blank (i) must be “created equal”: not all errors are created equal because in some instances errors have had some special quality, being more “insidious” or “potent” or “inconsequential” than narrowly correct ideas. Since we are concerned here with errors that have led to breakthroughs, the answer choice for Blank (ii) has to be something positive: of the three choices available, only “potent” fills this requirement. The final blank, Blank (iii), must be filled with a word that characterizes these “potent” mistakes that lead to breakthroughs, and “productive” is the only one that logically fits the context.

Thus the correct answer is **created equal, potent, and productive**.

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-12

Questions 7 and 8 are based on this passage.

According to von Kármán, a scientist seeks to understand what is; an engineer, to create what never was. But dichotomies are seldom clear-cut. When a scientist proposes a truly new hypothesis about, say, the origin of the universe, that hypothesis “never was” prior to its articulation by that scientist. Einstein, certainly a prototypical scientist, took that view, criticizing physicist and philosopher Ernst Mach for having “thought that somehow theories arise by means of discovery rather than invention.” Science historian Thomas P. Hughes notes that to Einstein, invention was the manipulation not only of things but also of concepts. Einstein believed that an artifact was a materialized concept and that a hard-and-fast line between technology and science simply did not exist.

The primary purpose of the passage is to

- suggest that a certain term is often misunderstood
- question the basis for a particular distinction
- show how one field has been influenced by another
- argue that one view of a dichotomy has changed over time
- examine the origins of a scientific theory

Passage Description

The passage considers the validity of a statement made by Hungarian mathematician and physicist Theodore von Kármán comparing the fundamental nature of the work of scientists and engineers.

Question Explanation

The passage begins by citing a claim about a difference between the work of scientists and engineers but immediately continues with the statement “But dichotomies are seldom clear-cut.” The remainder of the passage argues in favor of the idea that scientists, like engineers, do indeed create and invent new theories and concepts rather than simply discover what already exists; this argument undermines the opening statement. This points to **Choice 2** as the correct answer choice. The passage does not suggest that a misunderstanding of terminology is the cause of any confusion (Choice 1), nor does it note any particular influence that either field in question has had on the other (Choice 3). While the passage does discuss a “dichotomy,” it does not claim that the view of it has changed (Choice 4), and the dichotomy itself is not presented as a scientific theory (Choice 5).

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-13

Questions 7 and 8 are based on this passage.

According to von Kármán, a scientist seeks to understand what is; an engineer, to create what never was. But dichotomies are seldom clear-cut. When a scientist proposes a truly new hypothesis about, say, the origin of the universe, that hypothesis “never was” prior to its articulation by that scientist. Einstein, certainly a prototypical scientist, took that view, criticizing physicist and philosopher Ernst Mach for having “thought that somehow theories arise by means of discovery rather than invention.” Science historian Thomas P. Hughes notes that to Einstein, invention was the manipulation not only of things but also of concepts. Einstein believed that an artifact was a materialized concept and that a hard-and-fast line between technology and science simply did not exist.

The author of the passage mentions Mach most likely in order to

- provide a contrast that illuminates Einstein’s view
- identify an inspiration for von Kármán’s views
- show how perspectives on the nature of invention have changed over time
- show how Einstein’s view of Mach influenced other scientists’ views about invention
- illustrate Einstein’s and Mach’s opposing views about the value of technology

Passage Description

The passage considers the validity of a statement made by Hungarian mathematician and physicist Theodore von Kármán comparing the fundamental nature of the work of scientists and engineers.

Question Explanation

The question asks about the most likely intention behind the author’s mention of Ernst Mach. Since Einstein criticized Mach’s point of view (“that somehow theories arise by means of discovery rather than invention”) in contrasting it to his own view, which was that theories are invented rather than discovered, the correct answer choice is **Choice 1**. There is no indication that Mach inspired von Kármán (Choice 2), and the mention of Mach does not imply that perspectives on this issue changed over time (Choice 3). It could be true that Einstein’s opinion of Mach directly influenced other scientists’ views (Choice 4), but the passage offers no information on that matter, and while Einstein and Mach clearly had opposing views, the views discussed here do not concern the value of technology (Choice 5).

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-14

Questions 18 to 20 are based on this passage.

Following the United States Civil War (1861–1865), many former slaves in the rural South became sharecroppers (raising a landlord’s crop for a share of the profits) or tenant farmers (selling what they raised and paying a share of the profits as rent). Most historians tend to depict these African Americans as victims of racism and the farm tenancy system. This approach, however, overlooks the role played by such African American rural reformers as Robert Lloyd Smith, founder of the Farmers’ Improvement Society of Texas, and Joseph Edward Clayton, the first African American to organize farmers’ institutes for the Texas Department of Agriculture. Both men advocated comfortable homes and better schools for African Americans; both attributed poverty and illiteracy to causes other than racism, such as insect damage to crops; and both worked to keep Black farmers on the land, although Smith opposed farm tenancy. Both were also accused by their contemporaries of downplaying the devastating impact of the farm tenancy system on Black farmers and of accommodating racism. While the extent of these reformers’ influence requires more study, clearly their organizations provided a voice for African American farmers seeking to improve their positions in the agrarian South.

The passage is primarily concerned with

- restoring the reputations of two reformers whose accomplishments have long been denigrated by historians
- refuting criticisms of two reformers made by their contemporaries by demonstrating that those criticisms are baseless
- providing evidence to support a claim that historians’ understanding of a particular phenomenon may be incomplete
- discussing some of the reasons that two reformers who were well-known during their lifetimes are considered by historians today to have been ineffective
- suggesting an alternative interpretation of the effect of the farm tenancy system on the economy of the rural South following the Civil War

Passage Description

The passage discusses the work of two African American rural reformers following the United States Civil War.

Question Explanation

The passage asserts that the view of “most historians” is that African Americans were victims of the farm tenancy system after the Civil War. The activities of the reformers Smith and Clayton are presented as evidence that historians’ views do not take the reformers’ work into account—work that advocated for rural African Americans, as well as pointed to various possible causes, beyond pure racism, of their hardships. This points to **Choice 3** as the correct answer choice. The passage does not imply that Smith and Clayton have poor reputations (Choice 1), and while contemporary criticism of the reformers is mentioned, that criticism is not refuted or said to be baseless (Choice 2). The passage suggests that modern historians may be unaware of the existence or extent of the reformers’ work, but not that they consider the reformers to have been ineffective (Choice 4). The passage does not concern itself with the overall economy of the rural South (Choice 5).

Difficulty level: 3 (1 = easy, 5 = hard)

Q’s–15

Questions 18 to 20 are based on this passage.

Following the United States Civil War (1861–1865), many former slaves in the rural South became sharecroppers (raising a landlord’s crop for a share of the profits) or tenant farmers (selling what they raised and paying a share of the profits as rent). **Most historians tend to depict these African Americans as victims of racism and the farm tenancy system.** This approach, however, overlooks the role played by such African American rural reformers as Robert Lloyd Smith, founder of the Farmers’ Improvement Society of Texas, and Joseph Elward Clayton, the first African American to organize farmers’ institutes for the Texas Department of Agriculture. Both men advocated comfortable homes and better schools for African Americans; both attributed poverty and illiteracy to causes other than racism, such as insect damage to crops; and both worked to keep Black farmers on the land, although Smith opposed farm tenancy. Both were also accused by their contemporaries of downplaying the devastating impact of the farm tenancy system on Black farmers and of accommodating racism. While the extent of these reformers’ influence requires more study, clearly their organizations provided a voice for African American farmers seeking to improve their positions in the agrarian South.

Select the sentence that identifies a prevailing scholarly view.

Passage Description

The passage discusses the work of two African American rural reformers following the United States Civil War.

Question Explanation

The correct answer choice is the **second sentence** of the passage, “**Most historians tend to depict these African Americans as victims of racism and the farm tenancy system.**” The phrase “**Most historians tend to depict . . .**” indicates that the view of these historians currently dominates scholarship on this matter. The final sentence of the passage also presents a scholarly view, but it is the view of the author of the passage, who is arguing in favor of additional study that could end up changing the prevailing view.

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-16

Questions 18 to 20 are based on this passage.

Following the United States Civil War (1861–1865), many former slaves in the rural South became sharecroppers (raising a landlord’s crop for a share of the profits) or tenant farmers (selling what they raised and paying a share of the profits as rent). Most historians tend to depict these African Americans as victims of racism and the farm tenancy system. This approach, however, overlooks the role played by such African American rural reformers as Robert Lloyd Smith, founder of the Farmers’ Improvement Society of Texas, and Joseph Edward Clayton, the first African American to organize farmers’ institutes for the Texas Department of Agriculture. Both men advocated comfortable homes and better schools for African Americans; both attributed poverty and illiteracy to causes other than racism, such as insect damage to crops; and both worked to keep Black farmers on the land, although Smith opposed farm tenancy. Both were also accused by their contemporaries of downplaying the devastating impact of the farm tenancy system on Black farmers and of accommodating racism. While the extent of these reformers’ influence requires more study, clearly their organizations provided a voice for African American farmers seeking to improve their positions in the agrarian South.

The author of the passage would most likely agree with which of the following statements concerning Smith and Clayton?

- More research is required to determine whether or not their organizations were typical of those established to aid African American farmers in the post–Civil War rural South.
- Their contributions to the improvement of the living conditions of African American farmers were overshadowed by subsequent political controversy.
- Their achievements as reformers have been exaggerated by many historians of the post–Civil War period.
- There is evidence demonstrating that they were committed to aiding African American farmers in the rural South.
- The extent of the criticisms made about them by their contemporaries is difficult to determine.

Passage Description

The passage discusses the work of two African American rural reformers following the United States Civil War.

Question Explanation

The author of the passage describes the work of Smith and Clayton as advocacy for African American farmers, including the organization of farmers’ institutes and lobbying for better homes and schools. This points to **Choice 4** as the correct answer choice. Nothing in the passage suggests that the author is interested in determining whether the reformers’ organizations were typical at the time (Choice 1), or that the author believes the reformers’ work was eclipsed by political controversy (Choice 2). The author maintains that historians have given too little attention to Smith and Clayton, which is the opposite of the claim in Choice 3. While contemporary criticism of the reformers is mentioned, there is no discussion about the extent of that criticism (Choice 5).

Difficulty level: 3 (1 = easy, 5 = hard)

Questions 9 to 12 are based on this passage.

In the late nineteenth century, art critics regarded seventeenth-century Dutch paintings as direct reflections of reality. The paintings were discussed as an index of the democracy of a society that chose to represent its classes, actions, and occupations exactly as they were; wide-ranging realism was seen as the great accomplishment of Dutch art. However, the achievement of more recent study of Dutch art has been the recovery of the fact that the “realistic” paintings are more than depictions of daily life. They are, of course, that too, but it has now become clear that such paintings are to be taken as symbolizing mortality, the transience of earthly life, and the power of God, and as messages that range from the mildly moralizing to the firmly didactic. How explicit and consistent the symbolizing process was intended to be is a much thornier matter, but anyone who has more than a passing acquaintance with Dutch literature or with the kinds of images used in illustrated books (above all emblem books) will recognize how pervasive was the habit of investing ordinary objects and familiar scenes with meanings that go beyond their surface and outward appearance. In the mid-1960s, Eddy de Jongh published an extraordinary array of material—especially from the emblem books and vernacular literature—that confirmed the unreliability of taking Dutch pictures at surface value alone.

The major difficulty, however, with the findings of critics such as de Jongh is that it is not easy to assess the multiplicity of levels in which Dutch viewers interpreted these pictures. De Jongh’s followers typically regard the pictures as purely symbolic. Not every object within Dutch paintings need be interpreted in terms of the gloss given to its equivalent representation in the emblem books. Not every foot warmer is to be interpreted in terms of the foot warmer in Roemer Visscher’s *Sinnepoppen* of 1614; not every bridle is an emblem of restraint (though many were indeed just that). To maintain as Brown does, that the two children in Netscher’s painting *A Lady Teaching a Child to Read* “stand for industry and idleness” is to fail to understand that the painting has a variety of possible meanings, even though the picture undoubtedly carries unmistakable symbolic meanings, too. Modern art historians may well find the discovery of parallels between a painting and a specific emblem exciting; they may, like seventeenth-century viewers, search for the double meanings that lie behind many paintings. But seventeenth-century response can hardly be reduced to the level of formula. To suggest otherwise is to imply a laboriousness of mental process that may well characterize modern interpretations of seventeenth-century Dutch art, but that was, for the most part, not characteristic in the seventeenth century.

Q's-17

The passage is primarily concerned with which of the following?

- Reconciling two different points of view about how art reflects reality
- Criticizing a traditional method of interpretation
- Tracing the development of an innovative scholarly approach
- Describing and evaluating a recent critical approach
- Describing a long-standing controversy and how it was resolved

Passage Description

The passage discusses critical approaches over time to seventeenth-century Dutch paintings, with a focus on the views of certain modern art historians.

Question Explanation

The passage mentions more than one critical approach to Dutch paintings, but focuses mainly on an appraisal of the work of twentieth-century scholar Eddy de Jongh and similar modern critics. This points to **Choice 4** as the correct answer choice. Multiple points of view are discussed, but there is no specific reconciliation of any two of them (Choice 1). Earlier schools of criticism could be considered “traditional,” but the main concern of the passage is not to disparage them (Choice 2). The passage does not chronicle the development of a scholarly approach (Choice 3) or mention the resolution of any controversy in the field (Choice 5).

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-18

The author of the passage mentions bridles in the highlighted portion of the passage most likely in order to

- suggest that restraint was only one of the many symbolic meanings attached to bridles
- provide an example of an everyday, physical object that was not endowed with symbolic meaning
- provide an example of an object that modern critics have endowed with symbolic meaning different from the meaning assigned it by seventeenth-century Dutch artists
- provide an example of an object with symbolic meaning that was not always used as a symbol
- provide an example of an everyday object that appears in a significant number of seventeenth-century Dutch paintings

Passage Description

The passage discusses critical approaches over time to seventeenth-century Dutch paintings, with a focus on the views of certain modern art historians.

Question Explanation

The reference to bridles appears in the larger context of symbolic representations in Dutch art. However, the highlighted statement asserts that “not every bridle” must be seen as a symbol of restraint. This points to **Choice 4** as the correct answer choice. There is no suggestion in the passage that bridles were associated with symbolic meanings other than that of restraint (Choice 1), and the notion that bridles had no symbolic import whatsoever (Choice 2) is clearly contradicted by information in the passage (“many were indeed just that”). The passage does not suggest that the symbolic interpretation of bridles has changed over time (Choice 3) or that bridles appear with notable frequency in Dutch paintings (Choice 5).

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-19

Which of the following best describes the function of the last paragraph of the passage?

- It provides specific applications of the critical approach introduced in the preceding paragraph.
- It presents a caveat about the critical approach discussed in the preceding paragraph.
- It presents the research on which a theory presented in the preceding paragraph is based.
- It refutes a theory presented in the preceding paragraph and advocates a return to a more traditional approach.
- It provides further information about an unusual phenomenon described in the preceding paragraph.

Passage Description

The passage discusses critical approaches over time to seventeenth-century Dutch paintings, with a focus on the views of certain modern art historians.

Question Explanation

The last paragraph of the passage follows directly after a statement that the work of de Jongh was “extraordinary” and provided confirmation for an important idea—that Dutch paintings were imbued with symbolism. However, the last paragraph itself begins by stating that there is a “major difficulty” with the findings of critics such as de Jongh, and goes on to explain why. This points to **Choice 2** as the correct answer choice. The paragraph is an assessment of aspects of the critics’ approach, not a catalog of applications for it (Choice 1), and does not present research fundamental to any particular theory (Choice 3). While it critiques de Jongh’s work, it does not lobby for a return to a more traditional approach (Choice 4), nor does it address any “unusual phenomenon” from the previous paragraph (Choice 5).

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-20

The passage suggests which of the following about emblem books in seventeenth-century Holland?

- They confirm that seventeenth-century Dutch paintings depict some objects and scenes rarely found in daily life.
- They are more useful than vernacular literature in providing information about the symbolic content of seventeenth-century Dutch painting.
- They have been misinterpreted by art critics, such as de Jongh, who claim seventeenth-century Dutch paintings contain symbolic meaning.
- They are not useful in interpreting seventeenth-century Dutch landscape painting.
- They contain material that challenges the assumptions of late nineteenth-century critics about seventeenth-century Dutch painting.

Passage Description

The passage discusses critical approaches over time to seventeenth-century Dutch paintings, with a focus on the views of certain modern art historians.

Question Explanation

Emblem books are discussed in the passage as evidence that it was commonplace in Dutch culture to invest ordinary objects with symbolic meaning. The passage opens with a statement about nineteenth-century critics' interpretation of seventeenth-century Dutch paintings as "direct reflections of reality." Since emblem books support a critical interpretation of that same Dutch art as being highly symbolic, **Choice 5** is the correct answer choice. The books are described as depicting "ordinary objects and familiar scenes," so they are unlikely to support a claim that Dutch paintings portrayed rare objects or events (Choice 1). The passage suggests that emblem books are an especially useful type of illustrated book, but does not weigh in on their relative merits compared to vernacular literature (Choice 2). There is no suggestion that critics such as de Jongh have misinterpreted emblem books (Choice 3), nor that emblem books are somehow irrelevant to seventeenth-century Dutch landscape paintings (Choice 4).

Difficulty level: 4 (1 = easy, 5 = hard)

Section 2 : Quant

Q's-01

$$n > 1$$

Quantity A

$$125n$$

Quantity B

$$215(n - 1)$$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

In this question, you are to compare Quantity A, $125n$, and Quantity B, $215(n - 1)$, given that $n > 1$. To explore the relationship between Quantities A and B, you can substitute some easy values for n .

If $n = 2$, then Quantity A equals 250 and Quantity B equals 215. In this case, Quantity A is greater than Quantity B.

If $n = 3$, then Quantity A equals 375 and Quantity B equals 430. In this case, Quantity B is greater than Quantity A.

Since in one case Quantity A is greater and in the other case Quantity B is greater, the correct answer is **Choice 4**, that is, **The relationship cannot be determined from the information given**.

This explanation uses the following strategies.

Strategy 10: Trial and Error

Strategy 13: Determine Whether a Conclusion Follows from the Information Given

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-02

Quantity A

The area of an isosceles triangle that has one right angle and two sides of length 2

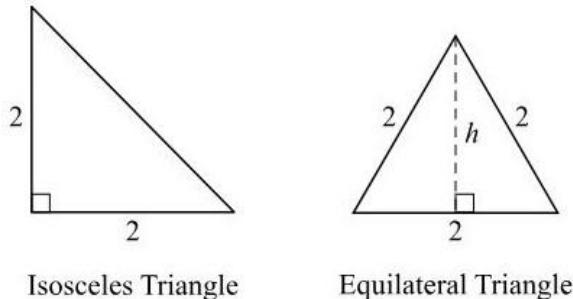
Quantity B

The area of an equilateral triangle that has sides of length 2

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

One way to approach this question is to draw an isosceles triangle that has one right angle and two sides of length 2, and an equilateral triangle that has sides of length 2 side-by-side, as shown below.



Recall that a triangle with base b and height h has area $\frac{bh}{2}$. From the figure you can see that the isosceles triangle has base 2 and height 2, and the equilateral triangle has base 2 and a height that is less than 2. So Quantity A, the area of the isosceles triangle, is greater than Quantity B, the area of the equilateral triangle, and the correct answer is **Choice 1**, that is, **Quantity A is greater**.

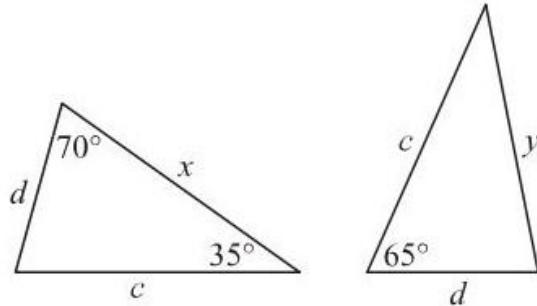
This explanation uses the following strategies.

Strategy 2: Translate from Words to a Figure or Diagram

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-03



Quantity A

x

Quantity B

y

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

In this question, you are given two triangles, where the lengths of all the sides are labeled. You are also given the measures of three interior angles: 70° and 35° in the triangle on the left and 65° in the triangle on the right. Note that in each triangle, two of the sides have lengths c and d . Also, the third sides of the triangles have lengths x and y , which are the quantities to be compared.

In the triangle on the left, the measure of the unlabeled angle is 75° , since the sum of the angle measures of every triangle is 180° and $180^\circ - (70^\circ + 35^\circ) = 75^\circ$. This angle with measure 75° in the triangle on the left corresponds to the angle with measure 65° in the triangle on the right, because they both are the angles between the two sides of length c and d . Also, the third sides of the triangles, with lengths x and y , are opposite sides of the angles with measures 75° and 65° , respectively.

For any triangle with two sides of length c and d , as the angle between the two sides increases, the length of the third side will also increase. So for the two given triangles, since $75^\circ > 65^\circ$, it follows that $x > y$. Thus the correct answer is **Choice 1**, that is, **Quantity A is greater**.

This explanation uses the following strategies.

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-04

Quantity A

The number of integers from 1 to 300 that are divisible by both 5 and 9

Quantity B

6

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

If an integer is divisible by both 5 and 9, then it is divisible by 45. So Quantity A is equal to the number of multiples of 45 between 1 and 300. The least multiple of 45 that is between 1 and 300 is $(1)(45)$, or 45; and the greatest multiple of 45 that is between 1 and 300 is $(6)(45)$, or 270. Thus there are 6 multiples of 45 between 1 and 300. Since Quantity B also equals 6, the correct answer is **Choice 3**, that is, **The two quantities are equal**.

This explanation uses the following strategy.

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-05

A car travels d miles along a stretch of highway at a constant speed of r miles per hour and then travels d miles back to its starting point at a constant speed of s miles per hour, where $r > s$.

Quantity A

The time taken by the car to travel the d miles at r miles per hour

Quantity B

$$\frac{d}{s} \text{ hours}$$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

Quantity A, the time taken by the car to travel d miles at r miles per hour, is $\frac{d}{r}$ hours. From this you can see that Quantity B, $\frac{d}{s}$ hours, is the amount of time taken by the car to travel d miles back to its starting point at s miles per hour. Since you are given that $r > s$, you can determine that Quantity A, $\frac{d}{r}$ hours, is less than Quantity B, $\frac{d}{s}$ hours. Thus the correct answer is **Choice 2**, that is, **Quantity B is greater**.

This explanation uses the following strategy.

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-06

$$-10 < x + y < 20$$

$$5 < x < 10$$

Quantity A

$$y$$

Quantity B

$$-15$$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

In this question, you are given the two compound inequalities $-10 < x + y < 20$ and $5 < x < 10$ and are asked to compare y with -15 . One way to proceed is to use the information about x in the second inequality to eliminate the x in the first inequality. This can be accomplished as follows.

First, multiply the inequality $5 < x < 10$ by -1 to obtain the inequality $-10 < -x < -5$. Next, add the inequality $-10 < -x < -5$ to the inequality $-10 < x + y < 20$. This yields the inequality $-10 + (-10) < (x + y) + (-x) < 20 + (-5)$, which simplifies to $-20 < y < 15$.

Thus Quantity A, y , can be any number between -20 and 15 . Quantity A can be greater than, less than, or equal to Quantity B, -15 . The correct answer is **Choice 4**, that is, **The relationship cannot be determined from the information given**.

This explanation uses the following strategies.

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Strategy 13: Determine Whether a Conclusion Follows from the Information Given

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-07

$$R = \left(2^{16}\right)\left(5^{34}\right)\left(N^{50}\right), \text{ where } N \text{ is a positive integer.}$$

Quantity A

$$\sqrt{R}$$

Quantity B

$$\frac{R}{10}$$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

Given that $R = (2^{16})(5^{34})(N^{50})$, the two quantities can be determined as follows.

Quantity A: $\sqrt{R} = (2^8)(5^{17})(N^{25})$

Quantity B: $\frac{R}{10} = \frac{(2^{16})(5^{34})(N^{50})}{(2)(5)} = (2^{15})(5^{33})(N^{50})$

Note that both Quantity A and Quantity B are the product of three factors, where one factor is a power of 2, one factor is a power of 5, and one factor is a power of N . Comparing each of the three factors in Quantity A with the corresponding factor in Quantity B, you can see that $2^8 < 2^{15}$, $5^{17} < 5^{33}$, and $N^{25} \leq N^{50}$, since N is a positive integer. Since two of the factors in Quantity A are less than the corresponding factors in Quantity B and the third factor is less than or equal to its corresponding factor, it follows that Quantity B is greater than Quantity A. So the correct answer is **Choice 2**, that is, **Quantity B is greater**.

This explanation uses the following strategies.

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 7: Find a Pattern

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 2 (1 = easy, 5 = hard)

Q's–08

$$2s = r + t$$

Quantity A

The median of r , s , and t

Quantity B

s

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

You are given that $2s = r + t$, or $s = \frac{r+t}{2}$, which means that s is the average of r and t . It follows that either $r \leq s \leq t$ or $t \leq s \leq r$. In either case, s is the median of r , s , and t . The correct answer is **Choice 3**, that is, **The two quantities are equal**.

This explanation uses the following strategy.

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-09

A copy machine was used to produce two smaller versions of a rectangular picture. Each dimension of the original picture was reduced by 20 percent to produce the first smaller version, and then each dimension of the first smaller version was reduced by 15 percent to produce the second smaller version. Each dimension of the second smaller version was what percent of the corresponding dimension of the original picture?

35%

38%

65%

68%

70%

Explanation

In the first smaller version of the picture, each dimension was $(100 - 20)\%$, or 80%, of its original size. In the second smaller version, each dimension was $(100 - 15)\%$, or 85%, of its size in the first version. Therefore, each dimension of the second smaller version was 85% of 80%, or 68%, of its original size. The correct answer is **Choice 4**, that is, **68%**.

This explanation uses the following strategy.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-10

A metal right circular cylinder is 20 centimeters tall, has a base with diameter 8 centimeters, and is open at both ends. Which of the following is closest to the outside surface area of the cylinder, in square centimeters?

450

475

500

525

550

Explanation

Note that if you cut the cylinder along its height and then flatten it, the outside surface of the cylinder will become a rectangular region with a width of 20 centimeters and a length equal to the circumference of the cylinder. Since the circumference of a circle with diameter d is $d\pi$ and the area of a rectangle is the product of its length and width, you can conclude that the surface area of the cylinder is $(8\pi)(20) = 160\pi \approx (160)(3.14) \approx 502$ square centimeters. Of the answer choices, the closest is 500. The correct answer is **Choice 3**, that is, **500**.

This explanation uses the following strategies.

Strategy 2: Translate from Words to a Figure or Diagram

Strategy 8: Search for a Mathematical Relationship

Strategy 9: Estimate

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-11

Matt's Coins

Coin Value	Number of Coins
\$0.01	3
\$0.05	3
\$0.10	3
\$0.25	1

Matt has 10 coins, and their values are shown in the table. If Matt randomly selects 4 of the coins, which of the following could be the total value of the 4 coins?

Indicate all such values.

\$0.25

\$0.26

\$0.27

\$0.28

Explanation

Try to express each of the answer choices as a sum of 4 of the coin values given in the table.

Choice 1: $\$0.25 = (3)(\$0.05) + (1)(\$0.10)$

Choice 2: $\$0.26 = (2)(\$0.10) + (1)(\$0.05) + (1)(\$0.01)$

Choice 3: For \$0.27, trying all possible sums of 4 coins, you will see that it is not possible to obtain a total value of \$0.27.

Choice 4: $\$0.28 = (1)(\$0.25) + (3)(\$0.01)$

The correct answer consists of **Choices 1, 2, and 4**, that is, **\$0.25, \$0.26, and \$0.28**.

This explanation uses the following strategies.

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 10: Trial and Error

Strategy 13: Determine Whether a Conclusion Follows from the Information Given

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-12

If $\frac{x+1}{6x} + \frac{x+1}{2x} = 1$, what is the value of x ?

$x =$

Explanation

Using algebra you can solve the equation $\frac{x+1}{6x} + \frac{x+1}{2x} = 1$ for x , as follows.

Multiplying both sides of the equation by $6x$ gives $x+1 + 3(x+1) = 6x$, which simplifies to $2x = 4$, or $x = 2$. The correct answer is **2**.

This explanation uses the following strategy.

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-13

x , 12, 11

If the standard deviation of the three numbers in the list above is 4, what is the standard deviation of $x + 9$, 21, and 20?

- 4
- 13
- 31
- 36
- 108

Explanation

Note that the three numbers $x + 9$, 21, and 20 are 9 more than the three numbers x , 12, and 11, respectively. Recall that the standard deviation of a list of numbers is a measure of the spread of the numbers, which does not change if the same amount is added to each of the numbers in the list. So the standard deviation of $x + 9$, 21, and 20 is equal to the standard deviation of x , 12, and 11, which is 4. The correct answer is **Choice 1**, that is, 4.

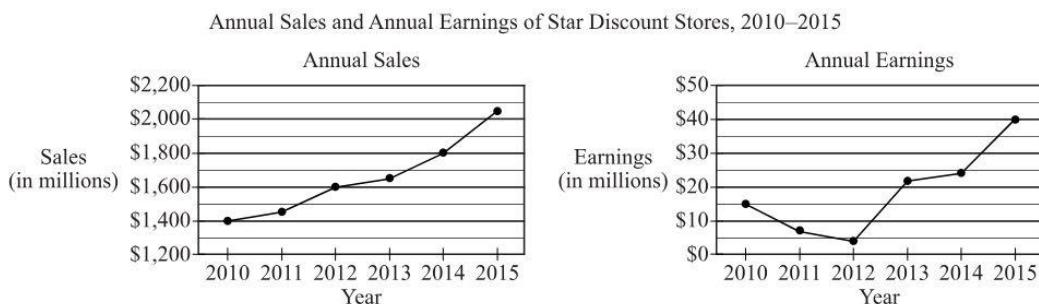
This explanation uses the following strategy.

Strategy 7: Find a Pattern

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-14

Questions 14 to 16 are based on the following data.



According to a projection made in January 2016, for each of the three years following 2015, annual sales would increase by an amount equal to $\frac{1}{2}$ of the increase in annual sales from 2014 to 2015. According to this projection, approximately what would annual sales be for the year 2018?

- \$2,200 million
- \$2,425 million
- \$3,450 million
- \$4,050 million
- \$4,875 million

Explanation

According to the graph, annual sales increased from approximately \$1,800 million in 2014 to approximately \$2,050 million in 2015, that is, by approximately \$250 million. If annual sales were to increase by one-half of this amount for each of the following 3 years, then the total increase would be $(3)(\$125)$ million, or \$375 million. So the annual sales in 2018 would be approximately $(\$2,050 + \$375)$ million, or \$2,425 million. The correct answer is **Choice 2**, that is, **\$2,425 million**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

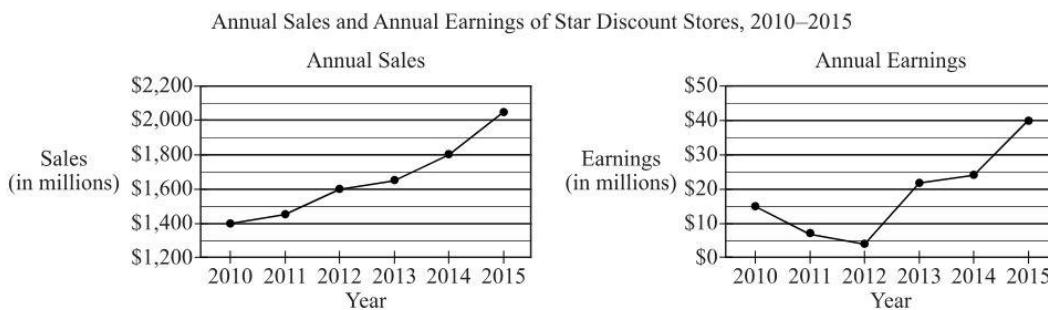
Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 9: Estimate

Difficulty level: 1 (1 = easy, 5 = hard)

Q's-15

Questions 14 to 16 are based on the following data.



Based on the information given, which of the following statements are true?

Indicate all such statements.

- For the years shown, the range of the annual earnings was greater than \$30 million.
- From 2010 to 2015, both annual sales and annual earnings more than doubled.
- For each of the years shown, annual earnings were more than 1 percent of annual sales.

Explanation

Choice 1: Recall that the range of the annual earnings is the difference between the greatest annual earnings for the years shown and the least annual earnings for the years shown. For the years shown, the greatest annual earnings was approximately \$40 million (in 2015) and the least annual earnings was approximately \$5 million (in 2012). So the range of the annual earnings for the years shown is approximately \$35 million, which is greater than \$30 million. Statement 1 is true.

Choice 2: According to the graph, annual sales increased from approximately \$1,400 million in 2010 to approximately \$2,050 million in 2015. Since 2,050 is less than twice 1,400, it is not true that annual sales more than doubled. Statement 2 is false.

Choice 3: In 2012, annual sales were approximately \$1,600 million and annual earnings were approximately \$5 million. Since 1% of \$1,600 million is \$16 million, it is not true that annual earnings were more than 1% of annual sales. Statement 3 is false.

The correct answer consists of **Choice 1**, that is, **For the years shown, the range of the annual earnings was greater than \$30 million.**

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 9: Estimate

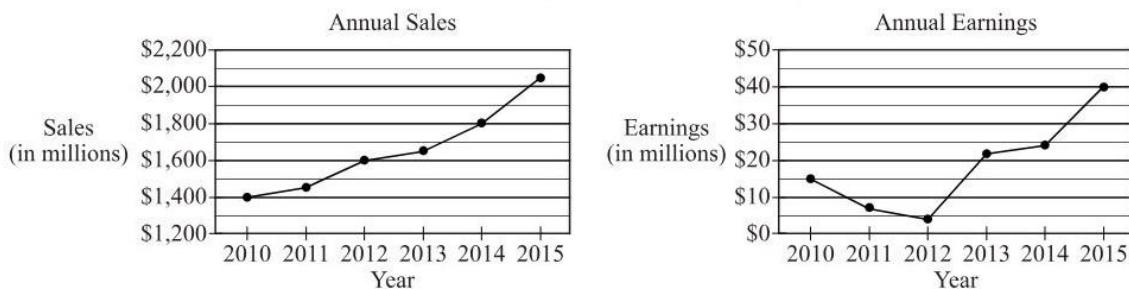
Strategy 13: Determine Whether a Conclusion Follows from the Information Given

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-16

Questions 14 to 16 are based on the following data.

Annual Sales and Annual Earnings of Star Discount Stores, 2010–2015



The number of stores owned by Star Discount in 2015 was twice the number owned by Star Discount in 2010.
By approximately what percent did the average annual earnings per store increase from 2010 to 2015?

- 5%
- 12%
- 25%
- 33%
- 40%

Explanation

Let x represent the number of stores owned by Star Discount in 2010. Since the number of stores doubled from 2015 to 2010, the number of stores owned by Star Discount in 2015 was $2x$.

According to the graph, the annual earnings in 2010 were approximately \$15 million. So the average annual earnings per store in 2010 were approximately $\frac{\$15}{x}$ million. Similarly, the annual earnings in 2015 were approximately \$40 million. So the average annual earnings per store in 2015 were approximately $\frac{\$40}{2x}$ million, or $\frac{\$20}{x}$ million. Thus the percent increase in average annual earnings per store from 2010 to 2015 is $\left(\frac{\frac{20}{x} - \frac{15}{x}}{\frac{15}{x}} \right) (100\%)$, which is $\left(\frac{5}{15} \right) (100\%)$, or approximately 33%. The correct answer is **Choice 4**, that is, 33%.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Strategy 9: Estimate

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-17

In a certain list of positive integers, the ratio of the number of odd integers to the number of even integers is 7 to 4. One-fourth of the number of odd integers is what fraction of the total number of integers in the list?

- $\frac{7}{44}$ $\frac{3}{16}$ $\frac{11}{28}$ $\frac{7}{16}$ $\frac{9}{16}$

Explanation

Since the ratio of the number of odd integers to the number of even integers in the list is 7 to 4, the numbers of odd and even integers in the list are $7t$ and $4t$, respectively, for some integer t . Thus the total number of integers in the list is $11t$, and one-fourth of the number of odd integers in the list is $\frac{7t}{4}$. Thus one-fourth of the number of odd

integers as a fraction of the total number of integers in the list is equal to $\frac{\frac{7t}{4}}{11t}$, or $\frac{7}{44}$. The correct answer is **Choice 1**, that is, $\frac{7}{44}$.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-18

If the circumference of a circle is 6, what is the area of the circle?

$\frac{6}{\pi^2}$

$\frac{9}{\pi}$

6π

9π

36π

Explanation

Recall that a circle of radius r has circumference $2\pi r$ and area πr^2 . So a circle with circumference 6 has radius $\frac{6}{2\pi}$, or $\frac{3}{\pi}$. Thus the area of the circle is $\pi \left(\frac{3}{\pi}\right)^2$, or $\frac{9}{\pi}$. The correct answer is **Choice 2**, that is, $\frac{9}{\pi}$.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-19

In the xy -plane, the graph of the equation $y = -\frac{1}{2}x + 3$ passes through the point $(c, -c)$. What is the value of c ?

-6

-3

2

3

6

Explanation

Since the point $(c, -c)$ is on the graph of the equation $y = -\frac{1}{2}x + 3$, it follows that $-c = -\frac{1}{2}c + 3$. Simplifying the equation and solving the equation for c yields $-\frac{1}{2}c = 3$, or $c = -6$. The correct answer is **Choice 1**, that is, -6 .

This explanation uses the following strategies.

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-20

On a final exam, 75 percent of a class had scores that were greater than 70, and 60 percent of the class had scores that were less than 85. What percent of the class had scores that were greater than 70 but less than 85?

35 %

Explanation

Given that 75% of the class had scores that were greater than 70, it follows that 25% of the class had scores that were less than or equal to 70; and given that 60% of the class had scores that were less than 85, it follows that 40% of the class had scores that were greater than or equal to 85.

Since 25% of the class had scores less than or equal to 70, and 40% of the class had scores greater than or equal to 85, it follows that $100\% - 25\% - 40\%$, or 35%, of the class had scores that were greater than 70 but less than 85. The correct answer is **35**.

This explanation uses the following strategy.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Difficulty level: 5 (1 = easy, 5 = hard)

Section 3 : Verbal

Q's-01

Question 16 is based on this passage.

The immune systems of hamsters injected with laboratory cultures of *Borrelia burgdorferi*, the bacterium that causes Lyme disease, respond differently than do the immune systems of people infected with the bacterium as a result of the bites of ticks, the disease's carrier. However, when hamsters are infected with the bacterium by tick bites, their immune-system response is identical to the human one. Probably, therefore, the bacterium in the ticks has a different form from the bacterium cultured in the laboratory.

The argument in the passage assumes which of the following?

- The difference in the manner in which the infection enters the body is not what causes the difference in the hamster's immune-system response.
- The human immune-system response to injection with *Borrelia burgdorferi* would be identical to the hamster's immune-system response to injection with that bacterium.
- In the wild, hamsters are at least occasionally infected with Lyme disease by tick bites.
- There are no laboratory-cultured bacteria that would cause the hamster's immune system to react as it does when infected with *Borrelia burgdorferi* by a tick bite.
- In rodents other than hamsters, the immune-system responses to *Borrelia burgdorferi* infections both by injection and by tick bite are identical to those in hamsters.

Explanation

Passage Description

The passage describes the different reactions when hamsters are infected with *B. burgdorferi* via injection and via tick bite and suggests a hypothesis that would explain these differing reactions.

Question Explanation

The hypothesis suggested by the passage—different forms of bacterium in the ticks and in the injected culture—assumes that there are no other pertinent differences that would account for the divergent reactions. Since the method by which the bacterium entered the hamsters' bodies is the only other difference mentioned in the two experiments, the passage assumes that that difference is not pertinent. Therefore **Choice 1** is the correct answer choice. The passage's argument does not depend on other species' reactions to the bacterium (Choices 2 and 5). Hamsters' reactions to other cultured bacteria (Choice 4) or whether they are infected in the wild (Choice 3) are also not pertinent to the argument.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-02

Many of the unusual behaviors attributed to crows—such as drinking coffee or presenting gifts to people who feed them—are based on (i) _____ and therefore fall into the category of (ii) _____ rather than science.

Blank (i)

long-term observation
controlled experiments
secondhand testimony

Blank (ii)

anecdote
speculation
hypothesis

Explanation

Question Explanation

By using the expression “rather than science,” the sentence states that our source of information about the behaviors listed is not scientific. Since “long-term observation” and “controlled experiments” are scientific sources of information, the choice that makes the most sense for Blank (i) is “secondhand testimony.” It follows that such hearsay can best be categorized in Blank (ii) as a form of “anecdote.”

Thus the correct answer is **secondhand testimony** and **anecdote**.

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-03

Research into butterfly wings could have (i) _____ implications, since knowledge of their optical and thermal properties may be (ii) _____ controlling the behavior of computer chips, which likewise consist of finely structured thin films.

Blank (i)	Blank (ii)
ecological	tantamount to
aesthetic	germane to
technological	advanced by

Explanation

Question Explanation

The sentence focuses on the possible implications or uses of research on butterfly wings for the design of computer chips. It follows that research on butterfly wings is best characterized in Blank (ii) as “germane to” controlling computer chips. Since computer chips are essentially technological but only incidentally “ecological” or “aesthetic,” the implications in Blank (i) are best characterized as “technological.”

Thus the correct answer is **technological** and **germane to**.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-04

Our sixth-grade teacher was a real _____: though she was, admittedly, just and fair, any infraction of her long list of rules for conduct was immediately met with strict discipline.

bully
dissembler
ascetic
martinet
sophist

Explanation

Question Explanation

The word that fills in the blank must convey that the teacher was a strict but not arbitrary disciplinarian. The characterization of the teacher that makes the most sense is “martinet.” While a “bully” may be strict, such a person is not fair. A “dissembler” would merely appear to be just and fair without actually being so. An “ascetic” would follow a strict discipline rather than enforcing it on others. A “sophist” would engage in false reasoning that could lead to unfair or unjust conclusions.

Thus the correct answer is **martinet**.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's–05

The critic inaccurately described a pastiche what was in fact _____ and original body of work.

an allegorical
a coherent
a temperate
a derivative
a realistic

Explanation

Question Explanation

A pastiche typically involves imitation of multiple styles, so to argue that a work is not a pastiche it is important to emphasize that it is not only original but “coherent.” A pastiche is “derivative” by definition, and nothing rules it out from being “allegorical,” “realistic,” or “temperate.”

Thus the correct answer is **a coherent**.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's–06

We found the government officials' (i)_____ their assessment of their country's needs and problems an astonishing departure, (ii)_____ as several of us were to the usual blandness and occasional (iii)_____ that typically characterizes such discussions.

Blank (i)

Blank (ii)

Blank (iii)

apathy underlying
candor in
optimism resulting from

impervious
accustomed
antagonistic

humility
obfuscation
raillery

Explanation

Question Explanation

The sentence focuses on the claim of observers that government officials made an “astonishing departure” from their “usual blandness” in connection with an assessment of national needs and problems. “Apathy” does not suggest the necessary departure from “blandness.” “Optimism” suggests a contrast with pessimism or discouragement, rather than “blandness.” Therefore, the choice that makes the most sense for Blank (i) is “candor.” Once it is determined that “candor” is the best choice for characterizing the officials’ assessment, it follows that the officials are departing in Blank (iii) from “obfuscation.” Observers of the officials’ “usual blandness” are best characterized in Blank (ii) as “accustomed” to the behavior.

Thus the correct answer is **candor in, accustomed, and obfuscation**.

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-07

Although the official United States poverty rate measure is now by and large taken for granted, having become widely regarded with the passage of time as the most (i) _____ method of calibrating the prevalence of material deprivation in American society, the measure was originally an (ii) _____ and in practical terms appears to be a (iii) _____ descriptor of poverty trends in modern America. For one thing, its results do not track well with other indicators that bear directly on living conditions across the nation.

Blank (i)

Blank (ii)

Blank (iii)

subjective
natural
tortuous

ad hoc improvisation
enormous success
obvious benchmark

conspicuous
judicious
problematic

Explanation

Question Explanation

The paragraph focuses on the official method of measuring the poverty rate in the United States. It states that the method is “taken for granted” but does not match other important indicators. Given the first point, it makes the most sense to say in Blank (i) that the method has come to be regarded as “natural.” The other choices, “subjective” and “tortuous,” do not characterize measures that are likely to gain general acceptance. And since the measure does not “track well with other indicators,” it is best characterized in Blank (iii) as “problematic.” The other choices, “conspicuous” and “judicious,” do not convey inconsistency with other indicators. Finally, the opening “Although” implies that while it may now be thought of as natural, it was not though so at first. So Blank (ii) requires “ad hoc improvisation,” since the other choices, “enormous success” and “obvious benchmark,” suggest that it seemed natural from the start.

Thus the correct answer is **natural, ad hoc improvisation, and problematic**.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-08

According to former coworkers, he was _____ bringing skeptical colleagues on board: one technique involved homing in on possible dissidents and absorbing their suggestions into his proposals.

deft at

avid about

uninterested in

apathetic about

canny about

lauded for

Explanation

Question Explanation

The second half of the sentence describes a technique meant to be successful at bringing around skeptical colleagues, so it is unlikely that the subject employing it would be described as “uninterested in” or “apathetic about” doing so. Since his strategy for persuading skeptics is cited as proof of the claim made in the first half of the sentence, the blank requires something that describes the subject’s ability to bring skeptics around. Both “deft at” and “canny about” do this, and they produce sentences that are similar in meaning. While someone who is adept at bringing skeptics on board might plausibly be “avid about” or “lauded for” doing so, nothing else in the sentence speaks to the subject’s enthusiasm or how his efforts are perceived.

Thus the correct answer is **deft at** (Choice 1) and **canny about** (Choice 5).

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-09

Contemporary observers liked to place Malcolm X into fixed political categories, but, as Marable powerfully demonstrates, he increasingly _____ those categories and set out to pursue his own odyssey of intellectual discovery and transformation.

- respected
- spurned
- resented
- flouted
- internalized
- redefined

Explanation

Question Explanation

The word “but” suggests that there is a tension between the “fixed political categories” into which observers attempted to place Malcolm X and his actions. Neither “respected” nor “internalized” convey this tension, as they both imply an acceptance of such categories. The passage does not suggest that Malcolm X “resented” the categories, or that his work “redefined” them. Rather it implies that his work rejected these fixed political categories.

Thus the correct answer is **spurned** (Choice 2) and **flouted** (Choice 4).

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-10

Those who read Empson's correspondence for the first time may be disappointed that so much of it is professional rather than personal, but the distinction in this case is _____: every letter bears the full stamp of Empson's personality.

- unambiguous
- artificial
- significant
- spurious
- clear-cut
- unique

Explanation

Question Explanation

The sentence's concluding phrase suggests that there is an overarching unity to Empson's letters, so the blank must be a word that discounts the distinction between his professional and personal correspondence. "Unambiguous," "clear-cut," and "significant" all do just the opposite by emphasizing or defending the distinction. "Unique" also does not fit, since it suggests that the distinction is merely different, not unjustified.

Thus the correct answer is **artificial** (Choice 2) and **spurious** (Choice 4).

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-11

The arrival of the manual describing procedures for adding content to the Web site may mark a new, more _____ phase in the site's history, and some contributors will no doubt become nostalgic for the unpredictable do-it-yourself days.

- fickle
- reticent
- indecisive
- sober
- prescribed
- staid

Explanation

Question Explanation

The blank requires an adjective that will directly contrast with the “unpredictable, do-it-yourself” past of the Web site. “Fickle” and “indecisive” do not provide this contrast, so they are incorrect. The new procedures may be “prescribed,” but that adjective would not aptly describe a phase in the site’s history. “Reticent” is generally applied to people, so it also does not work.

Thus the correct answer is **sober** (Choice 4) and **staid** (Choice 6).

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-12

Questions 7 and 8 are based on this passage.

Carolina Hospital notes that Cuban-American writers who write primarily in English are dismissed from anthologies and analyses of Cuban exile literature on that account. She argues that since these writers were born in Cuba and consider themselves Cuban writers, they should not be ignored, and maintains that they represent a new phase of Cubanness, one that is expressed in the language comfortable to its writers: English. Moreover, another critic notes that the Spanish and English traditions of Cuban-American writing have different but equally viable functions. The English branch seeks to create a distinctive culture of Cuban roots in the United States, whereas the Spanish branch wishes to preserve a specifically Cuban culture while seeking affiliation with the canon of Latin American letters.

Consider each of the choices separately and select all that apply.

The “critic” mentioned would probably agree with which of the following about Cuban-American writers?

- Contributing to a distinctive Cuban-American culture is a worthwhile thing for Cuban-American writers to do.
- If Cuban-American writers choose to write in English, preserving a specifically Cuban culture in the United States will become increasingly difficult.
- It is appropriate for Cuban-American writers who write in Spanish to seek affiliation with the larger canon of Latin America letters.

Explanation

Passage Description

The passage discusses two critics’ arguments against the exclusion of English-language writers from the canon of Cuban-American literature.

Question Explanation

Choices 1 and 3 are correct. The question asks about the critic’s likely views concerning Cuban-American literature. The critic notes that Spanish and English Cuban-American writing have “different but equally viable functions”; these functions are then spelled out in the passage’s final sentence.

Choice 1 is correct. One of the functions of Cuban-American literature mentioned in the final sentence is to “create a distinctive culture of Cuban roots in the United States.”

Choice 2 is incorrect. The critic thinks that part of the role of Cuban-American writers who write in English is to cultivate a distinctively Cuban culture.

Choice 3 is correct. The answer’s wording closely follows the second function of Cuban-American literature described in the passage’s last sentence.

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-13

Questions 7 and 8 are based on this passage.

Carolina Hospital notes that Cuban-American writers who write primarily in English are dismissed from anthologies and analyses of Cuban exile literature on that account. She argues that since these writers were born in Cuba and consider themselves Cuban writers, they should not be ignored, and maintains that they represent a new phase of Cubanness, one that is expressed in the language comfortable to its writers: English. Moreover, another critic notes that the Spanish and English traditions of Cuban-American writing have different but equally viable functions. The English branch seeks to create a distinctive culture of Cuban roots in the United States, whereas the Spanish branch wishes to preserve a specifically Cuban culture while seeking affiliation with the canon of Latin American letters.

In the context in which it appears, “comfortable” most nearly means

- prosperous
- sufficient
- agreeable
- restful
- painless

Explanation

Passage Description

The passage discusses two critics’ arguments against the exclusion of English-language writers from the canon of Cuban-American literature.

Question Explanation

The passage describes English as a language that is “comfortable” to the Cuban-American writers who choose to write in it. Since no further information is given about the reasons behind their choice, the best synonym for “comfortable” in this context is the most neutral one: **Choice 3**, “agreeable.” The other answer choices imply various shades of meaning that are unsupported by the passage.

Difficulty level: 1 (1 = easy, 5 = hard)

Q's-14

Questions 9 to 11 are based on this passage.

Recent studies of the Philippine fruit bat fauna have confirmed some previous hypotheses regarding bats on oceanic islands: for example, species richness [the number of different species in a particular area] and abundance are generally highest in the lowlands and decrease with increasing elevation. With few exceptions, each endemic species [species native to a particular place] is restricted to the modern islands that made up a single island during periods of low sea level, and genetic differentiation has been influenced by the ecology of the species and the current and past geographic and geological conditions. However, far more previous hypotheses have been overturned than supported. Some endemic Philippine species use disturbed habitat as extensively as nonendemic species that are widespread in Southeast Asia. Levels of genetic variation within all species are high, not low, and rather than showing evidence of an intrinsic vulnerability to extinction from natural causes, independent lineages of these bats have persisted in rather small areas for very long periods of time (often millions of years) in spite of frequent typhoons and volcanic eruptions. While colonization from outside areas has clearly contributed to the high species richness, speciation within the archipelago has contributed at least a quarter of the total species richness, including many of the most abundant species.

The primary purpose of the passage is to

- draw on studies of the Philippine fruit bat in proposing a new theory regarding bats on oceanic islands
- show how recent research on the Philippine fruit bat reflects debates about bats on oceanic islands
- argue for the relevance of certain new evidence pertaining to the Philippine fruit bat for the study of bats on oceanic islands
- discuss recent investigations of the Philippine fruit bat in light of conventional wisdom regarding bats on oceanic islands
- explain why the Philippine fruit bat is atypical among bats on oceanic islands in terms of genetic variation

Explanation

Passage Description

The passage lists the ways in which recent studies of Philippine fruit bats have confirmed and challenged previous hypotheses about bats on oceanic islands.

Question Explanation

Choice 4 is the correct answer: the passage enumerates the accepted hypotheses that the new research has confirmed and then explains the ways in which it has overturned others. The passage does not mention new theories about island bats (Choice 1) or refer to any debates about them (Choice 2). Nor is there any question raised about the relevance of the new evidence (Choice 3). Although one explanation for the disparity between the new findings and the generally accepted hypotheses might be that the Philippine bats are atypical (Choice 5), that claim is not made in the passage.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-15

Questions 9 to 11 are based on this passage.

Recent studies of the Philippine fruit bat fauna have confirmed some previous hypotheses regarding bats on oceanic islands: for example, species richness [the number of different species in a particular area] and abundance are generally highest in the lowlands and decrease with increasing elevation. With few exceptions, each endemic species [species native to a particular place] is restricted to the modern islands that made up a single island during periods of low sea level, and genetic differentiation has been influenced by the ecology of the species and the current and past geographic and geological conditions. However, far more previous hypotheses have been overturned than supported. Some endemic Philippine species use disturbed habitat as extensively as nonendemic species that are widespread in Southeast Asia. Levels of genetic variation within all species are high, not low, and rather than showing evidence of an intrinsic vulnerability to extinction from natural causes, independent lineages of these bats have persisted in rather small areas for very long periods of time (often millions of years) in spite of frequent typhoons and volcanic eruptions. While colonization from outside areas has clearly contributed to the high species richness, speciation within the archipelago has contributed at least a quarter of the total species richness, including many of the most abundant species.

The primary function of the highlighted text is to

- identify a finding from the Philippine fruit bat studies that will have a significant impact on how oceanic bats generally are viewed
- point out a hypothesis that has been the subject of considerable disagreement among researchers studying oceanic bats
- present evidence that is difficult to reconcile with other recent findings regarding the Philippine fruit bat
- illustrate a widely held view about oceanic bats generally that was confirmed by the Philippine fruit bat studies
- identify a feature of the Philippine fruit bat that does not appear to apply to oceanic bats generally

Explanation

Passage Description

The passage lists the ways in which recent studies of Philippine fruit bats have confirmed and challenged previous hypotheses about bats on oceanic islands.

Question Explanation

The first part of the passage's opening sentence states that recent studies confirmed some previous hypotheses; the colon, along with the phrase "for example" that begins the next clause, signals that the next portion of the passage will list some of those hypotheses that were confirmed. The highlighted portion is included in this list. (The phrase "However, far more previous hypotheses have been overturned" in the next sentence signals its end.) Therefore, **Choice 4** is the correct answer.

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-16

Questions 9 to 11 are based on this passage.

Recent studies of the Philippine fruit bat fauna have confirmed some previous hypotheses regarding bats on oceanic islands: for example, species richness [the number of different species in a particular area] and abundance are generally highest in the lowlands and decrease with increasing elevation. With few exceptions, each endemic species [species native to a particular place] is restricted to the modern islands that made up a single island during periods of low sea level, and genetic differentiation has been influenced by the ecology of the species and the current and past geographic and geological conditions. However, far more previous hypotheses have been overturned than supported. Some endemic Philippine species use disturbed habitat as extensively as nonendemic species that are widespread in Southeast Asia. Levels of genetic variation within all species are high, not low, and rather than showing evidence of an intrinsic vulnerability to extinction from natural causes, independent lineages of these bats have persisted in rather small areas for very long periods of time (often millions of years) in spite of frequent typhoons and volcanic eruptions. While colonization from outside areas has clearly contributed to the high species richness, speciation within the archipelago has contributed at least a quarter of the total species richness, including many of the most abundant species.

Which of the following can be inferred from the passage about the “recent studies”?

- They point to the need for a significantly revised perspective on oceanic island bats generally.
- They were undertaken with the assumption that Philippine fruit bats were somewhat atypical among oceanic bats.
- They remain somewhat controversial among researchers because of the number of standard hypotheses that they tested.
- They have largely confirmed what scientists thought about the Philippine fruit bat.
- They suggest that bats on oceanic islands are more vulnerable to extinction than previously thought.

Explanation

Passage Description

The passage lists the ways in which recent studies of Philippine fruit bats have confirmed and challenged previous hypotheses about bats on oceanic islands.

Question Explanation

The passage lists the ways in which studies confirmed some hypotheses about oceanic island bats, as well as the many more ways in which they challenged them. Because the passage does not suggest that the data from these studies were in any way flawed or controversial (Choice 3), or that the species studied were atypical (Choice 2), it can be inferred that the hypotheses themselves need to be revised. **Choice 1** is therefore the correct answer. As for the remaining choices, Choice 4 is directly contradicted by the passage (“far more previous hypotheses have been overturned than supported”). The evidence cited suggests that the Philippine bats are more robustly adaptive and resilient, and therefore less vulnerable to extinction (Choice 5), than such bats were generally assumed to be.

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-17

Questions 17 and 18 are based on this passage.

In 1876 Edmond Durany dubbed the style of emerging French Impressionist artists “The New Painting.” More than a style, the Impressionists’ luminous landscapes were regarded as a new way of seeing. Of course, it was not wholly new. The English painters Constable and Turner, whose work French artists knew, had already painted out of doors earlier in the century and brilliantly sought to capture the impact of natural scenes on their sensibility. Courbet’s tough-minded realism and Jongkind’s harbor scenes also had much to teach the emergent movement. The Impressionists never denied this ancestry; but they were aware, too, that they had taken these painters’ unconventional experiments to unfamiliar levels and, consolidating themselves as a movement, had indeed made painting new.

The passage suggests that the impact of Impressionism can be attributed in part to

- Durany’s enthusiastic promotion of the movement
- the moribund state of painting when Impressionists first presented their works
- the widespread popularity in France of works by Courbet and Jongkind
- a lack of earlier examples of outdoor painting
- the solidarity of its practitioners

Explanation

Passage Description

The passage discusses the precursors of Impressionism and argues that, while earlier painters shared some important commonalities, it was French Impressionist artists who transformed these earlier experiments into a recognizable movement.

Question Explanation

The passage's final sentence attributes the impact of Impressionism both to the Impressionists' furthering of earlier experiments in painting and to their "consolidating themselves as a movement." Since **Choice 5** refers to the latter action, it is the correct answer choice.

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-18

Questions 17 and 18 are based on this passage.

In 1876 Edmond Durany dubbed the style of emerging French Impressionist artists "The New Painting." More than a style, the Impressionists' luminous landscapes were regarded as a new way of seeing. Of course, it was not wholly new. The English painters Constable and Turner, whose work French artists knew, had already painted out of doors earlier in the century and brilliantly sought to capture the impact of natural scenes on their sensibility. Courbet's tough-minded realism and Jongkind's harbor scenes also had much to teach the emergent movement. The Impressionists never denied this ancestry; but they were aware, too, that they had taken these painters' unconventional experiments to unfamiliar levels and, consolidating themselves as a movement, had indeed made painting new.

Which of the following best describes the function of the highlighted sentence?

- It provides support for an assertion made previously in the passage.
- It undermines a claim made earlier in the passage.
- It questions the usefulness of categorizing artists into particular movements.
- It identifies painters whose works were praised by some Impressionists.
- It suggests that painting out of doors was unusual during the early 1800s.

Explanation

Passage Description

The passage discusses the precursors of Impressionism and argues that, while earlier painters shared some important commonalities, it was French Impressionist artists who transformed these earlier experiments into a recognizable movement.

Question Explanation

The first sentence of the passage claims that Impressionism "was not wholly new," and the highlighted portion gives an example of previous artists whose practices were similar to those used by French Impressionists. Since the example supports the previous assertion, **Choice 1** is the correct answer choice.

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-19

Questions 19 and 20 are based on this passage.

The ability to recognize specific individuals has profound implications for the evolution of complex social behaviors such as reciprocal altruism. Many researchers assumed that recognition of individuals, a phenomenon predominantly observed in laboratory studies of fish, might also operate extensively in free-ranging fish populations, where it could underpin these complex interactions. In fact, evidence of individual recognition in free-ranging fish populations is equivocal. The possibility exists that for many species, individual recognition observed in the laboratory might be an artifact of experimental designs, which enforce prolonged interaction between individuals and which prevent the diluting effects on social structure of immigration into and emigration from the shoal, factors that in nature would erode group stability and prevent the learning of individual identities.

The passage is primarily concerned with

- resolving a controversy
- describing a behavior
- dismissing a theory
- predicting a result
- appraising an assumption

Explanation

Passage Description

The passage discusses the recognition of individuals by laboratory fish and questions whether this behavior is shared by fish in the wild.

Question Explanation

The passage states that “many researchers assumed” that the recognition of individuals observed in laboratory fish would also be found in wild fish. It goes on to say that evidence for this assumption is “equivocal” and discusses reasons why the assumption could be incorrect. Thus **Choice 5** is the correct answer choice. The passage does not resolve the questions it raises (Choice 1) or dismiss any theory (Choice 3), nor does it predict any future results (Choice 4). While the passage discusses behaviors such as individual recognition and reciprocal altruism, they are never actually described (Choice 2).

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-20

Questions 19 and 20 are based on this passage.

The ability to recognize specific individuals has profound implications for the evolution of complex social behaviors such as reciprocal altruism. Many researchers assumed that recognition of individuals, a phenomenon predominantly observed in laboratory studies of fish, might also operate extensively in free-ranging fish populations, where it could underpin these complex interactions. In fact, evidence of individual recognition in free-ranging fish populations is equivocal. The possibility exists that for many species, individual recognition observed in the laboratory might be an artifact of experimental designs, which enforce prolonged interaction between individuals and which prevent the diluting effects on social structure of immigration into and emigration from the shoal, factors that in nature would erode group stability and prevent the learning of individual identities.

The author would most likely agree with which of the following statements about the prevalence of specific individual recognition that occurred in fish in the laboratory studies discussed?

- It suggests that the laboratory studies were well designed to simulate the natural habitats of the fish studied.
- It suggests that the advantages that individual recognition provides free-ranging fish differ significantly from those provided to fish in laboratory studies.
- It might have been inflated due to continued exposure to the same individuals.
- It may occur with greater frequency as the number of individuals in a population increases.
- It sheds light on the phenomenon of reciprocal altruism among free-ranging fish.

Explanation

Passage Description

The passage discusses the recognition of individuals by laboratory fish and questions whether this behavior is shared by fish in the wild.

Question Explanation

The passage states that the experiments forced the laboratory fish into “prolonged interaction between individuals” that would not have occurred in the wild. Moreover, it suggests that this interaction eliminated “factors that in nature would . . . prevent the learning of individual identities.” This points to **Choice 3** as the correct answer choice. Of the other choices, the passage implies that the laboratory experiments were *not* well designed to replicate the fish’s natural habitats (Choice 1); it also suggests that individual recognition decreases rather than increases as populations grow (Choice 4). Since the experiments proved little about individual recognition in free-ranging fish, conclusions about the relative advantages of that skill cannot be drawn (Choice 2), nor is light shed on phenomena that require that skill (Choice 5).

Difficulty level: 3 (1 = easy, 5 = hard)

Section 4 : Quant

Q's-01

Each of the 120 people in a group donated one of three different amounts to charity. Of the people in the group, $\frac{2}{3}$ donated \$10.00 each, $\frac{1}{4}$ donated \$15.00 each, and the rest donated \$25.00 each.

Quantity A

The average (arithmetic mean) amount donated per person in the group

Quantity B

\$12.50

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

According to the information given, $\left(\frac{2}{3}\right)(120)$, or 80 people, donated \$10 each; $\left(\frac{1}{4}\right)(120)$, or 30 people, donated \$15 each; and the remaining 10 people donated \$25 each.

Thus Quantity A, the average amount donated per person in the group, is

$$\frac{(80)(\$10) + (30)(\$15) + (10)(\$25)}{120}$$

which is equal to \$12.50. Since Quantity B is also \$12.50, the correct answer is **Choice 3**, that is, **The two quantities are equal**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 2 (1 = easy, 5 = hard)

Q's-02

$$-|x| = |x|$$

Quantity A

x

Quantity B

0

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

If $|x| = c$, then the given equation, $-|x| = |x|$, can be rewritten as $-c = c$. Note that the only number c for which $-c = c$ is the number 0.

So from the equation $-|x| = |x|$, it follows that $|x| = 0$, and thus that $x = 0$. Quantities A and B are both equal to 0, and the correct answer is **Choice 3**, that is, **The two quantities are equal**.

This explanation uses the following strategy.

Strategy 13: Determine Whether a Conclusion Follows from the Information Given

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-03

Quantity A

The greatest possible value of $\frac{2}{x-y}$, where
 $6 \leq x \leq 8$ and $2 \leq y \leq 5$

Quantity B

$\frac{2}{3}$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

First note that $x - y$ is positive for all values of x and y such that $6 \leq x \leq 8$ and $2 \leq y \leq 5$. Therefore, $\frac{2}{x-y}$ is positive, and the value of $\frac{2}{x-y}$ is greatest when the value of $x - y$ is least. The value of $x - y$ is least when x has its least possible value and y has its greatest possible value, that is, when $x = 6$ and $y = 5$. Thus the least possible value of $x - y$ is $6 - 5$, or 1, and so the greatest possible value of $\frac{2}{x-y}$ is $\frac{2}{1}$, or 2. Thus Quantity A, 2, is greater than Quantity B, $\frac{2}{3}$. The correct answer is **Choice 1**, that is, **Quantity A is greater**.

This explanation uses the following strategy.

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-04

The function f is defined by $f(x) = x(x^2 - 4)$ for all numbers x .

Quantity A

The number of points at which the graph of $y = f(x)$ intersects the x -axis in the xy -plane

Quantity B

3

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

Recall that for all points at which the graph of the function $y = f(x)$ intersects the x -axis, the x -coordinates satisfy the equation $f(x) = 0$. Since $f(x) = x(x^2 - 4)$ for all numbers x , it follows that Quantity A, the number of points at which the graph of $y = x(x^2 - 4)$ intersects the x -axis, is equal to the number of values of x that satisfy the equation $x(x^2 - 4) = 0$. Factoring the left-hand side of the equation gives $x(x + 2)(x - 2) = 0$. Thus the equation $x(x^2 - 4) = 0$ has 3 solutions: $x = 0$, $x = -2$, and $x = 2$. So Quantity A is equal to 3. Since Quantity B is also equal to 3, the correct answer is **Choice 3**, that is, **The two quantities are equal**.

This explanation uses the following strategies.

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-05

$$0 < r < v < x < y < z$$

Quantity A

The average (arithmetic mean)
of the 4 numbers r , v , y , and z

Quantity B

The average (arithmetic mean)
of the 5 numbers r , v , x , y , and z

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

Quantity A is the average of the 4 numbers r , v , y , and z . Quantity B is the average of 5 numbers, the 4 numbers that were averaged in Quantity A, and the number x . To get some idea of the relationship between the two averages, try picking some easy numbers and calculating the two averages for those numbers.

Case 1: Try some evenly spaced numbers. Let r , v , x , y , and z be 2, 4, 6, 8, and 10, respectively. Quantity A, the average of 2, 4, 8, and 10, is 6; and Quantity B, the average of 2, 4, 6, 8, and 10, is also 6. In this case, Quantity A is equal to Quantity B.

Case 2: Try using the same values for r , v , y , and z as in case 1, but use a different value of x , say $x = 5$. Quantity A is still 6, but Quantity B, which is now equal to the average of 2, 4, 5, 8, and 10, is 5.8. In this case, Quantity A is greater than Quantity B.

Case 3: Try using the same values for r , v , y , and z as in cases 1 and 2, but now use a value of x that is greater than 6 but still less than 8, like $x = 7$. Quantity A is still 6, but Quantity B, which is now equal to the average of 2, 4, 7, 8, and 10, is 6.2. In this case, Quantity A is less than Quantity B.

In case 1, Quantity A is equal to Quantity B; in case 2, Quantity A is greater than Quantity B; and in case 3, Quantity A is less than Quantity B. It follows that the correct answer is **Choice 4**, that is, **The relationship cannot be determined from the information given**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 10: Trial and Error

Strategy 13: Determine Whether a Conclusion Follows from the Information Given

Q's-06

The volume of a right circular cylinder is $2,000\pi$, and its height is 16 times its radius.

Quantity A

The radius of the cylinder

Quantity B

5

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

The formula for the volume V of a right circular cylinder with radius r and height h is $V = \pi r^2 h$. You can substitute the given information $V = 2,000\pi$ and $h = 16r$ into the formula and solve the resulting equation for r as follows.

$$\begin{aligned}2,000\pi &= (\pi r^2)(16r) \\125 &= r^3 \\r &= 5\end{aligned}$$

So Quantity A, the radius of the cylinder, is 5. Since Quantity B is also equal to 5, the correct answer is **Choice 3**, that is, **The two quantities are equal**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-07

$$C_1, C_2, C_3, \dots, C_j, \dots$$

The sequence shown is defined by $C_1 = 5$ and $C_{j+1} = \frac{1}{5}C_j$ for each positive integer j .

Quantity A

C_{10}

Quantity B

$(5^{15})C_{25}$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Explanation

To investigate the pattern of the terms of the sequence, you can use the definition of the sequence to write out a few terms.

$$C_1 = 5, C_2 = 1, C_3 = \frac{1}{5}, C_4 = \left(\frac{1}{5}\right)^2, C_5 = \left(\frac{1}{5}\right)^3, \dots$$

This pattern and the equation $C_{j+1} = \frac{1}{5}C_j$ show that a general formula for the n th term of the sequence is given by $C_n = \left(\frac{1}{5}\right)^{n-2}$.

So Quantity A, C_{10} , is equal to $\left(\frac{1}{5}\right)^8$, and Quantity B, $(5^{15})C_{25}$, is equal to $(5^{15})\left(\frac{1}{5}\right)^{23}$, which is also equal to $\left(\frac{1}{5}\right)^8$. The correct answer is **Choice 3**, that is, **The two quantities are equal**.

This explanation uses the following strategies.

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 7: Find a Pattern

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-08

A flat rectangular tile has a length that is between 4 inches and 6 inches and a width that is between 3 inches and 6 inches. Which of the following could be the value of the area, in square feet, of the top surface of the tile? (1 foot = 12 inches)

Indicate all such values.

$\frac{1}{8}$ $\frac{1}{6}$ $\frac{1}{2}$ $\frac{4}{3}$

Explanation

From the information about the length and width of the tile, you can determine the upper and lower bounds of the possible areas of the tile. Any value of the area must be between these two values. Converting inches to feet, the greatest possible area, in square feet, is $\left(\frac{6}{12}\right)\left(\frac{6}{12}\right)$, or $\left(\frac{1}{4}\right)$, and the least possible area is $\left(\frac{4}{12}\right)\left(\frac{3}{12}\right)$, or $\left(\frac{1}{12}\right)$. Of the answer choices, $\frac{1}{8}$ and $\frac{1}{6}$ are between $\frac{1}{12}$ and $\frac{1}{4}$. The correct answer consists of **Choices 1 and 2**, that is, $\frac{1}{8}$ and $\frac{1}{6}$.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 11: Divide into Cases

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-09

An investor placed a total of \$6,400 in two accounts for one year. One of the accounts earned simple annual interest at a rate of 5 percent, and the other earned simple annual interest at a rate of 3 percent. The investor made no deposits or withdrawals from the accounts. If each account earned the same amount of interest after one year, what was the total amount of interest earned from both accounts?

- \$128
- \$144
- \$240
- \$256
- \$512

Explanation

Let x and y be the amounts, in dollars, invested at the simple annual interest rates of 5% and 3%, respectively. Then $x + y = 6,400$, or $y = 6,400 - x$. The amounts of interest earned by the accounts after one year are $0.05x$ dollars and $0.03(6,400 - x)$ dollars, respectively. Since you are given that each account earned the same amount of interest, you can set the expressions equal and solve the resulting equation for x as follows.

$$\begin{aligned}0.05x &= 0.03(6,400 - x) \\0.08x &= 192 \\x &= 2,400\end{aligned}$$

So \$2,400 was invested at the simple annual interest rate of 5%, earning $(0.05)(\$2,400)$, or \$120, after one year. Since both accounts earned the same interest after one year, the total interest earned from both accounts was \$240. The correct answer is **Choice 3**, that is, **\$240**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-10

If 2, 4, 6, and 9 are the digits of two 2-digit integers, what is the least possible positive difference between the integers?

- 28
- 27
- 17
- 13
- 9

Explanation

Case 1: The lesser of the two 2-digit integers has a 2 in the tens place.

In this case, to make the difference between the two 2-digit integers as small as possible, the tens digit of the greater two-digit integer must be 4. There are two possible such pairs: the 2-digit integers 26 and 49, and the 2-digit integers 29 and 46. The difference between 26 and 49 is 23, and the difference between 29 and 46 is 17. The lesser of these two differences is 17.

Case 2: The lesser of the two 2-digit integers has a 4 in the tens place.

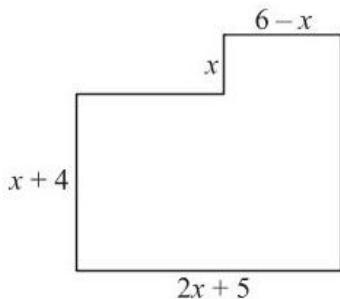
In this case, to make the difference between the two 2-digit integers as small as possible, the tens digit of the greater 2-digit integer must be 6. There are two possible such pairs: the 2-digit integers 49 and 62, and the 2-digit integers 42 and 69. The difference between 49 and 62 is 13, and the difference between 42 and 69 is 27. The lesser of these two differences is 13.

Case 3: The lesser of the two 2-digit integers has a 6 in the tens place.

In this case, to make the difference between the two 2-digit integers as small as possible, the tens digit of the 2-digit integers must be 9. There are two possible such pairs: the 2-digit integers 62 and 94, and the 2-digit integers 64 and 92. The difference between 62 and 94 is 32, and the difference between 64 and 92 is 28. The lesser of these two differences is 28.

The least possible difference for all the cases is 13. The correct answer is **Choice 4**, that is, **13**.

Q's-11



In the figure, all intersecting line segments meet at right angles. Which of the following represents the perimeter of the figure in terms of x ?

$3x + 15$

$4x + 9$

$5x + 19$

$6x + 16$

$8x + 18$

Explanation

The perimeter of the figure is the sum of the lengths of the six sides. In the figure, the lengths of four of the six sides are labeled in terms of x , and the lengths of the other two sides are unlabeled. To find the perimeter, you can try to determine the lengths of the unlabeled sides. From the figure, you can see that (1) the length of the longest vertical side, which is unlabeled, is equal to the sum of the lengths of the two shorter vertical sides, and (2) the length of the longest horizontal side is equal to the sum of the lengths of the two shorter horizontal sides, one of which is unlabeled.

Thus the unlabeled vertical length is $x + (x + 4)$, which is equal to $2x + 4$, and the unlabeled horizontal length is $(2x + 5) - (6 - x)$, which is equal to $3x - 1$.

Therefore the perimeter of the figure is $(x + 4) + (3x - 1) + x + (6 - x) + (2x + 4) + (2x + 5)$, which is equal to $8x + 18$. The correct answer is **Choice 5**, that is, $8x + 18$.

This explanation uses the following strategies.

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-12

A certain experiment has only three possible outcomes. The probabilities of the outcomes are p , r , and s . If $r = 1 - 3p$, what is s in terms of p ?

- p
- $2p$
- $3p$
- $1 - p$
- $1 - 2p$

Explanation

If an experiment has exactly three possible outcomes, then the probabilities of the three outcomes must add up to 1. So $p + r + s = 1$. Since you are given that $r = 1 - 3p$, you can substitute $1 - 3p$ for r in the equation $p + r + s = 1$ to get $p + 1 - 3p + s = 1$, or $s = 2p$. The correct answer is **Choice 2**, that is, $2p$.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-13

When the positive integer d is divided by 12, the remainder is 5. What is the remainder when d^2 is divided by 8?

- 1
- 3
- 5
- 6
- 7

Explanation

For this type of question, you are asked to select only one of the answer choices. Therefore, you can assume that any value of d that satisfies the conditions given in the question will give the same answer. So try to find a positive integer d such that when d is divided by 12, the remainder is 5. Then calculate the value of d^2 and determine what the remainder is when d^2 is divided by 8.

If you think about it a bit, you will realize that one possible value of d is 17. If $d = 17$, then $d^2 = 289$. When 289 is divided by 8, the remainder is 1. The correct answer is **Choice 1**, that is, **1**.

This explanation uses the following strategy.

Strategy 10: Trial and Error

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-14

Questions 14 to 16 are based on the following data.

Percent Distribution of Primary Modes of Transportation Used by Commuters in Country S in June 2016

Mode of Transportation	Percent of Commuters
Drive alone	35%
Bus	25%
Train	20%
Bicycle or motorcycle	10%
Car pool	4%
Other	6%

Total number of commuters in Country S in June 2016: 8 million

If 75 percent of the commuters were local commuters and if 20 percent of the local commuters used buses as their primary mode of transportation, what percent of all commuters who used buses as their primary mode of transportation were local commuters?

- 6%
- 15%
- 30%
- 60%
- 75%

Explanation

Since 75% of the commuters were local commuters, and since 20% of the local commuters used buses as their primary mode of transportation, it follows that $(0.75)(0.2)$, or 15%, of all commuters were local commuters that used buses.

You are given in the table that 25% of all commuters used buses as their primary mode of transportation. Therefore, of all commuters who used buses as their primary mode of transportation, the percent who were local commuters was $\frac{15\%}{25\%} = 0.6$, or 60%. Thus the correct answer is **Choice 4**, that is, **60%**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-15

Questions 14 to 16 are based on the following data.

Percent Distribution of Primary Modes of Transportation Used by Commuters in Country S in June 2016

Mode of Transportation	Percent of Commuters
Drive alone	35%
Bus	25%
Train	20%
Bicycle or motorcycle	10%
Car pool	4%
Other	6%

Total number of commuters in Country S in June 2016: 8 million

For commuters who used car pools as their primary mode of transportation, the average (arithmetic mean) number of commuters per car pool vehicle was 2.5. Which of the following is closest to the total number of car pool vehicles for these commuters?

- 0.02 million
- 0.13 million
- 0.32 million
- 0.80 million
- 1.20 million

Explanation

The number of commuters who used car pools as their primary mode of transportation was 4% of the total number of commuters. Hence the number who used car pools was equal to $(0.04)(8,000,000)$, or 320,000. Since the average number of commuters per car pool vehicle was 2.5, it follows that the total number of car pool vehicles for these commuters was $\frac{320,000}{2.5}$, or 128,000.

Note that $128,000 = 0.128$ million, so among the answer choices given, the closest choice is 0.13 million. The correct answer is **Choice 2**, that is, **0.13 million**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 9: Estimate

Difficulty level: 3 (1 = easy, 5 = hard)

Q's-16

Questions 14 to 16 are based on the following data.

Percent Distribution of Primary Modes of Transportation Used by Commuters in Country *S* in June 2016

Mode of Transportation	Percent of Commuters
Drive alone	35%
Bus	25%
Train	20%
Bicycle or motorcycle	10%
Car pool	4%
Other	6%

Total number of commuters in Country *S* in June 2016: 8 million

From June 2016 to December 2016, the total number of commuters increased by x percent while the percent of commuters who used trains as their primary mode of transportation remained the same. If the number of commuters who used trains as their primary mode of transportation increased by 16,000 from June to December, what is the value of x ?

- 1
- 2
- 3
- 4
- 5

Explanation

One way to approach this question is to use the given relationships to set up an equation involving the numbers of commuters who used trains as their primary mode of transportation in the two given months. In June 2016, the number who used trains was 20% of all 8,000,000 commuters, or 1,600,000. Since this number increased by 16,000 from June to December, the number who used trains in December was 1,616,000.

You are also given that the total number of commuters increased by x percent from June to December, so the total number of commuters in December was equal to $\left(1 + \frac{x}{100}\right)(8,000,000)$. Since the percent of commuters who used trains remained the same, it follows that 20% of the total number of commuters in December, or $\left(1 + \frac{x}{100}\right)(8,000,000)(0.2)$, gives the number who used trains in December. The following equation expresses this number in two ways.

$$\left(1 + \frac{x}{100}\right)(8,000,000)(0.2) = 1,616,000$$

The equation can be simplified to $\left(1 + \frac{x}{100}\right) = 1.01$, so that $x = 1$. The correct answer is **Choice 1**, that is, **1**.

Q's-17

The sale price of a certain radio is 25 percent less than the list price and 40 percent greater than the wholesale price of the radio. If the wholesale price of the radio is \$30, what is the list price of the radio?

- \$52
- \$53
- \$54
- \$55
- \$56

Explanation

If the sale price of the radio is 40% greater than the wholesale price, then the sale price is $(1.4)(\$30)$, or \$42. Given that this price is 25% less than the list price, you can see that \$42 is 75%, or $\frac{3}{4}$, of the list price. So the list price is $\frac{4}{3}(\$42)$, or \$56. The correct answer is **Choice 5**, that is, **\$56**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 8: Search for a Mathematical Relationship

Difficulty level: 4 (1 = easy, 5 = hard)

Q's-18

A list consists of three different positive integers whose sum is 10.

Which of the following statements individually provide(s) sufficient additional information to determine the value of the greatest integer in the list?

Indicate all such statements.

- The median of the integers in the list is 3.
- The range of the integers in the list is 5.
- The sum of the greatest integer and the least integer in the list is 7.

Explanation

Let x , y , and z be the three positive integers in the list, where $x < y < z$. You are given that $x + y + z = 10$ and asked to identify what further information is sufficient to determine the value of z , the greatest integer in the list.

By the definition of median, Choice 1 means that $y = 3$. This tells you that $x + z = 7$; however, knowing the relationship $x + z = 7$ is not sufficient to determine the value of z . For example, it could be that $x = 1$ and $z = 6$, or that $x = 2$ and $z = 5$.

By the definition of range, Choice 2 means that $z - x = 5$, or $z = x + 5$. Then $x + y + z = 10$ can be rewritten as $x + y + (x + 5) = 10$, or $2x + y = 5$. Since x has to be at least 1 and $y > x$, you can see that $x = 1$ and $y = 3$ are the only pair of integers that satisfy the equation $2x + y = 5$. Therefore, you can determine that the value of z is 6, and so Choice 2 does provide sufficient information.

Choice 3 means that $x + z = 7$, which, as explained for Choice 1, is not sufficient to determine the value of z .

The correct answer consists of **Choice 2**, that is, **The range of the integers in the list is 5**.

This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Strategy 13: Determine Whether a Conclusion Follows from the Information Given

Strategy 14: Determine What Additional Information Is Sufficient to Solve a Problem

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-19

A group of n college students bought three identical round cakes to share. They divided the first cake into equal-sized pieces, one piece for each of them. They did the same with the second cake. After 3 of the students decided they did not want any more cake, the remaining students divided the third cake into equal-sized pieces, one piece for each of them. If Silvia received 1 piece from each of the three cakes, then, in terms of n , the amount of cake that she received was the same as what fraction of 1 cake?

- $\frac{n+2}{n(n-3)}$ $\frac{2n-3}{n(n-3)}$ $\frac{3n-3}{n(n-3)}$ $\frac{3n-6}{n(n-3)}$ $\frac{3n-3}{2n(n-3)}$

Explanation

Since the first cake is divided into n pieces, the fraction of 1 cake that each piece represents is $\frac{1}{n}$. Similarly, for the second cake the fraction is $\frac{1}{n}$. For the third cake, the fraction of 1 cake that each piece represents is $\frac{1}{n-3}$. Thus the fraction of 1 cake that Silvia's three pieces represents is

$$\frac{1}{n} + \frac{1}{n} + \frac{1}{n-3} = \frac{(n-3) + (n-3) + n}{n(n-3)} = \frac{3n-6}{n(n-3)}$$

The correct answer is **Choice 4**, that is, $\frac{3n-6}{n(n-3)}$.

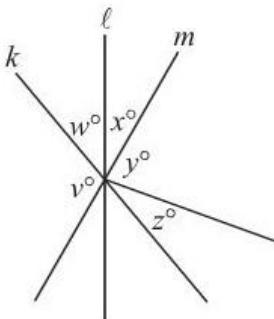
This explanation uses the following strategies.

Strategy 1: Translate from Words to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 5 (1 = easy, 5 = hard)

Q's-20



In the figure, lines k , ℓ , and m intersect at a single point, which is the vertex of all the angles shown. If $x = z$, $y = 2w$, and $v = 110$, what is the ratio of x to w ?

Give your answer as a fraction.

$$\frac{x}{w} = \frac{\boxed{3}}{\boxed{4}}$$

Explanation

From the figure, you can see that $w + x + y + z = 180$. Also, $v = y + z$, since opposite angles have equal measure. Using the three given relationships, $x = z$, $y = 2w$, and $v = 110$, you can express the variables w and y in terms of x . The equation $v = y + z$ becomes $110 = y + x$, or $y = 110 - x$, and together with $y = 2w$, it follows that $w = \frac{110 - x}{2}$. Now you can rewrite the equation $w + x + y + z = 180$ in terms of x , and solve the rewritten equation for x as follows.

$$\begin{aligned}\frac{110 - x}{2} + x + 110 - x + x &= 180 \\ 110 - x + 2x + 220 &= 360 \\ x &= 30\end{aligned}$$

Then $w = \frac{110 - x}{2} = 40$, and the ratio of x to w can be expressed as $\frac{x}{w} = \frac{3}{4}$. The correct answer is $\frac{3}{4}$.

This explanation uses the following strategies.

Strategy 4: Translate from a Figure to an Arithmetic or Algebraic Representation

Strategy 5: Simplify an Arithmetic or Algebraic Representation

Difficulty level: 5 (1 = easy, 5 = hard)

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