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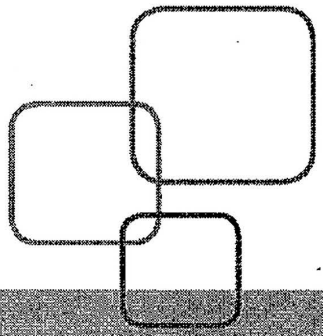

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NEXT-GENERATION

Reading

Sample Questions

The College Board

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- Information and Ideas (reading closely, determining central ideas and themes, summarizing, understanding relationships)
- Rhetoric (analyzing word choice rhetorically, analyzing text structure, analyzing point of view, analyzing purpose, analyzing arguments)
- Synthesis (analyzing multiple texts)
- Vocabulary

00716-019

Sample Questions

Directions for questions 1-18

Read the passage(s) below and answer the question based on what is stated or implied in the passage(s) and in any introductory material that may be provided.

In this passage, an amateur theater group called the Laurel Players is putting on its first production.

(1) The Players, coming out of their various kitchen doors and hesitating for a minute to button their coats or pull on their gloves, would see a landscape in which only a few very old, weathered houses seemed to belong; it made their own homes look as weightless and impermanent, as foolishly misplaced as a great many bright new toys that had been left outdoors overnight and rained on. **(2)** Their automobiles didn't look right either—unnecessarily wide and gleaming in the colors of candy and ice cream, seeming to wince at each splatter of mud, they crawled apologetically down the broken roads that led from all directions to the deep, level slab of Route Twelve. **(3)** Once there the cars seemed able to relax in an environment all their own, a long bright valley of colored plastic and plate glass and stainless steel—KING KONE, MOBILGAS, SHOPORAMA, EAT—but eventually they had to turn off, one by one, and make their way up the winding country road that led to the central high school; they had to pull up and stop in the quiet parking lot outside the high-school auditorium.

(**4**) "Hi!" the Players would shyly call to one another.

(5) "Hi! . . ." **(6)** "Hi! . . ." **(7)** And they'd go reluctantly inside.

(8) Clumping their heavy galoshes around the stage, blotting at their noses with Kleenex and frowning at the unsteady print of their scripts, they would disarm each other at last with peals of forgiving laughter, and they would agree, over and over, that there was plenty of time to smooth the thing out. **(9)** But there wasn't plenty of time, and they all knew it, and a doubling and redoubling of their rehearsal schedule seemed only to make matters worse. **(10)** Long after the time had come for what the director called "really getting this thing off the ground; really making it happen," it remained a static, shapeless, inhumanly heavy weight; time and time again they read the promise of failure in each other's eyes, in the apologetic nods and smiles of their parting and the spastic haste with which they broke for their cars and drove home to whatever older, less explicit promises of failure might lie in wait for them there.

(11) And now tonight, with twenty-four hours to go, they had somehow managed to bring it off. **(12)** Giddy in the unfamiliar feel of make-up and costumes on this first warm evening of the year, they had forgotten to be afraid: they had let the movement of the play come and carry them and break like a wave; and maybe it sounded corny (and what if it did?) but they had all put their hearts into their work. **(13)** Could anyone ever ask for more than that?

From Richard Yates, *Revolutionary Road*. ©1989 by Richard Yates. Originally published in 1961.

1. The contrasts the narrator draws in sentences 1 and 2 between the Players' homes and the houses in the "landscape" and between the Players' automobiles and the "roads" are most likely meant to suggest that the Players' homes and automobiles are
   A. old and neglected
   B. modern and alien
   C. small but expensive
   D. grand but unappreciated

2. Based on the passage, which of the following most accurately characterizes the claim that "there was plenty of time to smooth the thing out" (sentence 8)?
   A. A comforting falsehood that the Players know to be untrue
   B. An outright lie that the director persuades the Players to accept
   C. An optimistic conclusion reached by outside observers watching an early rehearsal
   D. A realistic appraisal offered by the director after careful analysis of the play's shortcomings

3. The descriptive language in sentence 10 is mainly intended to reinforce the passage's depiction of the Players'
   A. growing resentment of the director's leadership
   B. increasing reluctance to work as hard as they have been
   C. lingering doubts about their fellow cast members
   D. persistent mood of despair regarding the play

4. The narrator most strongly suggests that which of the following resulted in the transformation described in the last paragraph?
   A. The change in time of day during which rehearsals were being held
   B. The greater frequency with which rehearsals were being scheduled
   C. The shift in the director's style from strict to more forgiving
   D. The break in routine occurring the day before the first performance

Passage 1

Green Bank, West Virginia, is a tech-savvy teenager's nightmare. In this tiny town in Pocahontas County—population 143—wireless signals are illegal. No cell phones. No WiFi. No radio. No Bluetooth. No electronic transmitters at all. You're not even allowed to cozy up to an electric blanket.

The remote town is smack in the center of the National Radio Quiet Zone, a 13,000 square mile stretch of land designated by the Federal Communications Commission to protect two government radio telescopes from human-made interference. The rules are most strict in Green Bank. So strict that a police officer roves the streets listening for forbidden wireless signals.

It's necessary, though. The town is home to the Green Bank Telescope, the largest steerable radio telescope in the world—and arguably our most powerful link to the cosmos. Scientists there listen to radio energy that has journeyed light years, unlocking secrets about how the stars and galaxies formed. A rogue radio signal could prevent potential discoveries, discoveries that could answer big questions about how the universe ticks.

Adapted from Lucas Reilly, "The West Virginia Town Where Wireless Signals Are Illegal." ©2013 by Mental Floss, Inc.

Passage 2

Lawn mowers seem to have little in common with astronomy, but they are keeping astronomers at the National Radio Astronomical Observatory up at night. A new type of robotic lawn mower has been proposed that uses beacons to train the lawn mower to stay within property lines. The beacons, placed around the yard, transmit at the same wavelength as interstellar molecules astronomers study to understand how stars form. Humans wouldn't notice the tiny amount of energy given off by the beacons, but the Green Bank Telescope—the size of a football stadium—is so sensitive it can detect the energy given off by a snowflake as it melts. By simply mowing the lawn, a homeowner runs the risk of interfering with one of our greatest tools for studying the universe.

The manufacturer of one "lawnbot" requested a waiver to operate within the National Radio Quiet Zone. Astronomers countered with the suggestion that the beacons be reprogrammed to transmit at another wavelength not emitted by interstellar molecules. Alternately, astronomers want global positioning system (GPS) devices added to each lawnbot to prevent them from operating within the Quiet Zone.

5. The main purpose of the last paragraph of Passage 1 is to offer

   A. criticism
   B. justification
   C. exemplification
   D. comparison

6. Which conclusion can reasonably be drawn about the status of the "lawnbot" issue at the time of the writing of Passage 2?

   A. The manufacturer has received a waiver to operate within the National Radio Quiet Zone.
   B. The manufacturer has changed the wavelength at which the lawnbot's beacons transmit.
   C. Astronomers have succeeded in getting GPS devices added to each lawnbot.
   D. The manufacturer and astronomers have yet to resolve their conflict.

7. Which choice best describes the relationship between the two passages?

   A. Passage 1 mainly discusses the National Radio Quiet Zone in general, while Passage 2 mainly discusses a particular threat to the zone's integrity.
   B. Passage 1 focuses on Green Bank, West Virginia, while Passage 2 focuses on the National Radio Quiet Zone surrounding the town.
   C. Passage 1 evaluates drawbacks of the National Radio Quiet Zone, while Passage 2 evaluates benefits of the zone.
   D. Passage 1 offers praise for astronomers, while Passage 2 offers criticism of astronomers.

8. Given the evidence in the passages, with which statement would the authors of both passages most likely agree?

   A. Radio telescopes could be used to measure snowfall amounts.
   B. The Green Bank Telescope can detect extremely small amounts of energy.
   C. Increased sales of robotic lawn mowers may require the creation of more radio quiet zones.
   D. The lack of modern technology has made people move away from Pocahontas County.

As soon as I saw the Manhattan map, I wanted to draw it. I should be able to draw the place where I lived. So I asked Mom for tracing paper and she got it for me and I brought it into my fort and I pointed the light right down on the first map in the Hagstrom Atlas—downtown, where Wall Street was and the stock market worked. The streets were crazy down there; they didn't have any kind of streets and avenues; they just had names and they looked like a game of Pick-Up Sticks. But before I could even worry about the streets, I had to get the land right. Manhattan was actually built on land. Sometimes when they were digging up the streets you saw it down there—real dirt! And the land had a certain curve to it at the bottom of the island, like a dinosaur head, bumpy on the right and straight on the left, a swooping majestic bottom.

From Ned Vizzini, *It's Kind of a Funny Story*.

9. In the passage, the use of "crazy," "dinosaur head," "bumpy," "straight," and "swooping" serve mainly to emphasize the

   A. narrator's serious approach to mapmaking
   B. narrator's frustration with drawing
   C. irregularity of downtown Manhattan
   D. ways in which a landscape can change over time

The life of Edith Wharton is not an inspiriting rags-to-riches saga, nor is it a cautionary tale of riches to rags—riches to riches, rather. Born Edith Newbold Jones, in January of 1862, into one of the leading families of New York, the author maintained multiple establishments and travelled in the highest style, with a host of servants, augmenting her several inheritances by writing best-selling fiction. In the Depression year of 1936, when two thousand dollars was a good annual income, her writing earned her a hundred and thirty thousand, much of it from plays adapted from her works. Yet her well-padded, auspiciously sponsored life was not an easy one. The aristocratic social set into which she was born expected its women to be ornamental, well-sheltered, intellectually idle agents of their interwoven clans, whereas Edith was an awkward, red-haired bookworm and dreamer, teased by her two older brothers about her big hands and feet and out of sympathy with her intensely conventional mother, née Lucretia Stevens Rhinelander—a mother-daughter disharmony that rankled in Edith's fiction to the end.

Adapted from John Updike, "The Changeling," a review of the biography *Edith Wharton* by Hermione Lee.

10. Which choice best describes the overall structure of the passage?

    A. Biographical incidents are recounted chronologically.
    B. An author's life is connected to various themes in her work.
    C. The works of two authors are compared and contrasted.
    D. A list of advantages is followed by a list of disadvantages.

Bones found in South America reveal a bizarre new dinosaur. Based on an ancestry that links it to *Tyrannosaurus rex*, this reptile should have been a meat eater. Instead, it preferred plants. Researchers described the new species in *Nature*.

Its genus name—*Chilesaurus*—reflects that it was found in what's now Chile. The team that discovered the fossils gave it a species name of *diegosuarezi* to honor Diego Suarez. While just 7 years old, Diego found the first dinosaur bones in the same general area of Chile. It's a place known as the Toqui Formation.

C. diegosuarezi roamed South America 150 million years ago. It measured about 3 meters (roughly 10 feet) from head to tail. Its sturdy back legs, thin body and short, stout arms made it look a bit like *T. rex*. But it also had a long neck, small head and a mouth full of leaf-shaped teeth. Those gave it a *Brontosaurus*-like appearance. And like the *Brontosaurus*, it would have eaten plants, making it an herbivore.

Adapted from Ashley Yeager, "'Frankenstein' Dino Showed a Mashup of Traits." ©2015 by Society for Science & the Public.

11. When the author writes that *C. diegosuarezi* "should have been a meat eater," she most likely means that the species

    A. would have been healthier if it had eaten meat
    B. would have grown even larger if it had eaten meat
    C. had the head, neck, and teeth of a meat eater
    D. had body features similar to those of its meat-eating relative

The first album that singer Leehom Wang bought as an adolescent was the Beastie Boys' *Licensed to Ill*; his first concert was Heart, at the War Memorial in Rochester, New York. As for Chinese pop music, though, Wang says he recalls hearing it only once as a youngster—when his singer uncle, Li Jian-fu, paid a visit in the 1980s and played his nationalistic-patriotic hit "Descendants of the Dragon" in Wang's living room.

Wang didn't know it then, but he would go on to remix "Descendants of the Dragon" for a new generation, adding new lyrics about his parents' own immigrant experience. Over the last decade, Wang's songs have frequently emphasized his dedication to and pride in his Chinese heritage—themes that reflect his personal journey and have a powerful commercial appeal, particularly on the mainland.

At the same time, Wang has demonstrated a strong interest in incorporating traditional Chinese music and instruments into his hip-hop and R&B-based tunes.

Adapted from Julie Makinen, "Can Leehom Wang Transcend China and America's Pop Cultures?" ©2014 by Los Angeles Times.

12. The second paragraph marks a shift in the passage from a discussion of Leehom Wang's
    A. family members to Leehom Wang himself
    B. early musical influences to his later musical career
    C. interest in the United States to his interest in China
    D. fondness for pop music to his fondness for traditional music

Technology has scrambled the lines between public and private. Cellphones make our most intimate conversations available to anyone within earshot, while headphones create zones of pure solitude even in the midst of the liveliest crowd. Smartphones and tablets allow us to spend time with art without ever leaving the office, while sophisticated new robots enable people who are house-bound to participate in live events remotely.

Adapted from Philip Kennicott, "How to Act in Public Spaces in a Digital Age." ©2015 by the Washington Post.

13. Which of the following would be most similar to the examples the author provides in the passage?
    A. A person's confidential information is compromised because that person left some papers in a public place.
    B. A person enjoys numerous television programs, so that person buys a sophisticated new television on which to watch them.
    C. A person's unfiltered first reaction to a major event becomes widely known because that person posts it online.
    D. A person wants to keep a record of his or her private thoughts, so that person secretly starts keeping a daily journal.

Construction management is ideal for someone who has a general interest in building and design. Working as a construction manager affords the chance to learn a construction project from the planning stage with architects and engineers, to the budgeting stage with cost estimators, to the production stage with laborers. And that's just a small taste of the job's duties: Construction managers also obtain work permits, hire contractors, troubleshoot emergencies, schedule walkthroughs and keep clients informed on work timetables and progress.

Adapted from "Best Construction Jobs: Construction Manager." ©2015 by U.S. News & World Report LP.

14. The passage most strongly emphasizes which aspect of the job of construction management?
    A. The variety of its responsibilities
    B. The educational background it requires
    C. The kind of person for whom it is suitable
    D. The amount of stress it inflicts

In this passage, "serialization" refers to the publication of installments, or parts, of an ongoing story in a newspaper or magazine.

The Pickwick Papers (1836-7) wasn't the original serialized novel—the format had existed for at least a century prior—but it was the work that truly popularized the form. The first installment had a print order of 1,000 copies; by the time the final entry was published, circulation had reached 40,000. Buoyed by the success of *Pickwick*, Charles Dickens serialized his work for the rest of his career, and scores of other notable Victorian novelists joined the publishing craze. William Makepeace Thackeray's *Vanity Fair*, Wilkie Collins's *The Woman in White* and Arthur Conan Doyle's Sherlock Holmes stories all emerged as serials. Old and new magazines, such as *Blackwood's* and *Household Words*, competed for established and emerging voices. The constant influx of unresolved plots and elliptical section breaks stoked a fervor for fiction in Victorian England. It wasn't until book production became cheap and easy, and new mediums such as radio arose to fill leisure time, that serialization slowly shriveled away.

Adapted from Hillary Kelly, "Bring Back the Serialized Novel." ©2015 by the Washington Post.

15. Which of the following does the author offer as evidence to support the point that, for a time, serialization was highly successful?

A. The change in circulation for *The Pickwick Papers*
B. The use of unresolved plots and elliptical section breaks
C. The decrease in cost of book production
D. The development of new mediums, such as radio

The neighborhood of Harlem in the twenties offered up a cultural richness that made everything seem possible. Jervis Anderson, writing in the *New Yorker* in 1981, noted, "Harlem has never been more high-spirited and engaging than it was during the nineteen-twenties. Blacks from all over America and the Caribbean were pouring in, reviving the migration that had abated toward the end of the war—word having reached them about the 'city,' in the heart of Manhattan, that blacks were making their own."

Adapted from Hilton Als, "The Sojourner." ©2015 by Condé Nast.

16. Based on the passage, Anderson puts "city" in quotation marks most likely to

A. introduce irony into his writing
B. signal a nonliteral usage
C. mark a citation of another author
D. indicate the inclusion of dialogue

Certainly, scholars are driven toward a "regression to the safe," as science historian Alice Dreger puts it, though that is not, as she implies, particularly new in the Internet age. Since Galileo's time, thinkers have relied on the patronage of others to fund their work, and that patronage—be it from government, business interests or individuals—generally extracts a price. In Galileo's case, that meant softening his position on the Copernican theory under pressure from the pope. In the case of science today, despite Dreger's argument, that pressure comes less as a consequence of political correctness than of economic forces that have shifted academic and scientific institutions to a corporate model not designed to prioritize public interests. In the academy, it is money far more than ideology that rules the day.

Adapted from Ellen Ruppel Shell, "In Science, Has Evidence Given Way to Ideology?" ©2015 by the Washington Post.

17. It can reasonably be concluded from the passage that in the author's opinion, scientific research today is chiefly impaired by the

A. influence of the academic institutions with which scientists are affiliated
B. overabundance of information available to scientists in the Internet age
C. pressure on scientists to make their outcomes socially acceptable
D. operation of economic forces potentially hostile to the common good

Sherry Turkle of the Massachusetts Institute of Technology has been writing about human-technology interactions for the past three decades. She has become increasingly wary of the capacity of online spaces to fulfill us in the ways we seem to want them to. According to Turkle, part of the problem with the internet is that it encourages self-invention. "At the screen," she writes in *Alone Together* (2011), "you have a chance to write yourself into the person you want to be and to imagine others as you wish them to be, constructing them for your purposes. It's a seductive but dangerous habit of mind."

Adapted from Olivia Laing, "The Future of Loneliness."

18. The main purpose of the passage is to
    A. evaluate conflicting assessments
    B. present a sharp critique
    C. propose a necessary remedy
    D. provide background details

Directions for questions 19-20

The following sentence has a blank indicating that something has been left out. Beneath the sentence are four words or phrases. Choose the word or phrase that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

19. Deciding that none of the nominees was _____ the award, the film committee began reviewing a new group of candidates with better qualifications.
    A. known for
    B. pleased with
    C. worthy of
    D. interested in

20. Nuclear engineer Meena Mutyala argues that nuclear power is an environmentally _____ technology, operating with essentially no emissions.
    A. lavish
    B. culpable
    C. antagonistic
    D. benign

Answer Key

1. B
2. A
3. D
4. D
5. B
6. D
7. A
8. B
9. C
10. D
11. D
12. B
13. C
14. A
15. A
16. B
17. D
18. B
19. C
20. D

Rationales

1. **Choice B is the best answer.** Sentence 1 notes that in the "landscape," "only a few very old, weathered houses seemed to belong"; by contrast, the Players' houses seemed "weightless," "impermanent," and "misplaced," like "bright new toys." Sentence 2 establishes that the Players' automobiles "didn't look right either," that they appeared "unnecessarily wide and gleaming in the colors of candy and ice cream," that they seemed "to wince at each splatter of mud," and that they "crawled apologetically down the broken roads." Choice A is incorrect because the Players' homes and automobiles are neither old nor neglected; in fact, the passage indicates that the homes and automobiles are modern in relation to the "landscape" and "roads" (sentences 1-2) and that the automobiles are "gleaming" (sentence 2). Choice C is incorrect because the Players' homes and automobiles are not small; for one thing, the automobiles are "unnecessarily wide" (sentence 2). Choice D is incorrect because there is no evidence in the passage that the Players' homes and automobiles are unappreciated.

2. **Choice A is the best answer.** Sentence 9 establishes, in contrast to what is stated in sentence 8, that "there wasn't plenty of time" and that the Players "all knew it." Despite knowing better, the Players use the claim as part of the strategy described in sentence 8 to lighten the tense mood ("disarm each other," "forgiving laughter"). Choice B is incorrect because the passage suggests that the source of the claim was the Players themselves, not the director. Choice C is incorrect because no outside observers are mentioned in the passage. Choice D is incorrect because the passage suggests that the source of the claim was the Players themselves, not the director, and because the claim is false, not realistic.

3. **Choice D is the best answer.** The descriptive language of sentence 10—notably, "static," "shapeless," "inhumanly heavy weight," "promise of failure," "apologetic nods and smiles," "spastic haste," "less explicit promises of failure"—serves primarily to convey a persistent mood of despair on the part of the Players toward the play. Choice A is incorrect because there is no evidence in the passage that the Players blame the director for the problems with the play. Choice B is incorrect because the passage indicates that the Players have relatively recently undertaken "a doubling and redoubling of their rehearsal schedule" (sentence 9). Choice C is incorrect because there is no evidence in the passage that the Players blame one another for the problems with the play; instead, they share a generalized sense of failure.

4. **Choice D is the best answer.** Sentence 10 indicates that the play "remained a static, shapeless, inhumanly heavy weight" even after numerous rehearsals. "With twenty-four hours to go," however, the Players "had somehow managed to bring it off" (sentence 11). The narrator goes on to suggest that something about the break in routine near the very end of the rehearsal period was responsible. Feeling "giddy in the unfamiliar feel of make-up and costumes," the Players "had forgotten to be afraid"; instead, "they had let the movement of the play come and carry them and break like a wave" and "had all put their hearts into their work" (sentence 12). Choice A is incorrect because the passage does mention that the transformative last rehearsal took place "tonight" (sentence 11) but does not clearly indicate the time of day during which prior rehearsals were held, and it seems likely, given the intensifying schedule ("doubling and redoubling," sentence 9), that at least some prior rehearsals had taken place at night. Choice B is incorrect because sentence 9 asserts that the "doubling and redoubling" of the rehearsal schedule "seemed only to make matters worse." Choice C is incorrect because there is no evidence in the passage that the director changed his or her style.

5. **Choice B is the best answer.** The first two paragraphs of Passage 1 describe what might seem like extremely harsh restrictions on wireless transmissions: "no electronic transmitters at all," "you're not even allowed to cozy up to an electric blanket," "a police officer roves the streets listening for forbidden wireless signals." The last paragraph of Passage 1 serves mainly to offer justification: the restrictions are "necessary" because "the town is home to the Green Bank Telescope," and "a rogue radio signal could prevent potential discoveries." Choice A is incorrect because the last paragraph of Passage 1 does not take a critical tone toward the electronics restrictions in Green Bank, instead describing them as "necessary." Choices C and D are incorrect because no example is being given nor is a comparison being made; the whole passage is about Green Bank and its electronics restrictions.

6. **Choice D is the best answer.** Passage 2 indicates that the manufacturer of one "lawnbot" had "requested a waiver to operate within the National Radio Quiet Zone" and that astronomers had "countered with the suggestion that the beacons be reprogrammed" or that "global positioning system (GPS) devices" be "added to each lawnbot." However, Passage 2 offers no evidence that the two sides have come to any resolution. Choice A is incorrect because while the manufacturer of one "lawnbot" had "requested a waiver to operate within the National Radio Quiet Zone," there is no evidence in Passage 2 that the manufacturer received such a waiver. Choice B is incorrect because while astronomers had "countered with the suggestion that the beacons be reprogrammed to transmit at another wavelength," there is no evidence in Passage 2 that the manufacturer reprogrammed the lawnbots. Choice C is incorrect because while astronomers had suggested that "global positioning system (GPS) devices" be "added to each lawnbot," there is no evidence in Passage 2 that GPS devices have been installed.

7. **Choice A is the best answer.** Passage 1 mainly focuses on describing the National Radio Quiet Zone in general terms: "no electronic transmitters at all," "a 13,000 square mile stretch of land" intended to "protect two government radio telescopes from human-made interference," "a rogue radio signal could prevent potential discoveries." Passage 2 mainly focuses on describing one particular threat to the zone's integrity: the "lawnbot" that "transmit[s] at the same wavelength as interstellar molecules astronomers study to understand how stars form." Choice B is incorrect because Passage 1 is only incidentally about Green Bank (as it just happens to be "smack in the center of the National Radio Quiet Zone") and because describing the National Radio Quiet Zone in general terms is better considered the main focus of Passage 1, not Passage 2. Choice C is incorrect because the drawbacks of the National Radio Quiet Zone are not the main focus of Passage 1 (the author refers to the restriction as "necessary," for example) and because the benefits of the zone are not the main focus of Passage 2. Choice D is incorrect because neither passage focuses mainly on either praising or criticizing astronomers.

8. **Choice B is the best answer.** Passage 1 notes that the Green Bank Telescope is vulnerable to "human-made interference" and that even "a rogue radio signal could prevent potential discoveries." Passage 2 describes the telescope as "so sensitive it can detect the energy given off by a snowflake as it melts." Choice A is incorrect because only Passage 1 mentions the Green Bank Telescope being able to "detect the energy given off by a snowflake as it melts," and that passage does not suggest that such measurement would be a proper role for the telescope, which is instead designed to help astronomers "understand how stars form." Choices C and D are incorrect because there is no evidence in either passage that increased sales of robotic lawn mowers may require the creation of more radio quiet zones or that people have been moving away from Pocahontas County.

9. **Choice C is the best answer.** The narrator uses all of the listed words and phrases to convey the irregularity of downtown Manhattan: its streets are "crazy," and the land has "a certain curve to it at the bottom of the island, like a dinosaur head, bumpy on the right and straight on the left, a swooping majestic bottom." Choices A and B are incorrect because the listed words and phrases are about downtown Manhattan, not about the narrator's approach to mapmaking or attitude toward drawing. Choice D is incorrect because the passage does not describe how a landscape can change; everything presented in the passage occurs over a relatively short period of time.

10. **Choice D is the best answer.** The passage begins by listing some of the advantages Wharton enjoyed: being born into "one of the leading families of New York," maintaining "multiple establishments," traveling "in the highest style, with a host of servants," having "several inheritances," being the author of "best-selling fiction," and earning $130,000 in a Depression year. The passage concludes with a list of disadvantages Wharton labored under: women in her "social set" were expected to be "ornamental, well-sheltered, intellectually idle agents of their interwoven clans," and Wharton was "awkward," "teased" by her older brothers, and "out of sympathy with her intensely conventional mother." Choice A is incorrect because the passage does not follow a chronological structure. Choice B is incorrect because the passage conveys only one theme of Wharton's work ("mother-daughter disharmony"). Choice C is incorrect because the passage focuses on Wharton exclusively.

11. **Choice D is the best answer.** The author notes that the new dinosaur "should have been a meat eater" given that it had "an ancestry that links it to *Tyrannosaurus rex*," which, the author implies, was itself a meat eater. Like the *T. rex*, *C. diegosuarezi* had "sturdy back legs," a "thin body," and "short, stout arms" that "made it look a bit like *T. rex*." *C. diegosaurezi*, however, had other features that linked it to herbivores. Choices A and B are incorrect because there is no evidence in the passage that the author thinks *C. diegosuarezi* would have been healthier or would have grown even larger had it eaten meat. Choice C is incorrect because the author indicates that the "long neck," "small head," and "mouth full of leaf-shaped teeth" gave *C. diegosuarezi* "a *Brontosauraus*-like appearance" and that "like the *Brontosaurus*, it would have eaten plants, making it an herbivore."

12. **Choice B is the best answer.** The first paragraph focuses mainly on Leehom Wang's early musical influences: the first album he bought, the first concert he attended, and his relative lack of exposure to Chinese pop music. By contrast, the second and last paragraphs focus mainly on Wang's later musical career: his updating of "Descendants of the Dragon," the Chinese influences on the songs he has written "over the last decade," and his ongoing interest in "incorporating traditional Chinese music and instruments into his hip-hop and R&B-based tunes." Choice A is incorrect because the first paragraph mentions only one relative, Leehom Wang's "singer uncle," and because the focus of the whole passage is on Wang. Choice C is incorrect because while the first paragraph does discuss Wang's interest in US popular culture, the second and last paragraphs discuss Wang's interest in both his Chinese and US heritage and influences. Choice D is incorrect because while the first paragraph does discuss Wang's fondness for pop music, the second and last paragraphs discuss Wang's interest in both traditional and pop music.

13. **Choice C is the best answer.** The examples in the passage describe in various ways how "technology has scrambled the lines between public and private." In choice C, what might otherwise have been a private thought has been made public through technology. Choice A is incorrect because the example does not clearly involve technology. Choice B is incorrect because the example does not clearly involve technology blurring the lines between public and private. Choice D is incorrect because the example does not clearly involve technology or the blurring of the lines between public and private.

14. **Choice A is the best answer.** The main focus of the passage is on the variety of the responsibilities of a construction manager, who must "learn a construction project from the planning stage . . . to the budgeting stage . . . to the production stage" and must "obtain work permits, hire contractors, troubleshoot emergencies, schedule walkthroughs and keep clients informed on work timetables and progress." Choices B and D are incorrect because there is no information in the passage about the educational background required of a construction manager or about the amount of stress the construction manager career inflicts. Choice C is incorrect because there is no information in the passage about the kind of person for whom a construction manager career would be suitable beyond the broad claim that it is "ideal for someone who has a general interest in building a design."

15. **Choice A is the best answer.** The author asserts that *The Pickwick Papers* "truly popularized" the form of the serialized novel, noting that the first installment had a print order of 1,000 copies and that circulation had climbed to 40,000 "by the time the final entry was published." Choice B is incorrect because the passage indicates that unresolved plots and elliptical section breaks were merely features of serialized novels, ones that helped promote serialization's success but were not themselves evidence of the success of serialization. Choices C and D are incorrect because the passage cites the decrease in cost of book production and the development of new mediums, such as radio, as causes of the decline of serialization ("slowly shriveled away").

16. **Choice B is the best answer.** Harlem is identified in the passage as a "neighborhood" and "in the heart of Manhattan," not an actual city, indicating that Anderson's use of "city" is nonliteral. The passage most strongly suggests that Harlem is a "city" in the sense that it was a place that "blacks were making their own." Choices A, C, and D are incorrect because there is no evidence in the passage that Anderson intended to introduce irony into his writing, was citing another author, or quoting dialogue.

17. **Choice D is the best answer.** The author contends that patronage of science "generally extracts a price" and that "in the case of science today . . . that pressure comes less as a consequence of political correctness than of economic forces that have shifted academic and scientific institutions to a corporate model not designed to prioritize public interests" and hence potentially hostile to the common good. The author concludes that "it is money far more than ideology that rules the day" in contemporary science. Choice A is incorrect because the author depicts the academic institutions with which scientists are affiliated as subject to larger "economic forces" that have shifted these institutions to "a corporate model." Choice B is incorrect because there is no evidence in the passage that the author considers the overabundance of information available to scientists in the Internet age as the chief impairment of scientific research today or even that she sees information as overabundant. Choice C is incorrect because the idea that pressure on scientists to make their outcomes socially acceptable ("political correctness," "ideology") is the chief impairment of scientific research today is attributed to Alice Dreger, not to the author herself, who argues a different position "despite Dreger's argument."

18. **Choice B is the best answer.** The passage focuses mainly on presenting the critique of the Internet offered by Sherry Turkle, who "has become increasingly wary of the capacity of online spaces to fulfill us in the ways we seem to want them to" and feels that the Internet encourages "a seductive but dangerous habit of mind." Choice A is incorrect because only Sherry Turkle's assessment is presented in the passage. Choice C is incorrect because the passage does not propose a remedy; it only presents Turkle's assessment of a problem. Choice D is incorrect because while the passage does present some details that might be considered background (e.g., that Turkle works at the Massachusetts Institute of Technology), the passage focuses mainly on Turkle's critique of the Internet's ability to support self-invention.

19. **Choice C is the best answer.** "Worthy of" means deserving respect or praise, which is consistent with the idea in the sentence that the film committee began looking for new candidates for the award when the original nominees proved unsatisfactory. Choices A, B, and D are incorrect because it makes no sense in context to describe unsatisfactory nominees for an award as being "known for" or "pleased with" the award (since none of them has received it) or "interested in" the award (since the nominees' interest is irrelevant to their qualifications).

20. **Choice D is the best answer.** One definition of "benign" is "having no significant effect: harmless," which is consistent with how "benign" is used in the sentence to refer to a technology that operates "with essentially no emissions." Choices A, B, and C are incorrect because it makes no sense in context to refer to a technology that operates "with essentially no emissions" as "lavish" (abundant, profuse, excessive), "culpable" (deserving blame), or "antagonistic" (showing dislike or opposition).

ACCUPLACER® CollegeBoard

NEXT-GENERATION

Quantitative Reasoning, Algebra, and Statistics

Sample Questions

The College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading education institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators, and schools

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ACCUPLACER Quantitative Reasoning, Algebra, and Statistics Sample Questions

The Next-Generation Quantitative Reasoning, Algebra, and Statistics placement test is a computer adaptive assessment of test-takers' ability for selected mathematics content. Questions will focus on a range of topics including computing with rational numbers, applying ratios and proportional reasoning, creating linear expressions and equations, graphing and applying linear equations, understanding probability and set notation, and interpreting graphical displays. In addition, questions may assess a student's math ability via computational or fluency skills, conceptual understanding, or the capacity to apply mathematics presented in a context. All questions are multiple choice in format and appear discretely (stand alone) across the assessment. The following knowledge and skill categories are assessed:

- Rational numbers
- Ratio and proportional relationships
- Exponents
- Algebraic expressions
- Linear equations
- Linear applications
- Probability and sets
- Descriptive statistics
- Geometry concepts

Sample Questions

Choose the best answer. If necessary, use the paper you were given.

1. Which of the following expressions is 5 times as much as the sum of r and s?

   A. $5 \times r + s$
   B. $5 + r + s$
   C. $r + s \times 5$
   D. $(r + s) \times 5$

2. What is the solution to the equation $\frac{1}{2}x + \frac{3}{2}(x+1) - \frac{1}{4} = 5$?

   A. $\frac{5}{2}$

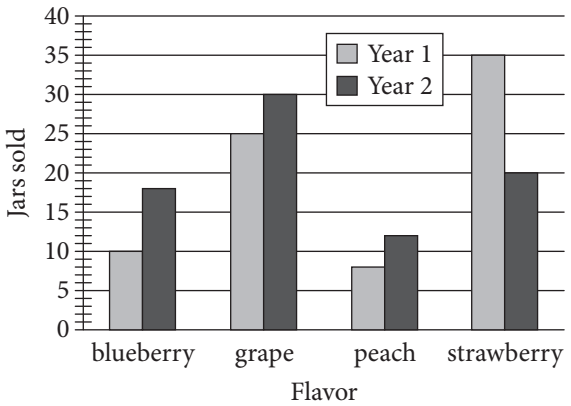
   B. $\frac{13}{8}$

   C. $\frac{15}{8}$

   D. $\frac{17}{8}$

3. What is the number of grams in 500 kilograms? (1 kilogram = 1,000 grams)

   A. 0.5
   B. 5,000
   C. 50,000
   D. 500,000

4. 

   Robert sells four different flavors of jam at an annual farmers market. The graph above shows the number of jars of each type of jam he sold at the market during the first two years. Which flavor of jam had the greatest increase in number of jars sold from Year 1 to Year 2?

   A. Blueberry
   B. Grape
   C. Peach
   D. Strawberry

5. In the xy-plane, a line crosses the y-axis at the point (0, 3) and passes through the point (4, 5). Which of the following is an equation of the line?

   A. $y = \frac{1}{2}x + 3$

   B. $y = 2x + 3$

   C. $y = \frac{1}{2}x - 4$

   D. $y = 2x - 4$

6. The amount of money M, in dollars, Paul earns can be represented by the equation $M = 12.5h + 11$, where h is the number of hours Paul works. Which of the following is the best interpretation of the number 11 in the equation?

   A. The amount of money, in dollars, Paul earns each hour
   B. The total amount of money, in dollars, Paul earns after working for h hours
   C. The total amount of money, in dollars, Paul earns after working for one hour
   D. The amount of money, in dollars, Paul earns in addition to an hourly wage

7.

Country	Approximate population (millions)
France	65.9
Germany	80.8
Italy	60.8
Spain	46.5
United Kingdom	64.3

   The table gives the population of the 5 largest countries in the European Union in the year 2014. Which of the following is closest to the mean population of these countries?

   A. 80.8 million
   B. 64.3 million
   C. 63.7 million
   D. 60.8 million

8. Which of the following fractions is equivalent to $\frac{-6-(-9)}{8}$?

   A. $-\frac{3}{8}$

   B. $\frac{3}{8}$

   C. $-\frac{15}{8}$

   D. $\frac{15}{8}$

9. Water runs from a pump at a rate of 1.5 gallons per minute. At this rate, how long would it take to fill a tub with a 150-gallon capacity?

   A. 10 minutes
   B. 100 minutes
   C. 225 minutes
   D. 2,250 minutes

10. The volume of a right rectangular prism is found by multiplying the length of the base by the width of the base by the height of the prism. A right rectangular prism has a volume of 30 cubic inches. If the height of the prism is 6 inches, what is the area of the base of the prism?

    A. 5 square inches
    B. 24 square inches
    C. 36 square inches
    D. 180 square inches

11. Jacoby followed a recipe that requires 2 cups of water for every 3 cups of flour. If he used 8 cups of flour, how many cups of water did he use?

    A. $2\frac{2}{3}$

    B. 4

    C. $5\frac{1}{3}$

    D. 12

12. $4(x + 5) + 4x + 8$

    Which of the following is equivalent to the expression above?

    A. $4(2x + 7)$
    B. $8(x + 4)$
    C. $5x + 17$
    D. $8x + 13$

13. It took Khalid 90 minutes to complete 40 tasks. Which of the following is an equivalent rate?

    A. 10 tasks in 0.9 minutes
    B. 10 tasks in 2.25 minutes
    C. 10 tasks in 9 minutes
    D. 10 tasks in 22.5 minutes

14.

	Plans to vote "yes" on issue Q	Plans to vote "no" on issue Q	Total
Plans to vote "yes" on issue P	8	12	20
Plans to vote "no" on issue P	14	16	30
Total	22	28	50

    The table above shows a survey of 50 registered voters in a city. Each voter was asked whether they planned to vote "yes" or "no" on two different issues. If a voter who plans to vote "yes" on issue P is randomly selected, what is the probability that voter also plans to vote "yes" on issue Q?

    A. 0.16
    B. 0.36
    C. 0.40
    D. 0.67

15. Which of the following values is equivalent to 5^{-3}?

    A. $\frac{1}{15}$

    B. $\frac{1}{125}$

    C. –15

    D. –125

16. Which of the following expressions is equivalent to $(x^3 \cdot x^2)^5$?

    A. x^{10}
    B. x^{15}
    C. x^{25}
    D. x^{30}

17. The elevation at the summit of Mount Whitney is 4,418 meters above sea level. Climbers begin at a trailhead that has an elevation of 2,550 meters above sea level. What is the change in elevation, to the nearest foot, between the trailhead and the summit? (1 foot = 0.3048 meters)

A. 569 feet
B. 5,604 feet
C. 6,129 feet
D. 14,495 feet

18. $3x - 2y = 15$
$x = 3$

The two lines given by the equations above intersect in the xy-plane. What is the value of the y-coordinate of the point of intersection?

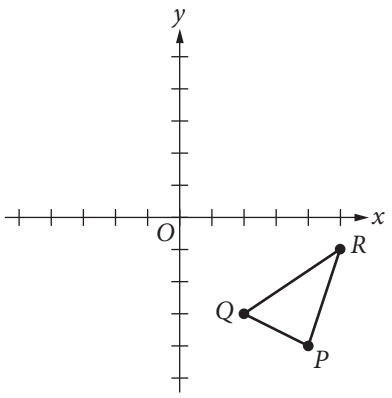
A. –7
B. –3
C. 3
D. 7

19. $L = \{0, 20, 40, 80, 100\}$
$M = \{5, 10, 15, 20, 25\}$
$N = \{10, 20, 30, 40, 50\}$

Sets L, M, and N are shown above. Which of the following sets represents $L \cup (M \cap N)$ (the union of L with the intersection of sets M and N)?

A. {0, 5, 10, 15, 20, 25, 30, 40, 50, 80, 100}
B. {0, 10, 20, 40, 80, 100}
C. {20, 40}
D. {20}

20.



Triangle PQR lies in the xy-plane, and the coordinates of vertex Q are (2, –3). Triangle PQR is rotated 180° clockwise about the origin and then reflected across the y-axis to produce triangle $P'Q'R'$, where vertex Q' corresponds to vertex Q of triangle PQR. What are the coordinates of Q'?

A. (–3, –2)
B. (3, –2)
C. (–2, 3)
D. (2, 3)

Answer Key

1. D

2. C

3. D

4. A

5. A

6. D

7. C

8. B

9. B

10. A

11. C

12. A

13. D

14. C

15. B

16. C

17. C

18. B

19. B

20. D

Rationales

1. **Choice D is correct.** The order of operations was used properly to write the expression. The sum of r and s in parentheses is found first, then multiplication is used to find the number that is 5 times the sum of r and s. Choice A is incorrect because this is the sum of s and 5 times as much as r. Choice B is incorrect because this is the sum of 5, r, and s. Choice C is incorrect because this is the sum of r and 5 times as much as s.

2. **Choice C is correct.** The equation $\frac{1}{2}x+\frac{3}{2}(x+1)-\frac{1}{4}=5$ can be rewritten as $\frac{1}{2}x+\frac{3}{2}x+\frac{3}{2}-\frac{1}{4}=5$, which simplifies to $2x=5+\frac{1}{4}-\frac{3}{2}=\frac{15}{4}$. Therefore, $x=\frac{15}{4}\div 2=\frac{15}{8}$. Choice A is incorrect because if x were equal to $\frac{5}{2}$, then $\frac{1}{2}x+\frac{3}{2}(x+1)-\frac{1}{4}$ would equal $\frac{1}{2}\left(\frac{5}{2}\right)+\frac{3}{2}\left(\frac{5}{2}+1\right)-\frac{1}{4}$, which is equal to $\frac{25}{4}$, not 5. Choice B is incorrect because if x were equal to $\frac{13}{8}$, then $\frac{1}{2}x+\frac{3}{2}(x+1)-\frac{1}{4}$ would equal $\frac{1}{2}\left(\frac{13}{8}\right)+\frac{3}{2}\left(\frac{13}{8}+1\right)-\frac{1}{4}$, which is equal to $\frac{9}{2}$, not 5. Choice D is incorrect because if x were equal to $\frac{17}{8}$, then $\frac{1}{2}x+\frac{3}{2}(x+1)-\frac{1}{4}$ would equal $\frac{1}{2}\left(\frac{17}{8}\right)+\frac{3}{2}\left(\frac{17}{8}+1\right)-\frac{1}{4}$, which is equal to $\frac{11}{2}$, not 5.

3. **Choice D is correct.** To convert from kilograms to grams, multiply $500\text{ kg}\times\frac{1{,}000\text{ g}}{1\text{ kg}}$, which results in $500{,}000$ grams. Choice A is incorrect because 0.5 is the number of kilograms in 500 grams. Choice B is incorrect because $5{,}000$ grams is equal to 5 kilograms, not 500 kilograms. Choice C is incorrect because $50{,}000$ grams is equal to 50 kilograms, not 500 kilograms.

4. **Choice A is correct.** The graph shows that he sold 10 jars of blueberry jam the first year and 18 the second year, for an increase of 8 jars. This is the largest increase of any of the flavors. Choice B is incorrect. This is the jam he sold the most of, but it is not the largest increase. Choice C is incorrect. He sold more peach jam the second year, but his sales increased by only 4, which is less than the increase for blueberry. Choice D is incorrect. He sold less strawberry jam the second year, not more.

5. **Choice A is correct.** An equation in the form $y=ax+b$ has a slope of a and a y-intercept of b. The line described has a y-intercept of 3 because it crosses the y-axis at $y=3$ and has a slope of $\frac{1}{2}$ because the value of y increases by 1 for every x increase of 2. Therefore, an equation of the line is $y=\frac{1}{2}x+3$. Choice B is incorrect. The line described does not have a slope of 2. Choice C is incorrect. The line described does not have a y-intercept of -4. Choice D is incorrect. The line described does not have a slope of 2 or a y-intercept of -4.

6. **Choice D is correct.** Paul earns $\$12.50$ per hour, so the number of hours, h, is multiplied by 12.5. Paul earns $\$11$ in addition to how much he works per hour, which is why it is added to the product $12.5h$ and is independent of how many hours Paul works. Choice A is incorrect because it is what 12.5 represents in the equation. Choice B is incorrect because it is what M stands for in the equation. Choice C is incorrect because substituting 1 into the equation gives $12.5+11=23.5$.

7. **Choice C is correct.** To find the mean, find the total population of all 5 countries and divide by the total number of countries: $65.9 + 80.8 + 60.8 + 46.5 + 64.3 = 318.3$ and $318.3 \div 5 = 63.66$, which rounds to 63.7. The values in the table are given in millions, so the mean population is about 63.7 million. Choice A is incorrect. It is the maximum of the values given. Choice B is incorrect. It is the median population. Choice D is incorrect. It is the middle value in the table.

8. **Choice B is correct.** The fraction $\frac{-6-(-9)}{8} = \frac{-6+9}{8}$, which is equivalent to $\frac{3}{8}$. Choices A, C, and D are incorrect because they use incorrect order of operations and/or do not take into account that subtracting -9 is the same as adding 9.

9. **Choice B is correct.** The time it would take to fill the tub can be found by dividing the number of gallons the tub can hold by the rate the water runs from the pump. This is represented by $150 \text{ gallons} \div 1.5 \text{ gallons per minute} = 100$. Choice A is incorrect and may be the result of dividing 150 by 15. Choice C is incorrect and may be the result of multiplying 150 by 1.5. Choice D is incorrect and may be the result of multiplying 150 by 15.

10. **Choice A is correct.** Volume of a right rectangular prism is equal to the area of the base times the height. Since the height is known, divide the volume by height to find the area of the base. This is represented by $30 \div 6 = 5$. Choice B is incorrect because this is the result of subtracting 6 from 30 instead of dividing. Choice C is incorrect because this is the result of adding 6 to 30 instead of dividing. Choice D is incorrect because this is the result of multiplying 6 and 30 instead of dividing.

11. **Choice C is correct.** The ratio of water to flour is $\frac{2}{3}$. Since there were 8 cups of flour used, the expression $8 \times \frac{2}{3}$ can be used to determine the amount of water used, which is $5\frac{1}{3}$. Choice A is incorrect because this is the number of 3-cup "units" of flour that Jacoby used: $8 \div 3 = 2\frac{2}{3}$. Choice B is incorrect because this would be the amount of water necessary if 6 cups of flour were used, not 8. Choice D is incorrect because this results from using a ratio of 2 cups of flour to 3 cups of water.

12. **Choice A is correct.** The expression $4(x+5)+4x+8$ can be expanded to $4x+20+4x+8$, which is equivalent to $8x+28$. Since 4 can be factored from each term in this expression, it can be rewritten as $4(2x+7)$. Choice B is incorrect because it expands to $8x+32$, which is not equivalent to $4(x+5)+4x+8$. Choice C is incorrect because it is equivalent to $4+(x+5)+4x+8$ rather than $4(x+5)+4x+8$. Choice D is incorrect because the 4 was not distributed through the expression in parentheses properly.

13. **Choice D is correct.** Ninety minutes to complete 40 tasks is an average rate of 2.25 minutes per task (90 minutes ÷ 40 tasks). Multiplying this rate by 10 gives the average number of tasks Khalid completed every 10 minutes ($2.25 \times 10 = 22.5$). Choice A is incorrect and is most likely the result of incorrectly dividing 10 by 90. Choice B is incorrect because it is the average number of minutes it took Khalid to complete one task. Choice C is incorrect because it is equivalent to $90 \div 10$.

14. **Choice C is correct.** There are 8 voters who plan to vote "yes" on both issues. There are 20 voters who plan to vote "yes" on issue P. This is represented by $8 \div 20 = 0.4$. Choice A is incorrect. This is the probability that a voter plans to vote "yes" on both issues. Choice B is incorrect. This is the probability that a voter plans to vote "yes" on P, given that he or she plans to vote "yes" on Q. Choice D is incorrect. This is the number of voters who plan to vote "yes" on both issues divided by the number of voters who plan to vote "yes" on P and "no" on Q.

15. Choice B is correct. The expression 5^{-3} can be rewritten as $\frac{1}{5^3}$, which is equal to $\frac{1}{5\times5\times5} = \frac{1}{125}$. Choices A, C, and D are incorrect because they are not equivalent to 5^{-3}. Choice A is the value of $\frac{1}{5\times3}$, choice C is the value of $5\times(-3)$, and choice D is the value of $(-5)^3$.

16. Choice C is correct. Using the rules of exponents, $(x^3 \cdot x^2)^5$ can be rewritten as $\left(x^{(3+2)}\right)^5 = \left(x^5\right)^5 = x^{5\times5} = x^{25}$. Choices A, B, and D are incorrect and may be the result of not following the proper rules of exponents.

17. Choice C is correct. The difference between the elevations is $4{,}418 - 2{,}550 = 1{,}868$ meters. Since each meter is 0.3048 of a foot, divide the change of elevation in meters by the conversion factor to find the number of feet ($1{,}868 \div 0.3048 \approx 6{,}129$). Choice A is incorrect. This is the result of multiplying by the conversion factor instead of dividing. Choice B is incorrect. This is the result of multiplying $1{,}868$ by 3 (perhaps figuring that there are 3 feet in a yard and a meter is similar to a yard). Choice D is incorrect. This is the elevation of the summit in feet.

18. Choice B is correct. Substituting 3 for x in the first equation gives $3(3) - 2y = 15$. This simplifies to $9 - 2y = 15$. Subtracting 9 from both sides of $9 - 2y = 15$ gives $-2y = 6$. Finally, dividing both sides of $-2y = 6$ by -2 gives $y = -3$. Choice A is incorrect because $3(3) - 2(-7)$ does not equal 15. Choice C is incorrect because $3(3) - 2(3)$ does not equal 15. Choice D is incorrect because $3(3) - 2(7)$ does not equal 15.

19. Choice B is correct. The intersection of sets M and N is all the numbers that appear in both of the sets, so $M \cap N = \{10, 20\}$. The union of this and L is all the numbers that are in this set or in set L, therefore $L \cup (M \cap N) = \{0, 10, 20, 40, 80, 100\}$. Choice A is incorrect. This is the union of all three sets given. Choice C is incorrect. This is $L \cap (M \cup N)$. Choice D is incorrect. This is the intersection of all three sets.

20. Choice D is correct. When triangle PQR is rotated $180°$ clockwise about the origin $(0, 0)$, point Q is translated from $(2, -3)$ to $(-2, 3)$ in the xy-plane. Then, after the triangle is reflected, or flipped, across the y-axis, point Q is translated from $(-2, 3)$ to $(2, 3)$. Choice A is incorrect because it represents the location of point Q' after only a reflection across the y-axis. Choice B is incorrect and may be the result of a misunderstanding of a rotation about the origin. Choice C is incorrect because it represents the location of point Q′ after only the rotation.

ACCUPLACER® CollegeBoard

NEXT-GENERATION

Arithmetic

Sample Questions

The College Board

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ACCUPLACER Arithmetic Sample Questions

The Next-Generation Arithmetic placement test is a computer adaptive assessment of test-takers' ability for selected mathematics content. Questions will focus on computation, order of operations, estimation and rounding, comparing and ordering values in different formats, and recognizing equivalent values across formats. In addition, questions may assess a student's math ability via computational or fluency skills, conceptual understanding, or the capacity to apply mathematics presented in a context. All questions are multiple choice in format and appear discretely (stand alone) across the assessment. The following knowledge and skill categories are assessed:

- Whole number operations
- Fraction operations
- Decimal operations
- Percent
- Number comparisons and equivalents

Sample Questions

Choose the best answer. If necessary, use the paper you were given.

1. Which of the following fractions is equal to 0.06?

   A. $\frac{1}{6}$

   B. $\frac{1}{60}$

   C. $\frac{6}{10}$

   D. $\frac{6}{100}$

2. A club has 36 members. If each member donates 12 items for an auction, how many items will there be in the auction?

   A. 48
   B. 108
   C. 422
   D. 432

3. What is the value of $\frac{4}{10} + \frac{3}{100}$?

   A. $\frac{43}{100}$

   B. $\frac{43}{110}$

   C. $\frac{7}{10}$

   D. $\frac{7}{110}$

4. A conference planner has put together 280 binders for attendees and another 31 binders for presenters. How many total binders did the planner put together for attendees and presenters?

   A. 211
   B. 249
   C. 311
   D. 590

5. A store stocked 150 cans of popcorn for a weekend sale. That weekend, 72 of the cans sold. What percent of the cans of popcorn stocked were sold that weekend?

   A. 2%
   B. 5%
   C. 48%
   D. 72%

6. $\frac{8}{3}$, 2.28, $\frac{10}{12}$, 0.199

   What number in the list above has the greatest value?

   A. $\frac{8}{3}$

   B. 2.28

   C. $\frac{10}{12}$

   D. 0.199

7. If Manuel deposits 25% of $130 into a savings account, what is the amount of his deposit?

   A. $5.20
   B. $25.00
   C. $32.50
   D. $97.50

8. What is 1,582 + 761?

   A. 1,119
   B. 1,243
   C. 1,343
   D. 2,343

9. Xiaoming is making cookies. Each batch of cookies uses 3 eggs. If Xiaoming has 20 eggs, and assuming he has enough of the other ingredients to make the cookies, what is the greatest number of batches that he can make?

   A. 3
   B. 6
   C. 7
   D. 17

10. What is the value of 3.85 + 0.004 + 0.117?

    A. 3.9611
    B. 3.961
    C. 3.971
    D. 5.06

11. Which of the following is equivalent to $\frac{8}{25}$?

    A. 0.02
    B. 0.32
    C. 0.825
    D. 3.125

12. What is the remainder when 599 is divided by 9?

    A. 0
    B. 5
    C. 6
    D. 9

13. A machine is currently set to a feed rate of 5.921 inches per minute (IPM). The machinist changes this setting to 6.088 IPM. By how much did the machinist increase the feed rate?

A. 0.167 IPM
B. 1.167 IPM
C. 1.833 IPM
D. 1.967 IPM

14. 0.075, 0.75%, $\frac{3}{4}$

Which of the following correctly orders the values above from least to greatest?

A. 0.75%, 0.075, $\frac{3}{4}$
B. 0.75%, $\frac{3}{4}$, 0.075
C. $\frac{3}{4}$, 0.75%, 0.075
D. 0.075, 0.75%, $\frac{3}{4}$

15. What is the value of 2.84×3.9?

A. 3.408
B. 11.076
C. 34.08
D. 110.76

16. What is 0.8637 rounded to the nearest hundredth?

A. 0.86
B. 0.863
C. 0.864
D. 0.87

17. 60% of what number is equal to 30?

A. 0.5
B. 2
C. 18
D. 50

18. If $\frac{4}{3} \div \frac{1}{6} = p$, then the value of p is between which of the following pairs of numbers?

A. 3 and 4
B. 5 and 6
C. 6 and 7
D. 7 and 9

19. Which of the following inequalities is true?

A. $\frac{3}{4} < \frac{5}{7}$
B. $\frac{2}{3} > \frac{5}{6}$
C. $\frac{5}{8} > \frac{6}{10}$
D. $\frac{4}{5} < \frac{2}{9}$

20. Carole works at a bookstore and a restaurant. In a 28-day period, Carole worked $\frac{1}{4}$ of the days at the bookstore and did not work $\frac{1}{14}$ of the days. On the remaining days Carole worked at the restaurant. How many days did Carole work at the restaurant during the 28-day period?

A. 25
B. 19
C. 10
D. 9

Answer Key

1. D
2. D
3. A
4. C
5. C
6. A
7. C
8. D
9. B
10. C
11. B
12. B
13. A
14. A
15. B
16. A
17. D
18. D
19. C
20. B

Rationales

1. **Choice D is correct.** The number 0.06 is the same as six-hundredths, which when written as a fraction is $\frac{6}{100}$. Choice A is incorrect because $\frac{1}{6}$ is equivalent to one-sixth, or $0.16\overline{6}$. Choice B is incorrect because $\frac{1}{60}$ is equivalent to one-sixtieth, or $0.016\overline{6}$. Choice C is incorrect because $\frac{6}{10}$ is equivalent to six-tenths, or 0.6.

2. **Choice D is correct.** To find the total number of items, multiply the total number of members by the number of items each member will donate. This is represented by $36 \times 12 = 432$. Choice A is incorrect because this results from adding instead of multiplying. Choice B is incorrect because a multiplication error was made. This results from not using a placeholder zero or writing the numbers starting in the tens place when multiplying the second digit. Choice C is incorrect because a multiplication error was made. This results from making an error when carrying from the ones digit to the tens digit.

3. **Choice A is correct.** The expression $\frac{4}{10} + \frac{3}{100}$ can be rewritten as $\frac{40}{100} + \frac{3}{100}$, which is equal to $\frac{43}{100}$. Choice B is incorrect because it results from combining the numerators to create a two-digit number and adding the denominators. Choice C is incorrect because it results from adding the numerators and using the denominator of the first number in the sum. Choice D is incorrect because it results from adding the numerators and denominators separately.

4. **Choice C is correct.** The total number of binders the planner put together for attendees and presenters is $280 + 31 = 311$. Adding the ones place $(0 + 1)$ results in the digit 1, adding the tens place $(8 + 3)$ results in the number 11, which should be recorded as a 1 in the tens place and a 1 carried to the hundreds place, then adding the hundreds place $(2 + 1)$ results in the digit 3. Choice A is incorrect. This answer results from not carrying a 1 to the hundreds place after adding the tens place. Choice B is incorrect. This answer is the result of subtracting the presenter binders from the attendee binders. However, the total number of binders will be found through addition, not subtraction. Choice D is incorrect. This answer results from incorrectly adding the numbers.

5. **Choice C is correct.** Divide the number of cans sold by the number of cans stocked and multiply by 100 to find the percent: $72 \div 150 \times 100 = 48\%$. Choice A is incorrect. This is the approximate result of dividing 150 by 72. Choice B is incorrect. This is the approximate result of dividing 72 by 15. Choice D is incorrect. This is the number of cans sold represented as a percent.

6. **Choice A is correct.** The fraction $\frac{8}{3}$ is greater than 1 because the numerator is larger than the denominator. This makes it greater than choice C or choice D, which are both less than 1. The fraction $\frac{8}{3}$ can be converted to a mixed number $\left(2\frac{2}{3}\right)$ or decimal (approximately 2.66) by dividing 8 by 3. This makes it easier to compare choice A to the other choices. Choices B, C, and D are incorrect because $\frac{8}{3}$ (or approximately 2.66) is greater than 2.28, $\frac{10}{12}$, and 0.199.

7. **Choice C is correct.** To find 25% of \$130.00, multiply \$130.00 by 0.25, which is \$32.50. Choice A is incorrect because \$5.20 is 4% of \$130, which results from dividing \$130.00 by 25. Choice B is incorrect because \$25.00 is approximately 19% of \$130, which may be the result of misunderstanding 25% to be \$25. Choice D is incorrect because \$97.50 is 75% of \$130, which is not the amount that will go into the savings account.

8. **Choice D is correct.** $1{,}582 + 761 = 2{,}343$. Choices A, B, and C are incorrect. Choice A results from adding and carrying from left to right instead of right to left. Choice B is incorrect because no numbers are carried to the next place value. Choice C is incorrect because the 1 from the hundreds place is not carried to the thousands place.

9. **Choice B is correct.** If Xiaoming has 20 eggs, and each batch of cookies uses 3 eggs, the number of batches can be found by dividing 20 by 3. This does not divide evenly, so the number should be rounded down to 6 because Xiaoming does not have enough eggs to make 7 batches $(7 \times 3 = 21)$. Choice A is incorrect because 3 batches would use only 9 eggs $(3 \times 3$ eggs$)$. This means that Xiaoming would have 11 eggs left, which is enough to make more batches. Choice C is incorrect because 7 batches would use 21 eggs $(3 \times 7 = 21)$, but Xiaoming has only 20 eggs. Choice D is incorrect because 17 batches would use 51 eggs $(17 \times 3 = 51)$, but Xiaoming has only 20 eggs.

10. **Choice C is correct.** Using the standard algorithm, the sum of the thousandths places $(7 + 4)$ is 11, so a 1 should be recorded in the thousandths place and a 1 carried to the hundredths place. The sum of the hundredths places $(5 + 0 + 1 + 1)$ is 7, the sum of the tenths places is 9, and the sum of the ones places is 3. This results in 3.971. Choice A is incorrect. This results from adding from left to right and recording an 11 as the result of adding the thousandths places. Choice B is incorrect. This results from not carrying the 1 from the thousandths place to the hundredths place. Choice D is incorrect. This is the sum of 3.85, 0.04, and 1.17.

11. **Choice B is correct.** The fraction $\frac{8}{25}$ can be written as $\frac{32}{100}$, which can be interpreted as thirty-two hundredths, or 0.32. Choice A is incorrect. This may be the result of dividing the numerator by 4 instead of multiplying when converting to a common denominator of 100. Choice C is incorrect. This may be the result of trying to form a number using the numerator and the denominator of the fraction. Choice D is incorrect. This is the result of 25 divided by 8.

12. **Choice B is correct.** The result when 599 is divided by 9 is 66 with a remainder of 5. Multiplying $9 \times 66 = 594$ and $599 - 594 = 5$, which is the remainder. Choice A is incorrect. This may be the result of thinking that 9 divides evenly into 599. Choice C is incorrect. This may be the result of determining that 9 goes into 599 sixty-six times and misinterpreting the meaning of this number. Choice D is incorrect because this is the divisor, not the remainder.

13. **Choice A is correct.** The amount by which the feed rate increases is the difference between the second feed rate and the first feed rate. This is represented by $6.088 - 5.921 = 0.167$. Choices B, C, and D are incorrect and may be the result of errors when subtracting the two numbers given.

14. **Choice A is correct.** To best compare the numbers, they should be put in the same format. The percent 0.75% can be converted to a decimal by dividing 0.75 by 100, which gives 0.0075. The fraction $\frac{3}{4}$ can be converted to a decimal by dividing 3 by 4, which gives 0.75. Placing these numbers in order from least to greatest yields 0.0075, 0.075, and 0.75. Choices B, C, and D are incorrect because none of them order the numbers from least to greatest. Choice B is incorrect because $\frac{3}{4}$ is greater than 0.075. Choice C is incorrect because $\frac{3}{4}$ is the greatest value, not the least. Choice D is incorrect because 0.75% is less than 0.075.

15. **Choice B is correct.** Using the standard algorithm to multiply the tenths place of 3.9 by 2.84 results in 2.556 and then multiplying the ones place of 3.9 by 2.84 results in 8.520, since each product must have three places to the right of the decimal. The sum of these two numbers is $2.556 + 8.520 = 11.076$. Choice A is incorrect. This results from not using a placeholder zero when multiplying the ones place. Choice C is incorrect. This results from not using a placeholder zero when multiplying the ones place and incorrectly placing the decimal point in the resulting number. Choice D is incorrect. This results from placing the decimal point to match the number of decimal places in 2.84.

16. **Choice A is correct.** The second digit to the right of the decimal point is in the hundredths place and the third number to the right of the decimal point is in the thousandths place. The number in the hundredths place increases by 1 when the number in the thousandths place is 5 or greater. The number in the hundredths place remains the same if the number in the thousandths place is less than 5. Since the number in the thousandths place is less than 5, the number 0.8637 should be rounded down to 0.860. Choice B is incorrect. The number 0.863 is 0.8637 truncated to the thousandths place instead of rounded to the nearest hundredth. Choice C is incorrect. The number 0.864 is 0.8637 rounded to the nearest thousandths place instead of rounded to the nearest hundredth. Choice D is incorrect. The number 0.87 is 0.8637 rounded up to the nearest hundredth, but since the number in the thousandths place is less than 5, the number should be rounded down.

17. **Choice D is correct.** Dividing 30 by 60%, which is equivalent to 0.60, gives 50. So 60% of 50 is 30. Choices A and B are incorrect because 60% was not converted into a decimal, and in choice B the division was done in the wrong order. Choice C is incorrect because 30 was multiplied by 0.60 instead of divided.

18. **Choice D is correct.** The expression $\frac{4}{3} \div \frac{1}{6} = \frac{4}{3} \times 6 = \frac{24}{3} = 8$. The number 8 is between 7 and 9. Choices A, B, and C are incorrect. The quotient of the two given fractions is not between any of these pairs of numbers.

19. Choice C is correct. The fraction $\frac{5}{8}$ is greater than $\frac{6}{10}$. When using a common denominator, this statement is equivalent to $\frac{25}{40} > \frac{24}{40}$. When two fractions have common denominators, the fraction with the larger numerator is the larger number. Choice A is incorrect because $\frac{3}{4}$ is not less than $\frac{5}{7}$. Shown written with a common denominator, the comparison $\frac{21}{28} < \frac{20}{28}$ is not true. Choice B is incorrect because $\frac{2}{3}$ is not greater than $\frac{5}{6}$. Shown written with a common denominator, the comparison $\frac{4}{6} > \frac{5}{6}$ is not true. Choice D is incorrect because $\frac{4}{5}$ is not less than $\frac{2}{9}$. Shown written with a common denominator, the comparison $\frac{36}{45} < \frac{10}{45}$ is not true.

20. Choice B is correct. Carole worked $\frac{1}{4}$ of the 28 days at the bookstore, so she worked 7 days at the bookstore $(28 \times \frac{1}{4})$. She did not work on $\frac{1}{14}$ of the days, which equals 2 days $(28 \times \frac{1}{14})$. Subtracting these amounts from 28 gives the number of days she worked at the restaurant $(28 - 7 - 2 = 19)$. Choice A is incorrect and may be the result of erroneously adding $\frac{1}{4}$ and $\frac{1}{14}$ and finding $\frac{2}{18}$ as the days not worked at the restaurant. $28 - (28 \times \frac{2}{18}) = 25$. Choice C is incorrect and may be the result of adding the denominators of the fractions $(14 + 4)$ and using this as the number of days Carole did not work at the restaurant. $28 - 18 = 10$. Choice D is incorrect because it is the total number of days Carole worked at the bookstore and the days she did not work.

ACCUPLACER® CollegeBoard

NEXT-GENERATION

Advanced Algebra and Functions

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The Next-Generation Advanced Algebra and Functions placement test is a computer adaptive assessment of test-takers' ability for selected mathematics content. Questions will focus on a range of topics, including a variety of equations and functions, including linear, quadratic, rational, radical, polynomial, and exponential. Questions will also delve into some geometry and trigonometry concepts. In addition, questions may assess a student's math ability via computational or fluency skills, conceptual understanding, or the capacity to apply mathematics presented in a context. All questions are multiple choice in format and appear discretely (stand alone) across the assessment. The following knowledge and skill categories are assessed:

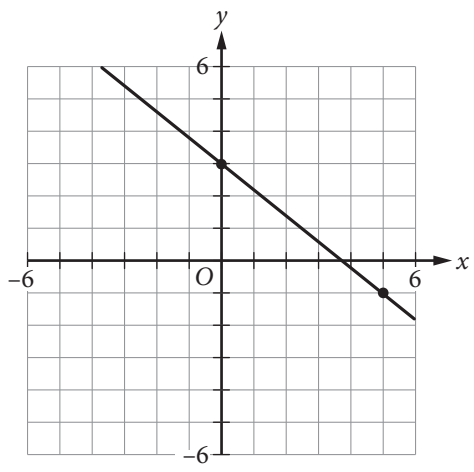
- Linear equations
- Linear applications
- Factoring
- Quadratics
- Functions
- Radical and rational equations
- Polynomial equations
- Exponential and logarithmic equations
- Geometry concepts
- Trigonometry

Sample Questions

Choose the best answer. If necessary, use the paper you were given.

1. Function g is defined by $g(x) = 3(x + 8)$. What is the value of $g(12)$?

   A. -4
   B. 20
   C. 44
   D. 60

2. 

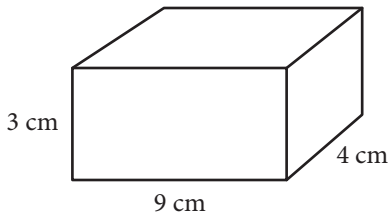
   Which of the following is an equation of the line that passes through the point (0, 0) and is perpendicular to the line shown above?

   A. $y = \frac{5}{4}x$

   B. $y = \frac{5}{4}x + 3$

   C. $y = -\frac{4}{5}x$

   D. $y = -\frac{4}{5}x + 3$

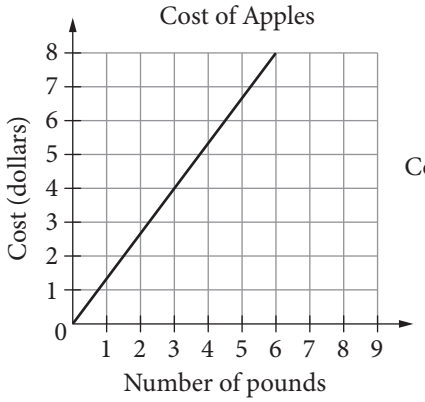
3. 

   The surface area of a right rectangular prism can be found by finding the sum of the area of each of the faces of the prism. What is the surface area of a right rectangular prism with length 4 centimeters (cm), width 9 cm, and height 3 cm? (Area of a rectangle is equal to length times width.)

   A. 75 cm^2
   B. 108 cm^2
   C. 120 cm^2
   D. 150 cm^2

4. Which of the following expressions is equivalent to $(x + 7)(x^2 - 3x + 2)$?

   A. $x^3 - 3x^2 + 2x + 14$
   B. $x^3 + 4x^2 - 19x + 14$
   C. $x^3 - 3x + 14$
   D. $x^2 - 2x + 9$

5. 

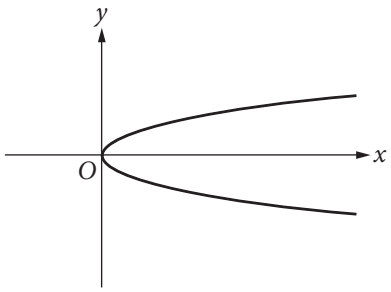
   Cost of Pears: $C = \frac{7}{5}p$

   The graph above shows the cost, in dollars, of apples as a function of the number of pounds of apples purchased at a particular grocery store. The equation above defines the cost C, in dollars, for p pounds of pears at the same store. Which of the following statements accurately compares the cost per pound of apples and the cost per pound of pears at this store?

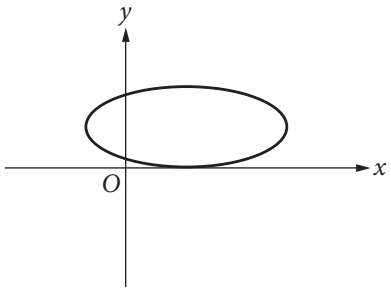
   A. Apples cost approximately \$0.07 less per pound than pears do.
   B. Apples cost approximately \$0.04 less per pound than pears do.
   C. Apples cost approximately \$0.73 less per pound than pears do.
   D. Apples cost approximately \$0.62 more per pound than pears do.

6. Which of the following is the graph of a function where $y = f(x)$?

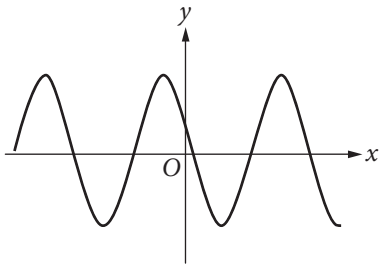
A.



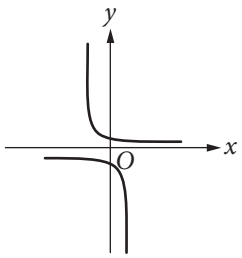
B.



C.



D.



7. Which of the following expressions is equivalent to $3x^2 + 6x - 24$?

A. $3(x + 2)(x - 4)$
B. $3(x - 2)(x + 4)$
C. $(x + 6)(x - 12)$
D. $(x - 6)(x + 12)$

8. A biologist puts an initial population of 500 bacteria into a growth plate. The population is expected to double every 4 hours. Which of the following equations gives the expected number of bacteria, n, after x days? (24 hours = 1 day)

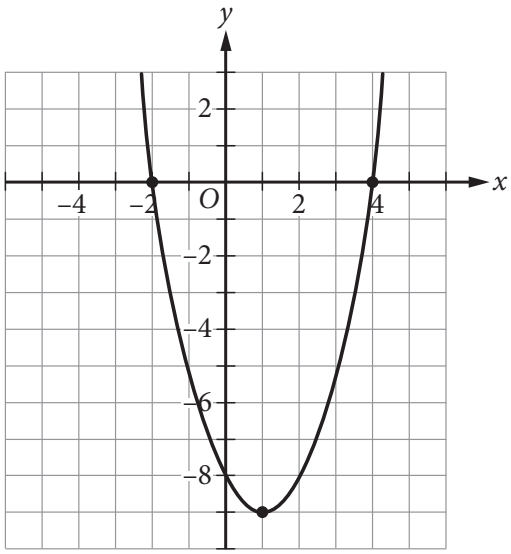
A. $n = 500(2)^x$
B. $n = 500(2)^{6x}$
C. $n = 500(6)^x$
D. $n = 500(6)^{2x}$

9. $x^2 + 5x - 9 = 5$

Which of the following values of x satisfies the equation above?

A. 7
B. 3
C. –2
D. –7

10. The graph of $y = f(x)$ is shown in the xy-plane below.



Which of the following equations could define $f(x)$?

A. $f(x) = x^2 - 2x - 8$
B. $f(x) = -x^2 + 2x - 8$
C. $f(x) = (x - 2)(x + 4)$
D. $f(x) = -(x - 1)^2 - 9$

11. Which of the following best describes the range of $y = -2x^4 + 7$?

A. $y \leq -2$
B. $y \geq 7$
C. $y \leq 7$
D. All real numbers

12. For which of the following equations is $x = 6$ the only solution?

A. $(6x)^2 = 0$
B. $(x - 6)^2 = 0$
C. $(x + 6)^2 = 0$
D. $(x - 6)(x + 6) = 0$

13. If $f(x) = x^2 + 3x + 1$, what is $f(x + 2)$?

A. $x^2 + 3x + 3$
B. $(x + 2)^2 + 3(x + 2) + 1$
C. $(x + 2)(x^2 + 3x + 1)$
D. $x^2 + 3x + 9$

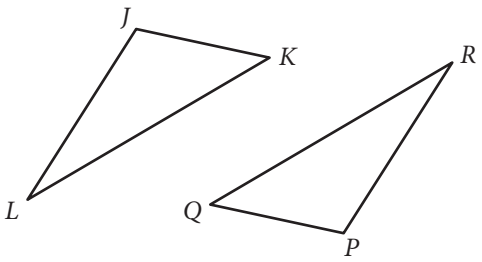
14. What, if any, is a real solution to $\sqrt{5x + 1} + 9 = 3$?

A. $-\frac{1}{5}$
B. 7
C. $\frac{143}{5}$
D. There is no real solution.

15. If $x \neq -2$ and $x \neq -\frac{3}{2}$, what is the solution to $\frac{5}{x + 2} = \frac{x}{2x - 3}$?

A. 3 and 5
B. 2 and $-\frac{3}{2}$
C. –2 and $\frac{3}{2}$
D. –3 and –5

16.



Triangle JKL and triangle PQR are shown above. If $\angle J$ is congruent to $\angle P$, which of the following must be true in order to prove that triangles JKL and PQR are congruent?

A. $\angle L \cong \angle R$ and $JL = PR$
B. $KL = QR$ and $PR = JL$
C. $JK = PQ$ and $KL = QR$
D. $\angle K \cong \angle Q$ and $\angle L \cong \angle R$

17. In the function $f(x) = a(x + 2)(x - 3)^b$, a and b are both integer constants and b is positive. If the end behavior of the graph of $y = f(x)$ is positive for both very large negative values of x and very large positive values of x, what is true about a and b?

A. a is negative, and b is even.
B. a is positive, and b is even.
C. a is negative, and b is odd.
D. a is positive, and b is odd.

18. Which of the following equations is equivalent to $2^{5x} = 7$?

A. $x = \log_2\left(\frac{7}{5}\right)$
B. $x = \frac{\log_2 7}{5}$
C. $x = \frac{\log_7 2}{5}$
D. $x = \frac{\log_7 5}{2}$

19. If $x > 0$ and $y > 0$, which of the following expressions is equivalent to $\frac{x - y}{\sqrt{x} - \sqrt{y}}$?

A. $\frac{x - y}{\sqrt{x - y}}$
B. $\sqrt{x - y}$
C. $\sqrt{x} + \sqrt{y}$
D. $x\sqrt{x} + y\sqrt{y}$

20. In triangle ABC, angle C is a right angle. If $\cos A = \frac{5}{8}$, what is the value of $\cos B$?

A. $\frac{3}{8}$
B. $\frac{5}{8}$
C. $\frac{\sqrt{39}}{8}$
D. $\frac{\sqrt{89}}{8}$

Answer Key

1. D
2. A
3. D
4. B
5. A
6. C
7. B
8. B
9. D
10. A
11. C
12. B
13. B
14. D
15. A
16. A
17. D
18. B
19. C
20. C

Rationales

1. **Choice D is correct.** The value of $g(12)$ can be found by substituting 12 for x in the equation for $g(x)$. This yields $g(12) = 3(12 + 8)$, which is equivalent to $3(20)$ or 60. Choice A is incorrect. This answer represents the value of x in the equation $12 = 3(x + 8)$. Choice B is incorrect. This answer represents the value of the expression in parentheses. Choice C is incorrect. This answer is a result of incorrectly distributing the 3 through the expression in parentheses: $g(12) = 3(12) + 8$.

2. **Choice A is correct.** The slopes of perpendicular lines are negative reciprocals of each other. The slope of the line in the graph is $-\frac{4}{5}$. The negative reciprocal of $-\frac{4}{5}$ is $\frac{5}{4}$. A line that passes through the point $(0, 0)$ has a y-intercept of 0. Therefore, the equation $y = \frac{5}{4}x + 0$, or $y = \frac{5}{4}x$, is correct. Choice B is incorrect because it is an equation of a line that is perpendicular to the line shown, but it does not pass through the origin. Choice C is incorrect because this equation is parallel to the line shown, not perpendicular. Choice D is incorrect because it is the equation of the line shown in the graph.

3. **Choice D is correct.** The surface area of the rectangular prism is the total area of each of the faces of the prism and can be written as $2(\text{length} \times \text{width}) + 2(\text{height} \times \text{width}) + 2(\text{length} \times \text{height})$, which is $2(4 \text{ cm} \times 9 \text{ cm}) + 2(3 \text{ cm} \times 9 \text{ cm}) + 2(4 \text{ cm} \times 3 \text{ cm})$, or 150 cm^2. Choice A is incorrect because it is half the surface area of the prism. Choice B is incorrect because it is the volume of the prism. Choice C is incorrect because it is 30 units less than the surface area of the prism described.

4. **Choice B is correct.** Using the distribution property, the given expression can be rewritten as $x(x^2) + x(-3x) + x(2) + 7(x^2) + 7(-3x) + 7(2)$. Further simplifying results in $x^3 - 3x^2 + 2x + 7x^2 - 21x + 14$. Finally, adding like terms yields $x^3 + 4x^2 - 19x + 14$. Choices A, C, and D are incorrect because they each result from errors made when performing the necessary distribution and adding like terms.

5. **Choice A is correct.** The cost per pound of apples can be determined by the slope of the graph as about $\$1.33$ per pound. The cost per pound of pears can be determined by the slope of the line defined by the equation $C = \frac{7}{5}p$. The slope of the line defined by C is $\frac{7}{5}$, so the cost per pound of pears is $\$1.40$. Therefore, the apples cost approximately $\$0.07$ less per pound than pears do. Choice B is incorrect. This is the result of misreading the cost per pound of apples as $\$0.67$ and the cost per pound of pears as $\$0.71$ and then finding the difference between the two values. Choice C is incorrect. This is the result of misreading the cost per pound of apples from the graph as $\$0.67$ and then subtracting the cost per pound of pears, $\$1.40$. Choice D is incorrect. This is the result of misreading the cost per pound of pears as $\$0.71$ and then subtracting this value from the cost per pound of apples, $\$1.33$.

6. **Choice C is correct.** A function has one output for each input. Each x-value on this graph corresponds to only one y-value. Choices A, B, and D are incorrect because each has x-values that correspond to more than one y-value.

7. **Choice B is correct.** The expression $3(x - 2)(x + 4)$ can be expanded by first multiplying $(x - 2)$ by 3 to get $(3x - 6)$ and then multiplying $(3x - 6)$ by $(x + 4)$ to get $3x^2 + 6x - 24$. Choice A is incorrect because it is equivalent to $3x^2 - 6x - 24$. Choice C is incorrect because it is equivalent to $x^2 - 6x - 72$. Choice D is incorrect because it is equivalent to $x^2 + 6x - 72$.

8. **Choice B is correct.** An exponential function can be written in the form $y = ab^t$ where a is the initial amount, b is the growth factor, and t is the time. In the scenario described, the variable y can be substituted with n, the total number of bacteria, and the initial amount is given as 500, which yields $n = 500b^t$. The growth factor is 2 because the population is described as being expected to double, which gives the equation $n = 500(2)^t$. The population is expected to double every 4 hours, so for the time to be x days, x must be multiplied by 6 (the number of 4-hour periods in 1 day). This gives the final equation $n = 500(2)^{6x}$. Choices A, C, and D are incorrect. Choice A does not account for the six 4-hour periods per day, choice C uses the number of time periods per day as the growth rate, and choice D uses the number of time periods per day as the growth rate and multiplies the exponent by the actual growth rate.

9. **Choice D is correct.** Subtracting 5 from both sides of the equation gives $x^2 + 5x - 14 = 0$. The left-hand side of the equation can be factored, giving $(x + 7)(x - 2) = 0$. Therefore, the solutions to the quadratic equation are $x = -7$ and $x = 2$. Choice A is incorrect because $7^2 + 5(7) - 9$ is not equal to 5. Choice B is incorrect because $3^2 + 5(3) - 9$ is not equal to 5. Choice C is incorrect because $(-2)^2 + 5(-2) - 9$ is not equal to 5.

10. **Choice A is correct.** The graph of $y = f(x)$ crosses the x-axis at $x = -2$ and $x = 4$, crosses the y-axis at $y = 8$, and has its vertex at the point $(1, -9)$. Therefore, the ordered pairs $(-2, 0)$, $(4, 0)$, $(0, -8)$, and $(1, -9)$ must satisfy the equation for $f(x)$. Furthermore, because the graph opens upward, the equation defining $f(x)$ must have a positive leading coefficient. All of these conditions are met by the equation $f(x) = x^2 - 2x - 8$. Choice B is incorrect. The points $(-2, 0)$, $(4, 0)$, $(0, -8)$, and $(1, -9)$, which are easily identified on the graph of $y = f(x)$, do not all satisfy the equation $f(x) = -x^2 + 2x - 8$; only $(0, -8)$ does. Therefore $f(x) = -x^2 + 2x - 8$ cannot define the function graphed. Furthermore, because the graph opens upward, the equation defining $y = f(x)$ must have a positive leading coefficient, which $f(x) = -x^2 + 2x - 8$ does not. Choice C is incorrect. The points $(-2, 0)$, $(4, 0)$, $(0, -8)$, and $(1, -9)$, which are easily identified on the graph of $y = f(x)$, do not all satisfy the equation $f(x) = (x - 2)(x + 4)$; only $(0, -8)$ does. Therefore, $f(x) = (x - 2)(x + 4)$ cannot define the function graphed. Choice D is incorrect. Though the vertex $(1, -9)$ does satisfy the equation $f(x) = -(x - 1)^2 - 9$, the points $(-2, 0)$, $(4, 0)$, and $(0, -8)$ do not. Therefore, $f(x) = -(x - 1)^2 - 9$ cannot define the function graphed. Furthermore, because the graph opens upward, the equation defining $y = f(x)$ must have a positive leading coefficient, which $f(x) = -(x - 1)^2 - 9$ does not.

11. **Choice C is correct.** The range of a function describes the set of all outputs, y, that satisfy the equation defining the function. In the xy-plane, the graph of $y = -2x^4 + 7$ is a U-shaped graph that opens downward with its vertex at $(0, 7)$. Because the graph opens downward, the vertex indicates that the maximum value of y is 7. Therefore, the range of the function defined by $y = -2x^4 + 7$ is the set of y-values less than or equal to 7. Choices A, B, and D are incorrect in that choice A doesn't cover the entire range, while choices B and D include values that aren't part of the range.

12. **Choice B is correct.** The only value of x that satisfies the equation $(x - 6)^2 = 0$ is 6. Choice A is incorrect because $x = 0$ is the only solution to the equation $(6x)^2 = 0$. Choice C is incorrect because $x = -6$ is the only solution to the equation $(x + 6)^2 = 0$. Choice D is incorrect because although $x = 6$ is a solution to the equation $(x - 6)(x + 6) = 0$, $x = -6$ is another solution to the equation.

13. **Choice B is correct.** Substituting $x + 2$ for x in the original function gives $f(x + 2) = (x + 2)^2 + 3(x + 2) + 1$. Choice A is incorrect. This is $f(x) + 2$. Choice C is incorrect. This is $(x + 2)f(x)$. Choice D is incorrect. This is $f(x) + 2^3$.

14. Choice D is correct. Subtracting 9 from both sides of the equation yields $\sqrt{5x+1} = -6$, and there are no real values of x that result in the square root of a number being negative, so the equation has no real solution. Choices A and C are incorrect due to computational errors in solving for x and not checking the solution in the original equation. Choice B is incorrect because it is the extraneous solution to the equation.

15. Choice A is correct. To solve the equation for x, cross multiply to yield $x(x+2) = 5(2x-3)$. Simplifying both sides of the new equation results in $x^2 + 2x = 10x - 15$. Next, subtract $10x$ from both sides of the equation and add 15 to both sides of the equation to yield $x^2 - 8x + 15 = 0$. By factoring the left-hand side, the equation can be rewritten in the form $(x-3)(x-5) = 0$. It follows, therefore, that $x = 3$ and $x = 5$. Choices B, C, and D are possible results from mathematical errors when solving the equation for x.

16. Choice A is correct. If two angles and the included side of one triangle are congruent to corresponding parts of another triangle, the triangles are congruent. Since angles J and L are congruent to angles P and R, respectively, and the side lengths between each pair of angles, JL and PR, are also equal, then it can be proven that triangles JKL and PQR are congruent. Choices B and C are incorrect because only when two sides and the included angle of one triangle are congruent to corresponding parts of another triangle can the triangles be proven to be congruent, and angles J and P are not included within the corresponding pairs of sides given. Further, side-side-angle congruence works only for right triangles, and it is not given that triangles JKL and PQR are right triangles. Choice D is incorrect because the triangles can only be proven to be similar (not congruent) if all three sets of corresponding angles are congruent.

17. Choice D is correct. A polynomial function of even degree with a positive leading coefficient will have positive end behavior for both very large negative values of x and very large positive values of x. For a polynomial function in the form $f(x) = a(x+2)(x-3)^b$ to be of even degree with a positive leading coefficient, a must be positive and b must be odd. Choice A is incorrect. If a is negative and b is even, the polynomial function will be of odd degree, with a negative leading coefficient. This results in positive end behavior for very large negative values of x and negative end behavior for very large positive values of x. Choice B is incorrect. If a is positive and b is even, the polynomial function will be of odd degree with a positive leading coefficient. This results in negative end behavior for very large negative values of x and positive end behavior for very large positive values of x. Choice C is incorrect. If a is negative and b is odd, the polynomial function will be of even degree with a negative leading coefficient. This results in negative end behavior on both sides of the function.

18. Choice B is correct. By definition, if $(b)^x = y$, where $b > 0$ and $b \neq 1$, then $x = \log_b y$. Therefore, the given equation $2^{5x} = 7$ can be rewritten in the form $\log_2 7 = 5x$. Next, solving for x by dividing both sides of the equation by 5 yields $\frac{\log_2 7}{5} = x$. Choices A, C, and D are incorrect because they are the result of misapplying the identity, which states that if $(b)^x = y$, where $b > 0$ and $b \neq 1$, then $x = \log_b y$.

19. Choice C is correct. Since $x > 0$ and $y > 0$, x can be rewritten as $(\sqrt{x})^2$ and y can be rewritten as $(\sqrt{y})^2$. It follows, then, that $\frac{x-y}{\sqrt{x}-\sqrt{y}}$ can be rewritten as $\frac{(\sqrt{x})^2-(\sqrt{y})^2}{\sqrt{x}-\sqrt{y}}$.

Because the numerator is a difference of two squares, it can be factored as $\frac{(\sqrt{x}+\sqrt{y})(\sqrt{x}-\sqrt{y})}{(\sqrt{x}-\sqrt{y})}$. Finally, dividing the common factors of $(\sqrt{x}-\sqrt{y})$ in the numerator and denominator yields $\sqrt{x}+\sqrt{y}$. Alternatively, if $\frac{x-y}{\sqrt{x}-\sqrt{y}}$ is multiplied by $\frac{\sqrt{x}+\sqrt{y}}{\sqrt{x}+\sqrt{y}}$, which is equal to 1, and therefore does not change the value of the original expression, the result is $\frac{(x-y)(\sqrt{x}+\sqrt{y})}{(\sqrt{x}-\sqrt{y})(\sqrt{x}+\sqrt{y})}$, which is equivalent to $\frac{x\sqrt{x}+x\sqrt{y}-y\sqrt{x}-y\sqrt{y}}{x-\sqrt{xy}+\sqrt{xy}-y}$. This can be rewritten as $\frac{(x-y)(\sqrt{x}+\sqrt{y})}{(x-y)}$, which can be simplified to $\sqrt{x}+\sqrt{y}$. Choice A is incorrect and may be the result of incorrectly combining $\sqrt{x}-\sqrt{y}$. Choice B is incorrect because it is equivalent to $\frac{x-y}{\sqrt{x-y}}$. Choice D is incorrect and may be the result of misusing the conjugate strategy. Instead of multiplying the numerator and denominator by the quantity $(\sqrt{x}+\sqrt{y})$, they may have been multiplied by $(\sqrt{x}-\sqrt{y})$ and then improperly distributed.

20. Choice C is correct. If triangle ABC is defined as a right triangle, where angle C is the right angle, then the cosine of angle A $(\cos A)$ is defined as the ratio $\frac{\text{the length of the side adjacent to angle } A}{\text{the length of the hypotenuse}}$. Since this ratio is defined as $\frac{5}{8}$, then the length of the side opposite angle A, which is also the side adjacent to angle B, can be derived from the Pythagorean theorem: $a^2 + 5^2 = 8^2$, where a represents the length of the side opposite angle A. Solving for a yields $a^2 = 64 - 25 = 39$, so $a = \sqrt{39}$. Then, to determine the cosine of angle B, use the same ratio in relation to angle B: $\cos B = \frac{\text{the length of the side adjacent to angle } B}{\text{the length of the hypotenuse}} = \frac{\sqrt{39}}{8}$. Choice A and D are incorrect and likely results from an error in finding the length of side $\overline{CB}$. Choice B is incorrect and is the value of cos A and sin B.