

# PRACTICE TEST 1

# Section 1: Reading and Writing

## Module 1

TIME: 32 minutes for 27 questions.

DIRECTIONS: Read these passages and answer the questions that follow based on what is stated or implied in the passages and accompanying diagrams, charts, or graphs. Each question has one best answer.

1. *First Woman* tells the tale of Callie Rodriguez, the first woman to explore the Moon. While Callie is a fictional character, the first female astronaut and person of color will soon set foot on the Moon — an historic milestone and part of upcoming NASA Artemis missions. Through a series of graphic novels and digital platforms, *First Woman* aims to \_\_\_\_\_ audiences and inspire the next generation of explorers who will return to the Moon.

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

- (A) anticipate
- (B) captivate
- (C) decimate
- (D) peruse

2. Modern communication has evolved to the point that door-to-door mail delivery is practically \_\_\_\_\_; that is, as out-of-date as having your mail delivered today by a mailman in a horse-drawn cart.

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

- (A) practical
- (B) unexpected
- (C) obsolete
- (D) insular

3. Poets use the beauty of nature and its quickly changing seasons to make a statement about the futility of protesting change. They compare human lives to the evanescence of spring, \_\_\_\_\_ their brief existences with the permanence of the giant boulders that dot the vast landscape.

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

- (A) opposing
- (B) contrasting
- (C) relating
- (D) observing

4. Loss of forested areas poses an increasing threat to the integrity of the nation's natural resources. As these areas are fragmented and disappear, so do the benefits they provide. By providing economic incentives to landowners to keep their forests as forests, we can \_\_\_\_\_ sustainable forest management and support strong markets for forest products.

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

- (A) access
- (B) determine
- (C) enrich
- (D) encourage

5. American bison once numbered 60 million in North America, with the population anchored in what is now the central United States. Many Indigenous cultures, especially in areas where the species was most abundant, developed strong ties with bison and relied upon them for sustenance, shelter, and cultural and religious practices. In the 19th century, bison were nearly driven to extinction through uncontrolled hunting and a U.S. policy of eradication tied to intentional harm against and control of Tribes. By 1889, only a few hundred wild bison remained. The \_\_\_\_\_ of bison contributed to the decline of healthy grassland ecosystems and, eventually, to the Dust Bowl in the 1930s.

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

- (A) persecution
- (B) enhancement
- (C) identification
- (D) persistence

6. The following text is an excerpt from *Labour Policy—False and True* by Lynden Macassey (1922).

Our great industrial difficulty, under modern conditions, is to combine human development with human work, and persuade people to be industrious. Formerly, people worked to benefit themselves; now, they are apt to refrain from working for fear they may benefit others. The injury to employers from such a course is evident; but the detriment to the workers themselves is less obvious, and the \_\_\_\_\_ effect on the community is seldom realized.

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

- (A) beneficial
- (B) common
- (C) inconclusive
- (D) calamitous

7. The following text is an excerpt from *Daughter of the Sky: The Story of Amelia Earhart* by Paul L. Briand Jr. (1960). In this scene, Amelia Earhart, formerly a social worker, is being interviewed to be the first woman to fly across the Atlantic.

The demure Boston social worker survived the examination. Recalling the experience, Amelia said later: “I found myself in a curious situation. If they did not like me at all or found me wanting in too many respects, I would be deprived of the trip. If they liked me too well, they might be loath to drown me. It was, therefore, necessary for me to maintain an attitude of impenetrable mediocrity. Apparently I did, because I was chosen.”

To what quality does Amelia Earhart attribute her success in the interview?

- (A) her blazing courage
- (B) her innate curiosity
- (C) her opaque ordinariness
- (D) her demure respectfulness

8. Honey bees are not native to the New World; they were brought here from Europe in the 1500s and 1600s by colonists. But many of our crops also came from the Old World and evolved in the same places as honey bees. Native pollinators exist in the United States, but honey bees are more prolific and easier to manage, especially on a commercial level for pollination of a wide variety of crops. Almonds, for example, are almost completely dependent on honey bees for pollination. In California, the almond industry makes use of almost three-quarters of all managed honey-bee colonies in the United States brought from all over the country during one short window of time in January and February each year.

Which of the following best describes the function of the underlined sentence in the text as a whole?

- (A) It makes an assertion that the next sentence develops.
- (B) It provides a specific detail that supports the writer’s central claim.
- (C) It identifies a crop that is native to Southern California.
- (D) It provides an example of a crop that is not dependent on pollination by honey bees.

9. The following excerpt contains the concluding lines from Sonnet 73 by William Shakespeare. The speaker of the poem directly addresses someone he loves.

In me thou see'st the glowing of such fire,  
That on the ashes of his youth doth lie  
As the deathbed whereon it must expire,  
Consumed with that which it was  
nourished by.  
This thou perceivest, which makes thy love  
more strong.  
To love that well which thou must leave  
ere long.

Which of the following best expresses the speaker's claim about his lover's reaction to his words?

- (A) You see that I will soon die, and that understanding makes you love me more.
  - (B) You will be quickly consumed by the fires of passion and will cease to love me.
  - (C) Your love for me will fade away and die when I am no longer in your presence.
  - (D) Your youth prevents you from understanding the significance of true love and you will leave me.
10. Carbon is the basic building block of forests. Trees naturally absorb carbon dioxide (CO<sub>2</sub>) through the process of photosynthesis and store it as carbon. That carbon gets locked in the trunks, roots, and leaves of trees and is deposited in surrounding soils for long periods of time. Carbon dioxide (CO<sub>2</sub>) is the most pervasive greenhouse gas (GHG) driving rising global temperatures, so forests play a critical role in moderating CO<sub>2</sub> and reducing the impact of climate change.

Which of the following would provide the strongest counterargument to the claim in this passage?

- (A) At several points in history, global average temperatures have been warmer than those currently observed.
- (B) Atmospheric CO<sub>2</sub> levels positively correlate to average global temperatures and are currently at the highest levels ever recorded.
- (C) Climate is always changing, and the changes in the past century are not any more dramatic than those in previous centuries.
- (D) Climate changes like rising sea levels are unrelated to greenhouse gas emissions.

11. Secretary of the Interior Deb Haaland made history by becoming the first Native American to serve as a U.S. cabinet secretary. Her life story is a legacy of firsts. After running for New Mexico Lieutenant Governor in 2014, Secretary Haaland became the first Native American woman to be elected to lead a state party. She is one of the first Native American women to serve in Congress and her family has a history of public service: Her father served as a 30-year combat Marine, and her mother is a Navy veteran who served as a federal employee for 25 years at the Bureau of Indian Affairs.

Which choice concludes the paragraph most effectively?

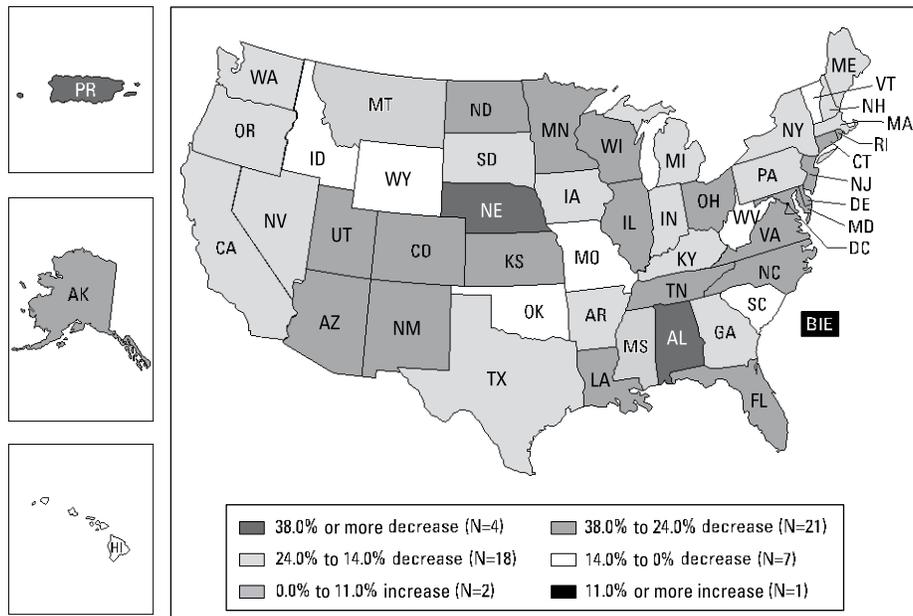
- (A) At the age of 28, Haaland enrolled at the University of New Mexico (UNM) where she earned a Bachelor's degree in English and later earned her J.D. from UNM Law School.
- (B) Secretary Haaland grew up in a military family; her father was a 30-year combat Marine, and, as a military child, she attended 13 public schools before graduating from Highland High School in Albuquerque.
- (C) Secretary Haaland ran her own small business producing and canning Pueblo Salsa, served as a tribal administrator at San Felipe Pueblo, and became the first woman elected to the Laguna Development Corporation Board of Directors.
- (D) As a 35th-generation New Mexican and member of the Pueblo of Laguna, Secretary Haaland has broken barriers and her achievements have opened the doors of opportunity for future generations.

12. While phosphorus is a naturally occurring and essential nutrient for plants and animals, too much of it can cause explosive growth of aquatic plants and algae. This can lead to a variety of water quality problems, including low dissolved oxygen concentrations, which can cause fish kills and harm other aquatic life. A major concern with phosphorus in lakes is a toxic blue-green algae bloom that can cause the lake to be closed to recreation and private landowners.

Which of the following statements by conservation or health experts best support the claim in the passage?

- (A) "Habitat loss, fragmentation, and degradation are some of the primary factors in the decline of native species."
- (B) "This project seeks to preserve and restore the ecosystems through partnerships between government and private sources. Let's get it started."
- (C) "High levels of phosphorus are detrimental to both people and wildlife — just a couple licks of contaminated water can be lethal for pets; it's pretty bad stuff."
- (D) "Phosphorus plays key roles in regulation of gene transcription, activation of enzymes, maintenance of normal pH in extracellular fluid, and intracellular energy storage."

14.



Source: Adapted from U.S. Department of Education

13. The following excerpt is from *O Pioneers!* by Willa Cather (1913).

Of all the bewildering things about a new country, the absence of human landmarks is one of the most depressing and disheartening. The houses were small and were usually tucked away in low places; you did not see them until you came directly upon them. Most of them were built of the sod itself, and were only the inescapable ground in another form. The roads were but faint tracks in the grass, and the fields were scarcely noticeable. The record of the plow was insignificant, like the feeble scratches on stone left by prehistoric races, so indeterminate that they may, after all, be only the markings of glaciers, and not a record of human strivings.

The comparison between the plowed fields and "the feeble scratches on stone left by prehistoric races" serves which of the following functions in the text?

- (A) To introduce the idea of human weakness
- (B) To show that this settlement has a long history
- (C) To describe the effects of glaciers
- (D) To emphasize the primitive quality of the farming

The map represents the change in the number of students who experienced homelessness in school years 2018–2019 and 2020–2021. However, various factors impact data on students who experienced homelessness, making it important to consider recent decreases within the context of longer-term trends. For example, states that experience major natural disasters such as hurricanes and flooding typically identify a larger number of students as homeless in the school year when the disaster occurs.

Based on the information in the text and in the map, which of the following might account for the decrease in homeless students in certain states in the years immediately after a natural disaster like a hurricane?

- (A) During a natural disaster, many students move from their home state to another state and remain homeless in their new location.
- (B) In certain states that are subject to frequent hurricanes, many students are unable to return to homes that were destroyed and cannot be rebuilt.
- (C) During the year the disaster occurs, many students find themselves homeless and the number of homeless students rises; within the next year, however, many of these students obtain housing.
- (D) A factor that impacted student homelessness was a decrease in student enrollment overall during the COVID-19 pandemic.

15. The following passage is an excerpt from *Biology For Dummies, 2nd Edition*, by Rene Kratz and Donna Siegfried (Wiley).

Some species, called keystone species, are so connected with other organisms in their environment that their extinction changes the entire composition of species in the area. As biodiversity decreases, keystone species may die out, causing a ripple effect that leads to the loss of many more species. If biodiversity gets too low, then the future of life itself becomes threatened. An example of a keystone species is the purple sea star, which lives on the northwest Pacific coast of the United States. Purple sea stars prey on mussels in the intertidal zone. When the sea stars are present, they keep the mussel population in check, allowing a great diversity of other marine animals to live in the intertidal zone. If the sea stars are removed from the intertidal zone, however, the mussels take over, and many species of marine animals disappear from the environment.

The text implies which of the following about large populations of mussels?

- (A) They become keystone species in their environment.
- (B) They may displace other species.
- (C) They do not compete for food with purple sea stars.
- (D) They are a major cause of extinctions.

16. About a century ago, in August 1914, what participants called “The Great War” and, ironically, “The War to End All Wars,” \_\_\_\_\_ . We know this conflict as World War I, one of the bloodiest periods in human history. When it ended in 1918, about 9 million soldiers were dead and the health of 7 million more was permanently disabled.

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

- (A) begun  
(B) had began  
(C) has begun  
(D) had begun
17. After working on the construction of his dream go-kart for seven months, David decided to test it out. He took it to the top of the hill in his neighborhood park. Turning around to greet his friends as they arrived for the inaugural run, he momentarily let go of the tethers. The runaway go-kart sped down the \_\_\_\_\_ momentum as it careened out of control.

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

- (A) hill; gaining  
(B) hill. Gaining  
(C) hill, gaining  
(D) hill gaining

18. In 1859, Thomas Austin, an Australian who enjoyed hunting, released 24 rabbits on his land. The hunter stated that “introduction of a few rabbits could do little harm” and “might provide a touch of home.” He liked to hunt. Before this time, \_\_\_\_\_ some domestic rabbits in Australia, mostly in cages or other enclosures. With a moderate climate, the wild rabbits bred all year round. Soon Australia had a rabbit problem with more than 200 million rabbits overrunning the land.

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

- (A) there were  
(B) there was  
(C) their were  
(D) they’re was
19. Named in honor of the \_\_\_\_\_ Hubble Space Telescope is a large, space-based observatory, which has revolutionized astronomy since its launch and deployment by the space shuttle Discovery in 1990. Far above rain clouds, light pollution, and atmospheric distortions, Hubble has a crystal-clear view of the universe. Scientists have used Hubble to observe some of the most distant stars and galaxies yet seen, as well as the other planets in our solar system.

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

- (A) trailblazing astronomer, Edwin Hubble, the  
(B) trailblazing, astronomer Edwin Hubble, the  
(C) trailblazing astronomer Edwin Hubble, the  
(D) trailblazing, astronomer, Edwin Hubble the

20. The following text is adapted from *Crime: Its Causes and Treatment* by Clarence Darrow (1922).

Strictly speaking, a crime is an act forbidden by the law of the land, and one which is considered sufficiently serious to warrant providing penalties for its commission. It does not necessarily follow that this act is either good \_\_\_\_\_ punishment follows for the violation of the law and not necessarily for any moral transgression.

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

- (A) or bad; the
- (B) or bad, the
- (C) nor bad when
- (D) nor bad because the

21. The view from the top of the mountain was \_\_\_\_\_ 30-mile drive to the base of the mountains and then the two-hour trek up the path left us too exhausted to appreciate the sight.

Which of the following completes the text with the most logical transition?

- (A) spectacular; however, the
- (B) spectacular. Consequently, the
- (C) spectacular. For example, the
- (D) spectacular; furthermore, the

22. The NASA Juno mission, launched in August of 2011, was expected to arrive at its destination in July of 2016. The mission had a far-seeking \_\_\_\_\_ to the planet Jupiter to uncover the secrets of its origin and to search for evidence of water and ammonia.

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

- (A) goal: to travel
- (B) goal, to travel
- (C) goal; to travel
- (D) goal. To travel

23. Architect I. M. Pei is celebrated for his brilliant designs that have become attractions in cities around the world. He has designed such famous buildings as the John F. Kennedy Library in Boston, the Bank of China Tower in Hong Kong, and the Museum of Islamic Art in Qatar. His design for the main entrance to the Louvre, with \_\_\_\_\_ iconic glass and steel pyramid, has become a Parisian landmark.

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

- (A) their
- (B) it's
- (C) its'
- (D) its

24. The great Persian Empire extended from the shores of the Mediterranean to the east, far beyond the knowledge of the Greeks. \_\_\_\_\_ knowledge of the interior of Asia was very imperfect, and Alexander's expedition was rather that of an explorer than of a conqueror. How he overthrew the Persians and subdued an area as large as Europe in the space of twelve years reads like a romance rather than fact.

Which of the following completes the text with the most logical transition?

- (A) However, their  
(B) Indeed, their  
(C) In contrast, their  
(D) On the other hand, their
25. The value of Paramhansa Yogananda's *Autobiography of a Yogi* is greatly enhanced by the fact that it is one of the few books in English about the wise men of India which \_\_\_\_\_, not by a journalist or foreigner, but by one of their own race and training — in short, a book *about yogis by a yogi*. As an eyewitness recountal of the extraordinary lives and powers of modern Hindu saints, the book has importance both timely and timeless.

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

- (A) was wrote  
(B) had been written  
(C) has been written  
(D) written

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

- Women have traditionally been caregivers but were prohibited from professionally practicing medicine until recent times.
- In Medieval times, women had limited roles as healers; Hildegard of Bingen was the most notable of Medieval healers.
- In 1849, Elizabeth Blackwell was the first woman to receive a medical degree from a U.S. university after being rejected from every medical school in the country except Geneva Medical College in New York.
- While the male students first thought Blackwell's application was a joke, they ultimately were impressed by her fierce dedication and supported her inclusion in their class.
- Blackwell founded the New York Infirmary for Indigent Women and Children, where she trained other women to become nurses and doctors.

The student wants to emphasize the distinguishing qualities of Elizabeth Blackwell. Which choice most effectively accomplishes this goal?

- (A) Although she lived in Medieval times, Hildegard of Bingen was a trailblazer who created a path for Elizabeth Blackwell to follow.
- (B) Without the intervention of the males in her medical school class at Geneva Medical College, Elizabeth Blackwell would never have become the first female physician in the U.S.
- (C) Following a path first blazed by Hildegard of Bingen, Elizabeth Blackwell overcame gender discrimination with courage and determination and established the place of women as professional healthcare providers.
- (D) By admitting Elizabeth Blackwell, Geneva Medical College took the first steps toward establishing a place for women in the practice of medicine.

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

- An enormous crash near Johannesburg, South Africa, created the Vredefort crater, presently about 9 miles in diameter.
- Based on physical evidence, scientists postulate that what was likely an asteroid crashed into Earth about 2 billion years ago.
- Scientists speculate that the crater was originally much larger and that erosion has made it difficult to estimate its original size.
- Scientists study the crater to gain new insights into the environments of early Earth because it provides invaluable information about the past.
- Scientists try to simulate the impacts of such events on Earth to determine their effects in the past and the future.

The student wants to create a statement of the significance of the findings obtained from the study of the Vredefort crater. Which choice most effectively accomplishes the student's goal?

- (A)** The discovery of the Vredefort crater was a great boon to scientists because it happened about 2 billion years ago.
- (B)** The Vredefort crater is important to scientists in that it preserves an almost continuous record of Earth's history.
- (C)** Because of their work on the Vredefort crater, scientists can simulate impact events on Earth and other planets.
- (D)** The team studying the crater has used a modern approach to obtain new insights into the environment of early Earth.

**Check Your Work.**

Continue to the next module when you're ready to move on.

## Module 2

TIME: 32 minutes for 27 questions.

DIRECTIONS: Read these passages and answer the questions that follow based on what is stated or implied in the passages and accompanying diagrams, charts, or graphs. Each question has one best answer.

1. Fungus beetles thrive in moist conditions where they feed on the mold that forms in these environments. Because their food is readily available and easily accessed, they are quite \_\_\_\_\_ and seldom move more than a foot or two in any direction.

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

- (A) sociable
- (B) fragile
- (C) sedentary
- (D) scarce

2. Biodiversity increases the chance that at least some living things will survive in the face of large changes in the environment, which is why protecting it is \_\_\_\_\_. The combined effect of various human actions in Earth's ecosystems is reducing the planet's biodiversity. In fact, the rate of extinctions is increasing along with the size of the human population. No one knows for certain how extensive the loss of species due to human impacts will ultimately be, but there's no question that human practices such as hunting and farming have already caused numerous species to become extinct.

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

- (A) crucial
- (B) unimportant
- (C) reliable
- (D) inadequate

3. In their various industries, the Egyptians made use of gold, silver, bronze, metallic iron, and copper, and their oxides, manganese, cobalt, alum, cinnabar, indigo, madder, brass, white lead, and lampblack. There is clear evidence that they smelted iron ore as early as 3400 b.c.e., maintaining a blast by means of leather tread-bellows. They also \_\_\_\_\_ temper the metal, and to make helmets, swords, lance-points, ploughs, tools, and other implements of iron.

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

- (A) refused to
- (B) were reluctant to
- (C) contrived to
- (D) grew to

4. Clouds are an important area of research on Mars (and on Earth, too) because of their feedback on the climate — they can reflect incoming sunlight, which has a cooling effect, and \_\_\_\_\_ the planet's outgoing infra-red radiation, which has a warming effect. In fact, clouds may have played a crucial role in sustaining a warm atmosphere on early Mars, enabling liquid water to flow and carve out channels we see in the geology today.

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

- (A) monitor
- (B) absorb
- (C) characterize
- (D) interpret

5. The Streamflow Monitoring Using Computer Vision Machine Learning project will develop a lower-cost method to quantify streamflow that can be used by states, tribes, and other organizations. This approach can supplement the current methods — that is, deployment of hydrological measurement equipment (stream gauges) that is costly and \_\_\_\_\_ specialized expertise. This user-friendly alternative relies on continuous photo imagery and machine learning to estimate streamflow.

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

- (A) requires
  - (B) prefers
  - (C) portrays
  - (D) predicts
6. In 1884, a conference in Washington, D.C., agreed to establish a single “prime” meridian (0° longitude), passing through Greenwich. This was for both longitude and timekeeping. This 0° meridian divides the Eastern from the Western Hemisphere. Today, one can visit the Royal Observatory and straddle this 0° meridian with one foot in each hemisphere. The location of this prime meridian is \_\_\_\_\_, meaning it could be chosen to be anywhere.

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

- (A) specific
- (B) dynamic
- (C) dubious
- (D) arbitrary

7. The following is an excerpt from Charles Darwin’s *On the Origin of Species* (1859).

A struggle for existence inevitably follows from the high rate at which all organic beings tend to increase. Every being, which during its natural lifetime produces several eggs or seeds, must suffer destruction during some period of its life, and during some season or occasional year; otherwise, on the principle of geometrical increase, its numbers would quickly become so inordinately great that no country could support the product. Hence, as more individuals are produced than can possibly survive, there must in every case be a struggle for existence, either one individual with another of the same species, or with the individuals of distinct species, or with the physical conditions of life.

Which choice best describes the function of the underlined portion in the text as a whole?

- (A) It gives a specific example to support the generalization in the first sentence.
- (B) It posits a new idea to counter a previously accepted conclusion.
- (C) It provides further details about the particular species referred to earlier in the text.
- (D) It draws a logical conclusion from the information in the previous sentences.

8. Non-native species are plants and animals living in areas where they do not naturally exist. “Non-native species” and “invasive species” cannot be used interchangeably. Many commonly grown fruits and vegetables are not native to the U.S. For example, tomatoes and hot peppers originated from South America, while lettuce was first grown by the Egyptians. Domestic cows are non-native to North America and were introduced as a food source and considered to be a beneficial organism in an agricultural setting.

Which choice best describes the function of the underlined portion in the text as a whole?

- (A) It clarifies by elaborating on terms used in the previous sentence.
- (B) It offers a specific example of a fruit and vegetable to support the generalization in the previous sentence.
- (C) It notes an exception to the terms used in the previous sentence.
- (D) It presents a counterclaim to the assertion in the first sentence.

9. The following text is adapted from *Bohemians of the Latin Quarter* by Henri Murger (1888).

The dinner took place at a Provençal restaurant in the Rue Dauphine, celebrated for its literary waiters and its “Ayoli” [a sauce similar to mayonnaise]. As it was necessary to leave room for the supper, they ate and drank in moderation. The acquaintance, begun the evening before between Colline and Schaubard and later on with Marcel, became more intimate; each of the young fellows hoisted the flag of his artistic opinions, and all four recognized that they had like courage and similar hopes. Talking and arguing they perceived that their sympathies were akin, that they had all the same knack in that chaff which amuses without hurting, and that the virtues of youth had not left a vacant spot in their heart, easily stirred by the sight of the narration of anything noble.

According to the text, what is true of the “young fellows?”

- (A) They each arrived in Paris from a different country.
- (B) They expressed very diverse opinions about art and their own aspirations.
- (C) They shared similar views on life, and their natures were very much alike.
- (D) They argued and disagreed strongly about the virtues of youth and nobility.

10. The following excerpt is from the U.S. Fish & Wildlife Services online article, “Leave it to Beaver: Partners Collaborate on Beaver Dam Analog Project.”

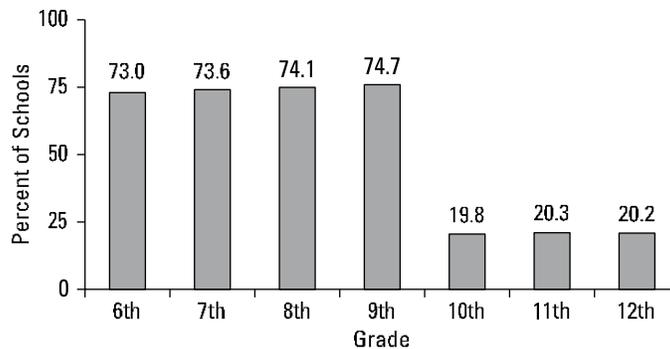
Historically, Thompson Creek meandered through the lower watershed; but over a century ago, it was straightened to accommodate for agriculture, helping to reduce flooding for farmers. While the straightened channel was beneficial to the farmers, it had less desirable impacts on watershed health. The straighter, less natural flow path increased the speed of the water, led to the erosion of the bank, and transported more sediment and pollutants downstream into Newman Lake. This incision of the creek has also caused a disconnection between the creek and its surrounding floodplains, which has allowed for the dominance of reed canary grass in the area, a non-native species that outcompetes more diverse and beneficial vegetation.

Which choice best states the main purpose of the text?

- (A) To summarize the results of a study of erosion in Newman Lake.
- (B) To present a specific example of the positive impact of straightening Thompson Creek.
- (C) To explain an unintended but undesirable effect of human intervention.
- (D) To speculate on the effects of competition between native grasses and non-native species.

11.

**Percent of Schools That Taught a Required Health Education Course in Each Grade**



Concerned about lack of awareness of certain health issues among students in the school system, the City School Superintendent decided to track the number of schools that provided health education in each grade of secondary school. Based on the data in the graph above, he concluded that most schools in the district were consistently providing a health education course in all grades of secondary school.

Which choice describes data that weakens the Superintendent’s conclusion?

- (A) All schools offered students some health education in every grade from 6 through 12.
- (B) Fewer schools offered students in grades 10 through 12 a health education course than they offered students in grades 6 through 9.
- (C) More schools offered students a health education course in grade 9 than in grade 6.
- (D) No schools offered a health education course to students in grades 1 through 5.

- 12.** Veterinarians who study animal behavior have entered a relatively new area of study. In earlier times, what was going on inside an animal's mind was not a concern. The Greek philosopher Aristotle (384–322 b.c.e.) said that animals couldn't think. French philosopher Rene Descartes (1596–1650 c.e.) compared the cry of an animal to the squeak of a clock spring, a mechanical reaction. Even in the modern era, animal behaviorists are reluctant to commit to the existence of complex emotions in animals for fear of being accused of anthropomorphism, ascribing human traits to nonhuman beings, and are belittled for being "unscientific" when they refer to an animal's inner life.

Which of the following quotes most logically supports the claim in the last sentence of the text?

- (A) Scientist Philip Low says, "If you ask my colleagues whether animals have emotions and thoughts, many will drop their voices or change the subject."
- (B) Scientist Philip Low says, "My cat meows plaintively every time I leave the house."
- (C) Scientist Philip Low says, "Every day we learn more about animals' cognitive abilities, their emotional capacities, and their moral lives."
- (D) Scientist Philip Low says, "Animal behavior can be easily explained in terms of the stimulus-response theory."

- 13.** The following text is an excerpt from "Sound and Sense," a poem by Alexander Pope (1688–1744).

True ease in writing comes from art, not chance,  
As those move easiest who have learned to dance.  
'Tis not enough no harshness gives offense,  
The sound must seem an echo to the sense;  
Soft is the strain when Zephyr\* gently blows,  
And the smooth stream in smoother numbers flows;

\* God of the west wind

Which choice makes a statement with which the poet would most likely agree?

- (A) Writing, like dance, arises from natural talent.
- (B) Writing should be focused on content rather than sound.
- (C) A writer must listen to and respond to the harshness in nature.
- (D) It is possible to become a skilled writer through hard work.

14. Charles Dickens's novel *Great Expectations* tells the story of Pip, a poor orphan in mid-19th century England. An unexpected encounter with a convict results in a dramatic change in Pip's life. He becomes wealthy, deserts his old friends, and ultimately learns that he has lost more than he has gained.

Which quotation from *Great Expectations* most effectively illustrates the claim?

- (A) "The broken heart. You think you will die, but you just keep living, day after day after terrible day."
- (B) "Pause you who read this, and think for a moment of the long chain of iron or gold, of thorns or flowers, that would never have bound you, but for the formation of the first link on one memorable day."
- (C) "There was a long hard time when I kept far from me, the remembrance, of what I had thrown away when I was quite ignorant of its worth. But, since my duty has not been incompatible with the admission of that remembrance, I have given it a place in my heart."
- (D) "I looked at the stars, and considered how awful it would be for a man to turn his face up to them as he froze to death, and see no help or pity in all the glittering multitude."

15. The following excerpt is from the 2022 Study Update from the Agricultural Health Study (AHS).

In some previous studies, agricultural work and occupational pesticide use have been associated with increased rates of renal cell carcinoma (RCC), the most common form of kidney cancer. However, few of those studies had investigated links to specific pesticides. Researchers evaluated associations with 38 pesticides, including one labeled 2,4,5-T, that were relatively commonly used at enrollment among pesticide applicators in the Agricultural Health Study, 308 individuals who developed RCC during follow-up until 2015. They hypothesized that certain pesticides, including and other agricultural exposure might influence the development of kidney disease and kidney cancer.

Which of the findings, if true, would directly support the researchers' hypothesis?

- (A) Farmers and agricultural workers face health risks from work-related injuries at a rate of 18 deaths per 100,00 workers.
- (B) Farmers and agricultural workers face stress from environmental factors, such as droughts, floods, wildfires, pests, and diseases affecting crops and livestock, as well as from working long hours, financial concerns, and feelings of isolation and frustration.
- (C) Farmers and agricultural workers who use methods of organic food production (avoiding artificial fertilizers and pesticides and using crop rotation and other forms of husbandry to maintain soil fertility, control weeds and diseases) were less likely to report incidences of cancer.
- (D) Farmers and agricultural workers who use the herbicide 2,4,5-T were three times more likely to develop RCC compared with those who never used this product.

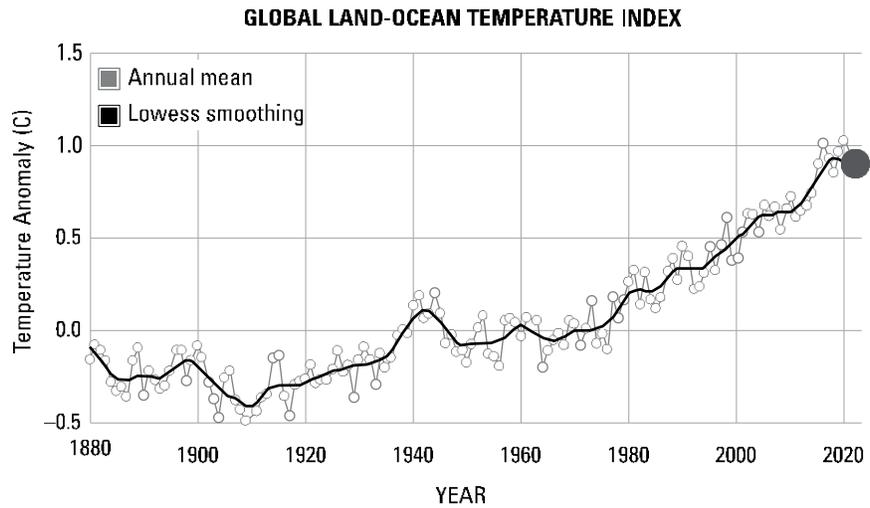
16. A branch of the Nez Percé tribe from the Pacific Northwest refused to be relocated to a reservation and attempted to flee to Canada. The U.S. Cavalry pursued them and forced them to return. In 1877, Chief Joseph of the Nez Percé tribe surrendered to General Oliver O. Howard. The following text is an excerpt from his speech.

“If the white man wants to live in peace with the Indian he can live in peace. There need be no trouble. Treat all men alike. Give them all an even chance to live and grow. All men were made by the same Great Spirit Chief. They are all brothers. The earth is the mother of all people, and all people should have equal rights upon it. You might as well expect all rivers to run backward as that any man who was born a free man should be contented penned up and denied liberty to go where he pleases.”

Which choice best expresses the main idea of Chief Joseph’s speech?

- (A) The Native American people had settled this land long before the arrival of the Europeans and deserve to have their land returned to them.
- (B) Freedom is the natural state of every man, and every man deserves the right to live his life fairly and equally.
- (C) Freedom should be available to all men and women, as long as they obey the laws that govern their society.
- (D) Although they have lost this battle, the Native Americans will continue to fight for control of their land and their rivers.

17.



Source: [climate.nasa.gov](https://climate.nasa.gov)

Lowess smoothing (Locally Weighted Scatterplot Smoothing) is a tool used in data analysis that creates a smooth line through a time plot or scatter plot to help you to see a relationship between variables and predict trends.

Among environmental scientists, there is a strong consensus that global surface temperatures have increased in recent decades and that the trend is caused by human-induced emissions of greenhouse gases. The extra energy that results from human activities has warmed the atmosphere, ocean, and land, and widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred. The actual warming of temperatures is something they say they can document. In fact, according to an intergovernmental panel on climate change, the scientific evidence that points to climate change is undeniable.

Which of the following findings, if true, would appear to weaken the conclusion of the intergovernmental panel?

- (A) The global mean sea levels have doubled compared to the 20th-century trend of 1.6 mm per year, and this is accelerating slightly every year. The global sea levels rose about 8 inches in the last century.
- (B) The increased heat in the atmosphere from greenhouse gas emissions has been absorbed by the oceans, with the top 700 meters (about 2,300 feet) of ocean showing warming of more than 0.4 degree Fahrenheit since 1969.
- (C) Core measures of the Arctic ice show that it has increased in volume since 2012 — by 50 percent in 2012 alone.
- (D) Tracking global atmospheric temperatures since the 1800s, scientists point to a steady rise with a stronger period in the 1970s, a lull in the 1990s, and a return to the rising pattern in the 2000s.

**18.** Habitat protection afforded by the Endangered Species Act, the federal government's banning of the insecticide DDT, and conservation actions taken by the American public have helped bald eagles make a remarkable recovery. Bald eagle sightings are now a common occurrence in many parts of the country. When America adopted the bald eagle as the national symbol in 1782, anecdotal accounts stated that the country may have had as many as 100,000 nesting eagles. The first major decline of the species probably began in the mid to late 1800s, coinciding with the decline of waterfowl, shorebirds, and other prey. Although they primarily eat fish and carrion, bald eagles used to be considered marauders that preyed on chickens, lambs, and domestic livestock.

\_\_\_\_\_ large raptors were shot in an effort to eliminate a perceived threat. Coupled with the loss of nesting habitat, bald eagle populations declined. In 1940, noting that the species was threatened with extinction, Congress passed the Bald Eagle Protection Act, which prohibited killing, selling, or possessing the species. A 1962 amendment added the golden eagle, and the law became the Bald and Golden Eagle Protection Act.

Which of the following completes the text with the most logical transition?

- (A) Consequently, the
- (B) Nonetheless, the
- (C) For instance, the
- (D) In addition, the

19. A tornado is a narrow, violently rotating column of air \_\_\_\_\_ from a thunderstorm to the ground. Because wind is invisible, it is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust, and debris. Tornadoes can be among the most violent phenomena of all atmospheric storms we experience.

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

- (A) that extend
  - (B) by which it extends
  - (C) that extends
  - (D) in which it extends
20. Many behavioral studies about the role of play in developing a cat's predatory skills conclude that play is not necessary for the cat to be a successful hunter. The evidence for this conclusion lies in studies of cats that are reared in isolation; \_\_\_\_\_ they have no opportunity to engage in playful activities with other cats.

Which of the following completes the text with the most logical transition?

- (A) thus,
- (B) similarly
- (C) although
- (D) in reality,

21. Some sugars used by manufacturers in foods and drinks that you buy may be different from what you traditionally think of as sugar, like sucrose or table sugar. These sugars meet the chemical definition of a \_\_\_\_\_ metabolized, or used by your body, differently than traditional sugars like sucrose.

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

- (A) sugar, which they are
  - (B) sugar, so it is
  - (C) sugar, and it is
  - (D) sugar, but they are
22. When I was growing up, my family always went to a lake in the Adirondack Mountains for a week of camping. My brothers and \_\_\_\_\_ would spend hours fishing, swimming, and searching for tadpoles in the lake.

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

- (A) we
  - (B) me
  - (C) I
  - (D) them
23. The faculty committee investigating the accident in the chemistry lab was less concerned about why the experiment was conducted than in whether \_\_\_\_\_ conducted with all safety precautions in place.

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

- (A) they were
- (B) they was
- (C) it were
- (D) it was

24. The first edition of the *Green Book*, a listing of lodgings, restaurants, and businesses that were safe for Black travelers, was published by postal employee Victor Green and his wife in 1936. Timing is important to understanding its \_\_\_\_\_ started the publication within an established context of protest and social action by African Americans eager to push back against discrimination.

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

- (A) success; Green  
(B) success, for which Green  
(C) success was: Green  
(D) success. The reason was because Green
25. Our planet Earth is composed of several layers. Each layer has a unique density (density = mass/volume). Scientists believe that all planets formed on the basis of \_\_\_\_\_ the layering of Earth is a result of gravitational pull. The densest layer (inner core) is at the center and the least dense layer (crust) is the outermost layer. The atmosphere, composed of gases, can technically be considered a layer as well and is obviously lighter than the crust.

Which of the following completes the text with the most logical transition?

- (A) gravity; therefore,  
(B) gravity; however,  
(C) gravity, but  
(D) gravity; instead,

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

- The density of Jupiter is  $1.326\text{g/cm}^3$ .
- Jupiter is larger than any other planet in the solar system.
- The stripes and swirls on the surface of Jupiter are cold, windy clouds of ammonia and water.
- The density of Saturn is  $0.687\text{g/cm}^3$ .
- Saturn has the most complicated rings — primarily chunks of ice — of any planet.
- Saturn is a massive ball made mostly of hydrogen and helium.

The student wants to compare the size of the two planets. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- (A) Some of the planets in the solar system like Jupiter and Saturn are mostly composed of gases.
- (B) Both Saturn and Jupiter have distinctive surface features which have been captured in images taken by NASA spacecraft.
- (C) Although both Saturn and Jupiter are composed of similar gases, Jupiter is bigger and denser than Saturn.
- (D) Saturn's rings are composed mostly of chunks of ice while Jupiter's distinctive stripes and swirls are clouds.

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

- Robert Frost wrote the poem, “Nothing Gold Can Stay” (1923), about how quickly things in nature fade.
- Frost often wrote about scenes from rural life in New England.
- The poem, “Nothing Gold Can Stay,” was published in a collection called *New Hampshire* the same year (1923), which would later win the 1924 Pulitzer Prize.
- In “Nothing Gold Can Stay,” Frost applies the images of nature to the larger themes such as the passage of time.
- Frost draws a parallel from nature to the short-lived quality of beauty, youth, and life in “Nothing Gold Can Stay.”

The student wants to create a statement that will introduce the poet and his major themes to an audience unfamiliar with Robert Frost. Which choice most effectively uses information from the notes to accomplish this task?

- (A)** Pulitzer Prize–winning poet Robert Frost often uses nature images from rural New England to express themes about nature and human existence.
- (B)** Robert Frost wrote “Nothing Gold Can Stay” in 1923, and the collection of poems that it was published in won a Pulitzer Prize.
- (C)** “Nothing Gold Can Stay,” written by Robert Frost in 1923, is about the fleeting quality of nature, youth, and time.
- (D)** Robert Frost, who wrote many poems, is famous for his poems about life and nature.

**Check your work.**

Continue to the next module when you’re ready to move on.

# Section 2: Math

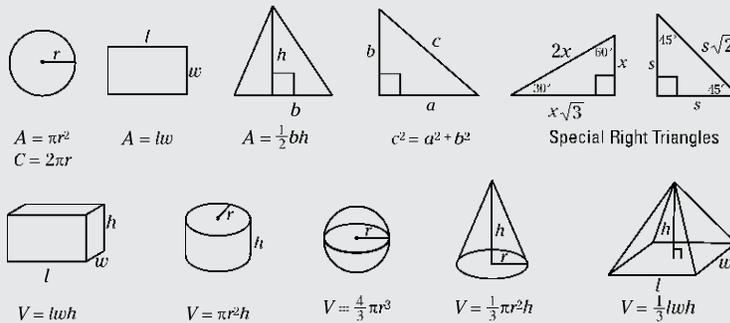
## Module 1

**TIME:** 35 minutes for 22 questions.

**DIRECTIONS:** For multiple-choice questions, choose only one answer for each question. For fill-in questions, write only one answer, even if you find more than one correct answer. Don't include symbols such as a percent sign, comma, or dollar sign.

**NOTES:**

- All numbers used in this exam are real numbers.
- All figures lie in a plane.
- All figures may be assumed to be to scale unless the problem specifically indicates otherwise.
- The domain of a given function  $f$  is the set of all real numbers  $x$  for which  $f(x)$  is a real number, unless the problem specifically indicates otherwise.
- You may use a calculator.

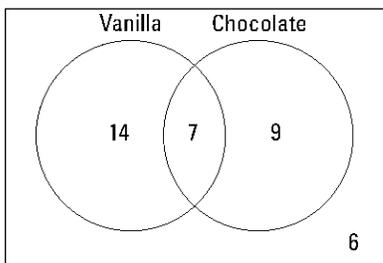


- The number of degrees in a circle is 360.
- The number of radians in a circle is  $2\pi$ .
- The sum of the measures of the angles of a triangle is 180.

1. In the  $xy$ -coordinate plane, what is the area of the rectangle with opposite vertices at  $(-3, -1)$  and  $(3, 1)$ ?

(A) 3  
(B) 6  
(C) 9  
(D) 12

2. The following Venn diagram shows the ice-cream flavor choice of 36 children at an ice-cream party. Each child could choose vanilla ice cream, chocolate ice cream, both, or neither. What percent of the children had chocolate ice cream only?



(A) 10%  
(B) 25%  
(C) 50%  
(D) 75%

3. If  $\frac{4}{5}$  of a number is 24, what is  $\frac{1}{5}$  of the number?

(A) 5  
(B) 6  
(C) 8  
(D) 18

4. The formula below is used in finance to compute  $A$ , the payment Amount per period, where  $P$  is the initial Principal, or loan amount,  $r$  is the interest rate per period, and  $n$  is the total number of payments per period.

$$A = P \frac{r(1+r)^n}{(1+r)^n - 1}$$

Which of the following correctly gives  $P$  in terms of  $A$ ,  $n$ , and  $r$ ?

(A)  $P = A \frac{r(1+r)^n}{(1+r)^n - 1}$

(B)  $P = A \frac{(1+r)^n - 1}{r(1+r)^n}$

(C)  $P = A \frac{r(1+r)^n - 1}{(1+r)^n}$

(D)  $P = A \frac{(1+r)^n}{r(1+r)^n - 1}$

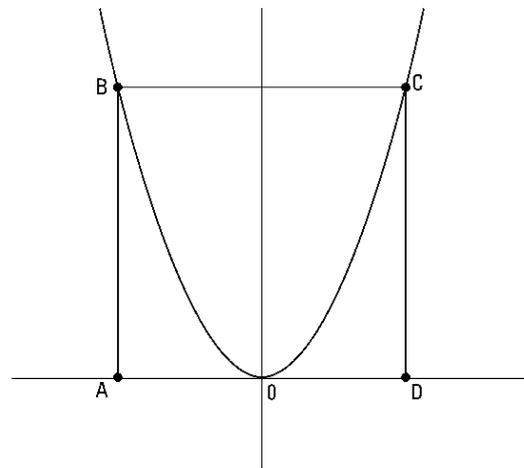
5. A circle in the  $xy$ -coordinate plane has a center of  $(2, 5)$  and a radius of 3. Which of the following is an equation of the circle?

(A)  $(x - 2)^2 + (y - 5)^2 = 9$

(B)  $(x - 2)^2 + (y - 5)^2 = 3$

(C)  $(x + 2)^2 - (y + 5)^2 = 9$

(D)  $(x + 2)^2 - (y + 5)^2 = 3$



6. In the figure above,  $ABCD$  is a square and points  $B$ ,  $C$ , and  $O$  lie on the graph of  $y = \frac{x^2}{k}$ , where  $k$  is a constant. If the area of the square is 36, what is the value of  $k$ ?

(A) 1.5  
(B) 3  
(C) 4.5  
(D) 6

7. How much greater than  $t - 5$  is  $t + 2$ ?

(A) 2  
(B) 4  
(C) 5  
(D) 7

8.  $f(x) = x^3 - 4x$

$g(x) = x^2 + x - 2$

Which of the following expressions is

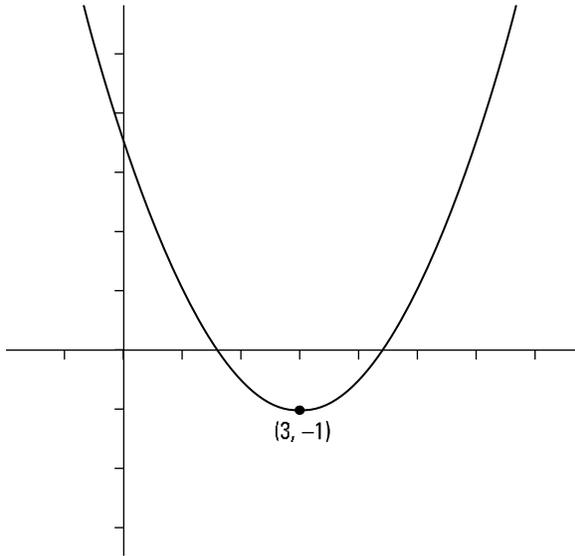
equivalent to  $\frac{f(x)}{g(x)}$ , for  $x > 2$ ?

(A)  $\frac{x-2}{x(x-1)}$

(B)  $\frac{x-1}{x(x-2)}$

(C)  $\frac{x(x-1)}{x-2}$

(D)  $\frac{x(x-2)}{x-1}$



9. In the parabola above, the vertex is at  $(3, -1)$ .

Which of the following are  $x$ -coordinates of two points on this parabola whose  $y$ -coordinates are equal?

(A) 1 and 5

(B) 1 and 6

(C) 2 and 5

(D) 2 and

6

10. The price of a television was first decreased by 10 percent and then increased by 20 percent.

The final price was what percent of the initial price?

(A) 88%

(B) 90%

(C) 98%

(D) 108%

11. In the  $xy$ -plane, the center of a circle has coordinates  $(-2, 4)$ . If one endpoint of a diameter of the circle is  $(-2, 1)$ , what are the coordinates of the other endpoint of this diameter?

(A)  $(-5, 4)$

(B)  $(-2, 6)$

(C)  $(-2, 7)$

(D)  $(1, 4)$

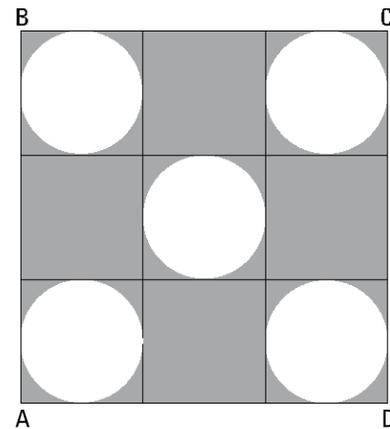
12. If  $\frac{3n}{2p} = \frac{4}{3}$ , what is the value of  $\frac{n}{p}$ ?

(A) 2

(B) 1

(C)  $\frac{9}{8}$

(D)  $\frac{8}{9}$



13. Square  $ABCD$  is divided into nine equal squares, five of which have circles inscribed in them. If  $AB = 6$ , what is the total shaded area?

(A)  $24 - 10\pi$

(B)  $24 - 5\pi$

(C)  $36 - 10\pi$

(D)  $36 - 5\pi$

14. In the  $xy$ -plane, line  $l$  passes through  $(-1, 3)$  and is parallel to the line  $4x + 2y = k$ . If line  $l$  passes through the point  $(p, -p)$ , what is the value of  $p$ ?

(A)  $-2$

(B)  $-1$

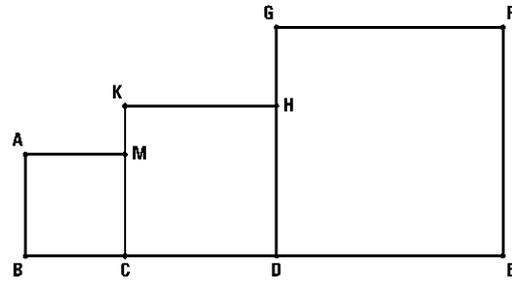
(C) 1

(D) 2

15.  $y = x^2 - 2x + 3$   
 $y = -3x + 5$

How many solutions are there to the system of equations above?

- (A) The answer cannot be determined with the information given.  
 (B) There are no solutions.  
 (C) There is exactly one solution.  
 (D) There are exactly two solutions.
16. Find the smallest even number divisible by 3, 5, and 7.
17. A certain fraction is equivalent to  $\frac{2}{3}$ . If the fraction's denominator is 12 less than twice its numerator, find the denominator of the fraction.
18. If  $p > 0$  and  $p^2 = 3p + 40$ , what is the value of  $p$ ?
19. If  $x^2 - 3x = 50$  and  $x^2 + 5x = 12$ , what is the value of  $x^2 + x$ ?



20. In the preceding figure, each shape is a square,  $BC$  has length 4, and  $CD$  has length 7. Points  $A$ ,  $K$ , and  $G$  all lie in the same line. Find the length of  $DE$ .
- (A) 10  
 (B) 11  
 (C) 11.5  
 (D) 12.25
21. Which values of  $x$  satisfy both functions  $f(x) = 3$  and  $f(x) = x^2 + 2$ ?
- (A)  $-1$  and  $0$   
 (B)  $-1$  and  $1$   
 (C)  $0$  and  $1$   
 (D) There are no values of  $x$  which satisfy both functions.
22. If  $xy = 120$ , and  $\frac{1}{x} + \frac{1}{y} = \frac{1}{4}$ , find  $x + y$ .

Check your work.

Continue to the next module when you're ready to move on.

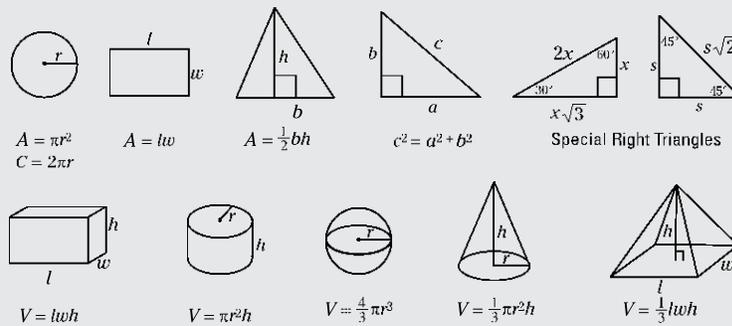
# Module 2

TIME: 35 minutes for 22 questions.

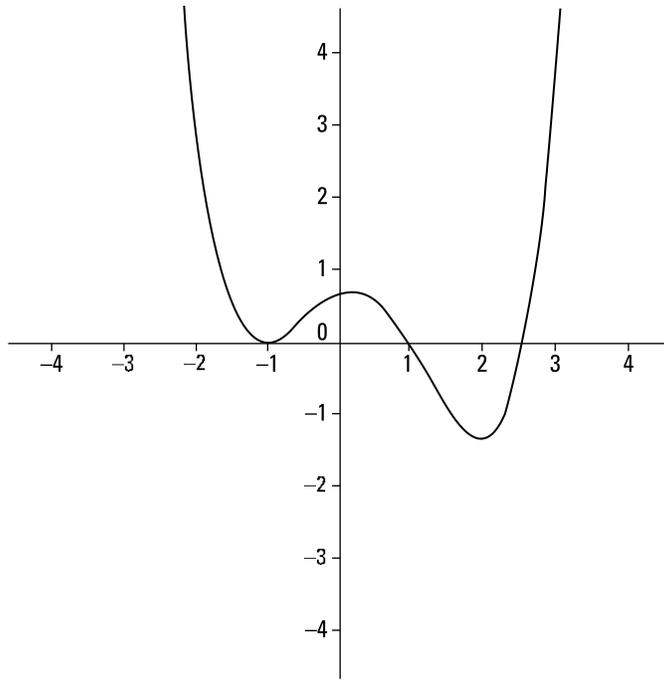
DIRECTIONS: For multiple-choice questions, choose only one answer for each question. For fill-in questions, write only one answer, even if you find more than one correct answer. Don't include symbols such as a percent sign, comma, or dollar sign.

NOTES:

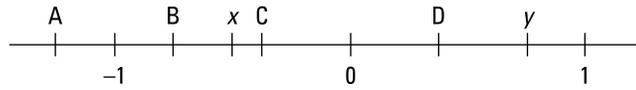
- All numbers used in this exam are real numbers.
- All figures lie in a plane.
- All figures may be assumed to be to scale unless the problem specifically indicates otherwise.
- The domain of a given function  $f$  is the set of all real numbers  $x$  for which  $f(x)$  is a real number, unless the problem specifically indicates otherwise.
- You may use a calculator.



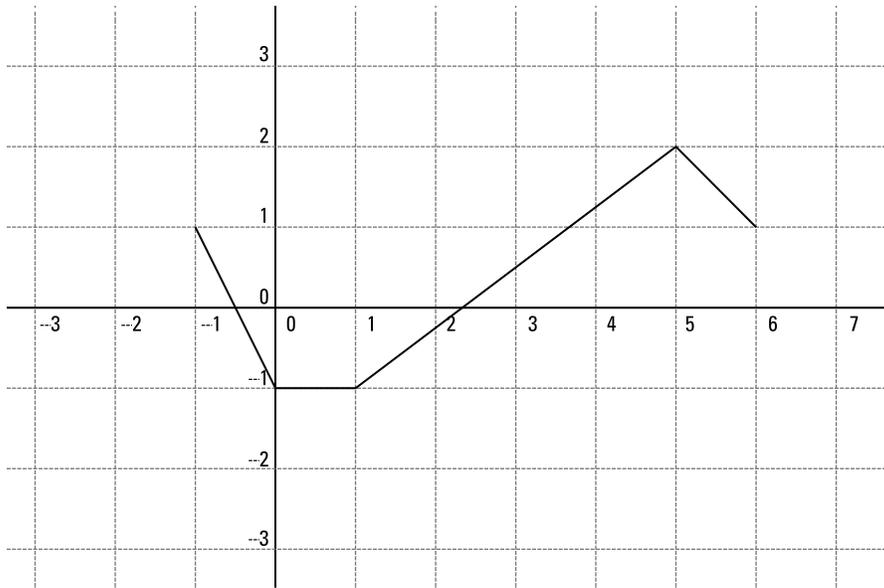
- The number of degrees in a circle is 360.
- The number of radians in a circle is  $2\pi$ .
- The sum of the measures of the angles of a triangle is 180.



1. The preceding figure shows the graph of  $y = f(x)$  from  $x = -3$  to  $x = 4$ . For what value of  $x$  in this interval does the function  $f$  attain its minimum value?
- (A) 2
  - (B) 1
  - (C) 0
  - (D) -2



2. Which point on the preceding number line best represents the product of  $x$  and  $y$ ?
- (A) A
  - (B) B
  - (C) C
  - (D) D

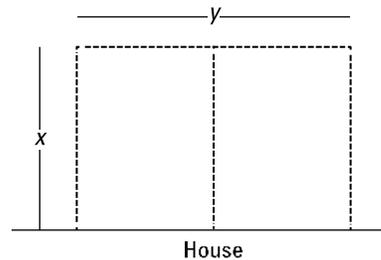


3. The graph of  $y = f(x)$  is shown above. If  $f(3) = k$ , which of the following is the value of  $f(k)$ ?

- (A)  $-1$
- (B)  $-\frac{1}{2}$
- (C)  $0$
- (D)  $\frac{1}{2}$

4. If  $-1 < x < 0$ , which of the following statements must be true?

- I.  $x > \frac{x}{2}$
  - II.  $x^2 > x$
  - III.  $x^3 > x^2$
- (A) I only
  - (B) II only
  - (C) I and II only
  - (D) II and III only



5. A gardener is building a fence to enclose their garden and divide it in half, as shown in the preceding figure. The fourth side of the garden is adjacent to their house, so it does not require fencing. The total area of the garden is 2,400 square feet. In terms of  $x$ , how many feet of fencing does the gardener require?

- (A)  $2,400 - 3x$
- (B)  $x + \frac{2,400}{x}$
- (C)  $3x + \frac{2,400}{x}$
- (D)  $3x + \frac{1,200}{x}$

6. An equilateral triangle has vertices at  $(-1, 1)$  and  $(5, 1)$ . Which of the following *could* be the coordinates of the third vertex?

(A)  $(2, -5)$   
 (B)  $(2, 1 - 3\sqrt{3})$   
 (C)  $(2, 3\sqrt{3})$   
 (D)  $(3\sqrt{3}, 1)$

7.  $x^2 + y^2 - 4x - 6y + 12 = 0$

In the  $xy$ -plane, the graph of the preceding equation is a circle. Which of the following is the radius of the circle?

(A) 4  
 (B) 3  
 (C) 2  
 (D) 1

8. The office supply store offers pens in two different boxes: one containing 6 pens and the other containing 12 pens. If Maria orders 28 boxes for a total of 204 pens, how many boxes of 12 pens are in the order?

(A) 6  
 (B) 8  
 (C) 10  
 (D) 12

9. The cell count of a certain lab culture increased from 19,000 in Week 3 to 41,000 in Week 6. Assuming that the cell count increased at a constant rate, which of the following linear functions  $f$  best models the cell count, in thousands of cells,  $t$  weeks after Week 3?

(A)  $f(t) = \frac{3}{22}t - 19$   
 (B)  $f(t) = \frac{22}{3}t - 19$   
 (C)  $f(t) = \frac{3}{22}t + 19$   
 (D)  $f(t) = \frac{22}{3}t + 19$

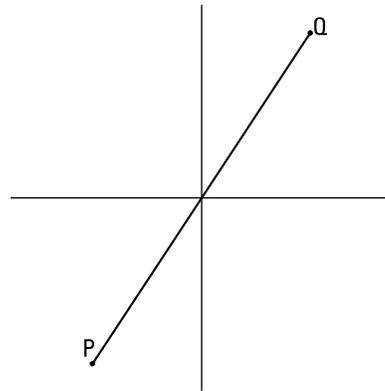
$k$	1	2	3	4	5	6
$f(k)$	15	11	7	$n$	-1	-5

10. The preceding table defines a linear function. What is the value of  $n$ ?

(A) 1  
 (B) 2  
 (C) 3  
 (D) 4

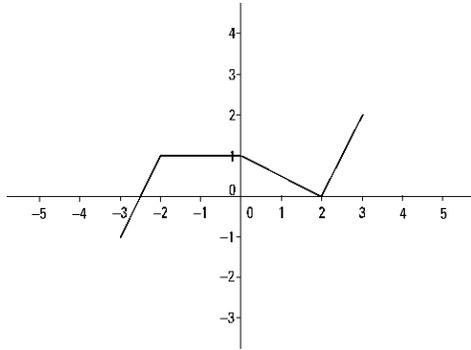
11. When the number  $m$  is multiplied by 5, the result is the same as when 6 is subtracted from  $m$ . What is the value of  $8m$ ?

(A) -12  
 (B) -6  
 (C)  $-\frac{3}{2}$   
 (D) 3

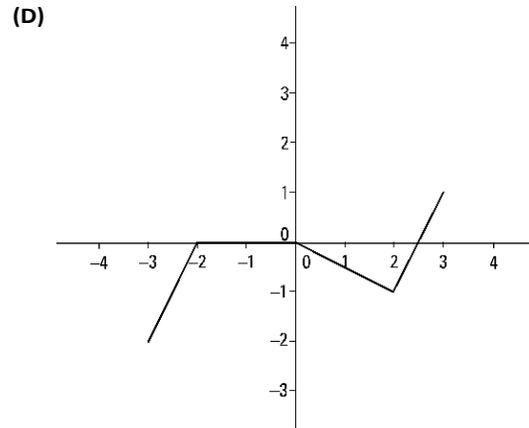
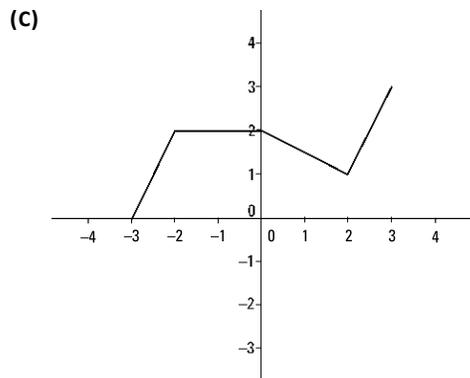
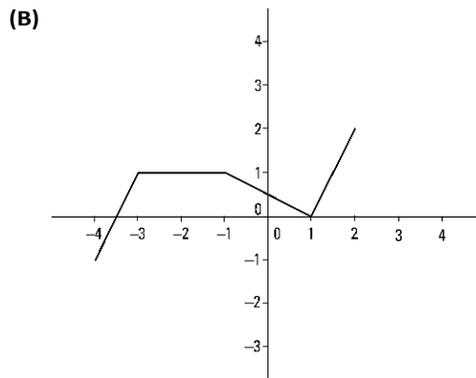
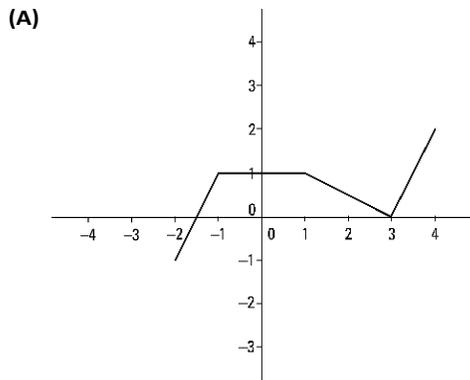


12. The coordinates of point  $P$  in the preceding figure are  $(a, b)$ , where  $|b| > |a|$ . Which of the following could be the slope of  $PQ$ ?

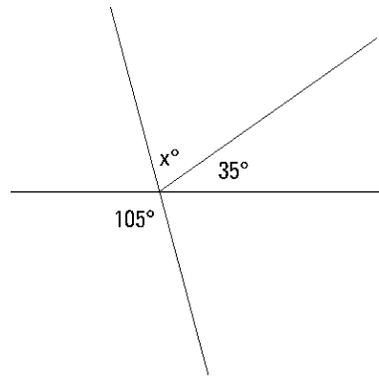
(A) -3  
 (B)  $-\frac{1}{2}$   
 (C)  $\frac{1}{2}$   
 (D)  $\frac{3}{2}$



13. The graph of  $y = g(x)$  is shown above. Which of the following could be the graph of  $y = g(x - 1)$ ?



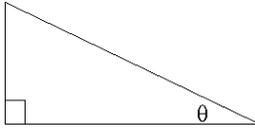
14. In the  $xy$ -plane, lines  $p$  and  $q$  are perpendicular. If line  $p$  contains the points  $(-2, 2)$  and  $(2, 1)$ , and line  $q$  contains the points  $(-2, 4)$  and  $(k, 0)$ , what is the value of  $k$ ?
- (A)  $-3$   
 (B)  $-2$   
 (C)  $-1$   
 (D)  $0$
15. If  $x^2 - y^2 = 39$  and  $x - y = 3$ , what is the value of  $y$ ?



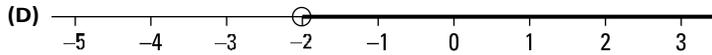
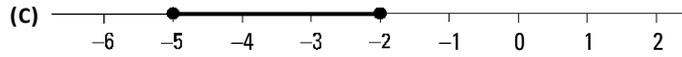
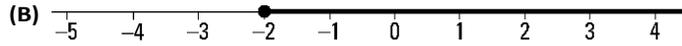
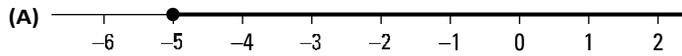
16. What is the value of  $x$  in the preceding figure?
17. Six times a number is the same as the number added to 6. What is the number?

$$a - \frac{1}{2}b = -8$$

18. If  $a = \frac{1}{2}$  in the preceding equation, what is the value of  $b$ ?



19. In the right triangle shown above, if angle  $\theta = 30^\circ$ , what is  $\sin\theta$ ?
20. A circle lies in the  $xy$ -coordinate plane. If the circle is centered at  $(-3, 17)$  and touches the  $y$ -axis at one point only, what is the diameter of the circle?
21. Which of the following represents all values of  $x$  that satisfy this inequality:  $7 \geq -2x + 3$ ?



22. If \$1,000 invested at  $i$  percent simple annual interest yields \$200 over a 2-year period, how much interest would the \$1,000 investment yield if the  $i$  percent interest were compounded annually over the 2-year period? Ignore the dollar sign when filling in your answer.

**Check your work.**

Continue to Chapter 12 when you're ready to grade your exam.

# Practice Test 1: Answers and Explanations

## Section 1: Reading and Writing

### Module 1

- 1. B.** The text states that the book *First Woman* is intended to inspire the next generation of space explorers. To inspire readers, the book will need to **captivate** (attract and hold the interest of) their attention. Choice B is the best answer.
- 2. C.** A mailman delivering your mail in a horse-drawn cart would be out of date, no longer in use, or **obsolete**. Choice C is the best answer.
- 3. B.** The sentence sets up a contrast between evanescence (existing only briefly) and permanence (lasting a long time). Thus, Choice B, **contrasting**, best expresses the relationship between the two ideas.
- 4. D.** The text suggests that to counter the threat to natural resources, incentives will **encourage** landowners to use sustainable management. While Choice C is tempting because it is a positive word, you should take the time to put the words into the sentence and reread it to find the **best** choice. The context clue *incentive* should lead you to choose **encourage**. Choice D is the best answer for the context.

5. **A.** The text states that “bison were nearly driven to extinction through uncontrolled hunting and a U.S. policy of eradication.” This context clue should lead you to Choice A, **persecution** (hostility and ill treatment).
6. **D.** The text sets up an increasing series of negative effects of modern working conditions. First injury to employers, then detriment to workers, and finally a **calamitous** (disastrous) effect on the community. Choice D is the best answer for the context.
7. **C.** The passage states that Amelia Earhart “maintained an attitude of impenetrable mediocrity,” and that’s what got her the job. That phrase should lead you to select Choice C, opaque (impenetrable) and ordinariness (averageness or mediocrity). Don’t allow words in the text like “curious,” “demure,” and “respectful” to tempt you to choose the incorrect answer Choices B or D. While those choices are used in the text to describe Earhart, they are not the qualities that got her the job.
8. **B.** The function of the underlined sentence in the text is to provide the reader with a specific example of a crop that relies extensively on the honey bee for pollination. Notice that the sentence says, “Almonds, for example . . .” This use of a specific example that supports the claim honey bees are valuable pollinators should lead you to select Choice B.
9. **A.** In these lines, the speaker in the poem claims that “you” (the person being addressed) see in “me” (the speaker) someone nearing the end of his life (“on the ashes of his youth doth lie”). You see this (“This thou perceivest”) and that makes you love me more (“makes thy love more strong”). Thus, the knowledge that the speaker will soon die drives the partner to love him even more. No evidence in the poem supports the other choices. Choice A is the best answer.
10. **C.** The claim in the text is that rising amounts of greenhouse gases contribute to global warming, yet if the warming trend is part of the fluctuating nature of climate and is well within “normal” temperature ranges, then the claim is weakened. Choice C is the best answer.
11. **D.** The sentence that best concludes the text is one that sums up the brief biography of Deb Haaland. Choices A, B, and C offer more details about Secretary Haaland’s life. Only Choice D offers a summary of Secretary Haaland’s life and her accomplishments thus far.
12. **C.** Choice C is the best answer because this statement by a conservation expert supports the claim in the text that high levels of phosphorus are dangerous to animals and humans. None of the other choices offer a direct link between phosphorus and its potentially harmful effects on people and animals.
13. **D.** The “insignificant” marks left by the plow indicate that it is a primitive implement that leaves a trail similar to the “feeble” marks left by prehistoric people. This comparison with prehistoric people creates a picture of a very early and somewhat ineffectual form of farming. Choice D is the best statement of the purpose of this line in the text.
14. **C.** The most logical choice to explain the decrease in homelessness among young people within a year after a disaster is Choice C. There is an increase in homelessness during and immediately after a disaster as homes are destroyed. Then, as homes are rebuilt the following year, homelessness decreases as young students find new housing. None of the other choices offer a logical explanation of the decrease in homelessness after a disaster.

- 15. B.** The text states that when “mussels take over,” other marine animals “disappear from the environment.” In other words, the mussels *displace* or remove other species — as Choice (B) states. Choice (D) may have tempted you, but that answer is too extreme. You know only that the other species “disappear,” not that they become extinct. They could be thriving in another spot! Choice (B) is the best answer.
- 16. D.** The past perfect form of the verb is needed to show action that occurred in the past over a period of time. Choice A is incorrect because *begun* can only be used as a verb in conjunction with a form of the verb *to have*. Choice B is incorrect because the correct form of the verb to use with *had* is the past participle *begun*. Choice C is incorrect because *has begun* is the present perfect tense, and the war took place in the past.
- 17. C.** The choice that conforms to the conventions of Standard English has a comma followed by the participial phrase *gaining momentum*. Choice A incorrectly uses the semicolon: *gaining momentum as it careened out of control* is not an independent clause. Choice B incorrectly uses a period for the same reason. Choice D is incorrect because it is missing the necessary comma between *hill* and *gaining*.
- 18. A.** Choice A uses the correctly spelled *there* and the correct plural form of the verb *were* to agree with the plural noun *rabbits*. Choice B incorrectly uses the singular form of the verb *was*. Choice C uses the incorrect word *their*. Choice D incorrectly uses *they’re*, the contraction of *they are*.
- 19. C.** Choice C correctly punctuates the participial phrase *Named in honor of the trailblazing astronomer* by putting a comma after it and by omitting the unnecessary comma between *trailblazing* and *astronomer* and between *astronomer* and *Edwin Hubble*. The other choices are incorrectly punctuated.
- 20. A.** Choice A uses the correct correlative conjunction *or* (remember the pairs: *either-or*, *neither-nor*) and the correct mark of punctuation, the semicolon, to join two independent clauses. Choice B has the dreaded comma splice error! Never use a comma to connect two independent clauses. Choices C and D incorrectly use *nor* rather than *or*.
- 21. A.** The best transitional word to use between the first clause and the second is *however* because the information in the second clause contrasts with the information in the first clause: The view was great, but we were too exhausted to appreciate it! The punctuation (semicolon before and comma after) is correct when *however* is used to connect two independent clauses. Choice B is incorrect because the second sentence is not a consequence or a result of the first sentence. Choice C, *For example*, is incorrect because the second clause is not an example of the first clause. Choice D is incorrect because *furthermore* does not reflect the contrast between the content of the first clause and the content of the second clause.
- 22. A.** Choice A correctly uses the colon after a main clause before information that clarifies the main clause. The other choices are incorrectly punctuated.
- 23. D.** Choice D correctly uses the singular possessive pronoun *its* to refer to his design for the entrance to the Louvre. Choice A incorrectly uses the plural pronoun *their*. Choice B incorrectly uses *it’s*, the contraction of *it is*. Choice C incorrectly adds an apostrophe to the possessive pronoun *its*. (A possessive pronoun never has an apostrophe because it is already possessive.)
- 24. B.** Choice B correctly uses the transitional word *Indeed* to add emphasis to the point of the second sentence, which agrees with and extends the idea of the lack of knowledge of the Greeks. Choices A, C, and D incorrectly use contrast words.

25. **C.** Choice C correctly uses the present perfect tense *has been written* about an action which has taken place over a period of time that began in the past and continues into the present. (*Tip:* Look at the other verbs in the passage and notice that they are written in the present tense.) Choice A is grammatically incorrect — you can never say *was wrote*. Choice B incorrectly uses the past perfect tense *had been written*. Choice D incorrectly uses the past participle *written* without a helping verb.
26. **C.** Choice C is the best answer because it highlights the distinguishing character qualities of Elizabeth Blackwell, which is what the prompt asks you to consider when selecting a choice. While Choices A, B, and D are true, they do not emphasize Blackwell’s distinguishing qualities.
27. **B.** Choice B is the best answer to accomplish the student’s goal of stating the significance of the findings obtained from the study of the Vredefort crater. Choices A, C, and D are true statements that don’t effectively focus on the significance of the findings.

## Module 2

1. **C.** Choice C is the best word to complete the text. The context clue “seldom move more than a foot or two in any direction” should lead you to **sedentary**, which means inactive or not moving.
2. **A.** Choice A is the best word to fill in the blank because biodiversity is very important or **crucial** to the survival of living things.
3. **C.** Choice C, **contrived to**, is the best choice to fit into the context of the sentence. The Egyptians **contrived** (created or managed to do something) a method of tempering iron ore so that they could shape it into tools and weapons. Choices A and B suggest the Egyptians didn’t want to make tools and weapons, which is illogical based on the text. Choice D doesn’t make logical sense.
4. **B.** Logically, to retain heat to create a warming effect, the clouds **absorb** outgoing infrared radiation. None of the other choices would create a warming effect.
5. **A.** The logic of the context suggests that the new, lower-cost method is preferable to the current method, which is costly and **requires** the help of experts (which would add to the cost and make it less user-friendly). None of the other choices are logical in the context of the sentences.
6. **D.** Choice D is the most logical word to fill in the blank. The meaning of **arbitrary**, based on whim or random choice, is included in the second half of the last sentence: “it could be chosen to be anywhere.” None of the other choices complete the sentence logically.
7. **D.** Choice D is the best choice because, beginning with the word *Hence* (which means *for this reason*), it presents a statement of what will happen as a result of the previously described situation. The underlined text draws a logical conclusion from the information in the previous sentences. It isn’t a specific example (Choice A) or a new idea (Choice B) that counters a previously accepted conclusion. It doesn’t provide further detail about any particular species (Choice C).

- 8. A.** Choice A is the best choice because the underlined sentence clarifies the meaning of *non-native*. It doesn't offer a specific example, so Choice B is incorrect. Choice C is incorrect because it doesn't offer an exception. Choice D is incorrect because there is no counterclaim.
- 9. C.** Choice C is true of the "young fellows." According to the text, "they perceived that their sympathies were akin [alike]" and "they had like courage and similar hopes." Don't let Choice D fool you into thinking that because they were "talking and arguing," they disagreed strongly; the passage suggests they agreed on most topics. Choice A can be eliminated because you don't know if they arrived from different countries. Choice B is the opposite of what the text suggests.
- 10. C.** The main purpose of the text is to explain how human intervention (straightening the creek) had an unintended, but harmful, effect (more erosion and pollutants) on the land. The text doesn't summarize the results of a study (Choice A), present a positive impact of straightening (Choice B), or speculate on the effect of plant competition (Choice D).
- 11. B.** The City School Superintendent concluded that most schools in the district were consistently providing a health education course in all grades of secondary school. However, according to the data, less than 25 percent of the schools offered students in grades 10 through 12 a health education course as compared to close to 75 percent of the schools in grades 6 through 9. This data clearly weakens the Superintendent's conclusion. Nothing in the data supports the other choices.
- 12. A.** According to the text, most animal behaviorists are unwilling to admit that animals have thoughts and feelings. (Dog and cat lovers among us know differently!) Choice A most accurately reflects the current thinking about attributing emotions and thoughts to animals. Choice B is off topic. Choice C, while it may be true, isn't supported by the text. Choice D is also somewhat off topic.
- 13. D.** A careful reading of the poem reveals Pope's belief that good writing, like good dancing, comes from practicing one's craft, not just chance (or natural talent); Choice A says the opposite of what Pope says. Pope would also disagree with Choice B; he makes a point that "The sound must seem an echo to the sense." Nothing in the poem supports the conclusion in Choice C.
- 14. C.** The quotation in Choice C reveals that Pip remembers what he had "thrown away" when he was "ignorant of its worth," but he has given "his duty" a "place in his heart." This illustrates the claim that he ultimately learns that he has lost more than he gained. The quotations in Choices A, B, and D don't effectively illustrate the claim as well as Choice C does.
- 15. D.** The evidence that farmers who use a herbicide are three times more likely to develop renal cell carcinoma supports the conclusion that certain pesticides (including the herbicide 2,4,5-T) lead to the development of kidney disease and kidney cancer. Choice A is too general to support the claim. Choice B is off topic. Choice C is also off topic.
- 16. B.** The main idea of Chief Joseph's speech is that everyone deserves freedom, and we are all brothers and should have equal rights. Choice B best states the main idea. Choice A is not relevant to the main idea of the speech. Choice C brings in the unrelated topic of laws. Choice D is not a topic that Chief Joseph addresses in this speech.

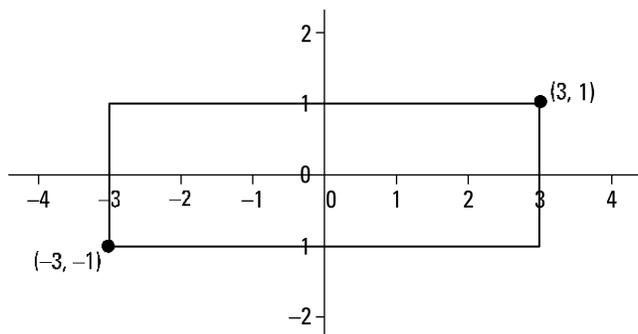
17. **C.** If it is true that Arctic ice increased in volume by 50 percent in 2012 alone, this statistic would appear to weaken the conclusion that the evidence pointing to climate change is undeniable. A decrease in the Arctic ice core is often used as a measurement of global warming. Choices A, B, and D all support, not weaken the conclusion of the panel.
18. **A.** The most logical transition to complete the text is *consequently*, Choice A. *Consequently* means as a result (or consequence); this fits the evidence in the text that as a consequence of the perception of bald eagles as predators who ate livestock, they were shot. Choice B, *nonetheless*, means *in spite of that*, which doesn't make sense in the context. Choice C is incorrect because shooting the eagles is not an *instance* of the first half of the sentence. Choice D is incorrect because it doesn't logically follow as an *addition* to their being perceived as predators; it is a result, not simply an additional piece of information.
19. **C.** Choice C completes the text with the most concise and grammatically correct phrase *that extends*. The subject of the verb *extends* is a singular noun, *tornado*, which agrees with the singular form of the verb *extends*. Choice A is incorrect because it uses the plural form of the verb *extend*, which doesn't agree with the singular subject *tornado*. Choice B is both wordy and inaccurate; the air is not the method *by which* the tornado extends. The tornado is the air. Choice D is also wordy and inaccurate: The tornado doesn't extend *in* the air; it is the air.
20. **A.** Choice A, *thus*, is the most logical transitional word for this context because it expresses a cause-and-effect relationship: Some cats are reared in isolation (cause), and they have no opportunity to engage in play activities (effect or result). Choice B is incorrect because the two ideas are not similar. Choice C is incorrect because *although* suggests that the cats' inability to engage in play activities contrasts with their being reared in isolation rather than being a result of the isolation. Choice D doesn't make logical sense because it doesn't indicate the cause-and-effect relationship.
21. **D.** Choice D is the most logical and grammatically correct choice to complete the sentence. First, Choice D uses the correct plural pronoun *they* to refer to the plural subject *sugars*. Choices B and C incorrectly use the singular pronoun *it* to refer to the plural subject *sugars*. Choice A uses the correct pronoun *they*, but it uses the ungrammatical and illogical wording *which they are metabolized* instead of the conjunction *but + they are* to show the contrast between the ways these sugars are metabolized.
22. **C.** This is an example of tricky pronoun case. *I* is a subject pronoun and *me* is an object pronoun; they are never interchangeable. If the pronoun is a doer (as in *I* would spend hours fishing. . .), then you always use the subject pronoun. If the pronoun receives the action (my brother handed *me* the rod), then you always use the object pronoun. . .not so tricky now, right? The only correct pronoun in this case is Choice C.
23. **D.** Take these choices two at a time. First, ask yourself: Is the sentence about one experiment or many experiments? The sentence states "the experiment," so just one. That eliminates Choices A and B because both have the plural pronoun, *they*. Now you must decide whether you need the singular verb *was* or the plural verb *were*. You've already established that the subject is singular, so eliminate Choice C, and you're good.
24. **A.** Choice A offers the clearest and most concise correctly punctuated choice, effectively using the semicolon to connect two independent clauses. All the other choices are unnecessarily wordy or awkward.

25. **A.** The logical relationship between the first half of the sentence and the second half is cause-and-effect. The best word to indicate that the layering is a result of gravity is *therefore*. Gravity (the cause) creates layering (the result). Choices B, C, and D, *however*, *but*, and *instead*, all indicate a contrast, which does not conform to the logic of the sentence.
26. **C.** In this question, your careful reading of the prompt is very important. (Actually, it always is!) Your task is to choose relevant information from the notes to compare the sizes of the planets, so all the other information in the notes is not relevant to your choice. Choice C is the best choice because it uses relevant information (not all the information) to make a comparison between the sizes of Saturn and Jupiter. All the other choices contain true — but irrelevant — information.
27. **A.** Choice A most effectively introduces the poet and his major themes to an audience unfamiliar with Robert Frost. (Hard to imagine!) None of the other choices include all the important information, and none are written as effectively as Choice A.

## Section 2: Math

### Module 1

1. **D.** Sketch out this problem to help you solve it:



The length of the rectangle is 6, and the height is 2. The area of a rectangle is *length* times *width*, so the area of this rectangle is  $(6)(2) = 12$ .

2. **B.** Because you're interested in the children who had only chocolate ice cream, you want to look in the chocolate circle where it doesn't overlap with the vanilla circle; the number in that section is 9. That means 9 kids had only chocolate ice cream, out of the 36 kids at the party. To find the percent of children who had chocolate ice cream, simply divide the part that you're interested in (9) by the whole (36):

$$\frac{9}{36} = \frac{1}{4} = 25\%$$

3. B. Set up the equation with  $x$  as the number and solve for  $x$ .

$$\frac{4}{5}x = 24$$

$$4x = 120$$

$$x = 30$$

Now find  $\frac{1}{5}$  of 30, which is 6.

4. B. Don't let this one drive you mad. To transfer the clunky fraction from  $P$  to  $A$ , simply multiply both sides by the reciprocal and cancel.

$$A = P \frac{r(1+r)^n}{(1+r)^n - 1}$$

$$\left( \frac{(1+r)^n - 1}{r(1+r)^n} \right) A = P \frac{r(1+r)^n}{(1+r)^n - 1} \left( \frac{(1+r)^n - 1}{r(1+r)^n} \right)$$

$$\left( \frac{(1+r)^n - 1}{r(1+r)^n} \right) A = P \frac{\cancel{r(1+r)^n}}{\cancel{(1+r)^n - 1}} \left( \frac{\cancel{(1+r)^n - 1}}{\cancel{r(1+r)^n}} \right)$$

$$\left( \frac{(1+r)^n - 1}{r(1+r)^n} \right) A = P$$

$$P = A \frac{(1+r)^n - 1}{r(1+r)^n}$$

5. A. The equation for a circle is  $(x-h)^2 + (y-k)^2 = r^2$ , where  $h$ ,  $k$ , and  $r$  are the  $x$ - and  $y$ -coordinates of the center and  $r$  is the radius. Place these coordinates and radius 2, 5, and 3 for  $h$ ,  $k$ , and  $r$ , respectively, in the equation for  $(x-2)^2 + (y-5)^2 = 3^2$  and square the 3 on the end. Choice (A) matches this answer.

6. A. The key to this problem is paying attention to the fact that the figure is a square. Knowing that the area is 36, you can immediately deduce that the length of a side of the square is 6 because  $6^2 = 36$ . You also know that the length of half the side of the square is 3. That means that the  $(x, y)$  coordinates of point  $C$  will be  $(3, 6)$ . You can then plug those coordinates into the equation  $y = \frac{x^2}{k}$  and solve for  $k$ :

$$6 = \frac{3^2}{k}$$

$$6 = \frac{9}{k}$$

$$6k = 9$$

$$k = \frac{3}{2} \text{ or } 1.5$$

7. D. Get rid of the  $t$ , and the question becomes, "How much greater than  $-5$  is 2?" Well, that would be 7, so Choice (D) is the right answer.

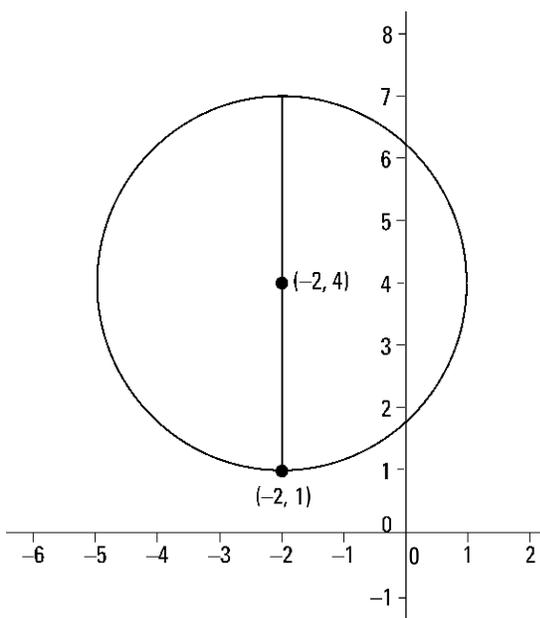
8. D. If  $f(x) = x^3 - 4x$  and  $g(x) = x^2 + x - 2$ , simply place  $x^3 - 4x$  over  $x^2 + x - 2$ , factor the expressions, and cancel what you can:

$$\frac{x^3 - 4x}{x^2 + x - 2}$$

$$\frac{x(x-2)\cancel{(x+2)}}{(x-1)\cancel{(x+2)}}$$

$$\frac{x(x-2)}{x-1}$$

9. A. The key to this problem is remembering that parabolas are symmetrical along the line that passes vertically through the vertex (known as the *axis of symmetry*). That means that if you were to fold the parabola along that line, both sides would line up. For the purpose of this problem, it means that  $x$ -values with the same  $y$ -coordinates must be the same distance from the axis of symmetry, which is at  $x = 3$  in this case. Both values in Choice (A) are two away from 3, so that looks like a great option. In Choice (B), 1 is two away from 3, but 6 is three away, so that option doesn't work. For Choice (C), 2 is one away from 3, but 5 is two away; again they're not the same distance from the axis of symmetry. Choice (D) keeps 2, which is still one away from 3, and moves the other point farther away, to 6. Choice (A) it is!
10. D. Whenever you're working on percentage problems, start with \$100. So if the TV cost \$100, and then the price was decreased by 10 percent (\$10), the reduced price is \$90. You add 20 percent on to 90 by finding 20 percent of 90 and adding it to \$90:  $0.20(90) = 18$ ;  $\$90 + \$18 = \$108$ . It's easy to see that \$108 is 108 percent of \$100:  $\frac{\$108}{\$100} = 1.08 = 108\%$ .
11. C. It's always a great idea to sketch problems where you're told the coordinates but not given a picture.



Looking at your picture, it's easy to see that the other endpoint of the diameter is also going to have  $-2$  as its  $x$ -coordinate. Now all you need to do is determine the radius of the circle so you can figure out the  $y$ -coordinate. Looking at the two points that were given in the problem, you can see that the radius is  $3$  ( $4 - 1 = 3$ ). That means that the  $y$ -coordinate of the other endpoint will be  $3$  away from the center:  $(-2, 4 + 3) = (-2, 7)$ .

- 12. D.** To isolate  $\frac{n}{p}$ , multiply both sides by the reciprocal of the coefficient, or  $\frac{2}{3}$ :

$$\begin{aligned}\frac{3n}{2p} &= \frac{4}{3} \\ \left(\frac{2}{3}\right)\frac{3n}{2p} &= \frac{4}{3}\left(\frac{2}{3}\right) \\ \frac{n}{p} &= \frac{8}{9}\end{aligned}$$

- 13. D.** The first step is to find the area of square  $ABCD$ . You know the length of one of the sides, so you know that the area is that length squared:  $6^2 = 36$ . Now you just need to subtract off the area of the five circles. You can see that each of the nine smaller squares has a side length equal to one-third of the length of the big square:  $\frac{1}{3}(6) = 2$ . This means that each circle has a diameter of  $2$  and a radius of  $1$ . The area of a circle is  $A = \pi r^2$ , so the area of each circle is  $A = \pi(1)^2 = \pi$ . Now you can find the area of the shaded part of the diagram. The area will be the total square area minus the area of five circles:  $36 - 5\pi$ , or Choice (D).

- 14. C.** The first step is to find the slope of the given line by solving for  $y$ :

$$\begin{aligned}2y &= -4x + k \\ y &= -2x + \frac{k}{2}\end{aligned}$$

The slope of this line is  $-2$ . Because you know that line  $l$  is parallel to this line, you now know that line  $l$  has a slope of  $-2$ . Now you can use the point  $(-1, 3)$  and  $y = mx + b$  to determine the equation of  $l$ . Substitute  $-2$  for  $m$ ,  $-1$  for  $x$ , and  $3$  for  $y$ , and then solve for  $b$ :  $3 = -2(-1) + b$ , so  $b = 1$ . Now you know the equation for  $l$  is  $y = -2x + 1$ . You can substitute  $p$  and  $-p$  in for  $x$  and  $y$ , respectively, to solve the problem:  $-p = -2(p) + 1$ . Simplifying,  $-p = -2p + 1$ , or  $p = 1$ .

- 15. D.** The number of solutions as graphed means how many times do the two functions cross, but in algebra it refers to the number of possible values of  $x$ . Since each expression is equal to  $y$ , set the expressions equal to each other:

$$\begin{aligned}x^2 - 2x + 3 &= -3x + 5 \\ x^2 + x - 2 &= 0 \\ (x + 2)(x - 1) &= 0\end{aligned}$$

Looks like  $x$  has two solutions.

- 16. 210.** Every even number must be divisible by  $2$ , so  $2 \times 3 \times 5 \times 7 = 210$ .

- 17. 36.** If the numerator is  $n$ , the denominator is  $2n - 12$ . Start by finding the numerator:

$$\begin{aligned}\frac{2}{3} &= \frac{n}{2n - 12} \\ 2(2n - 12) &= 3n \\ 4n - 24 &= 3n \\ n &= 24\end{aligned}$$

Hold on, though —  $n$  is the *numerator*, but you need the *denominator*. You know that the fraction is equivalent to  $\frac{2}{3}$ , so set up the equation with  $d$  as the denominator:

$$\begin{aligned}\frac{2}{3} &= \frac{24}{d} \\ 2d &= 72 \\ d &= 36\end{aligned}$$

- 18. 8.** Although you could use trial and error, without answer choices to try, it may be better to factor it. To factor a *quadratic equation* (that is, an equation with something “squared” in it), first set the equation equal to 0 with the squared term positive:

$$\begin{aligned}p^2 &= 3p + 40 \\ p^2 - 3p - 40 &= 0 \\ (p - 8)(p + 5) &= 0 \\ p &= -5, 8\end{aligned}$$

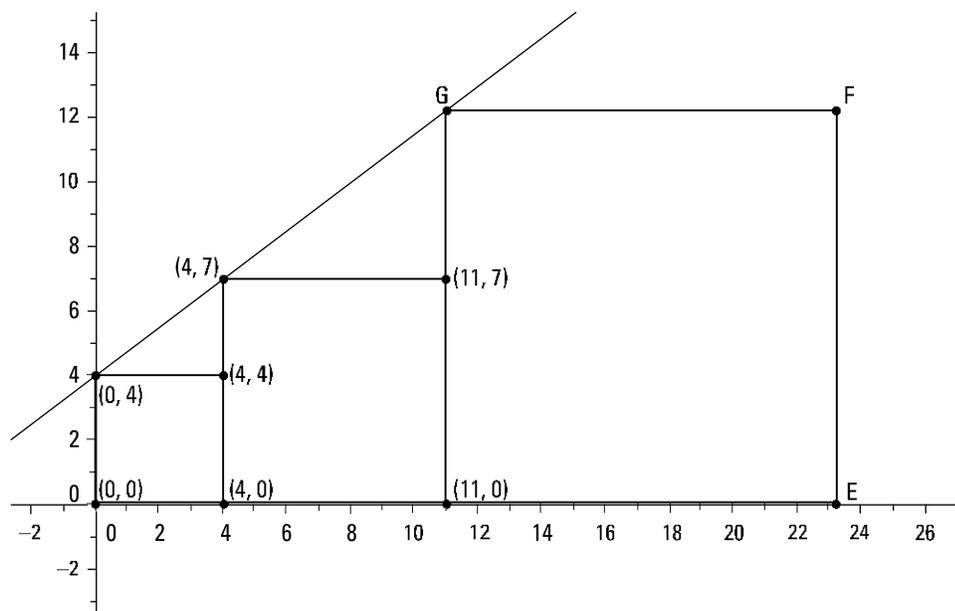
Because  $p > 0$ ,  $p = 8$ .

- 19. 31.** Don’t math it out. You *could* solve for  $x$  and place the value into  $x^2 + x$ , but because this is the SAT, you know there’s an easier way. First add the equations:

$$\begin{array}{r}x^2 - 3x = 50 \\ +(x^2 + 5x = 12) \\ \hline 2x^2 + 2x = 62\end{array}$$

Divide both sides by 2, and  $x^2 + x = 31$ .

- 20. D.** This is a tricky one. The key is that points A, K, and G are on the same line, because it tells you that the side-length ratio of the medium-to-small squares is the same as the side-length ratio of the large-to-medium squares. Look at this drawing to see the pattern:



You know from the question that the medium-square side length is 7 and the small-square side length is 4, making the ratio 7 to 4. Multiply this ratio by the medium-square side length to find the large-square side length:

$$7\left(\frac{7}{4}\right) = \frac{49}{4} = 12.25$$

- 21. B.** You know that  $f(x)$  equals both 3 and  $x^2 + 2$ , so set those expressions equal to each other and solve for  $x$ :

$$3 = x^2 + 2$$

$$1 = x^2$$

$$x = 1, -1$$

And this matches answer Choice (B).

- 22. 30.** This question is all about working with fractions. Consider the following:

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{4}$$

When you're working with fractions, getting a common denominator on each side is a good idea. Here's how it works out:

$$\left(\frac{y}{y}\right)\frac{1}{x} + \left(\frac{x}{x}\right)\frac{1}{y} = \frac{1}{4}$$

$$\frac{y}{xy} + \frac{x}{xy} = \frac{1}{4}$$

$$\frac{x+y}{xy} = \frac{1}{4}$$

You know that  $xy = 120$ , so plug that in and solve for  $x + y$  as a single unit (in other words, not  $x$  and  $y$  separately).

$$\frac{x+y}{xy} = \frac{1}{4}$$

$$\frac{x+y}{(120)} = \frac{1}{4}$$

$$4(x+y) = 120$$

$$x+y = 30$$

## Module 2

- 1. A.** The minimum value of a function is where the  $y$ -value is the lowest. Find the lowest point of the curve, and check the  $x$  value: The  $y$ -value is lowest where  $x$  is 2.
- 2. C.** Pick approximate numbers for  $x$  and  $y$ , such as  $-0.5$  for  $x$  and  $0.75$  for  $y$ . *Product* means multiply, so multiply these for  $(-0.5)(0.75) = -0.375$ . The only points between 0 and  $-1$  are B and C, and you want one between 0 and  $-0.5$ , so the answer is Choice (C).
- 3. A.** Remember that the number in parentheses is the  $x$ -value. In this chart,  $f(3) = k$  tells you that when  $x = 3$ ,  $y$  is  $\frac{1}{2}$ , so if  $f(3) = k$ , then  $k = \frac{1}{2}$ . To find the value of  $f(k)$ , same as  $f\left(\frac{1}{2}\right)$ , go to where  $x = \frac{1}{2}$ , and  $y = -1$ .

4. **B.** This problem is easier if you pick a number for  $x$ , such as  $-0.5$  or  $-\frac{1}{2}$ , and try out each statement. Try the first statement:

$$\begin{aligned} -0.5 &> \frac{-0.5}{2} \\ -0.5 &> -0.25 \end{aligned}$$

This is false, so eliminate Choices (A) and (C). Choices (B) and (D) both claim that Statement II is true, but try it just to be sure:

$$\begin{aligned} (-0.5)^2 &> -0.5 \\ 0.25 &> -0.5 \end{aligned}$$

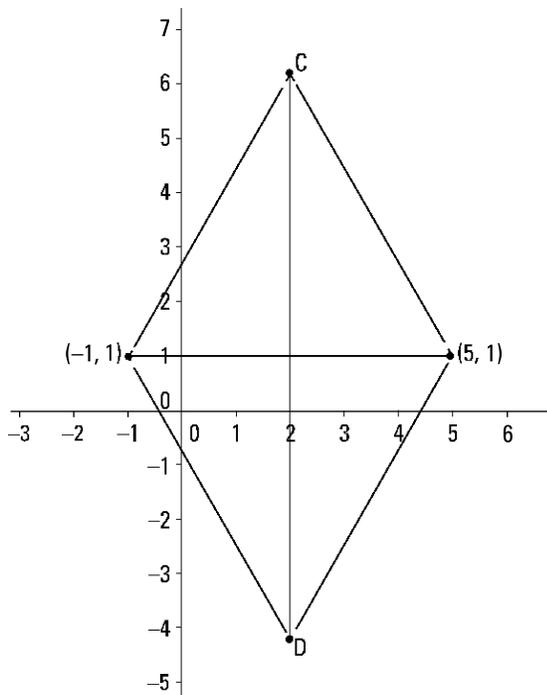
This is true, so now check Statement III for the tiebreaker:

$$\begin{aligned} (-0.5)^3 &> (-0.5)^2 \\ -0.125 &> 0.25 \end{aligned}$$

And it's not true. Choice (B) is the answer.

5. **C.** The fence that the gardener needs is equal to  $3x + y$ , so what you really need to do is figure out a way to represent  $y$  in terms of  $x$ . Because the area of the garden is 2,400 square feet, you can use your knowledge of the area of a rectangle to see that  $2,400 = xy$ . Divide both sides by  $x$  to solve for  $y$  for  $y = \frac{2,400}{x}$ , and then place that back in to the original expression for the total fencing needed:  $3x + y = 3x + \frac{2,400}{x}$ , Choice (C).

6. **B.** To help solve this problem, sketch a picture. Keep in mind that the triangle can point upward or downward.



The third vertex of the triangle will lie along the line that cuts through the midpoint between the two given vertices. You can find the coordinates of that midpoint by finding the average of the  $x$ 's and the average of the  $y$ 's:  $\left(\frac{-1+5}{2}, \frac{1+1}{2}\right) = (2, 1)$ . So the  $x$ -coordinate of the third vertex will be 2, which eliminates Choice (D). Because equilateral triangles have 60-degree angles in them, you can drop an altitude from the unknown vertex to make a 30-60-90 triangle. You know that the leg connecting a vertex to the 90-degree angle is going to be 3 units long, and from there, you can use your knowledge of common right triangles to see that the unknown altitude is  $3\sqrt{3}$ . That means that the unknown vertex is  $3\sqrt{3}$  away from 1, so it's either at  $(2, 1+3\sqrt{3})$  or  $(2, 1-3\sqrt{3})$ . Choice (B) is the only choice that fits.

- 7. D.** Convert the equation of the circle to the center-radius form, where the center is  $(h, k)$  and the radius is  $r$ :  $(x-h)^2 + (y-k)^2 = r^2$ .

$$\begin{aligned}x^2 + y^2 - 4x - 6y + 12 &= 0 \\x^2 + y^2 - 4x - 6y &= -12 \\[x^2 - 4x] + [y^2 - 6y] &= -12 \\[(x-2)^2 - 4] + [(y-3)^2 - 9] &= -12 \\(x-2)^2 + (y-3)^2 &= 1\end{aligned}$$

Because  $r^2 = 1$ ,  $r = 1$  and the answer is Choice (D).

- 8. A.** If  $x$  boxes each hold 12 pens, then that group has  $12x$  pens. If there are 28 boxes total, then  $28-x$  boxes each hold 6 pens, and that group has  $6(28-x)$  pens. Set up the equation for the total of 204 pens:

$$\begin{aligned}12x + 6(28 - x) &= 204 \\12x + (168 - 6x) &= 204 \\6x &= 36 \\x &= 6\end{aligned}$$

- 9. D.** In the third week after Week 3,  $t = 3$ , so plug 3 in for  $t$  in each answer and see which one yields 41. The answer is in thousands, so 41 refers to 41,000:

$$\begin{aligned}f(t) &= \frac{22}{3}t + 19 \\f(3) &= \frac{22}{3}(3) + 19 \\&= 22 + 19 \\&= 41\end{aligned}$$

- 10. C.** Looking at the chart, you can see that the top row increases by one in each box. In the bottom row, each box is four fewer than the previous one. That means that  $n$  will be four fewer than 7, or  $n$  is  $7-4=3$ .

- 11. A.** When  $m$  is multiplied by 5, or  $5m$ , the result equals when 6 is subtracted from  $m$ , or  $m-6$ . Set up the equation and solve for  $m$ :

$$\begin{aligned}5m &= m - 6 \\4m &= -6 \\m &= -\frac{6}{4} \\&= -\frac{3}{2}\end{aligned}$$

Now multiply this result by 8 for  $8m$ :

$$-\frac{3}{2} \times 8 = -12$$

- 12. D.** Looking at the picture, you can see that the line has a positive slope (as you read left to right, the line goes up). Already you can eliminate Choices (A) and (B). To find the slope of the line, use the points  $(a,b)$  and  $(0,0)$ :

$$m = \frac{b-0}{a-0} = \frac{b}{a}$$

You know from  $|b| > |a|$  that the fraction will be larger than 1, making Choice (D) the only viable choice.

- 13. A.** When you change the  $x$ -value in a function, the graph changes horizontally. In this case, you're subtracting 1 from  $x$  before plugging it into the function  $g$ , so the graph shifts either left or right. Knowing this narrows your choices down to Choices (A) and (B). You can look at the original graph and see that  $g(2) = 0$ . To get  $y = g(x-1)$  to equal 0, you need  $x-1$  to equal 2:  $x-1=2, x=3$ . That means that  $(3,0)$  will be a point on the transformed graph. Choice (A) is the only graph with that point on it.

- 14. A.** Your first step is to find the slope of line  $p$ .

$$m = \frac{2-1}{-2-2} = \frac{1}{-4} = -\frac{1}{4}$$

Because perpendicular lines have opposite (negative) reciprocal slopes, the slope of line  $q$  must be 4. So far, you know that line  $q$  has a slope of 4 and passes through the point  $(-2,4)$ . You can use the equation  $y = 4x + b$  and substitute in the point to figure out what  $b$  is:  $4 = 4(-2) + b$  becomes  $b = 12$  when you solve it. Now you have the equation of line  $q$ :  $y = 4x + 12$ . Substitute in the point  $(k,0)$  and solve for  $k$ :  $0 = 4k + 12, -12 = 4k$ , and  $k = -3$ .

- 15. 5.** For this problem, you need to factor a difference of perfect squares:  $x^2 - y^2 = (x-y)(x+y)$ . Substitute in the numbers that you know,  $39 = (3)(x+y)$ , and then divide both sides by 3 to get  $x+y = 13$ . Because you know both  $x+y$  and  $x-y$ , you can add the two together:  $(x+y) + (x-y) = 2x = 13 + 3 = 16$ . Now you know that  $x$  is 8. If  $x$  is 8 and  $x+y = 13$ , then  $y$  is 5.

- 16. 70.** The trick is to see that  $105^\circ$  is a vertical angle to  $35^\circ + x^\circ$ . Because vertical angles are equal, you know that  $105 = 35 + x$ .

- 17. 1.2 or  $\frac{6}{5}$ .** Call the number  $x$ . Translating the words into math: "Six times  $x$  is the same as  $x$  added to 6" becomes  $6x = 6 + x$ . Now solve for  $x$ :

$$6x = 6 + x$$

$$5x = 6$$

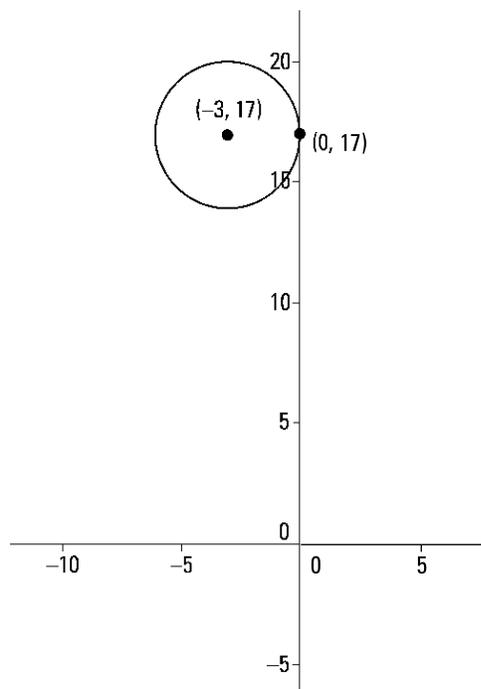
$$x = 1.2$$

18. 17. Place  $\frac{1}{2}$  for  $a$  and solve for  $b$ :

$$\begin{aligned}a - \frac{1}{2}b &= -8 \\ \left(\frac{1}{2}\right) - \frac{1}{2}b &= -8 \\ -\frac{1}{2}b &= -8\frac{1}{2} \\ b &= 17\end{aligned}$$

19.  $\frac{1}{2}$  or 0.5. If one angle is  $90^\circ$  and angle  $\theta = 30^\circ$ , then the third angle is  $60^\circ$ , making this a 30-60-90 triangle with a side ratio of  $1:\sqrt{3}:2$ . The sine of an angle is the angle's opposite side, which in this case is the triangle's smallest side, over the triangle's hypotenuse. From the ratio, you know that the smallest side is half the length of the hypotenuse, for an answer of  $\frac{1}{2}$  or 0.5. When you type in your answer, either  $\frac{1}{2}$  or 0.5 is considered correct.

20. 6. Sketch out the problem to help you solve:



For the circle to touch the  $y$ -axis in only one place, it must touch the  $y$ -axis at  $(0,17)$ . That point is three units away from the center of the circle, meaning that the radius of the circle is 3 and the diameter is 6.

- 21. B.** Simplify the expression. Just remember that when you divide both sides by a negative (in this case,  $-2$ ), you switch the inequality sign. Then you swap the  $x$  and the value, meaning you switch the inequality sign again:

$$\begin{aligned}7 &\geq -2x + 3 \\4 &\geq -2x \\-2 &\leq x \\x &\geq -2\end{aligned}$$

Both Choices (B) and (D) include numbers greater than  $-2$ , but Choice (B) has the circle at  $-2$  filled in, meaning that  $-2$  is included in the solution set, which is exactly what you want because you're looking for all numbers greater than or *equal to*  $-2$ .

- 22. 210.** If \$1,000 invested at  $i$  percent simple annual interest yields \$200 over a two-year period, you can deduce that it earns \$100 over one year. To find  $i$ , the interest rate, yielding \$100 simple annual interest on \$1,000, divide the amount of interest by the amount of the investment:

$$\frac{100}{1,000} = 0.1 = 10\%$$

Now you know that  $i = 10$ , for an interest rate of 10 percent.

To calculate compound interest, you can use the compound interest formula. However, for only two cycles, you can find the answer without the formula. Simply calculate the simple interest twice: once for the first year, and once for the second year. Start with the original \$1,000 investment, and increase it 10 percent:

$$\$1,000 + (10\% \times \$1,000) = \$1,000 + \$100 = \$1,100$$

The investment is worth \$1,100 at the end of the first year. To find its value at the end of the second year, increase \$1,100 by 10 percent:

$$\$1,100 + (10\% \times \$1,100) = \$1,100 + \$110 = \$1,210$$

The question asks for the amount of interest yielded, not the final value. To find the amount of interest, subtract the original value from the final value:

$$\$1,210 - \$1,000 = \$210$$

# Answer Key

## Section 1: Reading and Writing, Module 1

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

## Section 2: Reading and Writing, Module 2

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

## Section 3: Math, Module 1

- |    |   |     |   |     |     |     |    |
|----|---|-----|---|-----|-----|-----|----|
| 1. | D | 7.  | D | 13. | D   | 19. | 31 |
| 2. | B | 8.  | D | 14. | C   | 20. | D  |
| 3. | B | 9.  | A | 15. | D   | 21. | B  |
| 4. | B | 10. | D | 16. | 210 | 22. | 30 |
| 5. | A | 11. | C | 17. | 36  |     |    |
| 6. | A | 12. | D | 18. | 8   |     |    |

## Section 4: Math, Module 2

- |    |   |     |   |     |                      |     |                     |
|----|---|-----|---|-----|----------------------|-----|---------------------|
| 1. | A | 7.  | D | 13. | A                    | 19. | .5 or $\frac{1}{2}$ |
| 2. | C | 8.  | A | 14. | A                    | 20. | 6                   |
| 3. | A | 9.  | D | 15. | 5                    | 21. | B                   |
| 4. | B | 10. | C | 16. | 70                   | 22. | 210                 |
| 5. | C | 11. | A | 17. | 1.2 or $\frac{6}{5}$ |     |                     |
| 6. | B | 12. | D | 18. | 17                   |     |                     |