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Reading and Writing

27 QUESTIONS

DIRECTIONS

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

All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

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

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

- A) widespread
- B) careful
- C) unintended
- D) infrequent

Like the 1945 play it reimagines—Federico García Lorca's *The House of Bernarda Alba*—Marcus Gardley's 2014 play *The House That Will Not Stand* prominently features women. In both plays, the all-female cast _____ an array of female characters, including a strong mother and several daughters dealing with individual struggles.

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

- A) engulfs
- B) encourages
- C) comprises
- D) provokes

During a 2014 archaeological dig in Spain, Vicente Lull and his team uncovered the skeleton of a woman from El Algar, an Early Bronze Age society, buried with valuable objects signaling a high position of power. This finding may persuade researchers who have argued that Bronze Age societies were ruled by men to _____ that women may have also held leadership roles.

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

- A) waive
- B) concede
- C) refute
- D) require

The following text is adapted from Oscar Wilde's 1895 play *The Importance of Being Earnest*.

CECILY: Have we got to part?

ALGERNON: I am afraid so. It's a very painful parting.

CECILY: It is always painful to part from people whom one has known for a very brief space of time. The absence of old friends one can endure with equanimity. But even a momentary separation from anyone to whom one has just been introduced is almost unbearable.

As used in the text, what does the word "endure" most nearly mean?

- A) Regret
- B) Persist
- C) Tolerate
- D) Encourage

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

There shall be new roads wending,
A new beating of the drum—

Men's eyes shall have fresh seeing,
Grey lives reprise their span—
But under the new sun's being,
Completing what night began,

There'll be the same backs bending,
The same sad feet shall drum—
When this night finds its ending
And day shall have come.....

Which choice best states the main purpose of the text?

- A) To consider how the repetitiveness inherent in human life can be both rewarding and challenging
- B) To question whether activities completed at one time of day are more memorable than those completed at another time of day
- C) To refute the idea that joy is a more commonly experienced emotion than sadness is
- D) To demonstrate how the experiences of individuals relate to the experiences of their communities

The following text is from Charlotte Forten Grimké's 1888 poem "At Newport."

Oh, deep delight to watch the gladsome waves
Exultant leap upon the rugged rocks;
Ever repulsed, yet ever rushing on—
Filled with a life that will not know defeat:
To see the glorious hues of sky and sea.
The distant snowy sails, glide spirit like,
Into an unknown world, to feel the sweet
Enchantment of the sea thrill all the soul,
Clearing the clouded brain, making the heart
Leap joyous as it own bright, singing waves!

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

- A) It portrays the surroundings as an imposing and intimidating scene.
- B) It characterizes the sea's waves as a relentless and enduring force.
- C) It conveys the speaker's ambivalence about the natural world.
- D) It draws a contrast between the sea's waves and the speaker's thoughts.

The following text is adapted from Aphra Behn's 1689 novel *The Lucky Mistake*. Atlante and Rinaldo are neighbors who have been secretly exchanging letters through Charlot, Atlante's sister.

[Atlante] gave this letter to Charlot; who immediately ran into the balcony with it, where she still found Rinaldo in a melancholy posture, leaning his head on his hand: She showed him the letter, but was afraid to toss it to him, for fear it might fall to the ground; so he ran and fetched a long cane, which he cleft at one end, and held it while she put the letter into the cleft, and stayed not to hear what he said to it. But never was man so transported with joy, as he was at the reading of this letter; it gives him new wounds; for to the generous, nothing obliges love so much as love.

Which choice best describes the overall structure of the text?

- A) It describes the delivery of a letter, and then portrays a character's happiness at reading that letter.
- B) It establishes that a character is desperate to receive a letter, and then explains why another character has not yet written that letter.
- C) It presents a character's concerns about delivering a letter, and then details the contents of that letter.
- D) It reveals the inspiration behind a character's letter, and then emphasizes the excitement that another character feels upon receiving that letter.

The following text is adapted from Frances Hodgson Burnett's 1911 novel *The Secret Garden*. Mary, a young girl, recently found an overgrown hidden garden.

Mary was an odd, determined little person, and now she had something interesting to be determined about, she was very much absorbed, indeed. She worked and dug and pulled up weeds steadily, only becoming more pleased with her work every hour instead of tiring of it. It seemed to her like a fascinating sort of play.

Which choice best states the main idea of the text?

- A) Mary hides in the garden to avoid doing her chores.
- B) Mary is getting bored with pulling up so many weeds in the garden.
- C) Mary is clearing out the garden to create a space to play.
- D) Mary feels very satisfied when she's taking care of the garden.

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

Which choice best states the main idea of the text?

- A) Although inhabiting a home surrounded by fanciful features such as those designed by Gins and Arakawa can be rejuvenating, it is unsustainable.
- B) Designing disorienting spaces like those in the Gins and Arakawa building is the most effective way to create a physically stimulating environment.
- C) As a filmmaker, Yamaoka has long supported the designs of conceptual artists such as Gins and Arakawa.
- D) Although impractical, the design of the apartment building by Gins and Arakawa may improve the well-being of the building's residents.

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The following text is from Maggie Pogue Johnson's 1910 poem "Poet of Our Race." In this poem, the speaker is addressing Paul Laurence Dunbar, a Black author.

Thou, with stroke of mighty pen,
Hast told of joy and mirth,
And read the hearts and souls of men
As cradled from their birth.
The language of the flowers,
Thou hast read them all,
And e'en the little brook
Responded to thy call.

Which choice best states the main purpose of the text?

- A) To praise a certain writer for being especially perceptive regarding people and nature
- B) To establish that a certain writer has read extensively about a variety of topics
- C) To call attention to a certain writer's careful and elaborately detailed writing process
- D) To recount fond memories of an afternoon spent in nature with a certain writer

"To You" is an 1856 poem by Walt Whitman. In the poem, Whitman suggests that he deeply understands the reader, whom he addresses directly, writing, _____

Which quotation from "To You" most effectively illustrates the claim?

- A) "Your true soul and body appear before me."
- B) "Whoever you are, now I place my hand upon you, that you be my poem."
- C) "I should have made my way straight to you long ago."
- D) "Whoever you are, I fear you are walking the walks of dreams."

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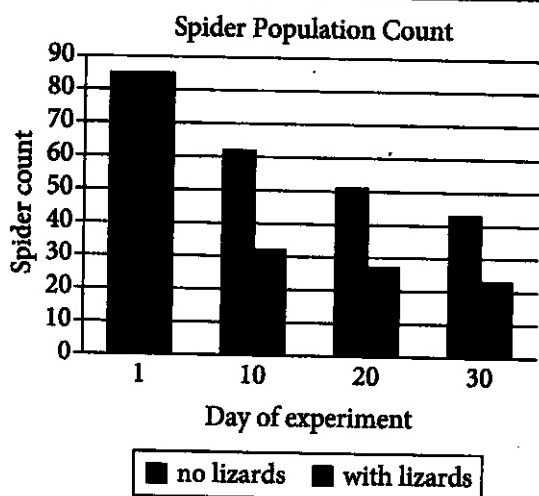
Approximate Rates of Speech and Information Conveyed for Five Languages

Language	Rate of speech (syllables per second)	Rate of information conveyed (bits per second)
Serbian	7.2	39.1
Spanish	7.7	42.0
Vietnamese	5.3	42.5
Thai	4.7	33.8
Hungarian	5.9	34.6

A group of researchers working in Europe, Asia, and Oceania conducted a study to determine how quickly different Eurasian languages are typically spoken (in syllables per second) and how much information they can effectively convey (in bits per second). They found that, although languages vary widely in the speed at which they are spoken, the amount of information languages can effectively convey tends to vary much less. Thus, they claim that two languages with very different spoken rates can nonetheless convey the same amount of information in a given amount of time.

Which choice best describes data from the table that support the researchers' claim?

- A) Among the five languages in the table, Thai and Hungarian have the lowest rates of speech and the lowest rates of information conveyed.
- B) Vietnamese conveys information at approximately the same rate as Spanish despite being spoken at a slower rate.
- C) Among the five languages in the table, the language that is spoken the fastest is also the language that conveys information the fastest.
- D) Serbian and Spanish are spoken at approximately the same rate, but Serbian conveys information faster than Spanish does.



To investigate the effect of lizard predation on spider populations, a student in a biology class placed spiders in two enclosures, one with lizards and one without, and tracked the number of spiders in the enclosures for 30 days. The student concluded that the reduction in the spider population count in the enclosure with lizards by day 30 was entirely attributable to the presence of the lizards.

Which choice best describes data from the graph that weaken the student's conclusion?

- A) The spider population count was the same in both enclosures on day 1.
- B) The spider population count also substantially declined by day 30 in the enclosure without lizards.
- C) The largest decline in spider population count in the enclosure with lizards occurred from day 1 to day 10.
- D) The spider population count on day 30 was lower in the enclosure with lizards than in the enclosure without lizards.

Although military veterans make up a small proportion of the total population of the United States, they occupy a significantly higher proportion of the jobs in the civilian government. One possible explanation for this disproportionate representation is that military service familiarizes people with certain organizational structures that are also reflected in the civilian government bureaucracy, and this familiarity thus _____

Which choice most logically completes the text?

- A) makes civilian government jobs especially appealing to military veterans.
- B) alters the typical relationship between military service and subsequent career preferences.
- C) encourages nonveterans applying for civilian government jobs to consider military service instead.
- D) increases the number of civilian government jobs that require some amount of military experience to perform.

The city of Pompeii, which was buried in ash following the eruption of Mount Vesuvius in 79 CE, continues to be studied by archaeologists. Unfortunately, as _____ attest, archaeological excavations have disrupted ash deposits at the site, causing valuable information about the eruption to be lost.

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

- A) researchers, Roberto Scandone and Christopher Kilburn,
- B) researchers, Roberto Scandone and Christopher Kilburn
- C) researchers Roberto Scandone and Christopher Kilburn
- D) researchers Roberto Scandone, and Christopher Kilburn

Seneca sculptor Marie Watt's blanket art comes in a range of shapes and sizes. In 2004, Watt sewed strips of blankets together to craft a 10-by-13-inch _____ in 2014, she arranged folded blankets into two large stacks and then cast them in bronze, creating two curving 18-foot-tall blue-bronze pillars. Which choice completes the text so that it conforms to the conventions of Standard English?

- A) sampler later,
- B) sampler;
- C) sampler,
- D) sampler, later,

Gathering accurate data on water flow in the United States is challenging because of the country's millions of miles of _____ the volume and speed of water at any given location can vary drastically over time.

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

- A) waterways and the fact that,
- B) waterways, and the fact that,
- C) waterways, and, the fact that
- D) waterways and the fact that

In assessing the films of Japanese director Akira Kurosawa, _____ have missed his equally deep engagement with Japanese artistic traditions such as Noh theater.

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

- A) many critics have focused on Kurosawa's use of Western literary sources but
- B) Kurosawa's use of Western literary sources has been the focus of many critics, who
- C) there are many critics who have focused on Kurosawa's use of Western literary sources, but they
- D) the focus of many critics has been on Kurosawa's use of Western literary sources; they

Joshua Hinson, director of the language revitalization program of the Chickasaw Nation in Oklahoma, helped produce the world's first Indigenous-language instructional app, Chickasaw _____ Chickasaw TV, in 2010; and a Rosetta Stone language course in Chickasaw, in 2015.

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

- A) Basic; in 2009, an online television network;
- B) Basic; in 2009, an online television network,
- C) Basic, in 2009; an online television network,
- D) Basic, in 2009, an online television network,

A group of ecologists led by Axel Mithöfer at the Max Planck Institute for Chemical Ecology in Germany examined the defensive responses of two varieties of the sweet potato _____ TN57, which is known for its insect resistance, and TN66, which is much more susceptible to pests.

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

- A) plant.
- B) plant;
- C) plant
- D) plant:

When, in the 1800s, geologists first realized that much of Earth had once been covered by great sheets of ice, some theorized that the phenomenon was cyclical, occurring at regular intervals. Each Ice Age is so destructive, though, that it largely erases the geological evidence of its predecessor.

_____ geologists were unable to confirm the theory of cyclical Ice Ages until the 1960s.

Which choice completes the text with the most logical transition?

- A) Hence,
- B) Moreover,
- C) Nevertheless,
- D) Next,

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

- The Seikan Tunnel is a rail tunnel in Japan.
- It connects the island of Honshu to the island of Hokkaido.
- It is roughly 33 miles long.
- The Channel Tunnel is a rail tunnel in Europe.
- It connects Folkestone, England, to Coquelles, France.
- It is about 31 miles long.

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

- A) Some of the world's rail tunnels, including one tunnel that extends from Folkestone, England, to Coquelles, France, are longer than 30 miles.
- B) The Seikan Tunnel is roughly 33 miles long, while the slightly shorter Channel Tunnel is about 31 miles long.
- C) The Seikan Tunnel, which is roughly 33 miles long, connects the Japanese islands of Honshu and Hokkaido.
- D) Both the Seikan Tunnel, which is located in Japan, and the Channel Tunnel, which is located in Europe, are examples of rail tunnels.

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

- Ancient Native American and Australian Aboriginal cultures described the Pleiades star cluster as having seven stars.
- It was referred to as the Seven Sisters in the mythology of ancient Greece.
- Today, the cluster appears to have only six stars.
- Two of the stars have moved so close together that they now appear as one.

The student wants to specify the reason the Pleiades' appearance changed. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Ancient Native American and Australian Aboriginal cultures described the Pleiades, which was referred to in Greek mythology as the Seven Sisters, as having seven stars.
- B) Although once referred to as the Seven Sisters, the Pleiades appears to have only six stars today.
- C) In the time since ancient cultures described the Pleiades as having seven stars, two of the cluster's stars have moved so close together that they now appear as one.
- D) The Pleiades has seven stars, but two are so close together that they appear to be a single star.

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

- Pinnipeds, which include seals, sea lions, and walruses, live in and around water.
- Pinnipeds are descended not from sea animals but from four-legged, land-dwelling carnivores.
- Canadian paleobiologist Natalia Rybczynski recently found a fossil with four legs, webbed toes, and the skull and teeth of a seal.
- Rybczynski refers to her rare find as a "transitional fossil."
- The fossil illustrates an early stage in the evolution of pinnipeds from their land-dwelling ancestors.

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

- A) Canadian paleobiologist Natalia Rybczynski's fossil has the skull and teeth of a seal, which, like sea lions and walruses, is a pinniped.
- B) Pinnipeds are descended from four-legged, land-dwelling carnivores; a fossil that resembles both was recently found.
- C) Having four legs but the skull and teeth of a seal, the rare fossil illustrates an early stage in the evolution of pinnipeds from their land-dwelling ancestors.
- D) A "transitional fossil" was recently found by paleobiologist Natalia Rybczynski.

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

- Gaspar Enriquez is an artist.
- He specializes in portraits of Mexican Americans.
- A portrait is an artistic representation of a person.
- Enriquez completed a painting of the sculptor Luis Jimenez in 2003.
- He completed a drawing of the writer Rudolfo Anaya in 2016.

The student wants to emphasize a difference between the two portraits. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) The portraits, or artistic representations, of Luis Jimenez and Rudolfo Anaya were both completed by Enriquez in the early 2000s.
- B) Enriquez has completed portraits of numerous Mexican Americans, including sculptor Luis Jimenez and writer Rudolfo Anaya.
- C) While both are by Enriquez, the 2003 portrait of Luis Jimenez is a painting, and the 2016 portrait of Rudolfo Anaya is a drawing.
- D) Luis Jimenez was a Mexican American sculptor, and Rudolfo Anaya was a Mexican American writer.

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

- *Las sergas de Esplandián* was a novel popular in sixteenth-century Spain.
- The novel featured a fictional island inhabited solely by Black women and known as California.
- That same century, Spanish explorers learned of an "island" off the west coast of Mexico.
- They called it California after the island in the novel.
- The "island" was actually the peninsula now known as Baja California ("Lower California"), which lies to the south of the US state of California.

The student wants to emphasize the role a misconception played in the naming of a place. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) The novel *Las sergas de Esplandián* featured a fictional island known as California.
- B) To the south of the US state of California lies Baja California ("Lower California"), originally called California after a fictional place.
- C) In the sixteenth century, Spanish explorers learned of a peninsula off the west coast of Mexico and called it California.
- D) Thinking it was an island, Spanish explorers called a peninsula California after an island in a popular novel.

27

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

- In 1851, German American artist Emanuel Leutze painted *Washington Crossing the Delaware*.
- His huge painting (149 × 255 inches) depicts the first US president crossing a river with soldiers in the Revolutionary War.
- In 2019, Cree artist Kent Monkman painted *mistikôsiwak (Wooden Boat People): Resurgence of the People*.
- Monkman's huge painting (132 × 264 inches) was inspired by Leutze's.
- It portrays Indigenous people in a boat rescuing refugees.

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

- A) Monkman, a Cree artist, finished his painting in 2019; Leutze, a German American artist, completed his in 1851.
- B) Although Monkman's painting was inspired by Leutze's, the people and actions the two paintings portray are very different.
- C) Leutze's and Monkman's paintings are both huge, measuring 149 × 255 inches and 132 × 264 inches, respectively.
- D) Leutze's painting depicts Revolutionary War soldiers, while Monkman's depicts Indigenous people and refugees.

STOP

**If you finish before time is called, you may check your work on this module only.
Do not turn to any other module in the test.**

Reading and Writing

27 QUESTIONS

DIRECTIONS

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In addition to being an accomplished psychologist himself, Francis Cecil Sumner was a _____ increasing the opportunity for Black students to study psychology, helping to found the psychology department at Howard University, a historically Black university, in 1930.

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

- A) proponent of
- B) supplement to
- C) beneficiary of
- D) distraction for

For her 2021 art installation *Anthem*, Wu Tsang joined forces with singer and composer Beverly Glenn-Copeland to produce a piece that critics found truly _____. They praised Tsang for creatively transforming a museum rotunda into a dynamic exhibit by projecting filmed images of Glenn-Copeland onto a massive 84-foot curtain and filling the space with the sounds of his and other voices singing.

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

- A) restrained
- B) inventive
- C) inexplicable
- D) mystifying

Scholarly discussions of gender in Shakespeare's comedies often celebrate the rebellion of the playwright's characters against the rigid expectations _____ by Elizabethan society. Most of the comedies end in marriage, with characters returning to their socially dictated gender roles after previously defying them, but there are some notable exceptions.

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

- A) interjected
- B) committed
- C) illustrated
- D) prescribed

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

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

- A) complementary
- B) unknown
- C) disparate
- D) interchangeable

Text 1

Conventional wisdom long held that human social systems evolved in stages, beginning with hunter-gatherers forming small bands of members with roughly equal status. The shift to agriculture about 12,000 years ago sparked population growth that led to the emergence of groups with hierarchical structures: associations of clans first, then chiefdoms, and finally, bureaucratic states.

Text 2

In a 2021 book, anthropologist David Graeber and archaeologist David Wengrow maintain that humans have always been socially flexible, alternately forming systems based on hierarchy and collective ones with decentralized leadership. The authors point to evidence that as far back as 50,000 years ago some hunter-gatherers adjusted their social structures seasonally, at times dispersing in small groups but also assembling into communities that included esteemed individuals.

Based on the texts, how would Graeber and Wengrow (Text 2) most likely respond to the “conventional wisdom” presented in Text 1?

- A) By conceding the importance of hierarchical systems but asserting the greater significance of decentralized collective societies
- B) By disputing the idea that developments in social structures have followed a linear progression through distinct stages
- C) By acknowledging that hierarchical roles likely weren't a part of social systems before the rise of agriculture
- D) By challenging the assumption that groupings of hunter-gatherers were among the earliest forms of social structure

In 1934 physicist Eugene Wigner posited the existence of a crystal consisting entirely of electrons in a honeycomb-like structure. The so-called Wigner crystal remained largely conjecture, however, until Feng Wang and colleagues announced in 2021 that they had captured an image of one. The researchers trapped electrons between two semiconductors and then cooled the apparatus, causing the electrons to settle into a crystalline structure. By inserting an ultrathin sheet of graphene above the crystal, the researchers obtained an impression—the first visual confirmation of the Wigner crystal.

Which choice best states the main idea of the text?

- A) Researchers have obtained the most definitive evidence to date of the existence of the Wigner crystal.
- B) Researchers have identified an innovative new method for working with unusual crystalline structures.
- C) Graphene is the most important of the components required to capture an image of a Wigner crystal.
- D) It's difficult to acquire an image of a Wigner crystal because of the crystal's honeycomb structure.

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

According to the text, why was Wang and his team's discovery of the *Terropterus xiushanensis* fossil significant?

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

The following text is adapted from Edith Nesbit's 1906 novel *The Railway Children*.

Mother did not spend all her time in paying dull [visits] to dull ladies, and sitting dully at home waiting for dull ladies to pay [visits] to her. She was almost always there, ready to play with the children, and read to them, and help them to do their home-lessons. Besides this she used to write stories for them while they were at school, and read them aloud after tea, and she always made up funny pieces of poetry for their birthdays and for other great occasions.

According to the text, what is true about Mother?

- A) She wishes that more ladies would visit her.
- B) Birthdays are her favorite special occasion.
- C) She creates stories and poems for her children.
- D) Reading to her children is her favorite activity.

"The Young Girl" is a 1920 short story by Katherine Mansfield. In the story, the narrator takes an unnamed seventeen-year-old girl and her younger brother out for a meal. In describing the teenager, Mansfield frequently contrasts the character's pleasant appearance with her unpleasant attitude, as when Mansfield writes of the teenager, _____

Which quotation from "The Young Girl" most effectively illustrates the claim?

- A) "I heard her murmur, 'I can't bear flowers on a table.' They had evidently been giving her intense pain, for she positively closed her eyes as I moved them away."
- B) "While we waited she took out a little, gold powder-box with a mirror in the lid, shook the poor little puff as though she loathed it, and dabbed her lovely nose."
- C) "I saw, after that, she couldn't stand this place a moment longer, and, indeed, she jumped up and turned away while I went through the vulgar act of paying for the tea."
- D) "She didn't even take her gloves off. She lowered her eyes and drummed on the table. When a faint violin sounded she winced and bit her lip again. Silence."

Estimates of Tyrannosaurid Bite Force

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

The largest tyrannosaurids—the family of carnivorous dinosaurs that includes *Tarbosaurus*, *Albertosaurus*, and, most famously, *Tyrannosaurus rex*—are thought to have had the strongest bites of any land animals in Earth's history.

Determining the bite force of extinct animals can be difficult, however, and paleontologists Paul Barrett and Emily Rayfield have suggested that an estimate of dinosaur bite force may be significantly influenced by the methodology used in generating that estimate.

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

- A) The study by Meers used body-mass scaling and produced the lowest estimated maximum bite force, while the study by Cost et al. used muscular and skeletal modeling and produced the highest estimated maximum.
- B) In their study, Gignac and Erickson used tooth-bone interaction analysis to produce an estimated bite force range with a minimum of 8,000 newtons and a maximum of 34,000 newtons.
- C) The bite force estimates produced by Bates and Falkingham and by Cost et al. were similar to each other, while the estimates produced by Meers and by Gignac and Erickson each differed substantially from any other estimate.
- D) The estimated maximum bite force produced by Cost et al. exceeded the estimated maximum produced by Bates and Falkingham, even though both groups of researchers used the same method to generate their estimates.

When digging for clams, their primary food, sea otters damage the roots of eelgrass plants growing on the seafloor. Near Vancouver Island in Canada, the otter population is large and well established, yet the eelgrass meadows are healthier than those found elsewhere off Canada's coast. To explain this, conservation scientist Erin Foster and colleagues compared the Vancouver Island meadows to meadows where otters are absent or were reintroduced only recently. Finding that the Vancouver Island meadows have a more diverse gene pool than the others do, Foster hypothesized that damage to eelgrass roots increases the plant's rate of sexual reproduction; this, in turn, boosts genetic diversity, which benefits the meadow's health overall.

Which finding, if true, would most directly undermine Foster's hypothesis?

- A) At some sites in the study, eelgrass meadows are found near otter populations that are small and have only recently been reintroduced.
- B) At several sites not included in the study, there are large, well-established sea otter populations but no eelgrass meadows.
- C) At several sites not included in the study, eelgrass meadows' health correlates negatively with the length of residence and size of otter populations.
- D) At some sites in the study, the health of plants unrelated to eelgrass correlates negatively with the length of residence and size of otter populations.

In the mountains of Brazil, *Barbacenia tomentosa* and *Barbacenia macrantha*—two plants in the Velloziaceae family—establish themselves on soilless, nutrient-poor patches of quartzite rock. Plant ecologists Anna Abrahão and Patricia de Britto Costa used microscopic analysis to determine that the roots of *B. tomentosa* and *B. macrantha*, which grow directly into the quartzite, have clusters of fine hairs near the root tip; further analysis indicated that these hairs secrete both malic and citric acids. The researchers hypothesize that the plants depend on dissolving underlying rock with these acids, as the process not only creates channels for continued growth but also releases phosphates that provide the vital nutrient phosphorus.

Which finding, if true, would most directly support the researchers' hypothesis?

- A) Other species in the Velloziaceae family are found in terrains with more soil but have root structures similar to those of *B. tomentosa* and *B. macrantha*.
- B) Though *B. tomentosa* and *B. macrantha* both secrete citric and malic acids, each species produces the acids in different proportions.
- C) The roots of *B. tomentosa* and *B. macrantha* carve new entry points into rocks even when cracks in the surface are readily available.
- D) *B. tomentosa* and *B. macrantha* thrive even when transferred to the surfaces of rocks that do not contain phosphates.

13

Ancestral Puebloans, the civilization from which present-day Pueblo tribes descended, emerged as early as 1500 B.C.E. in an area of what is now the southwestern United States and dispersed suddenly in the late 1200s C.E., abandoning established villages with systems for farming crops and turkeys. Recent analysis comparing turkey remains at Mesa Verde, one such village in southern Colorado, to samples from modern turkey populations in the Rio Grande Valley of north central New Mexico determined that the latter birds descended in part from turkeys cultivated at Mesa Verde, with shared genetic markers appearing only after 1280. Thus, researchers concluded that _____

Which choice most logically completes the text?

- A) conditions of the terrains in the Rio Grande Valley and Mesa Verde had greater similarities in the past than they do today.
- B) some Ancestral Puebloans migrated to the Rio Grande Valley in the late 1200s and carried farming practices with them.
- C) Indigenous peoples living in the Rio Grande Valley primarily planted crops and did not cultivate turkeys before 1280.
- D) the Ancestral Puebloans of Mesa Verde likely adopted the farming practices of Indigenous peoples living in other regions.

14

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

Which choice most logically completes the text?

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

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

Which choice most logically completes the text?

- A) the cultivation of the sweet potato in Polynesia likely predates its cultivation in South America.
- B) Polynesian peoples likely acquired the sweet potato from South American peoples only within the last three thousand years.
- C) human activity likely played no role in the introduction of the sweet potato in Polynesia.
- D) Polynesian sweet potato varieties likely descend from a single South American variety that was domesticated, not wild.

In Death Valley National Park's Racetrack Playa, a flat, dry lakebed, are 162 rocks—some weighing less than a pound but others almost 700 pounds—that move periodically from place to place, seemingly of their own volition. Racetrack-like trails in the _____ mysterious migration.

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

- A) playas sediment mark the rock's
- B) playa's sediment mark the rocks
- C) playas' sediment mark the rocks'
- D) playas' sediment mark the rocks'

Nigerian author Buchi Emecheta's celebrated literary oeuvre includes *The Joys of Motherhood*, a novel about the changing roles of women in 1950s _____ a television play about the private struggles of a newlywed couple in Nigeria; and *Head Above Water*, her autobiography.

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

- A) Lagos, *A Kind of Marriage*,
- B) Lagos; *A Kind of Marriage*,
- C) Lagos, *A Kind of Marriage*:
- D) Lagos; *A Kind of Marriage*

18

In 2016, engineer Vanessa Galvez oversaw the installation of 164 bioswales, vegetated channels designed to absorb and divert stormwater, along the streets of Queens, New York. By reducing the runoff flowing into city sewers, _____

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

- A) the mitigation of both street flooding and the resulting pollution of nearby waterways has been achieved by bioswales.
- B) the bioswales have mitigated both street flooding and the resulting pollution of nearby waterways.
- C) the bioswales' mitigation of both street flooding and the resulting pollution of nearby waterways has been achieved.
- D) both street flooding and the resulting pollution of nearby waterways have been mitigated by bioswales.

19

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

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

- A) quilts, and the
- B) quilts, the
- C) quilts; the
- D) quilts. The

20

Compared to that of alumina glass, _____ silica glass atoms are so far apart that they are unable to re-form bonds after being separated.

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

- A) silica glass is at a significant disadvantage due to its more dispersed atomic arrangement:
- B) silica glass has a more dispersed atomic arrangement, resulting in a significant disadvantage:
- C) a significant disadvantage of silica glass is that its atomic arrangement is more dispersed:
- D) silica glass's atomic arrangement is more dispersed, resulting in a significant disadvantage:

21

In the historical novel *The Surrender Tree*, Cuban American author Margarita Engle uses poetry rather than prose _____ the true story of Cuban folk hero Rosa La Bayamesa.

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

- A) tells
- B) told
- C) is telling
- D) to tell

22

Sociologist Alton Okinaka sits on the review board tasked with adding new sites to the Hawai'i Register of Historic Places, which includes Pi'ilanihale Heiau and the 'Ōpaeka'a Road Bridge. Okinaka doesn't make such decisions _____ all historical designations must be approved by a group of nine other experts from the fields of architecture, archaeology, history, and Hawaiian culture.

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

- A) single-handedly, however;
- B) single-handedly; however,
- C) single-handedly, however,
- D) single-handedly however

23

Researchers Helena Mihaljević-Brandt, Lucía Santamaría, and Marco Tullney report that while mathematicians may have traditionally worked alone, evidence points to a shift in the opposite direction. _____ mathematicians are choosing to collaborate with their peers—a trend illustrated by a rise in the number of mathematics publications credited to multiple authors.

Which choice completes the text with the most logical transition?

- A) Similarly,
- B) For this reason,
- C) Furthermore,
- D) Increasingly,

24

When Chinese director Chloé Zhao accepted the Oscar in 2021 for her film *Nomadland*, she made Academy Award history. _____ only one other woman, Kathryn Bigelow of the United States, had been named best director at the Oscars, making Zhao the second woman and the first Asian woman to win the award.

Which choice completes the text with the most logical transition?

- A) As a result,
- B) Previously,
- C) However,
- D) Likewise,

25

When soil becomes contaminated by toxic metals, it can be removed from the ground and disposed of in a landfill. _____ contaminated soil can be detoxified via phytoremediation: plants that can withstand high concentrations of metals absorb the pollutants and store them in their shoots, which are then cut off and safely disposed of, preserving the health of the plants.

Which choice completes the text with the most logical transition?

- A) Alternatively,
- B) Specifically,
- C) For example,
- D) As a result,

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

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

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

- A) The Lost Apple Project is dedicated to finding some of the apple varieties lost following a shift in agricultural practices in the mid-1900s.
- B) While over 14,000 apple varieties were grown in the US in the late 1890s, only 15 unique varieties make up most of the apples sold today.
- C) Since the rise of industrial agriculture, US farmers have mainly grown the same few unique apple varieties, resulting in the loss of thousands of varieties less suitable for commercial growth.
- D) As industrial agriculture rose to prominence in the mid-1900s, the number of crops selected for cultivation decreased dramatically.

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

- The *Atlantic Monthly* magazine was first published in 1857.
- The magazine focused on politics, art, and literature.
- In 2019, historian Cathryn Halverson published the book *Faraway Women and the "Atlantic Monthly."*
- Its subject is female authors whose autobiographies appeared in the magazine in the early 1900s.
- One of the authors discussed is Juanita Harrison.

The student wants to introduce Cathryn Halverson's book to an audience already familiar with the *Atlantic Monthly*. Which choice most effectively uses relevant information from the notes to accomplish this goal?

- A) Cathryn Halverson's *Faraway Women and the "Atlantic Monthly"* discusses female authors whose autobiographies appeared in the magazine in the early 1900s.
- B) A magazine called the *Atlantic Monthly*, referred to in Cathryn Halverson's book title, was first published in 1857.
- C) *Faraway Women and the "Atlantic Monthly"* features contributors to the *Atlantic Monthly*, first published in 1857 as a magazine focusing on politics, art, and literature.
- D) An author discussed by Cathryn Halverson is Juanita Harrison, whose autobiography appeared in the *Atlantic Monthly* in the early 1900s.

STOP

**If you finish before time is called, you may check your work on this module only.
Do not turn to any other module in the test.**

Math

22 QUESTIONS

DIRECTIONS

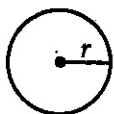
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

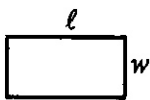
- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE

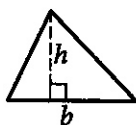


$$A = \pi r^2$$

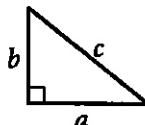
$$C = 2\pi r$$



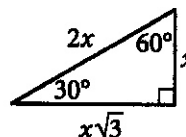
$$A = \ell w$$



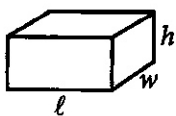
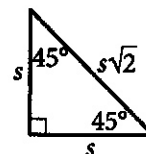
$$A = \frac{1}{2}bh$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



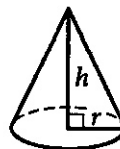
$$V = \ell wh$$



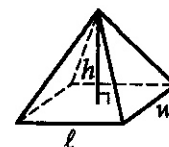
$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π .

The sum of the measures in degrees of the angles of a triangle is 180.

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

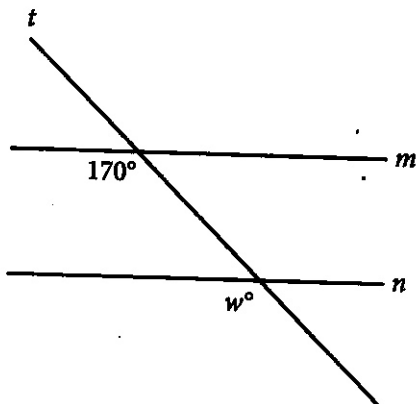
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- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction ($7/2$) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

$$4x + 6 = 18$$

Which equation has the same solution as the given equation?

- A) $4x = 108$
- B) $4x = 24$
- C) $4x = 12$
- D) $4x = 3$



Note: Figure not drawn to scale.

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

- A) 17
- B) 30
- C) 70
- D) 170

Each value in the data set shown represents the height, in centimeters, of a plant.

6, 10, 13, 2, 15, 22, 10, 4, 4, 4

What is the mean height, in centimeters, of these plants?

$$2.5b + 5r = 80$$

The given equation describes the relationship between the number of birds, b , and the number of reptiles, r , that can be cared for at a pet care business on a given day. If the business cares for 16 reptiles on a given day, how many birds can it care for on this day?

- A) 0
- B) 5
- C) 40
- D) 80

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

- A) 164
- B) 1,681
- C) 10,086
- D) 68,921

13 is $p\%$ of 25. What is the value of p ?

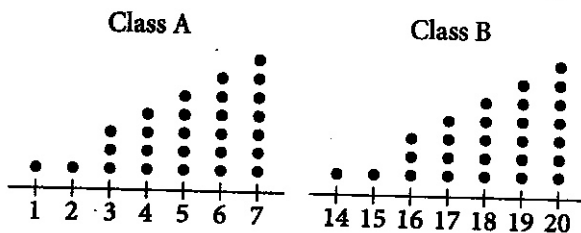
A model predicts that the population of Springfield was 15,000 in 2005. The model also predicts that each year for the next 5 years, the population p increased by 4% of the previous year's population. Which equation best represents this model, where x is the number of years after 2005, for $x \leq 5$?

- A) $p = 0.96(15,000)^x$
- B) $p = 1.04(15,000)^x$
- C) $p = 15,000(0.96)^x$
- D) $p = 15,000(1.04)^x$

$$-4x^2 - 7x = -36$$

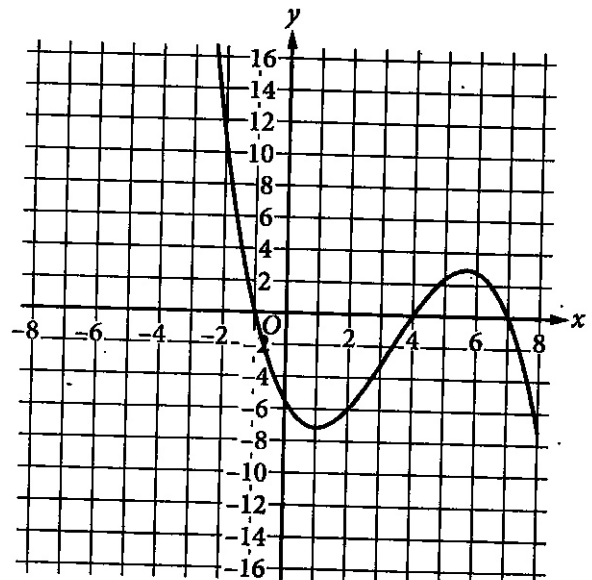
What is the positive solution to the given equation?

- A) $\frac{7}{4}$
- B) $\frac{9}{4}$
- C) 4
- D) 7



Each of the dot plots shown represents the number of glue sticks brought in by each student for two classes, class A and class B. Which statement best compares the standard deviations of the numbers of glue sticks brought in by each student for these two classes?

- A) The standard deviation of the number of glue sticks brought in by each student for class A is less than the standard deviation of the number of glue sticks brought in by each student for class B.
- B) The standard deviation of the number of glue sticks brought in by each student for class A is equal to the standard deviation of the number of glue sticks brought in by each student for class B.
- C) The standard deviation of the number of glue sticks brought in by each student for class A is greater than the standard deviation of the number of glue sticks brought in by each student for class B.
- D) There is not enough information to compare these standard deviations.



The graph of $y = f(x)$ is shown, where the function f is defined by $f(x) = ax^3 + bx^2 + cx + d$ and a , b , c , and d are constants. For how many values of x does $f(x) = 0$?

- A) One
- B) Two
- C) Three
- D) Four

The exponential function g is defined by $g(x) = 19 \cdot a^x$, where a is a positive constant. If $g(3) = 2,375$, what is the value of $g(4)$?

$$y = (x - 2)(x + 4)$$

$$y = 6x - 12$$

Which ordered pair (x, y) is the solution to the given system of equations?

- A) (0, 2)
- B) (-4, 2)
- C) (2, 0)
- D) (2, -4)

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

- A) $\frac{75}{317}$
- B) $\frac{308}{317}$
- C) $\frac{317}{308}$
- D) $\frac{317}{75}$

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

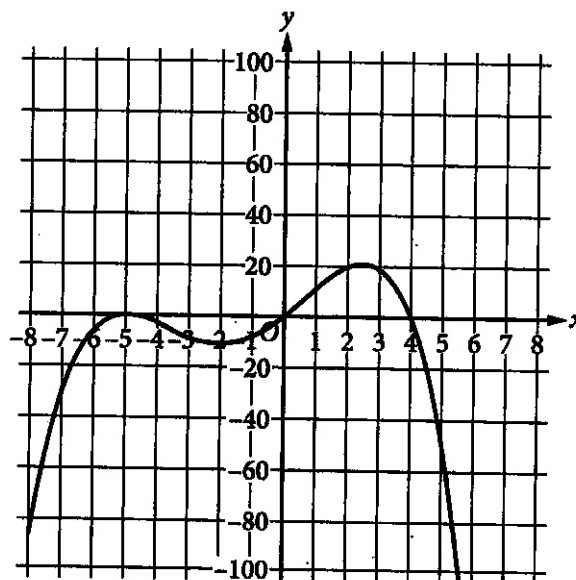
$$p = \frac{k}{4j + 9}$$

The given equation relates the distinct positive numbers p , k , and j . Which equation correctly expresses $4j + 9$ in terms of p and k ?

- A) $4j + 9 = \frac{k}{p}$
- B) $4j + 9 = kp$
- C) $4j + 9 = k - p$
- D) $4j + 9 = \frac{p}{k}$

Line p is defined by $4y + 8x = 6$. Line r is perpendicular to line p in the xy -plane. What is the slope of line r ?

Point O is the center of a circle. The measure of arc RS on this circle is 100° . What is the measure, in degrees, of its associated angle ROS ?



Which of the following could be the equation of the graph shown in the xy -plane?

- A) $y = -\frac{1}{10}x(x - 4)(x + 5)$
- B) $y = -\frac{1}{10}x(x - 4)(x + 5)^2$
- C) $y = \frac{1}{10}x(x - 5)(x + 4)$
- D) $y = \frac{1}{10}x(x - 5)^2(x + 4)$

19

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

$f(x)$ equals 201% of x

Which of the following could describe this function?

- A) Decreasing exponential
- B) Decreasing linear
- C) Increasing exponential
- D) Increasing linear

20

$$f(x) = 4x^2 + 64x + 262$$

The function g is defined by $g(x) = f(x + 5)$. For what value of x does $g(x)$ reach its minimum?

- A) -13
- B) -8
- C) -5
- D) -3

21

Poll Results

Angel Cruz	483
Terry Smith	320

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

- A) 163
- B) 1,304
- C) 3,864
- D) 5,621

22

$$\begin{aligned} y &= 2x^2 - 21x + 64 \\ y &= 3x + a \end{aligned}$$

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

- A) -8
- B) -6
- C) 6
- D) 8

STOP

If you finish before time is called, you may check your work on this module only.
Do not turn to any other module in the test.

Math

22 QUESTIONS

DIRECTIONS

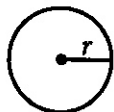
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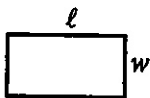
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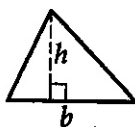


$$A = \pi r^2$$

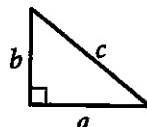
$$C = 2\pi r$$



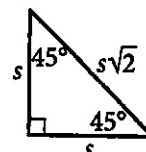
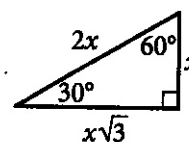
$$A = \ell w$$



$$A = \frac{1}{2}bh$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



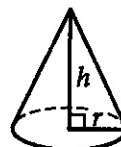
$$V = \ell wh$$



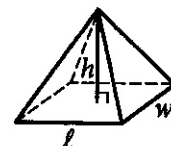
$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

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- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

$$\begin{aligned} 3x &= 12 \\ -3x + y &= -6 \end{aligned}$$

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

- A) -3
- B) 6
- C) 18
- D) 30

Which expression is equivalent to $11x^3 - 5x^3$?

- A) $16x^3$
- B) $6x^3$
- C) $6x^6$
- D) $16x^6$

$$66x = 66x$$

How many solutions does the given equation have?

- A) Exactly one
- B) Exactly two
- C) Infinitely many
- D) Zero

A proposal for a new library was included on an election ballot. A radio show stated that 3 times as many people voted in favor of the proposal as people who voted against it. A social media post reported that 15,000 more people voted in favor of the proposal than voted against it. Based on these data, how many people voted against the proposal?

- A) 7,500
- B) 15,000
- C) 22,500
- D) 45,000

Caleb used juice to make popsicles. The function $f(x) = -5x + 30$ approximates the volume, in fluid ounces, of juice Caleb had remaining after making x popsicles. Which statement is the best interpretation of the y -intercept of the graph of $y = f(x)$ in the xy -plane in this context?

- A) Caleb used approximately 5 fluid ounces of juice for each popsicle.
- B) Caleb had approximately 5 fluid ounces of juice when he began to make the popsicles.
- C) Caleb had approximately 30 fluid ounces of juice when he began to make the popsicles.
- D) Caleb used approximately 30 fluid ounces of juice for each popsicle.

An angle has a measure of $\frac{16\pi}{15}$ radians. What is the measure of the angle, in degrees?

$$\begin{aligned} y &\leq x + 7 \\ y &\geq -2x - 1 \end{aligned}$$

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

- A) $(-14, 0)$
- B) $(0, -14)$
- C) $(0, 14)$
- D) $(14, 0)$

A right triangle has legs with lengths of 24 centimeters and 21 centimeters. If the length of this triangle's hypotenuse, in centimeters, can be written in the form $3\sqrt{d}$, where d is an integer, what is the value of d ?

Value	Data set A frequency	Data set B frequency
30	2	9
34	4	7
38	5	5
42	7	4
46	9	2

Data set A and data set B each consist of 27 values. The table shows the frequencies of the values for each data set. Which of the following statements best compares the means of the two data sets?

- A) The mean of data set A is greater than the mean of data set B.
- B) The mean of data set A is less than the mean of data set B.
- C) The mean of data set A is equal to the mean of data set B.
- D) There is not enough information to compare the means of the data sets.

Triangle XYZ is similar to triangle RST such that X , Y , and Z correspond to R , S , and T , respectively. The measure of $\angle Z$ is 20° and $2XY = RS$. What is the measure of $\angle T$?

- A) 2°
- B) 10°
- C) 20°
- D) 40°

Keenan made 32 cups of vegetable broth. Keenan then filled x small jars and y large jars with all the vegetable broth he made. The equation $3x + 5y = 32$ represents this situation. Which is the best interpretation of $5y$ in this context?

- A) The number of large jars Keenan filled
- B) The number of small jars Keenan filled
- C) The total number of cups of vegetable broth in the large jars
- D) The total number of cups of vegetable broth in the small jars

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

What is the sum of the solutions to the given equation?

The function $f(x) = \frac{1}{9}(x - 7)^2 + 3$ gives a metal ball's height above the ground $f(x)$, in inches, x seconds after it started moving on a track, where $0 \leq x \leq 10$. Which of the following is the best interpretation of the vertex of the graph of $y = f(x)$ in the xy -plane?

- A) The metal ball's minimum height was 3 inches above the ground.
- B) The metal ball's minimum height was 7 inches above the ground.
- C) The metal ball's height was 3 inches above the ground when it started moving.
- D) The metal ball's height was 7 inches above the ground when it started moving.

$$F(x) = \frac{9}{5}(x - 273.15) + 32$$

The function F gives the temperature, in degrees Fahrenheit, that corresponds to a temperature of x kelvins. If a temperature increased by 2.10 kelvins, by how much did the temperature increase, in degrees Fahrenheit?

- A) 3.78
- B) 35.78
- C) 487.89
- D) 519.89

x	y
k	13
$k + 7$	-15

The table gives the coordinates of two points on a line in the xy -plane. The y -intercept of the line is $(k - 5, b)$, where k and b are constants. What is the value of b ?

One of the factors of $2x^3 + 42x^2 + 208x$ is $x + b$, where b is a positive constant. What is the smallest possible value of b ?

The function f is defined by $f(x) = 7x - 84$. What is the x -intercept of the graph of $y = f(x)$ in the xy -plane?

- A) (-12, 0)
- B) (-7, 0)
- C) (7, 0)
- D) (12, 0)

A certain park has an area of 11,863,808 square yards. What is the area, in square miles, of this park? (1 mile = 1,760 yards)

- A) 1.96
- B) 3.83
- C) 3,444.39
- D) 6,740.8

One gallon of paint will cover 220 square feet of a surface. A room has a total wall area of w square feet. Which equation represents the total amount of paint P , in gallons, needed to paint the walls of the room twice?

- A) $P = \frac{w}{110}$
- B) $P = 440w$
- C) $P = \frac{w}{220}$
- D) $P = 220w$

$$48x - 72y = 30y + 24$$

$$ry = \frac{1}{6} - 16x$$

In the given system of equations, r is a constant. If the system has no solution, what is the value of r ?

$$\frac{x^2}{\sqrt{x^2 - c^2}} = \frac{c^2}{\sqrt{x^2 - c^2}} + 39$$

In the given equation, c is a positive constant. Which of the following is one of the solutions to the given equation?

- A) $-c$
- B) $-c^2 - 39^2$
- C) $-\sqrt{39^2 - c^2}$
- D) $-\sqrt{c^2 + 39^2}$

$$f(x) = ax^2 + 4x + c$$

In the given quadratic function, a and c are constants. The graph of $y = f(x)$ in the xy -plane is a parabola that opens upward and has a vertex at the point (h, k) , where h and k are constants. If $k < 0$ and $f(-9) = f(3)$, which of the following must be true?

I. $c < 0$

II. $a \geq 1$

- A) I only
- B) II only
- C) I and II
- D) Neither I nor II

STOP

**If you finish before time is called, you may check your work on this module only.
Do not turn to any other module in the test.**