SAT SEPTEMBER BANK

Section 1, Module 1: Reading and Writing

Question 1

A Burial at Ornans, painted in the realist style by Gustave Courbet, depicts an ordinary provincial funeral in stark detail. The realists' emphasis on accurately portraying the experiences of average working people was largely a rejection of the romantic style evident in many paintings by Isidore Pils, which instead _____ blank their subjects' positive traits, altering subjects to appear more beautiful or heroic than they actually were.

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

A) apprehend

B) **magnify**

C) rectify

D) counteract

Question 2

Quinoa grain was domesticated in South America. Its physical structure is no longer identical to the structure of the wild plant it is descended from. Maize (corn) also _____ blank its wild ancestor. That ancestor plant had a few small kernels. Indigenous people in Mexico carefully bred the crop until it had numerous fleshy kernels.

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

A) helps with

B) varies from

C) argues with

D) reacts to

Question 3

The collectibles market is one of the most difficult segments of the consumer economy to _____ blank. Few economists would have predicted, for example, that the prices of vintage movie posters would soar in the 2010s, but soar they did.

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

A) forecast

B) monitor

C) avoid

D) exchange

Question 4

Tsuruoka, Japan, was named a City of Gastronomy by UNESCO in 2014, a title that _____ blank that Tsuruoka has a unique and vibrant food culture worthy of celebration.

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

A) complains

B) denotes

C) discovers

D) renounces

Question 5

The following text is from Louise Erdrich's 1986 novel *The Beet Queen*. Celestine takes her infant daughter with her to the butcher shop where she makes sausages.

Sometimes Celestine turned around and met the direct gaze of her daughter, a look so penetrating that Celestine's breath caught. She dropped the spice, the string, the knife she was using, and took the girl up in her arms, ready for her to speak as if a spell had suddenly lifted.

When the baby flexed her entire body and struggled to free herself, Celestine put her down. No matter how thorough Celestine's exhaustion, no matter how little sleep she'd had, there was a nerve of excitement running through each hour.

Which choice best states the main purpose of the text?

A) To demonstrate Celestine's unhappiness in the workplace

B) To portray Celestine's excitement about her daughter

C) To show that Celestine enjoys imagining her daughter's future life

D) To consider how Celestine's coworkers feel about her daughter

Question 6

In 1827, Rev. John Wilk and other free Black men in New York City founded *Freedom's Journal*, America's first Black-owned-and-operated newspaper. Wilk's accomplishment is just one example of the rich history of Black journalism in the United States. That history is preserved by the National Association of Black Journalists, which was founded in Washington, DC, in 1975 to support Black media professionals and honor people like Wilk.

Which choice best describes the overall structure of the text?

A) It introduces the history of an organization honoring Black journalists, then suggests how that organization might recruit more members.

B) **It mentions a specific achievement in Black journalistic history, then describes an organization dedicated to upholding that history.**

C) It summarizes a theory about journalism, then explains how a journalistic practice has changed over time.

D) It describes the career of a well-known figure in Black journalism, then compares that career to one of a figure who is lesser known.

Question 7

Though Vasily Grossman's novel *Stalingrad* is considered inferior to his later work *Life and Fate*, some critics praise it despite an arduous writing process required to satisfy Soviet censors (Marcel Theroux in *The Guardian* called *Stalingrad* "lucid and readable"). Of the novel's eleven drafts, the first is largely illegible, the sixth closely hews to Soviet orthodoxy, and published versions most resemble the fifth. The English edition's translators culled material from unpublished drafts and published Russian versions to create a comprehensive edition.

Which choice best describes the overall structure of the text?

A) It refers to a novel that has several different published and unpublished versions, identifies characteristics that have led critics to prefer one version to others, and tells how translators justified their choice to bring one particular version of the novel into another language.

B) It mentions a novel whose quality critics do not agree on, discusses obstacles that make it difficult to determine what the best version of that novel might be, and offers a reason why some critics find a translation of the novel to be superior to the original.

C) It describes a novel whose critical reputation has declined over time, explains the cause of that decline, and reports the effort of translators to rehabilitate a work they believe has been unjustly ignored.

D) **It notes a novel's critical reception, addresses the complicated history of the novel's development, and suggests how that history informed the work of the novel's English translators.**

Question 8

Hydroelectric generators and many other widely used mechanical systems have moving parts that rub or slide against one another, creating friction. This friction increases energy consumption and causes wear, which decreases the stability and life span of the system. Using carbon nanotubes and oil, Chanaka Kumara and colleagues at a US Department of Energy lab have created a coating for moving parts that reduces friction to the point where it is almost nonexistent. The new coating is suitable for common applications, unlike other approaches that require special conditions.

What does the text most strongly suggest about the coating created by Kumara and colleagues?

A) It is unlikely to be widely used because it can be applied only under special conditions.

B) It can likely improve the energy consumption of certain mechanical systems but not of hydroelectric generators.

C) It is unlikely to reduce wear in mechanical systems that have multiple moving parts.

D) **It can likely be used to reduce energy consumption and wear in hydroelectric generators and other common mechanical systems.**

Question 9

Optimal foraging theory (OFT) holds that animals' foraging behaviors reflect cost-benefit trade-offs that vary by species and with dynamic ecological circumstances. One such circumstance is lunar intensity, which Paul C. Griffiths and colleagues found to be negatively associated with foraging by snowshoe hares but Ian C. Colquhoun found to be positively associated with foraging by black lemurs. This discrepancy is explicable in terms of OFT: the lemurs' greater reliance on vision means that higher lunar intensity benefits them more than it benefits the hares.

Information in the text best supports which statement about OFT?

A) It can explain why some species act in accordance with cost-benefit trade-offs and others do not.

B) It may be weakened by the finding that the costs and benefits associated with a particular ecological circumstance vary by species.

C) It tends to allow for a better understanding of the benefits of ecological circumstances than the costs of those circumstances.

D) **It can account for observations of different species responding differently to similar ecological circumstances.**

Question 10

High-speed rail (HSR) systems have trains that move at much higher speeds than traditional trains. HSR is expanding in Switzerland, Uzbekistan, and many other countries around the world. The United States, however, has been slow to build HSR systems. Researchers surveyed United States residents about their attitudes toward HSR. The researchers claim that this survey reveals that there is strong support for building more HSR lines in the United States.

Which quotation from a survey respondent would best illustrate the underlined claim?

A) "I prefer riding buses instead of taking trains because buses travel to more locations."

B) "I have traveled on high-speed rail lines in Switzerland but not in Uzbekistan."

C) **"I think high-speed rail is wonderful. The United States needs to build more high-speed rail lines."**

D) "I believe that the United States has enough high-speed rail lines. It should invest in airports instead."

Question 11

Numbers of the 23 Non-native Tree Species Reported and the Insect and Fungus Threats to Them

Country	Trees	Fungi	Insects
Belgium	4	13	11
Italy	14	57	42
Denmark	12	22	33

Elisabeth Pötzelsberger and colleagues gathered data on 23 non-native tree species grown in Europe. They analyzed reports from Italy, Denmark, and Belgium about the number of these species grown in those countries as well as the numbers of insect and fungus species that damage those trees. The researchers concluded that Italy had a greater number of damaging fungus species than either of the other countries did.

Which choice best describes data from the table that support Pötzelsberger and colleagues' conclusion?

A) Belgium reported 13 damaging fungus species but only 11 damaging insect species.

B) Italy reported 57 damaging fungus species, whereas Denmark reported 33 damaging insect species.

C) **Italy reported 57 damaging fungus species, which is more than either Denmark or Belgium reported.**

D) Denmark and Belgium reported 12 and 4 damaging fungus species, respectively, which is far fewer than Italy reported.

Question 12

Life Among the Paiutes is an 1882 autobiographical narrative by Sarah Winnemucca Hopkins. In the work, Winnemucca explicitly indicates when and how she is shifting the focus of the narrative, as when she writes, _____ blank

Which quotation from *Life Among the Paiutes* most effectively illustrates the claim?

A) **"I will now stop writing about myself and family and tribe customs, and tell about the wars, and the causes of the wars. I will jump over about six years."**

B) "Now, my dear reader, there is no word so endearing as the word father, and that is why [my people] call all good people father or mother."

C) "But how can I describe the scene that followed? Some of you, dear readers, can imagine."

D) "During the time my grandfather was away in California, where he [stayed] till after the Mexican war, there was a girl-baby born in our family."

Question 13

Average Ratings of Perceived Personality Traits of Dogs and Human Willingness to Keep or Interact with Them

Image ID number	Irises	Not friendly (0)–Friendly (5)	Immature (0)–Mature (5)	Would not keep (0)–Would keep (3)	Would not interact with (0)–Would interact with (3)
20	light	2.08	4.06	1.5	1.75
14	light	2.11	3.27	1.55	1.85
11	dark	3.18	2.94	1.85	2.05
3	dark	3.88	2.51	2.35	2.65

Studies have found that when looking at other people's eyes, humans tend to perceive dilated pupils positively and constricted pupils negatively. Noting that a dark iris—the colored portion surrounding the pupil—is hard to distinguish from the black of the pupil (and thereby affects the pupil's apparent size) and that many domestic dogs have dark irises, Akitsugu Konno et al. showed close-up images of dogs' faces to human participants and asked them to rate the dogs' traits and their own attitudes toward the dogs. Their findings suggest that _____ blank

Which choice most effectively uses data from the table to complete the statement?

A) **humans' responses to pupil size in other people may extend to dogs, as participants responded more positively to images of dogs whose iris colors were likely to make their pupils appear large than they did to images of dogs whose iris colors were unlikely to have that effect.**

B) differences in dogs' pupil size may elicit a stronger response in humans than differences in people's pupil size do, as participants' responses to the images when dogs' pupils were actually large were indistinguishable from participants' responses when dogs' pupils only appeared to be large due to iris color.

C) iris color in domestic dogs may be an adaptation to elicit positive responses from humans, as participants responded more negatively to images of dogs whose iris colors can make pupils appear large than they did to images of dogs without such iris colors.

D) humans may not be as sensitive to pupil size in dogs as they are to pupil size in other people, as participants' responses to the images show no relationship to differences in the shade of dogs' irises that could affect how large the dogs' pupils appear to be.

Question 14

Across brown bears—omnivores with high dietary plasticity—there is wide variety in dietary mix, which may reflect genetics, local resource availability, or social learning (cubs stay with their mothers for two years or more). Evaluating these possibilities, Anne Hertel et al. analyzed 30 years of data on trophic position (indicative of dietary mix) for female brown bears. After separation, daughters, who tended to settle near their mothers, occupied the same trophic positions as their mothers for two years, but the correlation disappeared by year five. Trophic correlation with unrelated individuals in similar habitats was modest, while habitat-independent correlation with nonmaternal relatives (e.g., cousins) was no different than with unrelated individuals. These findings suggest that _____ blank

Which choice most logically completes the text?

A) social learning and resource fluctuations may both play a role in dietary mix among females, at least temporarily, though genetic factors appear to make a significant contribution as well.

B) growing dissimilarity between mothers and their daughters with regard to dietary mix may reflect changes in the resources available in maternal habitats, though social learning could also contribute to the trend.

C) female dietary mix is best understood as changeable and contingent on fluctuating environmental conditions rather than as the result of social learning or genetic factors.

D) **dietary mix among females may reflect a social learning effect that eventually diminishes, though environmental constraints cannot be ruled out as a contributing factor.**

Question 15

The hwamei and other fruit-eating bird species introduced to the Hawaiian island of Oahu in the last 150 years have recently been found to spread seeds from the fruits of forest plants native to Oahu that are at risk of extinction, such as the lapalapa tree. Many of these vulnerable plant species rely on the activity of fruit-eating birds to help spread the plants' seeds in the wild. All fruit-eating bird species native to Oahu have gone extinct, suggesting that _____ blank

Which choice most logically completes the text?

A) non-native birds, such as the hwamei, will also be at risk of extinction if they lose access to lapalapa trees.

B) **hwameis and other non-native birds play an important role that used to be filled by birds that were native to Oahu.**

C) non-native birds, such as the hwamei, now spread more seeds from the lapalapa tree than birds native to Oahu did in the past.

D) populations of hwameis and other non-native birds will probably soon experience rapid growth.

Question 16

Marie-Christine Doffey is the director of the Swiss National Library in Berne. In this role, Doffey _____ blank the library's collections, which feature a large number of historical newspapers.

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

A) having overseen

B) **oversees**

C) overseeing

D) to oversee

Question 17

The epic poem *Beowulf* dates back to the 8th century. Originally _____ blank in Old English, it has since been translated into other languages.

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

A) had been written

B) was written

C) is written

D) **written**

Question 18

Though it was designated as mission _____ blank mission was actually the seventy-first flight under NASA's Space Shuttle Program.

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

A) **STS-69, the**

B) STS-69, and the

C) STS-69 the

D) STS-69. The

Question 19

The grammar of the Kagulu language includes several noun cases common to most Bantu _____ blank the locative case, for instance, indicates that an action is occurring at, on, or near a particular noun.

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

A) languages,

B) languages; such as

C) languages, such as

D) **languages;**

Question 20

The radial velocity method, a means of indirect planetary discovery, has detected previously unknown exoplanets at vast distances from _____ blank the gas giant 24 Bootis b; at 522 light-years away, the Neptune-like planet CoRoT-7 c; and, as of 2023, over 1,000 other exoplanets that are too far away and dim to be observed directly.

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

A) Earth, at 313 light-years away,

B) **Earth: at 313 light-years away,**

C) Earth at 313 light-years away,

D) Earth at 313 light-years away:

Question 21

Phillip Huber is well known for his work as a puppeteer. _____ blank he specializes in marionette puppetry. This style of puppetry involves controlling the puppet with strings from above.

Which choice completes the text with the most logical transition?

A) By doing so,

B) Second,

C) **In particular,**

D) By contrast,

Question 22

Portuguese researcher Isabel C.F.R. Ferreira reports that the homogentisic acid in oyster mushrooms benefits the mushroom by combating harmful molecules called free radicals. _____ blank Ferreira suggests that the acid can promote cellular health in humans, who also experience free radical damage.

Which choice completes the text with the most logical transition?

A) For example,

B) Conversely,

C) Rather,

D) **Moreover,**

Question 23

In economics, milk is considered a soft commodity, while copper and crude oil are considered hard commodities. The categorical distinction between soft and hard commodities lies not in the products' strength or durability but in their origin: the former type is grown or farmed, while the latter is mined or drilled. _____ blank pine lumber is as much a soft commodity as milk, despite its decidedly sturdier composition.

Which choice completes the text with the most logical transition?

A) In a notable exception to this rule,

B) Summarizing this principle,

C) **By this definition,**

D) Though it is grown from the earth,

Question 24

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

- A copyright prevents a book's contents from being reproduced (published) without permission from the copyright holder.
- When a book's copyright expires, the book enters the public domain and can be legally reproduced by anyone.
- *Harmonium* is a poetry collection by Wallace Stevens.
- It entered the public domain in 2019.
- *The Secret of Chimneys* is a novel by Agatha Christie.
- It entered the public domain in 2021.

The student wants to emphasize the order in which *Harmonium* and *The Secret of Chimneys* entered the public domain. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) The year was 2021, and the copyrights to *Harmonium* and *The Secret of Chimneys* had finally expired.

B) *Harmonium*, a poetry collection by Wallace Stevens, and *The Secret of Chimneys*, a novel by Agatha Christie, are both in the public domain.

C) Though they once were copyrighted works, *Harmonium* and *The Secret of Chimneys* are now in the public domain.

D) ***Harmonium*, a poetry collection by Wallace Stevens, entered the public domain in 2019, with Agatha Christie's novel *The Secret of Chimneys* following in 2021.**

Question 25

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

- Shanawdithit (1801–1829) was a Beothuk cartographer (mapmaker).
- Her maps of Newfoundland's Beothuk Lake outline both the lake and various points around the lake where encounters between the Indigenous Beothuk people and British colonists occurred.
- Her maps are notable for depicting the experiences the Beothuk had within the landscape.
- Contemporary Potawatomi cartographer Margaret Pearce: Indigenous cartography emphasizes "experienced space, or place, as opposed to the Western convention of depicting space as universal, homogenized, and devoid of human experience."
- Pearce: "Indigenous cartographies are as diverse as Indigenous cultures, from Hawaiian performative cartographies to Navajo verbal maps and sand paintings."

The student wants to describe Shanawdithit's approach and explain its significance. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) Shanawdithit's maps are part of a broader tradition of Indigenous cartography that, according to Pearce, ranges from "Hawaiian performative cartographies to Navajo verbal maps and sand paintings."

B) According to Pearce, Indigenous cartography, such as Shanawdithit's maps of Beothuk Lake, emphasizes "experienced space, or place," with a variety of approaches that reflect the diversity of Indigenous cultures.

C) Shanawdithit mapped Beothuk Lake through significant encounters that occurred there, an approach that Pearce describes as "depicting space as universal [and] homogenized."

D) **By depicting experiences of the Beothuk that occurred around Beothuk Lake, Shanawdithit's maps reflect Indigenous cartography's emphasis on "experienced space, or place" rather than the landscape alone.**

Question 26

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

- The A.M. Turing Award is a prestigious award given by the Association for Computing Machinery (ACM).
- The ACM gives the award for "major contributions of lasting importance to computing."
- It is named after groundbreaking British mathematician Alan Turing.
- Charles P. Thacker won the award in 2009 for creating the first modern personal computer.

The student wants to explain whom the award is named for. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) In 2009, Charles P. Thacker won the A.M. Turing Award for creating the first modern personal computer.

B) The A.M. Turing Award is given for "major contributions of lasting importance to computing."

C) It was in 2009 that Charles P. Thacker won the A.M. Turing Award.

D) **The A.M. Turing Award is named for groundbreaking British mathematician Alan Turing.**

Question 27

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

- Bernard Malamud was an acclaimed writer.
- His first published work of fiction was a short story.
- It was called "Benefit Performance."
- It first appeared in *Threshold* in 1943.

The student wants to identify the title of Bernard Malamud's first published short story. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) Bernard Malamud's first published work of fiction appeared in 1943.

B) Acclaimed writer Bernard Malamud's first published work of fiction was a short story.

C) **Bernard Malamud's first published short story was called "Benefit Performance."**

D) In 1943, a short story by Bernard Malamud appeared in *Threshold*.

Section 1, Module 2: Reading and Writing

Question 1

The following text is from Thomas Hardy's 1874 novel *Far from the Madding Crowd*. In the text, the narrator describes an open tract of land.
The changes of the seasons are less obtrusive on spots of this kind than amid woodland scenery. Still, to a close observer, they are just as perceptible; the difference is that their media of manifestation are less trite and familiar than such well-known ones as the bursting of the buds or the fall of the leaf.

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

A) Expansive

B) Unyielding

C) Conspicuous

D) Insolent

Question 2

The metal displayed in the structure of House in Kamiaraya by Kazuto Nishi Architects and the metal hardware in UE House by GENETO are representative aspects of a juxtaposition common in contemporary Japanese architecture: the _____ blank of sleek, contemporary elements and traditional organic materials in a single design is a trend with both aesthetic and highly practical purposes.

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

A) analysis

B) diffusion

C) designation

D) synthesis

Question 3

Described in treatises mainly published between 1768 and 1950 (such as May Florence Smith's *Original Manual Course for Reading Vocal Music at Sight*), musical stenography used quickly written squiggles and dots in an attempt to preserve, in print and in real time, the _____ blank features of live performances—those that result from impromptu deviations of performers when fidelity to an established musical score is not mandated.

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

A) **extemporaneous**

B) meticulous

C) inconspicuous

D) inevitable

Question 4

The striped marlin is ectothermic, or cold-blooded, and the Albacore tuna is a regional endotherm, meaning that parts of its body are typically warmer than the surrounding water. The basking shark had been classified as a full ectotherm, a position that became _____ blank after researchers Haley R. Dolton and colleagues showed that the basking shark's body temperature is consistently 1.0 to 1.5°C warmer than the water.

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

A) unequivocal

B) **untenable**

C) inconsolable

D) unanticipated

Question 5

The Heege Manuscript (HM) is a collection of booklets of once-unbound paper sheets on which Richard Heege copied various texts at his fifteenth-century home between Derbyshire and Nottinghamshire in England. Most other contemporaneous personal manuscripts like the Findern Anthology (FA) consist primarily of pieces by celebrated medieval authors like Gower and other readings favored by elites, whereas the HM has a distinctive emphasis on the popular, including entertainments like parody romances, and the practical, with advice about health.

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

A) To illustrate how the discussion of the HM earlier in the text can improve historians' understanding of the FA

B) To emphasize the ubiquity of hand-copied collections like the FA and the HM in medieval England

C) To suggest that the FA is a poor point of comparison for a collection like the HM

D) **To provide context for the text's suggestion that the HM is an outlier among collections of its time**

Question 6

Text 1
Michigan State University and the investment bank JPMorgan Chase are two of the many institutions offering training programs in entrepreneurship. But what results do such programs produce? In a study of college students in Poland, researcher Paul Jones and colleagues addressed this question and reported that participants who received entrepreneurial training showed strong intentions to become entrepreneurs.

Text 2
While studies of entrepreneurial training typically report positive results, a close look at these studies reveals widespread methodological shortcomings. This research literature is plagued by unclear hypotheses, insufficient sample sizes, a lack of control groups, and failures to establish pretraining baselines for the measured attributes of participants.

Based on the texts, the author of Text 2 would most like to know the answer to which question about Jones and colleagues' study that is not addressed in Text 1?

A) Did the participants that Jones and colleagues included in the study share any characteristics or life circumstances?

B) Did Jones and colleagues compare Polish college students who received the training with a group of successful entrepreneurs who did not receive the training?

C) Did Jones and colleagues measure any attributes of the participants in the study after they had received the training?

D) **How many Polish college students did Jones and colleagues include in the study?**

Question 7

Ye Chen and John F. Canny found that a recommender system (RS)—an algorithm that generates personalized product suggestions for online shoppers—impacted consumer behavior and increased sales, a result that was corroborated by Dokyun Lee and Kartik Hosanagar. However, Lee and Hosanagar also determined that whereas an RS had a stronger positive effect on item views for utilitarian products (e.g., diapers) than for hedonic products (e.g., glass figurines), the RS had a stronger positive effect on likelihood of purchase for hedonic products than for utilitarian ones.

Information in the text best supports which statement about recommender systems?

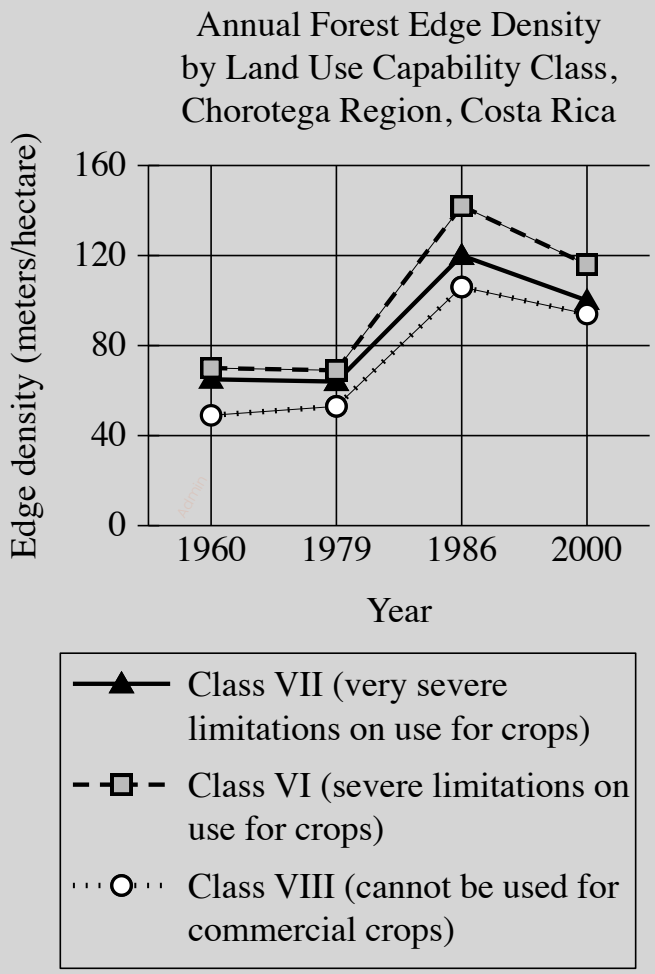
A) **While recommender systems can affect consumer behavior toward suggested products, those effects are not uniform in nature and strength across product categories.**

B) While recommender systems cause consumers to spend more time viewing utilitarian items such as diapers, recommender systems' positive effect on purchase rates is likely limited to hedonic items such as glass figurines.

C) By proposing the most useful options to consumers, recommender systems boost the online visibility of utilitarian items that otherwise tend to be overlooked.

D) By directing customers toward specific product categories on a retailer's website, recommender systems may limit the variety of items seen by online shoppers.

Question 8



- The following 3 lines are shown:
  - Class VII (very severe limitations on use for crops)
  - Class VI (severe limitations on use for crops)
  - Class VIII (cannot be used for commercial crops)
- The Class VII (very severe limitations on use for crops) line:
  - Begins at 1960, 65 meters per hectare
  - Falls gradually to 1979, 64 meters per hectare
  - Rises sharply to 1986, 120 meters per hectare
  - Falls gradually to 2000, 100 meters per hectare
- The Class VI (severe limitations on use for crops) line:
  - Begins at 1960, 70 meters per hectare
  - Falls gradually to 1979, 69 meters per hectare
  - Rises sharply to 1986, 142 meters per hectare
  - Falls gradually to 2000, 116 meters per hectare
- The Class VIII (cannot be used for commercial crops) line:
  - Begins at 1960, 49 meters per hectare
  - Rises gradually to 1979, 53 meters per hectare
  - Rises sharply to 1986, 106 meters per hectare
  - Falls gradually to 2000, 94 meters per hectare

Due to the Chorotega region's accessibility, various types of forested areas were converted to cattle pasture as rising international meat prices drove a cattle ranching boom in the 1960s and 1970s. Juan Pablo Arroyo-Mora and colleagues used historical aerial photography and remote sensing data to track fragmentation metrics across different land use capability classes (categories that indicate possible uses of forest land). One such metric, edge density, can be used to indicate the regularity of forest patch sizes, with decreases in edge density suggesting a trend towards uninterrupted forest patches with more regular shapes. The team found a range of edge density levels, from lows of around 80 meters per hectare or less in the 1960s and 1970s for all classes, to a high in 1986 of approximately _____ blank

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

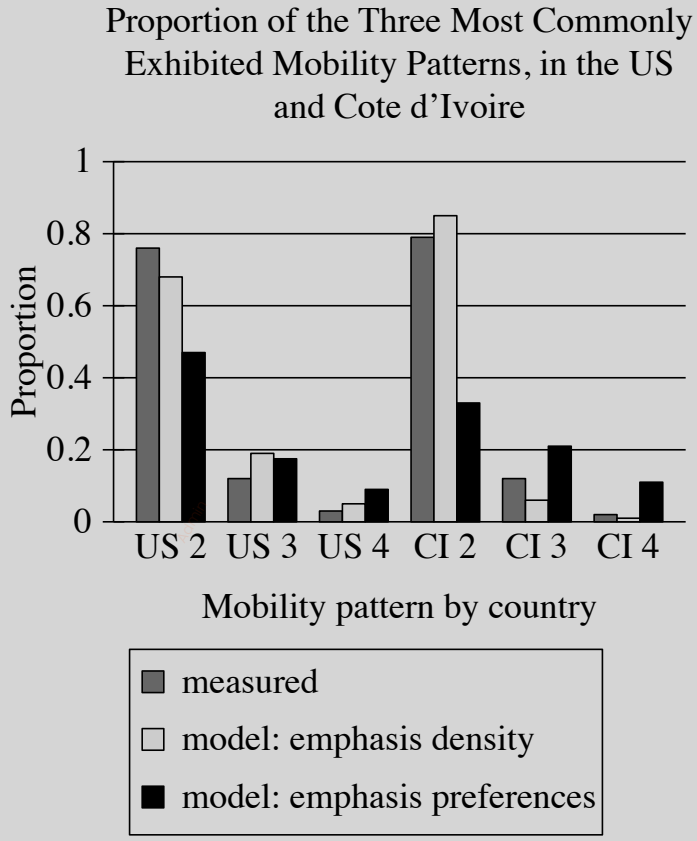
A) 120 for Class VIII.

B) 50 for Class VIII.

C) 50 for Class VII.

D) **140 for Class VI.**

Question 9



- For each data category, the following bars are shown:
  - measured
  - model: emphasis density
  - model: emphasis preferences
- The Proportion data for the 6 categories are as follows:
  - US 2:
    - measured: 0.76
    - model: emphasis density: 0.68
    - model: emphasis preferences: 0.47
  - US 3:
    - measured: 0.12
    - model: emphasis density: 0.19
    - model: emphasis preferences: 0.18
  - US 4:
    - measured: 0.03
    - model: emphasis density: 0.05
    - model: emphasis preferences: 0.09
  - CI 2:
    - measured: 0.79
    - model: emphasis density: 0.85
    - model: emphasis preferences: 0.33
  - CI 3:
    - measured: 0.12
    - model: emphasis density: 0.06
    - model: emphasis preferences: 0.21
  - CI 4:
    - measured: 0.02
    - model: emphasis density: 0.01
    - model: emphasis preferences: 0.11

Researchers used anonymized location data from the US and Côte d'Ivoire to document people's daily patterns of mobility, using these results to test the efficacy of the researchers' predictive computer model. In each country, unidirectional cycles among two, three, or four locations were empirically the most common pattern types; the graph shows each of these pattern types as a proportion of all pattern instances found for that country (e.g., the measured value for CI 3 in the graph, 0.12, indicates that the three-location pattern constituted 12% of all pattern instances in the Côte d'Ivoire data). The researchers ran their model twice under different assumptions, concluding that emphasizing the salience of local population density over personal preferences generally yielded the best results.

Which choice most effectively uses data from the graph to illustrate the researchers' conclusion?

A) Under the assumption that density is more salient than preferences, the US 2 and CI 2 proportions are approximately 0.65 and 0.85, respectively, significantly higher than the values predicted under the other assumption and thus farther than those predictions from the measured values.

B) Under the assumption that preferences are more salient than density, the two-location patterns (US 2 and CI 2) were predicted to be most frequent in the data even though neither proportion was projected to exceed 0.5, well below the proportion predicted under the other assumption.

C) **Under the assumption that preferences are more salient than density, the US 2 and CI 2 proportions were predicted to be in the range of 0.3 to 0.5, placing them farther from the measured values than were those predicted under the other assumption.**

D) Under the assumption that preferences are more salient than density, the US 2 and CI 2 proportions were predicted to be approximately 0.45 and 0.35, respectively, both below the measured values, whereas under the other assumption, the model overestimated the proportion for US 2 and overestimated that for CI 2.

Question 10

Studies of Cougar Population Density

Study authors	Location	Methods	Study area (square kilometers)	Maximum density (cougars per 100 square kilometers)
Verónica A. Quiroga et al.	Argentina	regular camera trapping	1,882	1.26
Rahel Sollmann et al.	Florida (United States)	infrared camera trapping, GPS tracking of collars	1,719	1.51
Gregory A. Davidson et al.	Oregon (United States)	scat-detecting dogs	1,225	5.50
David M. Choate et al.	Utah (United States)	helicopter surveying	1,300	10.24

Studies of the population density of cougars (*Puma concolor*) have yielded a range of results, which may in part reflect differences in the effectiveness of the methods that researchers have used in their studies. For example, the difference between the maximum population density reported by Verónica A. Quiroga et al. and that reported by David M. Choate et al. might be artificially large if the use of _____ blank

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

A) helicopter surveying underestimates the density of cougars.

B) **regular camera trapping underestimates the density of cougars.**

C) regular camera trapping is impractical outside of Argentina.

D) helicopter surveying is more common in Utah than the use of regular camera trapping is.

Question 11

Vegetation has two primary mechanisms by which it reduces air pollution: deposition (absorption of pollutants) and, the more effective, dispersion (dilution of pollutants by ventilation). Accordingly, establishment of green space to reduce major air pollutants such as fine particulate matter in urban areas receives considerable attention. Research by Zander S. Venter et al. comprised data from air-quality monitoring stations in Austria, the US state of Kentucky, and thousands of other global locations over a ten-year span, coupled with aerial imagery of those locations from the same period. The researchers ultimately recommended that reducing anthropogenic emissions remain the primary focus of urban air-quality improvement efforts.

Which finding from the study, if true, would most directly account for the recommendation by Venter et al.?

A) **The association between green space and fine particulate matter levels is moderately negative overall but becomes slightly negative and sometimes positive when consideration is limited to busy streets with tree cover heavy enough to hinder ventilation.**

B) There is a predictable relationship between a location's typical climate conditions and the efficacy of green spaces in that location, but anomalous local weather events have an outsized effect on deposition and dispersion of fine particulate matter.

C) Ambient levels of fine particulate matter are comparable across locations with comparable local infrastructure (e.g., typical building shape) but vary considerably depending on the predominant type of vegetation present.

D) The association between levels of fine particulate matter and green space is strongly negative for locations containing or in close proximity to major cities but becomes insignificant for more rural locations.

Question 12

Southern Indiana's Crawford County is among the most rural counties in the United States: the US Census Bureau classified it as 100% rural in 2010. Researchers often struggle to recruit residents of counties like Crawford for inclusion in studies. Melissa Valerio and colleagues tested whether an approach called snowball sampling improves recruitment. Working in two rural counties, they recruited a few people (known as "seeds") with the characteristics desired for a proposed study and asked them to recruit additional participants from their social networks. Though the seeds were given minimal guidance, many more people they recruited had the desired characteristics for the study than would be expected by chance alone, most likely because _____ blank

Which choice most logically completes the text?

A) **the seeds' social networks include a high proportion of people who share characteristics with the seeds.**

B) the seeds' social networks tend to be somewhat smaller than the networks of people who do not live in rural areas.

C) the characteristics that made the seeds desirable for inclusion in the proposed study may be unknown to some members of the seeds' social networks.

D) most seeds' social networks include some people who do not know one another and who share few characteristics.

Question 13

Neuroscientist Artin Arshamian and his team sought to determine what affects a person's perception of an odor as pleasant: is it culture, personal taste, or aspects of human anatomy? The team assessed odor preferences in ten groups of people with different modes of living (urban, agricultural, and hunter-gatherer) including the Semaq Beri people from a small community in the Malay Peninsula and urban dwellers from a large city in the United States. The team observed that across cultures, people generally rated odors about the same: phenethyl alcohol, which smells like roses, was typically rated more pleasant than diethyl disulfide, which smells like garlic. The team's study thus undermined the idea that _____ blank

Which choice most logically completes the text?

A) personal taste has little influence on whether odors are perceived as pleasant or unpleasant.

B) **culture significantly influences whether a person perceives an odor as pleasant or unpleasant.**

C) a person who perceives certain odors as pleasant will likely perceive the odors as roughly equal in pleasantness.

D) people agree in their perception of odors as pleasant or unpleasant regardless of where they live.

Question 14

A soil's microbial community (the microbial taxa present in their relative abundances) is known to affect plants' cyclical processes. Lady Grant and colleagues hypothesized that microbial communities could also affect plants' flavor chemistry, including volatiles and secondary metabolites like glucosinolates. Recognizing that soil's organic content varies by location in the wild and could influence plants' chemistry, Grant et al. introduced distinct microbial communities to individually potted mustard plants (*Brassica juncea*) growing in a controlled environment, then measured the plants' glucosinolates, like 3-methylthiopropyl and allyl (the most prominent), that create the spicy and bitter flavors in mustard. This method thus enabled the researchers to _____ blank

Which choice most logically completes the text?

A) demonstrate that differences in plants' flavor chemistry result from differences in the level of glucosinolates regardless of the soil's organic content.

B) disentangle the influence of microbial communities on soil's organic content from their influence on glucosinolate content in the plants.

C) re-create the conditions of studies conducted in the wild that found links between soil microbial communities and levels of 3-methylthiopropyl in mustard plants.

D) **distinguish variations in glucosinolates due to differences in microbial communities from those that in a natural setting may be due to differences in soil's organic content.**

Question 15

There is a growing belief that teaching medical students about art alongside standard science and clinical coursework helps them become more observant, develop greater patient empathy, and strengthen their communication skills. But some medical program educators are skeptical, questioning if arts and humanities experiences can be clearly shown to have any worthwhile advantages for their students. Research into the effectiveness of arts programs for medical students by Neha Mukunda and her colleagues found that evidence is largely anecdotal and based on studies that were short in duration, limited to single institutions, or restricted to small numbers of students. To strengthen the evidence base in support of incorporating humanities into the coursework for medical students, then, _____ blank

Which choice most logically completes the text?

A) institutions may need to provide medical students with exposure to larger numbers of artworks than have been used in previous studies.

B) researchers must prove that scientific training alone is insufficient for developing clinical skills.

C) medical schools should highlight more student testimonials about how arts education benefits their clinical abilities.

D) **larger-scale, multi-institutional research studies tracking outcomes for medical students over longer periods are needed.**

Question 16

Mississippi resident Blanche Bruce, one of the nearly two thousand African Americans elected to public office during the decade that followed the Civil War, _____ blank his term as a member of the US Senate in 1875.

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

A) to begin

B) having begun

C) beginning

D) **began**

Question 17

Occurring in the constellation Dorado, 168 thousand light-years from Earth, SN 1987A was a _____ blank explosion of a massive star, which blasts large amounts of radiation, heavy elements, and debris into space—that was first detected by Chilean astronomer Oscar Duhalde.

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

A) supernova, the

B) supernova. The

C) supernova: the

D) **supernova—the**

Question 18

The Alfiyya of Ibn Malik is one of the hundreds of thousands of manuscripts that have survived from roughly the sixteenth century to the present _____ blank being passed down through private libraries in the city of Timbuktu, Mali. Many of these manuscripts can be found at the Alpha Mahamane Library.

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

A) day by,

B) day; by

C) **day by**

D) day. By

Question 19

Taking a structuralist approach to analyzing Willa Cather's novel *My Ántonia* would lead a critic to focus on the linguistic conventions inherent in the novel. On the other hand, a postcolonial analysis _____ blank on narrative perspective and the representation of marginalized groups might yield a radically different interpretation of Cather's novel.

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

A) focuses

B) would be focusing

C) **focusing**

D) would focus

Question 20

The neurotechnology company Kernel is working on an exciting new technology: headsets that analyze the brain's blood flow and electrical patterns to map cortical activity. Kernel's technology, alongside other such brain-computer interfaces that function by interpreting and executing brain signals, _____ blank the way for future advancements in neurotechnology.

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

A) **is paving**

B) are paving

C) have paved

D) paving

Question 21

The legacy of the Spanish Empire, which once controlled portions of five continents, is evident in Spanish-speaking Mexico, one of many places that reveal their imperial history in their language. Contrast Mexico with Sardinia, which ceased to be part of the empire in _____ blank the latter's connection to the empire is so attenuated that Spanish is seldom spoken there today.

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

A) 1720

B) **1720:**

C) 1720 and

D) 1720,

Question 22

To determine the approximate age of rock carvings excavated from an archaeological site in Northern Arabia, archaeologist Maria Guagnin and colleagues collected samples of sediments surrounding the carvings; these samples were then analyzed using a method known as optically stimulated luminescence (OSL) dating. _____ blank OSL dating indicated that the carvings were at least 3,024 years old.

Which choice completes the text with the most logical transition?

A) By comparison,

B) Similarly,

C) **Ultimately,**

D) In addition,

Question 23

Architect Victor Gruen, the designer of New Jersey's Cherry Hill shopping mall, conceived of the mall as an indoor version of the European town square, a communal space that encouraged visitors to stroll and linger. _____ blank he designed Cherry Hill Mall with long, pedestrian-friendly promenades and ample seating areas clustered around fountains and greenery.

Which choice completes the text with the most logical transition?

A) By contrast,

B) **Accordingly,**

C) Regardless,

D) In addition,

Question 24

In his meta-analysis of recent studies of animal information cascades, Joseph S. McCormick presents several examples of adaptive cascades (i.e., information transfers that benefit a collective), including one that involves humpback whales. However, not all cascades are beneficial. _____ blank his meta-analysis cites one study that described how redshanks depleted their critical energy reserves by fleeing due to flock-mates' false alarms.

Which choice completes the text with the most logical transition?

A) In response,

B) **Indeed,**

C) Instead,

D) In addition,

Question 25

As can be seen in the case of *Poetry*, a Chicago magazine published from 1912 to the present day, some small periodicals influential in the development of the modernist movement have been explored in depth by scholars. The Florentine magazine *The Mask* (1908–1929), _____ blank remains among those modernist periodicals "of interest and significance about which relatively little is known," according to scholars Peter Brooker and Andrew Thacker.

Which choice completes the text with the most logical transition?

A) for instance,

B) **though,**

C) moreover,

D) likewise,

Question 26

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

- Peppercorns were used as commodity money in medieval Europe.
- In a commodity money economy, specific goods act as a common unit of monetary exchange that can be used to buy and sell other goods.
- In a barter economy, goods are traded directly between parties without the use of money.
- Economists Bruce Champ and Scott Freeman: bartering requires that "the person with whom you wish to trade must not only have what you want but also want what you have. The inefficiency is apparent; a great deal of time is spent merely finding someone with whom to trade."
- Champ and Freeman: when "individuals might come to accept one particular good in exchange for others even if they do not wish to consume that good…barter economies essentially become monetary economies."

The student wants to paraphrase a quotation from Champ and Freeman to explain the inefficiency of barter economies. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) According to Champ and Freeman, the inefficiencies of barter economies become apparent when goods are traded between parties without the use of money.

B) Champ and Freeman argue that inefficient barter economies can become monetary economies if a good becomes a unit of exchange.

C) In a barter economy, Champ and Freeman contend, goods are traded directly between parties without the use of money, leading to inefficiency.

D) **The precise alignment of desires that barter economies require, Champ and Freeman contend, makes them inefficient.**

Question 27

- Vexillology is the study of flags.
- The flags of many countries include symbols like animals, plants, or landforms.
- These symbols often represent an aspect of the region's history, culture, or landscape.
- The flag of San Marino includes the mountain of Monte Titano.
- The flag of Papua New Guinea includes a raggiana bird-of-paradise.

Which choice most effectively uses information from the given sentences to emphasize a difference between the two flags?

A) Countries like San Marino and Papua New Guinea use symbols on their flags; examples include landforms and animals.

B) Vexillologists study flags, like those of San Marino and Papua New Guinea.

C) Many countries feature symbols on their flags, such as animals, plants, or landforms, and the study of these designs is known as vexillology.

D) **San Marino includes a landform on its flag, whereas Papua New Guinea's flag includes an animal.**

Section 2, Module 1: Math

Question 1

A certain pigeon species can fly at an average speed of 16 meters per second when in continuous flight. At this rate, how many meters would this pigeon species fly in 3 seconds?

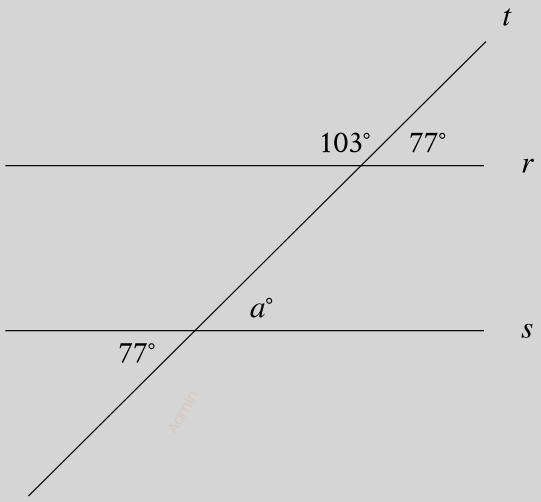
A) 16

B) 13

C) 48

D) 19

Question 2



Note: Figure not drawn to scale.

In the figure shown, lines r and s are parallel, and line t intersects both lines. What is the value of a?

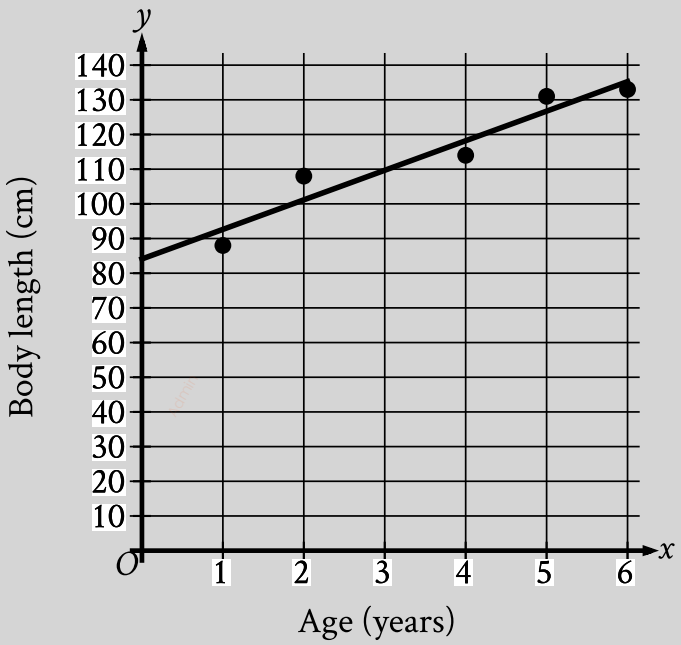
A) 180

B) 77

C) 167

D) 90

Question 3



The scatterplot shows 5 measurements of the body length, in centimeters (cm), of a New Zealand fur seal from an age of 1 year to 6 years old. A line of best fit is also shown. For a New Zealand fur seal at an age of 3 years old, what is the body length predicted by the line of best fit, to the nearest 10 cm?

Answer:

110

Question 4

There is a linear relationship between the mass of an object attached to a vertical spring and the length of the spring extension. The table shows data collected after certain objects were each attached to the spring.

Mass of object	Length of spring extension
40 grams	12.8 centimeters
100 grams	32 centimeters

What is the length of the spring extension, in centimeters, when a 70-gram object is attached to the spring?

A) 51.2

B) 19.2

C) 35.2

D) 22.4

Question 5

$$g = 14 - \frac{x}{23}$$

The equation shown gives the estimated amount of gas g, in gallons, that remains in the gas tank of a car after being driven x miles, where $0 \leq x \leq 322$. What is the estimated amount of gas, in gallons, that remains in the gas tank of the car when $x = 230$?

A) 14

B) 0

C) 9

D) 4

Question 6

$$\sqrt{x^2} = 24 - 5x$$

What is the solution to the given equation?

A) 2

B) 4

C) 19

D) 30

Question 7

A rectangle has an area of 48 square meters and a length of 12 meters. What is the width, in meters, of the rectangle?

A) 576

B) 36

C) 4

D) 144

Question 8

$$\frac{a}{(b+c)} = 55$$

The given equation relates the positive numbers a, b, and c. Which equation correctly expresses a in terms of b and c?

A) $a = (b + c)$

B) $a = 55 - (b + c)$

C) $a = 55(b + c)$

D) $a = \frac{55}{(b+c)}$

Question 9

Quadrilateral $MNOP$ is similar to quadrilateral $QRST$ such that M, N, O, and P correspond to Q, R, S, and T, respectively. The length of each side of quadrilateral $MNOP$ is 2 times the length of its corresponding side in quadrilateral $QRST$. The measure of angle P is 50° and $ST = 8$. Which of the following must be true?

A) $OP = 8$

B) **The measure of angle T is 50°.**

C) The measure of angle R is 100°.

D) $OP = 32$

Question 10

For the linear function f, the graph of $y = f(x)$ in the *xy*-plane passes through the points $(0, 4)$ and $(9, 9)$. What is the slope of $y = f(x)$?

Answer:

.5555

Question 11

If $x + 4y = 31$ and $9x - 20y = -57$, what is the value of y?

Answer:

6

Question 12

For the polynomial function f, the graph of $y = f(x)$ in the *xy*-plane passes through the points $(-4, 0)$, $(3, 0)$, and $(5, 0)$. Which of the following must be a factor of $f(x)$?

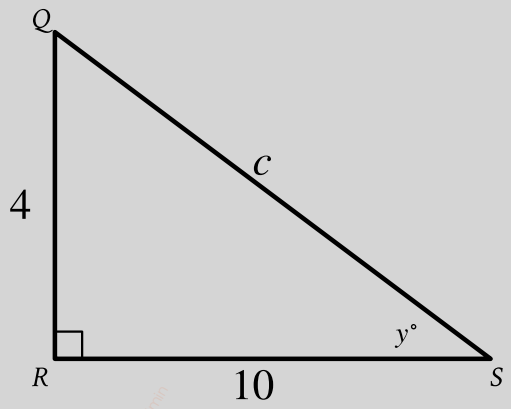
A) $x + 5$

B) $x + 3$

C) $x - 3$

D) $x - 4$

Question 13



Note: Figure not drawn to scale.

In triangle QRS, what is the value of $\tan y^\circ$?

A) $\frac{c}{4}$

B) $\frac{c}{10}$

C) $\frac{4}{10}$

D) $\frac{10}{4}$

Question 14

$$8x + 32y = 38$$

$$12x + 48y = 57$$

At how many points do the graphs of the given equations intersect in the *xy*-plane?

A) Exactly one

B) **Infinitely many**

C) Exactly two

D) Zero

Question 15

Number of cars	Maximum number of passengers and crew
2	75
7	245
9	313

The table shows the linear relationship between the number of cars, c, on a commuter train and the maximum number of passengers and crew, p, that the train can carry. Which equation represents the linear relationship between c and p?

A) $34p - c = 7$

B) $34c - p = 7$

C) $34p - c = -7$

D) $34c - p = -7$

Question 16

In the *xy*-plane, the graph of the equation $(x-3)^2+(y-8)^2=9$ is a circle. The point $(6, c)$, where c is a constant, lies on this circle. What is the value of c?

Answer:

8

Question 17

$$y > \frac{9}{2}x + b$$

In the given inequality, b is a positive constant. Which of the following does NOT contain any points (x, y) in the *xy*-plane that are solutions to this inequality?

A) The region where $x > 0$ and $y > 0$

B) The region where $x < 0$ and $y < 0$

C) The region where $x < 0$ and $y > 0$

D) **The region where $x > 0$ and $y < 0$**

Question 18

The expression $x^2 + kx + 14$, where k is a constant, can be rewritten as $(x + n)(x + 7)$, where n is a constant. What is the value of k?

A) 2

B) 5

C) 9

D) 7

Question 19

If $4(2x - 0.6) + x = 0.45 + 0.3x$, what is the value of $870x$?

Answer:

285

Question 20

$$-5x^2 - x + 9 = 0$$

What is the greatest solution to the given equation?

A) $-\frac{1}{5} + \frac{\sqrt{181}}{5}$

B) $-\frac{1}{10} + \frac{\sqrt{181}}{10}$

C) $-\frac{1}{5} - \frac{\sqrt{181}}{5}$

D) $-\frac{1}{10} - \frac{\sqrt{181}}{10}$

Question 21

A beaker containing a liquid is placed on a table. The function $g(t) = 295 + (364 - 295)(2.72)^{-0.104t}$ gives the approximate temperature, in kelvins, of the liquid t minutes after the beaker was placed on the table. According to this function, what was the approximate temperature, in kelvins, of the liquid when the beaker was placed on the table?

Answer:

364

Question 22

The function f is defined by $f(x) = a^x + b$, where a and b are constants and $a > 0$. In the *xy*-plane, the graph of $y = f(x)$ has a *y*-intercept at $(0, -22)$ and passes through the point $(2, 41)$. What is the value of $a + b$?

Answer:

-15

Section 2, Module 2: Math

Question 1

Which expression is equivalent to $(2x^3 - 3x + 5) - (7x^6 + 7x - 4)$?

A) $-7x^6 + 2x^3 + 4x + 1$

B) $-5x^9 - 10x - 9$

C) $-7x^6 + 2x^3 - 10x + 9$

D) $-5x^9 - 4x + 1$

Question 2

What is the slope of the graph of $y = \frac{5}{16}x$ in the *xy*-plane?

A) $-\frac{5}{16}$

B) 0

C) $\frac{16}{5}$

D) $\frac{5}{16}$

Question 3

$$38x + 85y = 360$$

The given equation represents the volume of mulch x, in cubic feet, and the volume of soil y, in cubic feet, in a mixture of mulch and soil that weighs 360 pounds. If the volume of soil in the mixture is 2 cubic feet, what is the volume of mulch in the mixture, in cubic feet?

Answer:

5

Question 4

A line passes through the points $(0, 0)$ and $(10, 320)$ in the *xy*-plane. Which equation represents this line?

A) $y = 10x + 32$

B) $y = 10x$

C) $y = 32x + 10$

D) $y = 32x$

Question 5

$$y < x$$

$$y > -5x - 10$$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given system of inequalities?

A)

x	y
6	11
7	10
8	9

B)

x	y
6	4
7	5
8	6

C)

x	y
-13	-15
-12	-14
-11	-13

D)

x	y
-13	-6
-12	-7
-11	-8

Question 6

$$f(x) = 4(g(x)) - 2$$

$$g(x) = |13x - 8|$$

The functions f and g are defined by the given equations. What is the value of $f(-10)$?

A) 554

B) -42

C) 550

D) 138

Question 7

The population of a certain city doubled every 75 years from 1651 to 1951. The population of this city was $160{,}000$ in 1951. What was the population of this city in 1651?

Answer:

10000

Question 8

Line k is defined by $3x + 13y - 4 = 0$. Line j is perpendicular to line k in the *xy*-plane. What is the slope of line j?

A) $-\frac{13}{4}$

B) $-\frac{3}{13}$

C) $\frac{4}{13}$

D) $\frac{13}{3}$

Question 9

In the *xy*-plane, an equation of circle A is $(x-2)^2 + (y-3)^2 = 25$. Circle B has the same center as circle A but has a radius that is twice the radius of circle A. Which equation represents circle B?

A) $(x-2)^2 + (y-3)^2 = 625$

B) $(x-2)^2 + (y-3)^2 = 50$

C) $(x-2)^2 + (y-3)^2 = 250$

D) $(x-2)^2 + (y-3)^2 = 100$

Question 10

The length of the diagonal of a square is $\frac{196\sqrt{2}}{2}$ units. What is the area, in square units, of the square?

A) 19,208

B) 98

C) 392

D) 9,604

Question 11

Each of the following frequency tables represents a data set. Which data set has the greatest mean?

A)

Value	Frequency
10	3
20	4
30	5
40	6

B)

Value	Frequency
10	7
20	4
30	4
40	7

C)

Value	Frequency
10	5
20	5
30	5
40	5

D)

Value	Frequency
10	6
20	5
30	5
40	6

Question 12

A partially filled container containing 28 milliliters of water is placed under a leaky faucet that produces one 0.05-milliliter drop of water every 5 seconds. Until the container is full, which of the following can be used to represent the volume v, in milliliters, of water in the container t seconds after it is placed under the faucet, where t is a multiple of 5?

A) $v = 5t$

B) $v = 0.25t + 28$

C) $v = 0.01t + 28$

D) $v = 0.05t + 28$

Question 13

A science club from a certain high school in Ohio conducted an experiment to study the effects of smell on taste. A sample of 125 students was selected at random from the high school to participate in the experiment. First, the students tasted a pureed food sample while wearing covered goggles and nose plugs. Then, the students tasted the same pureed food sample without nose plugs. 50 students were able to correctly identify the pureed food sample while wearing nose plugs. Which of the following is the largest population to which the results of the experiment can be generalized?

A) The 50 students who were able to correctly identify the pureed food sample while wearing nose plugs

B) **All students from the high school**

C) The 125 students who participated in the experiment

D) All students from high schools in Ohio

Question 14

Which expression is equivalent to $\frac{1}{5y^8}$, where $y > 1$?

A) $\frac{y^{-8}}{5}$

B) $(5y)^{-8}$

C) $5y^{-8}$

D) $\frac{5}{y^{-8}}$

Question 15

For the positive quantities h, j, and k, 12% of h is equivalent to 95% of j, and j is equivalent to 24% of k. What percentage of k is h? (Disregard the $\%$ sign when entering your answer. For example, if your answer is 39%, enter 39)

Answer:

190

Question 16

The function f is defined by $f(x) = 20x^3$. The graph of $y = f(-x) + c$ in the *xy*-plane, where c is a positive integer constant, has an *x*-intercept at $(r, 0)$ and a *y*-intercept at $(0, t)$, where r and t are constants. Which of the following must be true about r and t?

A) $r > 0$ **and** $t > 0$

B) $r > 0$ and $t < 0$

C) $r < 0$ and $t > 0$

D) $r < 0$ and $t < 0$

Question 17

A certain investment account offers a special interest rate for the first 4 months the account is open followed by a lower interest rate for the remainder of the time the account is open. Bennett opened one of these accounts with an original account balance of $\$900$ and did not make any other deposits or withdrawals. 4 months after Bennett opened the account, the balance had increased by 0.6% of the original balance. 6 months after Bennett opened the account, the balance had increased by an additional 0.1% of the balance at the end of the first 4 months. Every 2 months after the first 6 months, the balance had increased by an additional 0.1% of the balance 2 months before. Which of the following equations could represent the account balance $B(x)$, in dollars, x months after the account was opened, where $x \geq 4$?

A) $B(x) = 905.40(1.001)^{2x-8}$

B) $B(x) = 905.40(1.001)^{\frac{x}{2}-\frac{4}{2}}$

C) $B(x) = 905.40(1.001)^{\frac{x}{2}-4}$

D) $B(x) = 905.40(1.001)^{2x-4}$

Question 18

In the *xy*-plane, the graph of the equation $y = -x^2 + 9x - 72$ intersects the line $y = c$ at exactly one point. What is the value of c?

A) -72

B) $-\frac{369}{4}$

C) $-\frac{207}{4}$

D) $-\frac{9}{2}$

Question 19

$$\frac{1}{78}x^2 + \left(s - \frac{1}{78}t\right)x - st = 0$$

In the given equation, s and t are positive constants. The product of the solutions to the given equation is $-2kst$, where k is a constant. What is the value of k?

Answer:

39

Question 20

In triangle RST, angle T is a right angle, point L lies on $\overline{RS}$, point K lies on $\overline{ST}$, and $\overline{LK}$ is parallel to $\overline{RT}$. If the length of $\overline{RT}$ is 63 units, the length of $\overline{LK}$ is 21 units, and the area of triangle RST is 630 square units, what is the length of $\overline{KT}$, in units?

Answer:

40/3

Question 21

The area of a rectangular region is increasing at a rate of 190 square feet per hour. Which of the following is closest to this rate in square meters per minute? (Use 1 meter $= 3.28$ feet.)

A) 10.39

B) 0.97

C) 0.29

D) 17.66

Question 22

If $\frac{x+5}{4} = \frac{x+5}{13}$, the value of $x + 5$ is between which of the following pairs of values?

A) -2 **and** 2

B) 7 and 13

C) -6 and -4

D) 2 and 6