

Test: 26SM-TEST07

Module: 26SM-T07-RW-M01

Cognitive reserve, a concept developed by Columbia neurologist Yaakov Stern, describes the brain's resilience against neurological damage. Individuals with high cognitive reserve often show _____ of the cognitive deficits that typically accompany early Alzheimer's pathology — they remain functionally intact even as imaging confirms substantial amyloid accumulation.

1

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

(답 : B)

(A) exacerbation

(B) circumvention

(C) onset

(D) manifestation

Although earlier telescopes captured detailed images of nearby galaxies, they offered only partial views of the universe's most distant regions. The James Webb Space Telescope, launched in 2021, was built to _____ astronomers' reach so they could study galaxies formed soon after the Big Bang.

2

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

(답 : C)

(A) calibrate

(B) limit

(C) extend

(D) document

The Clean Air Act, which has governed federal air-quality standards since 1970, grants the EPA broad authority over stationary pollution sources. When the agency extended this authority to regulate carbon dioxide emissions, critics maintained that the EPA had _____ — Congress had not explicitly authorized greenhouse gas regulation under the statute.

3

Which choice completes the text with the most logical and precise word or phrase?
(답 : B)

(A) collaborated

(B) overstepped

(C) deferred

(D) equivocated

The following text is from Jamaica Kincaid's 1985 novel *Annie John*.

Sometimes he would take me with him. When he took me with him, we usually went to the jetty, and there he would sit and talk to the night watchman about cricket or some other thing that didn't interest me, because it was not personal; they didn't talk about their wives, or their children, or their parents, or about any of their likes and dislikes. They talked about things in such a strange way, and I didn't see what they found funny, but sometimes they made each other laugh so much that their guffaws would bound out to sea and send back an echo.

4

As used in the text, what does the word "strange" most nearly mean?
(답 : B)

(A) Tedious

(B) Peculiar

(C) Hostile

(D) Secretive

The following text is from Claude McKay's 1922 poem "When Dawn Comes to the City."

The tired cars go grumbling by,
The moaning, groaning cars,
And the old milk carts go rumbling by
Under the same dull stars.

Out of the tenements, cold as stone,
Dark figures start for work;
I watch them sadly shuffle on,
'Tis dawn, dawn in New York.

A lonely newsboy hurries by,
Humming a recent ditty;
Red streaks strike through the gray of the sky,
The dawn comes to the city.

5

Which choice best describes the function of the underlined lines in the text as a whole?
(답 : B)

- (A) It marks the moment the city's gloom gives way to the relief of daylight.
- (B) It completes the poem's accumulation of weariness by naming dawn's arrival without suggesting renewal.
- (C) It conveys the narrator's sense of hope as daylight finally breaks through the poem's gloom.
- (D) It introduces a contrast between natural imagery and the mechanical sounds established earlier.

Seagrass meadows cover roughly 300,000 square kilometers of the world's shallow coastal seafloor, yet for decades they were largely overlooked as carbon reservoirs. In a 2012 study published in Nature Geoscience, marine ecologist James Fourqurean and colleagues at Florida International University quantified the organic carbon locked in seagrass soils globally, finding that these ecosystems store up to 19.9 petagrams of carbon — a stock comparable to the organic carbon held in a year of global fossil-fuel emissions. Because seagrass soils can remain undisturbed for millennia, Fourqurean's team argued that coastal development threatening these meadows releases long-sequestered carbon at a scale previously unrecognized.

6

Which choice best states the main purpose of the text?
(답 : A)

- (A) To present research showing that seagrass meadows are major carbon stores and that their destruction releases previously sequestered carbon.
- (B) To argue that seagrass meadows should be reclassified based on their carbon-storage similarities to terrestrial ecosystems.
- (C) To compare the carbon-storage capacity of seagrass meadows with that of forest ecosystems around the world.
- (D) To present evidence that seagrass meadows have been overlooked as carbon stores, without addressing the implications of their loss.

At Karahantepe in southeastern Turkey, archaeologists working under Professor Necmi Karul of Istanbul University have uncovered an 11,000-year-old circular structure nearly seventeen meters in diameter — one of the most architecturally complex Neolithic buildings yet found in the Taş Tepeler region. Karul argues that the building's primary purpose was not religious but social: to consolidate the collective identity of an emerging settled community. The structure's interior features two stepped stone benches carved directly from the bedrock, arranged around a focal point occupied by a carved human sculpture — an arrangement Karul describes as resembling "an odeum or amphitheater." For Karul, the configuration suggests that the structure was designed to orient groups of people toward a shared symbolic center, reinforcing the communal bonds that settled life demanded.

7

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

(답 : A)

(A) It supplies the concrete architectural evidence on which Karul bases his interpretation of the structure's function.

(B) It introduces a contrast between Karahantepe's architectural features and those of other Neolithic structures in the region.

(C) It describes the architectural features of the structure's interior without advancing an interpretive claim.

(D) It elaborates on Karul's claim by explaining how the structure's design evolved over time.

Text 1

Toni Morrison's 1987 novel *Beloved*, set after the Civil War, departs from the realist tradition that has long dominated American slave-narrative literature. The character *Beloved* appears as a ghost who haunts the household of Sethe, a former slave, and the novel treats this presence as physically real. Some critics have argued that such supernatural elements weaken the novel's historical authority, since they introduce events that did not and could not have occurred.

Text 2

Conventional slave narratives, written under social and editorial constraints, frequently omitted the interior experiences of enslaved people—their grief, terror, and inherited memories. Morrison's ghost is a means of restoring those experiences to the historical record. The supernatural is not a departure from accuracy but an instrument for representing what realism alone could not.

8

Based on the texts, how would the author of Text 2 most likely characterize the criticism of *Beloved* presented in Text 1?

(답 : C)

(A) As ignorant, because the criticism shows no awareness that nineteenth-century slave narratives ever existed as a literary tradition.

(B) As partly justified, because the supernatural events in the novel cannot be verified historically but should be considered alongside its other strengths.

(C) As misguided, because the supernatural elements that the criticism objects to enable Morrison to represent experiences that conventional slave narratives left out.

(D) As misdirected, because the criticism focuses on the novel's prose style rather than on its handling of historical events.

The following text is from Anthony Trollope's 1857 novel *Barchester Towers*. The narrator describes Mr. Arabin, the new vicar of St. Ewold's.

Exteriorly, he was not a remarkable person. He was above the middle height, well made, and very active. His hair which had been jet black, was now tinged with gray, but his face bore no sign of years. It would perhaps be wrong to say that he was handsome, but his face was, nevertheless, high for beauty, and the formation of the forehead too massive and heavy: but his eyes, nose and mouth were perfect. There was a continual play of lambent fire about his eyes, which gave promise of either pathos or humour whenever he essayed to speak, and that promise was rarely broken.

9

What does the text most strongly suggest about Mr. Arabin?
(답 : A)

- (A) He appears unremarkable at first glance but possesses a consistently realized expressiveness.
- (B) He presents a striking figure through his energetic build and immediately commanding bearing.
- (C) He radiates an amiable warmth that puts those around him immediately at ease.
- (D) He impresses chiefly through the physical perfection of his eyes, nose, and mouth.

The following text is from John Matheus's 1926 short story "Mr. Bradford Teaches Sunday School." The previous evening, Mr. Bradford encountered a lynched young man while driving home through rural Florida.

There was an interested stillness when Mr. Bradford walked from his seat to the front of the room and facing the school of more than a hundred faces, gazed into the mellow radiance of a thorned head of the Christ, bending low on the cross between the thieves. This work of art formed a circular inset in the top of a stained glass window. Below was a representation of the death of Abel with Cain fleeing from his murdered brother. When Mr. Bradford's eyes fell upon that drooping Christ head, he thought of the hanging head of a Negro boy and blushed at the thought of the comparison.

10

Based on the text, what does Mr. Bradford's reaction most likely reveal about his attitude toward the comparison he makes?
(답 : C)

- (A) Mr. Bradford is embarrassed to have been distracted from his religious duties.
- (B) Mr. Bradford is disturbed by the violent imagery depicting Cain's murder of Abel in the window.
- (C) Mr. Bradford is unsettled by his involuntary recognition of a parallel between sacred suffering and racial violence.
- (D) Mr. Bradford is motivated to incorporate the religious imagery into his Sunday school lesson.

Thought experiments — hypothetical scenarios used to test the internal consistency of a theory without direct observation — have played a central role in natural philosophy since antiquity. A student argues that in *Two New Sciences* (1638), Galileo employs the thought experiment to expose a logical contradiction within Aristotelian physics rather than to support his own theory of free fall.

11

Which quotation from a work by a historian of science would most effectively support the student's claim?
(답 : C)

(A) “The hypothetical scenario Galileo develops in *Two New Sciences* is above all a vehicle for establishing the proportionality law of free fall, demonstrating through reasoning alone what no inclined-plane experiment had yet proved with sufficient precision.”

(B) “In *Two New Sciences* Galileo sets aside the question of why bodies fall and instead measures how they fall, deriving the times-squared law from his inclined-plane trials and presenting the thought experiment merely as an accessible gloss on results the experiments had already secured.”

(C) “Galileo asks his reader to imagine a heavy stone and a light one tied together: by Aristotle's rule the light stone should retard the heavy one so the pair falls slower than the heavy stone alone, yet the combined body is heavier than either and so should fall faster — a single supposition forcing Aristotle's own premise to yield two opposite speeds at once.”

(D) “By imagining combined and separated falling bodies, Galileo generates results that anticipate what later experiments would confirm, suggesting that his thought experiment functions as virtual empiricism — a substitute for observation rather than a critique of prior theory.”

Wuthering Heights is an 1847 novel by Emily Brontë. The visitor Lockwood, lodging at Wuthering Heights, has just recounted to his host, Heathcliff, a dream involving the ghost of Catherine Earnshaw, who died years earlier. Brontë renders Heathcliff's reaction so as to expose a depth of grief beneath the guarded hardness he ordinarily shows: _____

12

Which quotation from *Wuthering Heights* most effectively illustrates the claim?

(답 : C)

- (A) “He is a dark-skinned gipsy in aspect, in dress and manners a gentleman; that is, as much a gentleman as many a country squire.”

- (B) “I know, by instinct, his reserve springs from an aversion to showy displays of feeling—to manifestations of mutual kindness. He’ll love and hate equally under cover, and esteem it a species of impertinence to be loved or hated again.”

- (C) “He got on to the bed, and wrenched open the lattice, bursting, as he pulled at it, into an uncontrollable passion of tears. ‘Come in! come in!’ he sobbed. ‘Cathy, do come. Oh, do—once more! Oh! my heart’s darling!’”

- (D) “Heathcliff and his man climbed the cellar steps with vexatious phlegm: I don’t think they moved one second faster than usual, though the hearth was an absolute tempest of worrying and yelping.”

Selected Science Museum Branches: Annual Attendance and Gallery Capacity, 2023

Branch	Annual visitors (thousands)	Permanent galleries	Special exhibitions hosted
Hartwell Aviation Museum	1,860	24	3
Calder Museum of Natural History	1,120	14	9
Brae Maritime Museum	540	6	11
Pell Museum of Industry	760	9	7

A regional science-museum network evaluates its branches not by raw attendance but by *draw density*— the number of annual visitors a branch attracts per permanent gallery it maintains — on the reasoning that a branch pulling many visitors across few galleries is converting limited exhibit space into public interest most efficiently. A larger branch can post the highest total attendance simply by operating more galleries, without drawing more visitors to each one. Using the 2023 figures above, the network's analyst set out to identify the branch with the greatest draw density and concluded that _____

Analysis of 18th-century private letters in the Helsinki Corpus supports a claim once dismissed as _____ informal misspellings can register pronunciation shifts decades before they appear in print. Researchers increasingly treat these errors as acoustic fossils of everyday speech.

13

Which choice most effectively uses data from the table to complete the text?
(답 : A)

- (A) the Brae Maritime Museum had the greatest draw density, drawing roughly 90 thousand visitors for each of its permanent galleries.
- (B) the Hartwell Aviation Museum had the greatest draw density, drawing approximately 1,860 thousand visitors in 2023.
- (C) the Calder Museum of Natural History had the greatest draw density, drawing about 80 thousand visitors for each of its permanent galleries.
- (D) the Brae Maritime Museum had the greatest draw density, operating more permanent galleries than any other branch shown.

14

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : C)

- (A) untestable,
- (B) untestable, that
- (C) untestable: that
- (D) untestable; that

The Halvorsen Observatory, built on a remote ridge in northern Chile, has tracked faint radio emissions from distant galaxies for more than forty years. In 2014, the International Astronomical Union credited the facility with one of the decade's most significant deep-space _____ the pulsing radio source now catalogued as HX-227.

15

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : C)

- (A) discoveries
- (B) discoveries;
- (C) discoveries—
- (D) discoveries, which it is

Premiered in 1913, *The Rite of Spring* was a ballet whose angular movement would go on to reshape the vocabulary of more than a dozen modernist dance companies. Classical choreography of the period prized symmetry, elevation, and turned-out lines, restricting dancers to graceful poses and weightless leaps—a rigidity also satirized in early twentieth-century arts _____ Carl Van Vechten's essay "Music After the Great War."

16

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : A)

- (A) criticism, including
- (B) criticism: including
- (C) criticism; including
- (D) criticism—including

Contact improvisation emerged from the experiments of Steve Paxton and a small circle of dancers in early 1970s New York. Performers generate movement by sharing weight, tracking momentum, and responding to a partner's shifting center of gravity; abandon fixed sequences in favor of spontaneous physical dialogue and mutual ____ document each session less through notation than through recorded video.

17

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

(답 : C)

☒ A support and

☐ B support, and

☐ C support; and

☐ D support and,

The Japanese art of kintsugi treats breakage and repair as part of an object's history rather than something to disguise. Practiced for over five centuries, the technique restores broken pottery with seams of gold or ____ rather than hidden and each fragment rejoined with deliberate care.

18

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

(답 : B)

☐ A silver, each crack highlighting

☒ B silver, each crack highlighted

☐ C silver, each crack is highlighted

☐ D silver; each crack is highlighted

At the Bratislava telegraph office in 1888, the chief forecaster along with two junior assistants ____ responsible for compiling the daily storm bulletins that warned shipping agents and grain merchants along the lower Danube. Telegraphed each dawn, these bulletins reached river ports as far downstream as Budapest within hours.

19

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

(답 : C)

☒ A were

☐ B have been

☐ C was

☐ D are

The two bridges that span the Tagus River in Lisbon were built to serve markedly different traffic. The 25 de Abril Bridge, completed in 1966, carries six lanes of road traffic plus a rail deck added in 1999, whereas the Vasco da Gama Bridge, opened in 1998 and ____ more than 12 kilometers, was designed almost entirely to relieve commuter congestion north of the city center.

20

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

(답 : B)

☐ A stretched

☐ B stretching

☒ C stretches

☐ D had stretched

When the Arcturus Glider Project began testing autonomous ocean sensors in 2016, engineers focused on battery efficiency during deep-water dives. The endurance of the lithium-sulfur prototype exceeded _____ which lost capacity rapidly below 1,200 meters in the project's March trials.

21

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : D)

- ☒ A the nickel-meta hydride model,
- ☐ B that of the nickel-metal hydride model's,
- ☐ C those of the nickel-metal hydride model,
- ☐ D that of the nickel-metal hydride model,

Saffron remains the most expensive spice by weight anywhere in the world. Harvesting it is punishingly slow: each crocus flower yields only three crimson stigmas, which must be plucked by hand. _____ producing a single kilogram requires the stigmas of roughly 150,000 flowers, which is why a gram of high-grade Iranian saffron can retail for more than a gram of gold.

22

Which choice completes the text with the most logical transition?
(답 : B)

- ☐ A Otherwise,
- ☒ B In fact,
- ☐ C By contrast,
- ☐ D Previously,

Travelers crossing the Strait of Messina between mainland Italy and Sicily have two principal options. The state ferry service carries vehicles and foot passengers on a 20-minute crossing that runs roughly every 40 minutes throughout the day. ____ a private hydrofoil offers a faster 15-minute passenger-only trip, though it suspends service whenever wind speeds in the strait exceed 30 knots, which happens on dozens of days each winter.

23

Which choice completes the text with the most logical transition?

(답 : B)

(A) As a result,

(B) Alternatively,

(C) In fact,

(D) Subsequently,

Linguists have long debated why Basque, spoken in a small region straddling the French-Spanish border, bears no demonstrable relationship to any other living language. One school holds that Basque is the last survivor of languages spoken in Europe before the arrival of Indo-European tongues some 4,500 years ago. ____ a competing view argues that the apparent isolation simply reflects how thoroughly its relatives were erased, leaving too little evidence to reconstruct any family tree.

24

Which choice completes the text with the most logical transition?

(답 : A)

(A) Countering this hypothesis,

(B) Echoing this hypothesis,

(C) Illustrating this claim,

(D) Disputing this observation,

When the cartographer Marie Tharp first mapped the mid-Atlantic ocean floor in the early 1950s, her depiction of a deep rift valley running along the ridge suggested continental drift, a theory most geologists then dismissed as fanciful. Her male colleague initially discarded her first drafts. ____ Tharp continued refining the maps, and within a decade her rift valley had become central evidence for plate tectonics.

25

Which choice completes the text with the most logical transition?
(답 : B)

(A) Accordingly,

(B) Nonetheless,

(C) Likewise,

(D) For example,

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

- Bharati Mukherjee was an Indian-born American novelist whose work often explored the experiences of South Asian immigrants in the West.
- Her 1993 novel *The Holder of the World* moves between contemporary Massachusetts and 17th-century Mughal India.
- The protagonist, Beigh Masters, is a Boston-based asset hunter who investigates the life of a 17th-century New England woman named Hannah Easton.
- Hannah eventually travels to India and becomes the consort of a Hindu raja, encountering Mughal Emperor Aurangzeb.
- The novel weaves together American Puritan history with Mughal court politics, drawing on Mukherjee's recurring interest in cross-cultural identity.

26

The student wants to introduce *The Holder of the World* to an audience unfamiliar with Bharati Mukherjee. Which choice most effectively uses relevant information from the notes to accomplish this goal?
(답 : B)

(A) Bharati Mukherjee was an Indian-born American novelist whose work often explored the experiences of South Asian immigrants in the West.

(B) Indian-born American novelist Bharati Mukherjee's 1993 novel *The Holder of the World* weaves together American Puritan history with Mughal court politics.

(C) Mukherjee's 1993 novel *The Holder of the World* follows a Boston-based asset hunter investigating a 17th-century New England woman.

(D) *The Holder of the World* by Bharati Mukherjee moves between contemporary Massachusetts and 17th-century Mughal India.

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

- Cognitive scientists have long debated whether non-human animals can plan for future events.
- A 2017 study at Lund University in Sweden tested whether ravens could plan ahead for tool use.
- Researchers presented five ravens with a tool that could later open a puzzle box containing food, though the box was absent when the tool was offered.
- The ravens could select and store the tool, and were then offered the puzzle box between 15 minutes and 17 hours later.
- The study found that the ravens selected and saved the correct tool in 80 percent of trials, retrieving it when the box reappeared.

27

The student wants to present the study and its methodology. Which choice most effectively uses relevant information from the notes to accomplish this goal?
(답 : D)

- (A) Cognitive scientists have long debated whether non-human animals are capable of planning for future events.
- (B) A 2017 Lund University study tested whether ravens could plan ahead by offering five ravens a puzzle box useful for a later tool, letting them store it, and presenting the tool between 15 minutes and 17 hours afterward.
- (C) The study found that the ravens selected and saved the correct tool in 80 percent of trials, retrieving it when the puzzle box reappeared.
- (D) A 2017 Lund University study tested whether ravens could plan ahead by offering five ravens a tool useful for a later puzzle box, letting them store it, and presenting the box between 15 minutes and 17 hours afterward.

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The following text is from Yone Noguchi's 1914 memoir *The Story of Yone Noguchi*.

Now came a sudden turning of my life's page; I was thrown, of course of my own free will, into the strange streets of San Francisco in the month of December of 1893, in my eighteenth year ; my first despair there was my linguistic incompetency, which made me mad even to curse over the Japanese teachers who had not given me the right pronunciation of even one word. I used to carry paper and pencil, when I had to go out on some business, and write down what I wanted to say; I was often taken for a deaf mute.

1

As used in the text, what does the word "thrown" most nearly mean?
(답 : C)

- (A) Hurlled
- (B) Tossed
- (C) Immersed
- (D) Lured

Although the British novelist Anthony Trollope is often remembered for his Barsetshire and Palliser series, his career was extraordinarily _____ even by Victorian standards: between 1855 and his death in 1882, he published more than forty novels in addition to short stories, travel books, and a posthumous autobiography.

2

Which choice completes the text with the most logical and precise word or phrase?
(답 : A)

☒ A prolific

☐ B anonymous

☐ C sentimental

☐ D abbreviated

Although traditional database systems require fixed schemas defined in advance of data collection, modern NoSQL platforms, which include MongoDB, Cassandra, and DynamoDB, can dynamically _____ how information is stored as patterns in the underlying data become apparent through use.

3

Which choice completes the text with the most logical and precise word or phrase?
(답 : B)

☒ A restrict

☐ B optimize

☐ C photograph

☐ D inventory

Although decades of overhunting left the American alligator (*Alligator mississippiensis*) endangered across its range by the 1960s, the species proved remarkably _____ after federal protections were established, recovering to an estimated five million individuals within thirty years.

4

Which choice completes the text with the most logical and precise word or phrase?
(답 : C)

(A) fragile

(B) adaptable

(C) resilient

(D) tenacious

The following text is from Rachel Heng's 2023 novel *The Great Reclamation*. The Lees are a fishing family living in a kampong on the coast of Singapore.

While previously they'd subsisted on thin gruel with sweet potato, stringy bean sprouts, and the occasional scrawny chicken, now they feasted, day and night, on fish. They steamed them with ginger and freshly cut chilies; they chopped them up and sautéed the pieces with fragrant sambal, they fried them till the fins grew crispy, a delicious treat for the children.

5

Which choice best describes the function of the underlined sentence in the text as a whole?
(답 : B)

(A) It credits the family's resourcefulness with their changed fortunes, presenting their command of varied techniques as the trait that lifted them out of hardship.

(B) It corroborates the assertion just made that the family now "feasted" by amassing the concrete particulars of meals their earlier privation had denied them.

(C) It builds the whole description toward the fried fish, singling out the crispy "treat for the children" as the prized dish in which the account culminates.

(D) It registers the family's new plenty only to temper it, noting that the most elaborate dishes were reserved as occasional treats rather than daily fare.

Optical character recognition software reads scanned microfilm by comparing pixel patterns against character models trained on modern typefaces, but historical newspaper print deviates sharply from those models: ink bleed, emulsion deterioration, and uneven exposure produce characters the software consistently misclassifies or omits. In 2021, the Library of Congress reported that word-error rates in the Chronicling America digitization program — which has converted more than nineteen million pages of historical microfilm since 2004 — frequently exceeded twenty percent on pre-1900 editions, despite manual quality checks at each scanning stage. Computer scientist David Smith of Northeastern University has since argued that closing this gap requires not better scanning hardware but domain-adapted language models that can infer likely words from degraded partial characters and period-specific vocabulary.

6

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

(답 : A)

- (A) It provides specific data that illustrates the scale of the OCR accuracy problem the passage then addresses with a proposed solution.
- (B) It introduces a contrast between the Library of Congress's digitization goals and the performance of modern scanning hardware.
- (C) It summarizes the history of the Chronicling America program and explains why the program was launched.
- (D) It qualifies Smith's argument by showing that manual quality checks are sufficient for most pre-1900 editions.

Text 1

Climate scientist Jennifer Wilcox argues that direct air capture (DAC) technology represents a necessary component of any serious decarbonization strategy. Drawing on Carbon Engineering's Squamish facility data, Wilcox maintains that capture costs have fallen more than 40 percent since 2015 and will continue declining as deployment scales. She concludes that DAC offers a realistic path to net-zero emissions without requiring structural changes to existing economic systems.

Text 2

Any assessment of direct air capture must reckon with its extraordinary energy demands. While it is possible in theory that costs will continue declining, Shuchi Talati and colleagues at World Resources Institute note that current DAC facilities require approximately 2,000 kilowatt-hours per metric ton of captured CO₂—an amount that, at climate-relevant scale, would rival the entire US electricity sector. Without a decarbonized grid, DAC risks extending fossil fuel dependence rather than eliminating it.

7

Based on the texts, how would Shuchi Talati and colleagues most likely respond to the conclusion presented by Jennifer Wilcox in Text 1?
(답 : B)

(A) By conceding that DAC costs may continue to fall but arguing that current DAC facilities already consume energy equivalent to the entire US electricity sector.

(B) By conceding that DAC costs may continue to fall but contending that scaling the technology to climate-relevant levels requires precisely the structural energy-sector transformation that Wilcox's conclusion treats as avoidable.

(C) By dismissing Wilcox's projection that capture costs will keep declining, on the grounds that the technology's energy demands make further cost reductions implausible.

(D) By contending that Wilcox's reliance on Carbon Engineering's operational data obscures the broader cost trajectory that World Resources Institute researchers have documented across multiple DAC facilities.

In 2021, a team led by Tony Freeth of University College London proposed the most complete reconstruction to date of the Antikythera Mechanism, a bronze-gear astronomical computer recovered from a Roman-era shipwreck off the Greek island of Antikythera in 1901. Using three-dimensional X-ray imaging of the device's surviving fragments, Freeth's team modeled a front-panel cosmos display in which a rotating ball representing the Moon tracked lunar phases while seven additional pointers traced the orbital positions of the Sun and five planets known to ancient Greeks — all driven by an interlocking gear train of at least 82 individual bronze components. The team calculated that the device's lunar-calendar cycle required gears accurate to within a fraction of a degree. Freeth noted that no comparable mechanism is known to survive from antiquity, and that the sophistication of the design implies a broader tradition of such instruments that has been entirely lost.

8

Which statement about the Antikythera Mechanism is best supported by the text?

(답 : D)

(A) The Antikythera Mechanism is the oldest gear-driven calculating device ever discovered in the ancient Mediterranean world.

(B) The Antikythera Mechanism's most significant feature was its lunar-phase tracking ball, which represents the device's main astronomical function.

(C) The Antikythera Mechanism's discovery confirms that ancient Greek astronomical instruments of comparable sophistication were widespread and well-documented before the common era.

(D) The Antikythera Mechanism demonstrates that ancient Greek craftsmen achieved a level of mechanical and astronomical precision whose broader tradition has not survived to the present day.

The following text is from Carrie Law Morgan Figgs's 1921 poem "We Are Marching."

We are marching, truly marching
Can't you hear the sound of feet?
We are fearing no impediment
We have never known defeat.
Like Job of old we have had patience,
Like Joshua, dangerous roads we've trod
Like Solomon we have built out temples.
Like Abraham we've had faith in God.
Up the streets of wealth and commerce,
We are marching one by one
We are marching, making history,
For ourselves and those to come.

9

Which choice best states the main idea of the text?

(답 : B)

(A) The speakers celebrate a recent victory that has finally ended their long struggle.

(B) The speakers describe themselves as a determined group marching forward to shape the future.

(C) The speakers question whether their efforts will be remembered by future generations.

(D) The speakers regret the hardships endured by the biblical figures they admire.

Mirèio is a Provençal poem composed in 1867 by Frédéric Mistral, originally written in French. In it, Mistral introduces the young protagonist, Mirèio, as a farm girl of exceptional beauty. The poem portrays her as possessing a captivating charm that is nearly impossible to resist:

10

Which quotation from a translation of Mirèio most effectively illustrates the claim?

(답 : B)

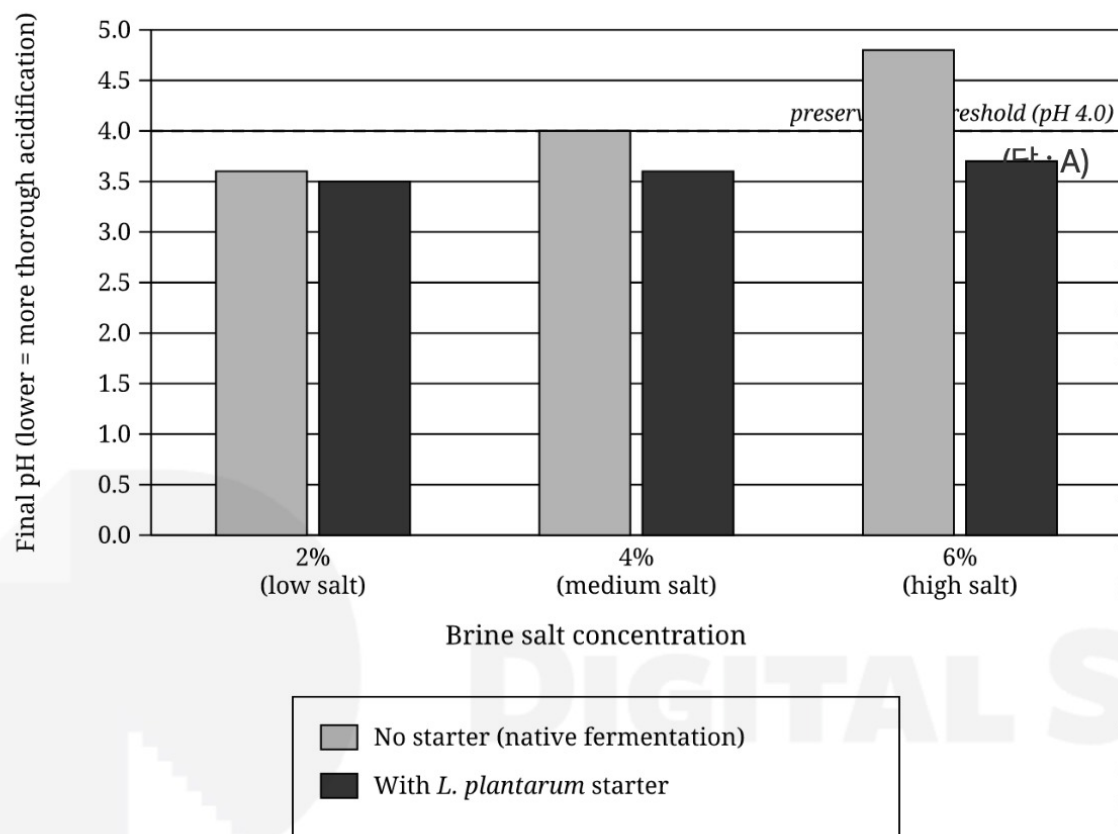
(A) "Eyes had she limpid as the drops of dew; / And, when she fixed their tender gaze on you, / Sorrow was not. Stars in a summer night / Are not more softly, innocently bright:"

(B) "Shy, yet a joyous little sprite she was; / And, finding all her sweetness in a glass, / You would have drained it at a single breath."

(C) "Ah, me! the purple coast of Font Vièio, / The hills of Baux, the desolate Crau plain, / A shape like hers will hardly see again."

(D) "Child of the merry sun, her dimpled face / Bloomed into laughter with ingenious grace."

Final pH after 7 Days of Cucumber Lacto-Fermentation at 22 °C, by Brine Salt Concentration and Inoculation



best describes data from the chart that, if true, illustrate the conclusion drawn by the team?

At 2% salt the two groups reached nearly the same final pH, but at 6% salt the starter batches finished well below the no-starter batches.

Across all three salt levels, the starter batches reached a lower final pH than the matching no-starter batches.

At 6% salt the starter batches finished at approximately pH 3.7 while the no-starter batches finished at approximately 4.8.

The authors of a recent study examined how the salt concentration of cucumber brine interacts with a commercial starter culture during lacto-fermentation. They prepared identical cucumber batches at three salt levels — 2%, 4%, and 6% by weight — and split each into two groups: one inoculated with a *Lactobacillus plantarum* starter, the other left to ferment with only the bacteria naturally present on the cucumbers. After seven days at 22 °C, they measured each batch's final pH (lower pH indicates more thorough acidification). The team concluded that the starter meaningfully accelerates acidification only when the salt level is high enough to suppress the cucumbers' native bacteria.

- (D) At 2% salt the starter batches finished slightly below the no-starter batches, and that advantage narrowed as salt increased.

Cuaya and her colleagues scanned the brains of eighteen dogs while each animal listened to spoken Spanish and Hungarian; every dog had been raised hearing only one of the two languages. The secondary auditory cortex of each dog showed distinct activity patterns for the familiar language versus the unfamiliar one. Notably, the dogs with the strongest discrimination tended to be the oldest — but the oldest dogs had also lived longest in their owners' homes, and time in the home only loosely tracks how much speech a dog actually overhears, since some households are quiet and some dogs are left alone for long stretches. Greater age, more years of co-residence, and a larger lifetime dose of overheard speech were thus all entangled in the sample. Cuaya and colleagues nonetheless propose that it is the accumulated dose of overheard speech, not age and not mere time in the home, that sharpens a dog's ability to detect a language's regularities.

12

Which finding, if true, would most directly support Cuaya and colleagues' proposal?

(답 : D)

(A) Dogs raised from birth hearing two languages spoken in alternation showed stronger neural discrimination between those languages than dogs raised hearing just one.

(B) Among dogs matched for the total lifetime hours of human speech they had overheard, the older dogs still showed stronger neural discrimination than the younger ones.

(C) Among dogs of the same age, those that had lived more years in their owners' homes showed stronger neural discrimination than those that had lived fewer years there.

(D) Among dogs of the same age, those whose lifetime cumulative hours of overheard speech were higher — regardless of how many years each had lived in its owner's home — showed stronger neural discrimination than those whose cumulative hours were lower.

Across Britain and Ireland, archaeologists have catalogued thousands of "burnt mounds"—heaps of fire-cracked stone surrounding water-filled troughs—dating to the Bronze Age. Their function has long been debated, with proposals ranging from cooking pits to bathing facilities. Following excavations at three sites in Suffolk, archaeologist Jonathan Hart and colleagues have proposed that burnt mounds served primarily as locations for tanning animal hides, an interpretation that they argue would account both for the distinctive trough construction and for the mounds' typical placement at a remove from inhabited settlements.

13

Which finding, if true, would most directly support Hart and colleagues' proposal?

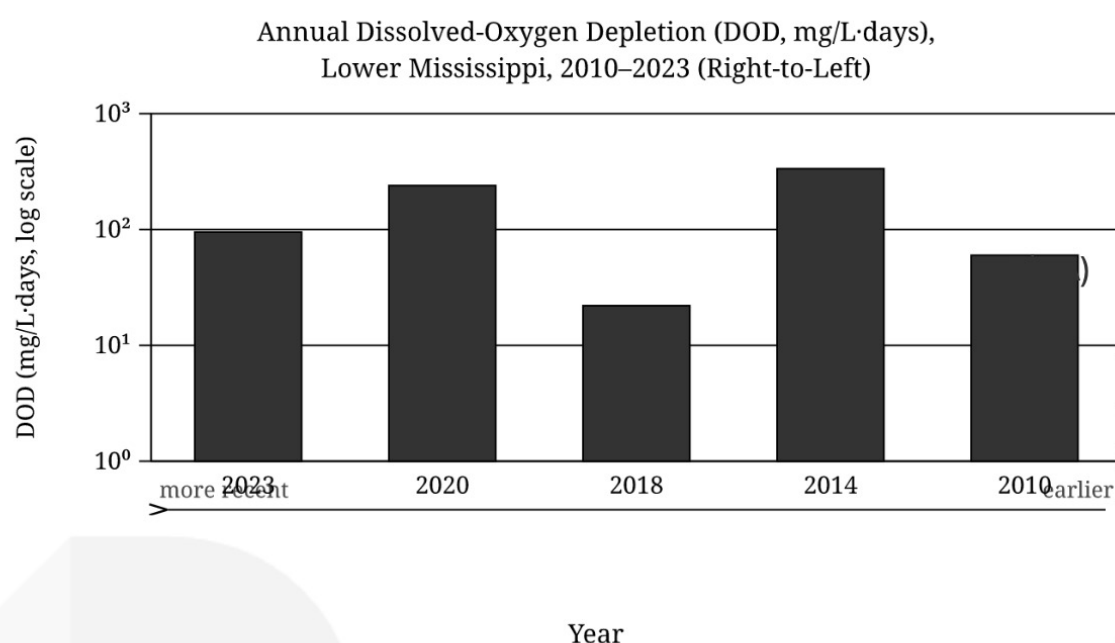
(답 : A)

A Sediment from troughs at multiple burnt mounds contained high concentrations of organic compounds known to be produced during the soaking of cattle hides.

B Stones from burnt mounds show patterns of heat fracturing consistent with prolonged heating of stews and other cooked foods.

C Burnt mounds across Britain and Ireland are typically located within 100 meters of a flowing water source such as a stream.

D Excavations at burnt mound sites have recovered abundant cattle bones, indicating that cattle were raised and butchered nearby.



most logically completes the analyst's

the poorest oxygenation occurred in the year whose bar is tallest on the log axis — 2014 — because the highest annual DOD corresponds to the most severe oxygen depletion.

the poorest oxygenation occurred in 2023, the year at the left edge of the chart, since the leftmost bar represents the most recent year in the record.

the poorest oxygenation occurred in 2018, whose bar is the shortest on the chart, because a shorter bar on a log axis marks the lowest level of oxygen depletion.

the poorest oxygenation occurred in 2020, when DOD reached approximately 240 mg/L·days, a value higher than that of most other years shown.

Hypoxic ("dead-zone") events in the Lower Mississippi watershed have been monitored since the early 2000s using a composite metric: dissolved-oxygen depletion (DOD), expressed in mg/L·days and integrated annually across the spring–summer hypoxic season. DOD and water-column oxygenation move inversely, so a higher annual DOD signals worse oxygenation than a lower one does. A research team compiling DOD records across 2010–2023 plotted the annual values on a log-scaled y-axis to accommodate the wide range observed across the period and arranged the years from right to left, so that the most recent year appears at the left edge of the chart. Reviewing the chart, the coalition's lead analyst set out to identify the single year of poorest water-column oxygenation across the 2010–2023 record and concluded that

In a 2026 systematic review of 88 laboratory studies on microplastic toxicity, Zang and colleagues examined how experimental design choices affected the reliability of published findings. They found that the concentrations of microplastics used in lab experiments were routinely 10^2 to 10^7 times higher than the concentrations measured in natural water bodies. Additionally, most studies relied on polystyrene microspheres, a particle type that represents only a fraction of the microplastics actually present in the environment. Because field organisms encounter far lower doses than those used in controlled experiments, the researchers concluded that findings from laboratory microplastic toxicity studies may _____

15

Which choice most logically completes the text?
(답 : A)

- ☒ A may not accurately reflect the effects of microplastics on organisms under real-world conditions
- ☐ B may nonetheless offer reliable guidance about the specific mechanisms by which microplastics damage fish tissue
- ☐ C may accurately capture the health effects that organisms are likely to experience in natural environments
- ☐ D may overstate microplastic toxicity compared to what organisms experience in more remote, less-polluted water bodies

A meta-analysis by Chen, Soininen, Myers, and colleagues examined the relationship between species richness and ecological uniqueness — a measure of how much each site contributes to the overall variation in species composition across a region — across four major groups of organisms: terrestrial plants, freshwater macroinvertebrates, birds, and fishes. In every group examined, sites with higher species richness tended to have lower ecological uniqueness. Because the negative relationship held consistently regardless of which organism group was studied, the researchers concluded that _____

16

Which choice most logically completes the text?
(답 : C)

- ☐ A the negative association between species richness and ecological uniqueness holds for animal groups such as birds and fishes but may not apply to plant communities
- ☐ B the relationship between species richness and ecological uniqueness varies in direction across organism groups, with some exhibiting a positive and others a negative association
- ☒ C the negative association between species richness and ecological uniqueness is not limited to any single type of organism but represents a broadly occurring ecological pattern
- ☐ D conservation efforts should prioritize sites with high species richness, since richness is more straightforward to measure than ecological uniqueness

The kakapo is among the longest-lived birds known, with some individuals surviving past 90 years. Its slow reproduction has made conservation difficult since females breed only when certain native trees ____ (A/a)n event that occurs every two to four years. The entire surviving population, fewer than 250 birds as of recent counts, lives on a handful of predator-free offshore islands under continuous monitoring.

17

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : B)

(A) mast

(B) mast,

(C) mast;

(D) mast.

A researcher at the Tbilisi heraldic society, Nino Beridze has spent years documenting roughly three thousand seventeenth-century coats of arms. Her catalogue groups them by region: the eastern provinces, where lions predominate; the western highlands, where eagles and crosses ____ the coastal districts, whose merchant families favored ships and anchors.

18

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : B)

(A) recur, and

(B) recur; and

(C) recur and

(D) recur,

Few photographers captured the American Depression as starkly as Dorothea Lange, whose images first drew national attention when news magazine Survey Graphic ran her field portraits in ____ reputation was sealed by the photo essay An American Exodus. Her assignments often paired her with economist Paul Taylor, and together they documented migrant labor camps that most of the country preferred to ignore.

19

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

(답 : A)

(A) 1936 and

(B) 1936, and

(C) 1936; and

(D) 1936: and

At a coastal market hall in Dakar, two hundred weavers sell baskets whose tight coils and dyed patterns have made ____ work prized in galleries far beyond Senegal. Ousmane Faye, who has woven for forty years, says the craft's survival depends on patiently teaching younger artisans the old coiling techniques.

20

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

(답 : B)

(A) there

(B) their

(C) they're

(D) theirs

While restoring the copper roof of the Old Veyra Observatory, architects consulted photographs taken shortly after the building opened in 1906. The images revealed that the original gutters curved inward, unlike the straight replacements installed decades later. Based on those photographs, the restoration team concluded that the curved design ____ rainwater away from the telescope chamber more effectively.

21

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : C)

(A) channels

(B) has channeled

(C) channeled

(D) had channeled

Araz Sarkisian compiled the first detailed depth soundings of the eastern Black Sea coast while working at the naval yard's hydrographic office in 1911. Although two competing foreign surveys had been published earlier, neither of the older charts ____ the treacherous shoals that his team mapped near the silt-choked river delta.

22

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : C)

(A) show

(B) have shown

(C) shows

(D) are showing

A meticulous craftsman of verse who had trained under Italian composers in his youth, ____ The 1923 premiere drew audiences from across the Caucasus and established the work as a cornerstone of the region's operatic repertoire for decades to come.

23

Which choice completes the text so that it conforms to the conventions of Standard English?
(답 : D)

- (A) the libretto for the opera took Aslan Khatko more than four years to complete.
- (B) it was four years before the opera's libretto was finished by Aslan Khatko.
- (C) more than four years went into the libretto that Aslan Khatko wrote.
- (D) Aslan Khatko spent more than four years writing the libretto for the opera.

The Great Wall of China is often described as a single continuous barrier that can be seen from space with the naked eye. ____ the structure is a discontinuous network of walls, trenches, and watchtowers built by different states and dynasties over many centuries, and astronauts have reported that it is difficult to distinguish from orbit without magnification. Many sections have also eroded or disappeared entirely.

24

Which choice completes the text with the most logical transition?
(답 : B)

- (A) Similarly,
- (B) On the contrary,
- (C) As a result,
- (D) Meanwhile,

Indigo dyeing produces its color through a chemical sleight of hand. The cloth is dipped into a vat where the dye, chemically reduced, is actually yellow-green rather than blue. The fabric emerges that same dull color and looks like a failure. ____ as the dye reacts with oxygen in the open air over the next few minutes, the cloth deepens before the dyer's eyes into the rich blue associated with denim and West African adire.

25

Which choice completes the text with the most logical transition?
(답 : B)

(A) Indeed,

(B) Then,

(C) In particular,

(D) In fact,

The color of a flamingo is not something the bird is born with. Newly hatched chicks are a dull, sooty gray and would stay that way on a different diet. ____ their famous pink comes entirely from pigments called carotenoids, absorbed from the algae and brine shrimp they eat, which is why flamingos in zoos fade to white unless their feed is deliberately supplemented.

26

Which choice completes the text with the most logical transition?
(답 : B)

(A) Likewise,

(B) Rather,

(C) Consequently,

(D) Initially,

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

- Tsitsi Dangarembga is a Zimbabwean novelist, filmmaker, and playwright born in 1959.
- Her debut novel, *Nervous Conditions*, published in 1988, was the first novel written in English by a Black Zimbabwean woman.
- Set in colonial Rhodesia in the 1960s, it follows a girl named Tambudzai who pursues an education against the constraints placed on women in her family.
- The novel's title is drawn from a phrase in Jean-Paul Sartre's preface to Frantz Fanon's *The Wretched of the Earth*.
- *Nervous Conditions* won the African section of the Commonwealth Writers' Prize in 1989.

27

The student wants to introduce the origin of the title *Nervous Conditions*. Which choice most effectively uses relevant information from the notes to accomplish this goal? (답 : B)

- (A) *Nervous Conditions* won the African section of the Commonwealth Writers' Prize in 1989.
- (B) The title of *Nervous Conditions* is drawn from a phrase in Jean-Paul Sartre's preface to Frantz Fanon's *The Wretched of the Earth*.
- (C) Set in colonial Rhodesia in the 1960s, *Nervous Conditions* follows a girl named Tambudzai who pursues an education despite restrictions placed on women in her family.
- (D) *Nervous Conditions* is the 1988 debut novel by Zimbabwean author Tsitsi Dangarembga.

Module: 26SM-MT-T07-M01

1

Which expression is equivalent to $4(x^2 - 3) + 2(3x^2 + 5)$? (답 : A)

- (A) $10x^2 - 2$
- (B) $10x^2 + 2$
- (C) $7x^2 - 2$
- (D) $10x^2 - 7$

2

The function f is defined by $f(x) = 30 - 12x$. For what value of x does $f(x) = -150$?
(답 : D)

(A) -15

(B) -10

(C) 10

(D) 15

3

$$\frac{15}{a} - \frac{3}{b} = -\frac{3}{c}$$

The given equation relates the variables a , b , and c , where $a > 0$, $b > 0$, and $c > b$. Which expression is equivalent to a ?
(답 : D)

(A) $5bc$

(B) $5(b - c)$

(C) $\frac{c-b}{5bc}$

(D) $\frac{5bc}{c-b}$

4

A flower shop owner purchased 800 feet of ribbon for several events. The school used 60% of the ribbon for decorations. How many more feet of ribbon did the owner use than it had left?

(답 : A)

(A) 160

(B) 320

(C) 480

(D) 640

5

Line m has a slope of 6 and a y -intercept of 95 . What is the absolute value of the x -coordinate of the x -intercept of line m ?

(답 : 95/6,15.83)

-15.84

6

For the linear function f , the table shows three values of x and their corresponding values of $f(x)$.

x	$f(x)$
-6	51
2	27
10	3

Function f is defined by $f(x) = rx + s$, where r and s are constants.
What is the value of $\frac{s}{r}$?
(답 : -11)

-11

7

$$4m + 6n = 92$$

The given equation describes the relationship between the number of medium storage boxes, m , and the number of narrow storage boxes, n , that can fit on a delivery shelf. If the number of medium storage boxes is 3 more than the number of narrow storage boxes, what is the value of m ?
(답 : C)

(A) 8

(B) 9

(C) 11

(D) 13

8

For two acute angles A and B , the measure of angle B is 41° and $\frac{\sin A}{\cos B} = 1$. What is the measure, in degrees, of angle A ?

(답 : B)

☐ (A) 41☒ (B) 49☐ (C) 59☐ (D) 82

9

The amount of paint in container r is 260% of the amount of paint in container s . The amount of paint in container r is also 75% of the amount of paint in container t . If the amount of paint in container t is $p\%$ of the amount of paint in container s , which of the following is closest to the value of p ?

(답 : D)

☐ (A) 195☐ (B) 260☐ (C) 335☒ (D) 347

10

A data logger stores each temperature record using 64 bits of memory. In this system, 1 byte is equal to 8 bits. How many bytes of memory are needed to store 3,600 temperature records?

(답 : C)

(A) 3,600

(B) 7,200

(C) 28,800

(D) 230,400

11

$$y = 7$$

$$y = x^2 - mx + 2m + 3$$

In the given system of equations, m is a constant. The system has exactly one distinct real solution. What is the value of m ?

(답 : 4)

2

$$3|4x + 7| = 45$$

What is the sum of the solutions to the given equation?
(답 : A)

☒ A $-\frac{7}{2}$

☐ B $-\frac{15}{4}$

☐ C 4

☐ D $\frac{15}{2}$

The table shows the distribution of the numbers of minutes students in a music class practiced piano on Saturday.

Minutes practiced	Number of students
18	3
25	5
32	4
40	6
55	2
70	5

After the data in the table were recorded, 3 more students reported that they each practiced for 32 minutes. What is the mode of the updated data set?

(답 : B)

(A) 25

(B) 32

(C) 40

(D) 70

14

What is an x -coordinate of an x -intercept of the graph of $y = 4(x - 9)(x + 2)(x + 7)$ in the xy -plane?
(답 : B)

(A) -9

(B) -7

(C) 2

(D) 4

15

A museum uses two types of cleaning solutions for display cases: glass-safe solution and metal-safe solution. The recommended amount of glass-safe solution is 1.5 liters per 6 square meters of display surface. The recommended amount of metal-safe solution is 2.4 liters per 10 square meters of display surface. If g is the amount, in liters, of glass-safe solution and m is the amount, in liters, of metal-safe solution used to clean a total of 90 square meters of display surface, which equation describes all possible values of g and m for the museum to use the recommended amount of cleaning solution?
(답 : D)

(A) $\frac{1.5}{6}g + \frac{2.4}{10}m = 90$

(B) $\frac{1.5}{6}g + \frac{10}{2.4}m = 90$

(C) $\frac{6}{1.5}g + \frac{2.4}{10}m = 90$

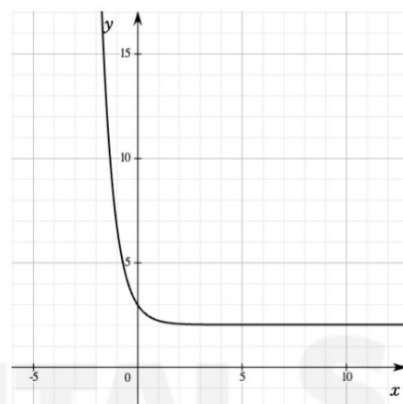
(D) $\frac{6}{1.5}g + \frac{10}{2.4}m = 90$

16

The circumference of the base of a right circular cylinder is 6π meters. The height of the cylinder is 19 meters. If the height of the cylinder is increased by 5 meters while the base remains the same, the volume of the cylinder increases by $a\pi$ cubic meters. What is the value of a ?
(답 : 45)

45

17



What is the equation of the graph shown?
(답 : C)

(A) $y = 5^{-x} + 3$

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

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

(D) $y = 5^x + 4$

18

The measure of angle R is $\frac{2\pi}{9}$ radians. Angle S is complementary to angle R . If the measure of angle S is $3n - 4$ degrees, where n is a constant, what is the value of n ?
(답 : 18)

121

19

$$x + y > 60$$

$$3x + 2y < 174$$

The point $(42, y)$ is a solution to the given system of inequalities in the xy -plane. Which of the following could be the value of y ?
(답 : B)

☐ (A) 18☒ (B) 21☐ (C) 24☐ (D) 30

20

$$-(x - 4)^2 + 3 = k$$

In the given equation, k is an integer constant. The equation has no real solution. What is the least possible value of k ?

(답 : C)

(A) 2

(B) 3

(C) 4

(D) 7

21

A solid hemisphere is divided into 4 pieces of equal volume. If the hemisphere has a radius of 18 inches, what is the volume, to the nearest cubic inch, of 3 of the pieces?

(답 : 9161)

364.5pi

$$\frac{x+3}{x-3} + \frac{12}{x+3} = \frac{k}{(x-3)(x+3)}$$

In the given equation, k is a integer. The equation has exactly one solution for which both sides of the equation are defined. What is the value of k ?

(답 : B)

(A) 108

(B) -108

(C) 48

(D) -48

Module: 26SM-MT-T07-M2

The function g is defined by $g(x) = 20(4)^{-x} + 3$. What is the value of $2g(2) - g(1)$?

(답 : A)

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

(B) $\frac{17}{4}$

(C) 8

(D) $\frac{25}{2}$

2

If $9(3x - 4) - 11 = 5(3x - 4) + 29$, what is the value of $6x - 8$?
(답 : C)

(A) 5

(B) 10

(C) 20

(D) 40

3

In June, a bakery sold 27 more than 4 times the number of croissants it sold in July. In June and July combined, the bakery sold 312 croissants. How many croissants did the bakery sell in July?
(답 : A)

(A) 57

(B) 63

(C) 69

(D) 75

4

In an old paper-counting system, a quire was a unit equal to 24 sheets of paper. In this system, how many sheets of paper were equivalent to 37.5 quires?
(답 : 900)

900

5

The graph of a line in the xy -plane passes through the points $(4, 16)$ and $(9, 10)$. Which of the following points (p, q) could lie on this line, where both p and q are positive integers and p has the greatest possible value?
(답 : B)

☐ (A) $(9, 10)$ ☐ (B) $(14, 4)$ ☐ (C) $(16, \frac{8}{5})$ ☒ (D) $(17, \frac{2}{5})$

6

If x is a positive number and $x^{3/2} - 9x^{1/2} = 440$, what is the value of x ?

(답 : 64)

15

7

Which of the following expressions is equivalent to

$$(\sin 37^\circ)(\cos 53^\circ) + (\cos 37^\circ)(\sin 53^\circ)?$$

(답 : B)

(A) $2(\sin 37^\circ)(\cos 53^\circ)$

(B) $(\sin 37^\circ)^2 + (\sin 53^\circ)^2$

(C) $(\cos 37^\circ)^2 + (\cos 37^\circ)^2$

(D) $2(\cos 37^\circ) + 2(\sin 53^\circ)$

8

A city transportation office surveyed a random sample of commuters in the city to estimate the percentage of commuters who use a bike-share service at least once per week. From the survey, the office estimated that 28% of commuters in the city use a bike-share service at least once per week, with an associated margin of error of 4.8%.

The office repeated the survey with a random sample of commuters from the same city that was three times the original sample size. The margin of error for each survey was calculated using the same confidence level and method. Which of the following must be true about the margin of error associated with the estimate from the larger sample?

(답 : A)

- ☐ (A) The margin of error is less than 4.8%.
- ☐ (B) The margin of error is exactly 1.6%.
- ☒ (C) The margin of error is 14.4%.
- ☐ (D) The margin of error is greater than 28%.

9

The equation $x^2 + y^2 - 6x + 4y = 12$ represents a circle in the xy -plane. All of the following points are on or within the circle EXCEPT:

(답 : D)

- ☐ (A) (3, 2)
- ☐ (B) (6, -2)
- ☐ (C) (-1, -2)
- ☒ (D) (7, 2)

10

The function h is defined by

$h(x) = -3(x - 2)^2(x + 6)(x - t) + s$, where s and t are integer constants. In the xy -plane, the graph of $y = h(x)$ passes through the point $(9, 11)$, and $h(2) = 11$. What is the value of $s + t$?

(답 : D)

(A) 9

(B) 11

(C) 18

(D) 20

11

The function f is defined by $f(x) = cb^x$ where b and c are positive constants. For some constant a , $f(a) = 12$ and $f(a + 2) = 108$. If $b > 1$, what is the value of $f(a + 1)$?

(답 : B)

(A) 24

(B) 36

(C) 54

(D) 60

12

$$4x^2 + bx + 49 = 0$$

In the given equation, b is an integer. The equation has no real solutions. What is the least possible value of b ?

(답 : B)

☒ A -28

☐ B -27

☐ C 27

☐ D 28

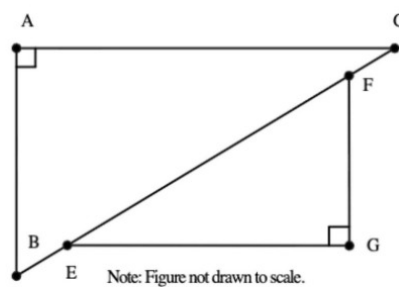
13

Triangle ABC is similar to triangle DEF , where angle B corresponds to angle E , and angles C and F are right angles. The sum of the perimeters of the two triangles is 420, and the length of $\overline{AB}$ is 3 times the length of $\overline{DE}$. If $\tan B = \frac{20}{21}$, what is the positive difference between lengths of $\overline{AC}$ and $\overline{EF}$?

(답 : 117/2, 58.5)

160/3

14



In triangles ABC and EFG shown, $\overline{EG}$ is parallel to $\overline{AC}$, $AB = 72$, $EG = 64$, and $BE = FC$. If $\tan C = \frac{3}{4}$, what is the length of BE ?

(답 : B)

(A) 16

(B) 20

(C) 40

(D) 80

15

The function f is defined by $f(x) = (x - 5)^2 - 9$. For $7 \leq x \leq 10$, what is the absolute value of the minimum value of $f(x)$?

(답 : 5)

4

16

The exponential function g is defined by

$$g(x) = mn^x,$$

where m and n are positive constants. If

$$g(k+1) + \frac{3}{8}g(k+2) = g(k+2),$$

where k is a constant, what is the value of n ?
(답 : B)

(A) $\frac{3}{8}$

(B) $\frac{8}{5}$

(C) $\frac{5}{8}$

(D) $\frac{11}{8}$

17

Jordan had already saved \$210 before starting a part-time job. For the first 3 weeks, Jordan earned \$450 per week and saved exactly $\frac{2}{5}$ of the money earned each week. Beginning in week 4, Jordan earned \$540 per week and saved exactly $\frac{1}{2}$ of the money earned each week. Jordan made no other deposits or withdrawals. What is the amount, in dollars, by which Jordan's savings first exceed \$1400 ?
(답 : 160)

6

18

$$x + y = n$$

$$4x + 7y = 95$$

In the given system of equations, n is a constant. The solution (x, y) consists of positive integers and satisfies $8 < x - y < 15$. What is the value of $2x - y$?
(답 : C)

(A) 10

(B) 20

(C) 25

(D) 95

19

For some constant $a < 25$, the equation $\sqrt{x - a} + \sqrt{25 - x} = 6$ has exactly one real solution x . What is the value of a ?
(답 : B)

(A) 6

(B) 7

(C) 16

(D) 18

An underwater robotics lab prepared data capsules for a field test. Each capsule is labeled by sensor type and by whether it contains prototype firmware. The table shows the number of capsules of each type.

Sensor type	Prototype firmware	Standard firmware
Sonar	2	5
Camera	4	3
Pressure	3	3

Two capsules are selected at random without replacement. Given that exactly one of the selected capsules contains prototype firmware and that the two selected capsules have different sensor types, what is the probability that exactly one of the selected capsules is a camera capsule?

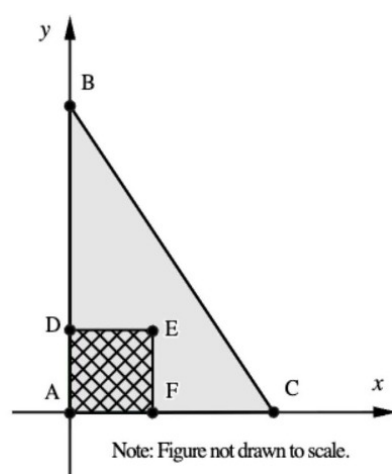
(답 : D)

(A) $\frac{15}{68}$

(B) $\frac{8}{17}$

(C) $\frac{47}{99}$

(D) $\frac{47}{68}$



In the figure shown, A is at the origin, $\overline{AB}$ lies on the y -axis, and $\overline{AC}$ lies on the x -axis. The line through B and C has slope $-\frac{3}{2}$ and crosses the x -axis at C , where the x -coordinate of C is 42. The shaded square $ADEF$ has sides parallel to the coordinate axes, with D on $\overline{AB}$ and F on $\overline{AC}$. Point D divides $\overline{AB}$ so that $AD : DB = 2 : 5$. The region inside triangle ABC but outside square $ADEF$ is rotated 360° about the x -axis. The resulting solid has volume $k\pi$ cubic units. What is the value of k ?

(답 : C)

(A) 5,832

(B) 16,674

(C) 49,734

(D) 55,566

At a construction site, ground level is assigned an elevation of 0 feet. A rectangular pit has a base measuring 18 feet by 12 feet. The pit was planned to be dug 15 feet below ground level, but the actual depth was 20% greater than the planned depth.

Gravel was placed in the pit until it filled exactly $\frac{1}{6}$ of the pit's actual depth, measured upward from the bottom of the pit. Concrete was then added on top of the gravel in whole truckloads of 540 cubic feet each. The concrete spread evenly across the entire base of the pit. If truckloads of concrete were added until the top surface of the concrete first exceeded an elevation of -4 feet, by how many feet did the top surface exceed -4 feet at that point?

(답 : 1.5)

270