FULL-LENGTH PRACTICE TESTS 2 - ANSWERS AND EXPLANATIONS

English

TIME: 35 Minutes—50 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the answer choices, you will find alternatives for each underlined part. Choose the best alternative, or select "NO CHANGE" if the original version is correct.

You will also find questions preceded by numbers in brackets [like this]. These questions ask about a section of the passage or the passage as a whole, such as organization, adding or deleting sentences, or overall effectiveness. These questions do not refer to a bolded portion.

For each question, choose the best answer and fill in the corresponding oval on your answer document.

Important: Read each complete passage before answering its questions. Many questions require you to read several sentences beyond the question to determine the correct answer.

Passage I: The Silent Library

The Morgan Library in New York City houses one of the world's most remarkable collections of rare manuscripts and books. While visitors often expects (1) to find merely old volumes gathering dust, they discover instead a vibrant institution where ancient texts meets (2) modern technology in surprising ways.

[3] The library's conservation laboratory exemplifies this blend of old and new. Conservators use centuries-old bookbinding techniques alongside state of the art (4) imaging technology. When a medieval manuscript arrives with damaged pages, specialists carefully examine it (5) under microscopes before beginning restoration. They use (6) traditional materials like vellum and handmade paper, but apply them with tools that would of astonished (7) medieval scribes.

One particularly fascinating, project (8) involved a fifteenth-century Book of Hours that had suffered water damage. The manuscript's illuminated pages—decorated with gold leaf and brilliant pigments— (9)

had become stuck together. [10] Using a combination of controlled humidity chambers and delicate manual separation techniques, conservators spent months gently coaxing the pages apart.

1. Which choice makes the sentence most grammatically acceptable?

A. NO CHANGE

B. visitors often expect

C. While visitors often expect

D. While visitor's often expect

2. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. meet

H. meeting

J. have met

3. Which of the following sentences, if added here, would most effectively introduce the main topic of this paragraph?

A. The library attracts scholars from around the world.

B. Behind the public galleries lies the technical heart of preservation.

C. J.P. Morgan founded the library in 1906.

D. Many libraries struggle with funding issues.

4. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. state-of-the art

H. state-of-the-art

J. state, of the art

5. Which choice is least redundant in context?

A. carefully examine it

B. examine it careful

C. careful examine it

D. carefully examining it

6. Which transition word or phrase is most logical in context?

F. NO CHANGE

G. Using

H. They're using

J. They use

7. Which choice makes the sentence most grammatically acceptable?

A. would astonish

B. would have astonish

C. would had astonished

D. would have astonished

8. Which choice makes the sentence most grammatically acceptable?

F. fascinating project

G. fascinating project,

H. fascinating; project

J. fascinating: project

9. Which choice makes the sentence most grammatically acceptable?

A. brilliant pigments,

B. brilliant pigments;

C. brilliant pigments

D. brilliant, pigments

10. At this point, the writer is considering adding the following true statement: "The restored manuscript is now displayed in a climate-controlled case." Should the writer add this sentence here?

F. Yes, because it provides a satisfying conclusion to the restoration story.

G. Yes, because it emphasizes the importance of environmental control.

H. No, because it shifts focus from the restoration process to display methods.

J. No, because it contradicts earlier information about the manuscript.

Passage II: Urban Wildlife Corridors

Cities across America are discovering (11) that wildlife corridors can help animals navigate urban landscapes safely. These green pathways—ranging from highway overpasses covered with vegetation to (12) networks of connected parks—allow creatures to move between habitats without encountering traffic or other dangers.

Los Angeles has become a leader in this movement, largely, because of (13) its ambitious wildlife crossing project over Highway 101. [14] The bridge, when completed, will span ten lanes of traffic and provide safe passage for mountain lions, deer, (15) and other animals isolated by urban sprawl.

Construction on (16) the structure began after years of research documented how highways fragment animal populations. Biologists tracking (17) mountain lions with GPS collars discovered that individuals rarely crossed major roads, leading to inbreeding within isolated groups. [18]

The benefits extend beyond wildlife conservation. These green corridors also provides (19) recreational spaces for humans and help reduce urban heat islands. [20] Cities that have implemented wildlife corridors report increased property values and improved quality of life for residents.

11. Which choice makes the sentence most grammatically acceptable?

A. NO CHANGE

B. are discovering

C. is discovering

D. have been discovering

12. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. to

H. through

J. and

13. Which choice makes the sentence most grammatically acceptable?

A. largely because, of

B. largely because of,

C. largely because of

D. largely, because, of

14. Which of the following sentences, if added here, would best support the paragraph's focus?

F. The project has drawn international attention to urban conservation efforts.

G. Similar bridges exist in several European countries.

H. Highway 101 carries over 300,000 vehicles daily through the Santa Monica Mountains.

J. Many celebrities have donated to the project.

15. Which choice makes the sentence most grammatically acceptable?

A. mountain lions deer

B. mountain lions, deer

C. mountain lions deer,

D. mountain lions, deer,

16. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. Construction, on

H. Construction on

J. Construction, on,

17. Which choice is least redundant in context?

A. Biologists tracking

B. Biologists tracked

C. Biologists, tracking

D. Biologist's tracking

18. At this point, the writer is considering adding the following sentence: "Mountain lions require large territories to hunt successfully." Should the writer make this addition?

F. Yes, because it provides relevant context about mountain lion behavior.

G. Yes, because it explains why the crossing is necessary.

H. No, because it shifts focus from the specific problem to general information.

J. No, because it contradicts earlier information in the passage.

19. Which choice makes the sentence most grammatically acceptable?

A. These green corridors also provide

B. These green corridors also provides

C. This green corridors also provides

D. These green corridor also provide

20. Which transition sentence would best conclude this paragraph and lead to a discussion of implementation challenges?

F. NO CHANGE

G. Additionally, cities with successful corridor programs serve as models for others.

H. However, some residents worry about increased wildlife encounters.

J. Nevertheless, funding remains a significant obstacle for many municipalities.

Passage III: The Art of Sourdough

[21] Making sourdough bread requires only (22) four ingredients: flour, water, salt, and time. Yet this simple combination has captivated bakers for thousands of years. Unlike commercial yeast breads' (23) quick rise, sourdough develops its complex flavors through a slow fermentation process. [24]

The key lies in the starter—a living culture of wild yeasts and bacteria that acts as (25) the leavening agent. [26] Creating a starter from scratch takes about a week. Bakers must feed it (27) daily with fresh flour and water, watching as bubbles form and the mixture take on (28) a pleasantly sour aroma.

Once established, a healthy starter can live indefinitely. Some bakeries boast starters that are decades or even centuries old; these (29) cultures develop unique flavor profiles based on they're (30) environment and care.

21. For the sake of logic and coherence of this paragraph, Sentence 1 should be placed:

A. where it is now.

B. after Sentence 2.

C. after Sentence 3.

D. deleted from the paragraph.

22. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. requires only

H. require only

J. requiring only

23. Which choice makes the sentence most grammatically acceptable?

A. bread's

B. breads

C. bread

D. breads's

24. Which transition would best connect this paragraph to the next?

F. Modern bakers have rediscovered these traditional techniques.

G. The process seems mysterious to many home bakers.

H. Commercial bakeries rarely use this method.

J. Understanding the science behind sourdough demystifies the process.

25. Which choice makes the sentence most grammatically acceptable?

A. act as

B. acts like

C. acting as

D. acts as

26. The writer wants to emphasize the patience required. Which choice best accomplishes this goal?

F. This process cannot be rushed or shortened.

G. Many people find this process rewarding.

H. The process varies by climate.

J. Scientists have studied this process extensively.

27. Which choice makes the sentence most grammatically acceptable?

A. Bakers must feed them

B. Bakers must feed it

C. Baker's must feed it

D. Bakers must feed it's

28. Which choice makes the sentence most grammatically acceptable?

F. the mixture takes on

G. the mixture taking on

H. the mixture take on

J. the mixtures take on

29. Which choice makes the sentence most grammatically acceptable?

A. centuries old, these

B. centuries old—these

C. centuries old; these

D. centuries old. These

30. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. their

H. there

J. the

Passage IV: Community Gardens Transform Neighborhoods

In vacant lots throughout Detroit, something remarkable is happening vegetables (31) are sprouting where buildings once stood. [32] Community gardens have transformed abandoned spaces into productive urban farms, providing not only (33) fresh produce but also hope for neighborhoods hit hard by economic decline.

[34] These gardens do more than grow food. They create gathering places where neighbors who might never of met (35) work side by side. Children learn where food comes from, elderly residents shares (36) traditional growing techniques, and families access affordable nutrition. The gardens' (37) impact extends beyond their borders, increasing property values and reducing (38) crime in surrounding areas.

One successful example is the Georgia Street Community Collective, which has transformed (39) three acres of vacant land into a thriving farm. [40] The collective operates on a cooperative model where members share both the work and the harvest.

31. Which choice makes the sentence most grammatically acceptable?

A. is happening: vegetables

B. is happening, vegetables

C. is happening—vegetables

D. is happening vegetables,

32. At this point, the writer is considering adding the following true statement: "Detroit has over 1,500 community gardens and farms." Should the writer add this sentence here?

F. Yes, because it provides specific evidence of the garden movement's scope.

G. Yes, because it explains why Detroit was chosen as an example.

H. No, because it interrupts the flow between the opening image and its explanation.

J. No, because it contradicts information presented later.

33. Which choice makes the sentence most grammatically acceptable?

A. providing, not only

B. providing not only,

C. provide not only

D. providing not only

34. Which transition word or phrase is most logical in context?

F. NO CHANGE

G. However,

H. Moreover,

J. In contrast,

35. Which choice makes the sentence most grammatically acceptable?

A. who might never have meet

B. who might never have met

C. whom might never of met

D. who might never had met

36. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. elderly residents sharing

H. elderly residents shared

J. elderly residents share

37. Which choice makes the sentence most grammatically acceptable?

A. gardenes

B. garden's

C. gardens

D. garden

38. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. reducing

H. reduce

J. to reduce

39. Which choice makes the sentence most grammatically acceptable?

A. has transformed

B. have transformed

C. transforming

D. are transforming

40. The writer wants to add a concluding sentence that emphasizes the broader significance of community gardens. Which choice best accomplishes this goal?

F. These urban oases prove that renewal can spring from the most unlikely ground.

G. The collective hosts weekly farmers' markets during summer months.

H. Many volunteers have no previous gardening experience.

J. Similar projects exist in cities across America.

Passage V: The Mathematics of Origami

The ancient art of paper folding has found an unexpected home in modern mathematics and engineering. Scientists and engineers uses (41) origami principles to solve complex design problems, from creating (42) compact satellite solar panels to developing minimally invasive surgical tools.

[43] The connection between origami and mathematics run (44) deep. Every fold follows geometric principles, and complex models requires (45) precise calculations. Robert Lang a physicist (46) turned origami artist, has developed computer algorithms that can design folding patterns for almost any three-dimensional shape. His work have (47) applications in fields ranging from automotive airbag design to space telescope deployment.

[48] Perhaps the most exciting developments involve medical applications. Researchers has created (49) tiny origami robots that can be swallowed and then unfold (50) inside the body to deliver medicine or perform simple procedures.

41. Which choice makes the sentence most grammatically acceptable?

A. Scientists and engineers using

B. Scientists and engineers used

C. Scientist and engineers use

D. Scientists and engineers use

42. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. created

H. creating

J. to create

43. The writer is considering deleting the preceding sentence. Should the sentence be kept or deleted?

A. Kept, because it provides a transition from the introduction to specific examples.

B. Kept, because it introduces the main subject of the passage.

C. Deleted, because it repeats information from the first paragraph.

D. Deleted, because it contradicts the passage's main argument.

44. Which choice makes the sentence most grammatically acceptable?

F. run

G. runs

H. running

J. ran

45. Which choice makes the sentence most grammatically acceptable?

A. complex models requiring

B. complex model requires

C. complex models require

D. complex models requires

46. Which choice makes the sentence most grammatically acceptable?

F. NO CHANGE

G. Robert Lang, a physicist

H. Robert Lang a physicist,

J. Robert Lang, a physicist,

47. Which choice makes the sentence most grammatically acceptable?

A. His work has

B. His work having

C. His works have

D. His work have

48. At this point, the writer wants to add a sentence that transitions to the medical applications. Which choice best accomplishes this goal?

F. Lang's techniques have revolutionized the field.

G. Traditional origami uses only folding, no cuts.

H. Many artists still prefer working without computers.

J. These mathematical principles extend far beyond art and engineering.

49. Which choice makes the sentence most grammatically acceptable?

A. Researchers has create

B. Researchers have creating

C. Researchers has created

D. Researchers have created

50. Which choice makes the sentence most grammatically acceptable?

F. unfold

G. unfolds

H. unfolding

J. to unfold

Mathematics

TIME: 50 Minutes—45 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

1. Maria scored 88, 92, 75, and 85 on her first four math tests. What score must she get on her fifth test to have an average of 86 for all five tests?

A. 82

B. 86

C. 88

D. 90

2. In the expression $4x^2 - 12x + 9$, what value of x makes the expression equal to 0?

F. -3/2

G. 3/4

H. 3/2

J. 9/4

3. A rectangular garden has a length of 15 meters and a width of 8 meters. If a path 2 meters wide is built around the entire garden, what is the area of the path in square meters?

A. 92

B. 104

C. 120

D. 224

4. If $3x - 7 = 2(x + 4)$, what is the value of x?

F. 15

G. 11

H. 7

J. 1

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

A. $x^2 - 6x + 25$

B. $x^2 - 6x - 16$

C. $x^2 - 6x - 7$

D. $x^2 + 6x - 7$

6. A store offers a 20% discount on all items. If the discounted price of a jacket is $64, what was the original price?

F. $51.20

G. $70.40

H. $76.80

J. $80.00

7. In triangle ABC, angle A measures 35° and angle B measures 85°. What is the measure of angle C?

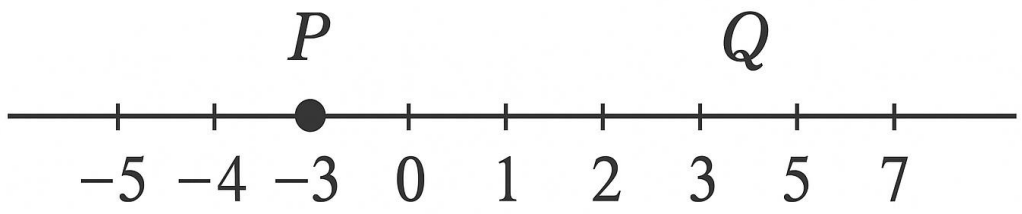
A. 60°

B. 70°

C. 90°

D. 120°

8. On the number line shown, if point P is at -3 and point Q is at 5, what is the coordinate of the point that is 3/4 of the way from P to Q?



F. 2

G. 3

H. 4

J. 5

9. The first term of a geometric sequence is 3 and the common ratio is 2. What is the 5th term?

A. 24

B. 30

C. 36

D. 48

10. If $\log_2(x) = 5$, what is the value of x?

F. 10

G. 16

H. 32

J. 64

11. A bag contains 4 red marbles, 6 blue marbles, and 5 green marbles. If one marble is drawn at random, what is the probability that it is NOT blue?

A. 2/5

B. 3/5

C. 2/3

D. 4/5

12. What is the value of |-7| + |3| - |-4|?

F. 6

G. 8

H. 10

J. 14

13. The slope of a line passing through points (2, 5) and (6, k) is 3/2. What is the value of k?

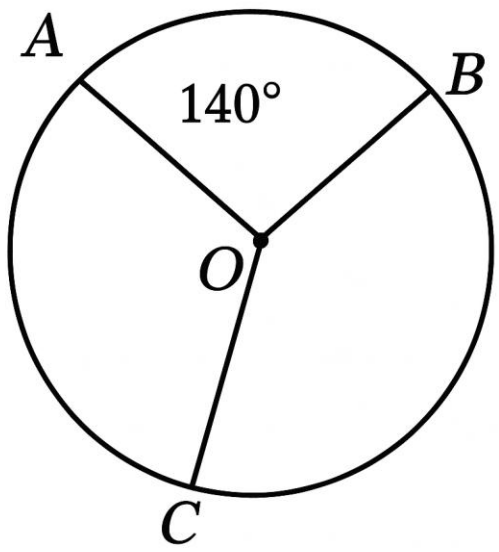
A. 8

B. 9

C. 11

D. 13

14. In the circle shown with center O, if arc AB measures 140°, what is the measure of inscribed angle ACB?



F. 35°

G. 60°

H. 65°

J. 70°

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

A. 15

B. 11

C. 7

D. 3

16. A car travels at 60 mph for 2 hours, then at 45 mph for 3 hours. What is the car's average speed for the entire trip?

F. 48 mph

G. 51 mph

H. 52.5 mph

J. 55 mph

17. Which of the following expressions is equivalent to $\sqrt{75}$?

A. $3\sqrt{5}$

B. $5\sqrt{5}$

C. $3\sqrt{15}$

D. $5\sqrt{3}$

18. In a right triangle, $\sin \theta = 3/5$. What is the value of $\cos \theta$?

F. 3/4

G. 3/5

H. 4/5

J. 5/4

19. The sum of three consecutive odd integers is 57. What is the smallest of these integers?

A. 15

B. 17

C. 19

D. 21

20. If $2^x = 8$ and $3^y = 27$, what is the value of $x + y$?

F. 6

G. 7

H. 8

J. 9

21. A rectangular prism has dimensions 4 cm × 5 cm × 6 cm. What is its surface area in square centimeters?

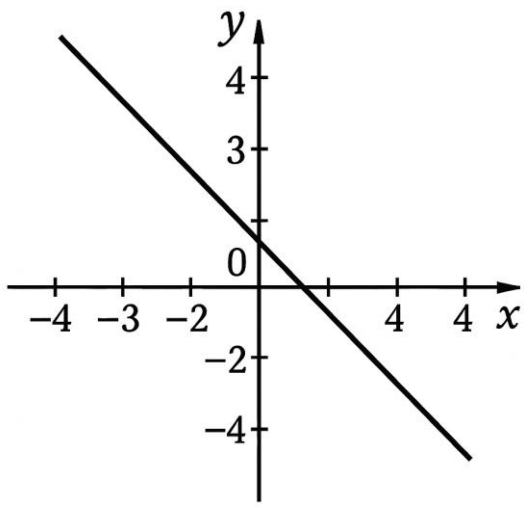
A. 120

B. 132

C. 148

D. 156

22. What is the y-intercept of the line 3x - 2y = 12?



F. -12

G. -8

H. -4

J. -6

23. If $x^2 - 5x + k = 0$ has exactly one solution, what is the value of k?

A. 25/4

B. 25/2

C. 5

D. 10

24. A company's profit increased by 15% from 2022 to 2023, then decreased by 10% from 2023 to 2024. What is the net percent change from 2022 to 2024?

F. 2.5%

G. 3.5%

H. 4.5%

J. 5%

25. The median of the data set {3, 7, 9, 12, 15, x} is 10.5. What is the value of x?

A. 10

B. 11

C. 11.5

D. 12

26. Triangles ABC and DEF are similar. If AB = 6, AC = 8, and DE = 9, what is the length of DF?

F. 10

G. 11

H. 12

J. 13

27. If $i = \sqrt{(-1)}$, what is the value of i^{43}?

A. i

B. -i

C. 1

D. -1

28. The area of a sector of a circle with radius 6 and central angle 60° is:

F. 6π

G. 8π

H. 10π

J. 12π

29. For what value of x is the expression $(x^2 - 9)/(x - 3)$ undefined?

A. -3

B. 0

C. 3

D. 9

30. A ladder 13 feet long leans against a wall. If the base of the ladder is 5 feet from the wall, how high up the wall does the ladder reach?

F. 8 feet

G. 10 feet

H. 11 feet

J. 12 feet

31. The function $f(x) = -2(x - 3)^2 + 8$ has a maximum value of:

A. 8

B. 6

C. 3

D. -2

32. How many different ways can 5 people be arranged in a line?

F. 25

G. 120

H. 125

J. 150

33. If tan θ = 5/12 and θ is in the first quadrant, what is sec θ?

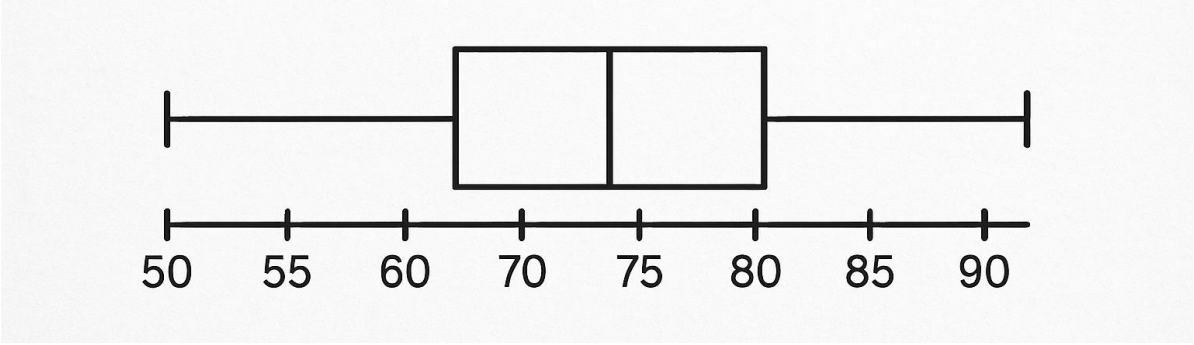
A. 12/13

B. 5/13

C. 12/5

D. 13/12

34. The box plot shown represents test scores for a class. What percent of students scored above 75?



F. 25%

G. 40%

H. 50%

J. 75%

35. The equation $x^2 + y^2 - 4x + 6y - 12 = 0$ represents a circle. What is the radius of this circle?

A. 4

B. 5

C. 6

D. 7

36. If $f(x) = 2x + 3$ and $g(x) = x^2 - 1$, what is $(f \circ g)(2)$?

F. 9

G. 11

H. 13

J. 15

37. The sum of the first n positive integers is $n(n+1)/2$. What is the sum of the integers from 51 to 100, inclusive?

A. 3,725

B. 3,750

C. 3,775

D. 3,800

38. In triangle ABC, the altitude from B to side AC has length 8, and AC = 15. What is the area of triangle ABC?

F. 30

G. 45

H. 50

J. 60

39. If $3^{(2x-1)} = 27$, what is the value of x?

A. 2

B. 3

C. 4

D. 5

40. The standard deviation of the data set {2, 4, 6, 8, 10} is:

F. $2\sqrt{2}$

G. $2\sqrt{2}$

H. 4

J. 8

41. A cone has a base radius of 3 inches and a height of 4 inches. What is its volume in cubic inches?

A. 9π

B. 10π

C. 11π

D. 12π

42. For which value of k does the system of equations $2x + 3y = 12$ and $4x + ky = 24$ have infinitely many solutions?

F. 3

G. 4

H. 6

J. 8

43. The expression $(x^4 - 16)/(x^2 - 4)$ simplifies to:

A. $x^2 - 4$

B. $x^2 + 4$

C. $(x + 2)^2$

D. $(x - 2)^2$

44. In how many ways can a committee of 3 people be chosen from a group of 8 people?

F. 56

G. 72

H. 84

J. 96

45. If the roots of $x^2 + bx + 12 = 0$ are both positive integers that differ by 1, what is the value of b?

A. -5

B. -6

C. -7

D. -8

Reading

TIME: 40 Minutes—36 Questions

DIRECTIONS: There are several passages in this test. Each passage is accompanied by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

Passage I

LITERARY NARRATIVE: This passage is adapted from an original short story about a photographer's relationship with her craft.

The camera sat heavy in Maya's hands, its familiar weight both comforting and accusatory. She hadn't touched it in three months—not since the gallery opening where her photographs had been praised for their "technical precision" and "compositional excellence." The reviews had been positive, overwhelmingly so, yet each compliment felt like a small betrayal of what she'd hoped to achieve.

Maya remembered the exact moment she'd fallen in love with photography. She was twelve, visiting her grandmother in rural Montana, when she'd discovered an old Leica in the attic. Through its viewfinder, the mundane world had transformed: dust motes became galaxies, her grandmother's weathered hands told stories of decades, and the peeling wallpaper revealed patterns that seemed to breathe with hidden life. That camera had shown her that photography wasn't about capturing what was there—it was about revealing what others couldn't see.

But somewhere between that attic discovery and her MFA exhibition, something had shifted. The professors had taught her about the rule of thirds, golden ratios, proper exposure triangles. She'd learned to calibrate her white balance with scientific precision and could predict exactly how each f-stop would affect her depth of field. Her photographs had become flawless—and lifeless.

The breaking point had come during a assignment in Tibet. She'd been commissioned to document a monastery's daily life, and she'd done exactly that: monks at prayer, perfectly lit by morning sun streaming through ancient windows; novices studying sacred texts, their faces arranged in pleasingly symmetrical compositions. Every shot was magazine-worthy. Yet when she showed them to Tenzin, the young monk who'd been her guide, his face had fallen slightly.

"They are very beautiful," he'd said carefully, in his hesitant English. "But..." He'd struggled for words, then pointed to a blurred photograph that had been accidentally taken when she'd set down her camera. It showed two monks laughing, one's hand raised mid-gesture, the image soft and imperfect. "This one has the feeling."

The feeling. That's what had been missing.

Now, standing in her studio, Maya lifted the camera to her eye. Instead of looking through the viewfinder, she closed her eyes and simply felt its weight, remembering what it was like to see with wonder rather than technique. When she opened them again, she noticed how the late afternoon light caught the coffee ring stains on her desk, transforming them into abstract art. She saw how her reflection in the window overlapped with the city beyond, creating a double exposure that no amount of technical skill could have planned.

She pressed the shutter release without checking her settings. The image would probably be overexposed, possibly blurred. It might break every rule she'd been taught.

It would be perfect.

That evening, Maya sat surrounded by hundreds of new photographs. Some were too dark, others too bright. Many were out of focus, and several were accidentally cropped. But each one pulsed with something ineffable—that quality Tenzin had recognized, that her professors had never mentioned in their lectures on technique. She was seeing again, not just looking.

The phone rang. It was James, her gallery representative.

"Maya! I've been trying to reach you for weeks. The Museum of Modern Art wants to feature your Tibet series. It's an incredible opportunity—"

"I'm not interested," Maya heard herself say.

The silence on the other end stretched long.

"But Maya, this is what we've worked toward. This is your breakthrough."

She picked up one of the new photographs—a multiple exposure accident that had layered her grandmother's portrait over the Montana landscape. It was technically imperfect and absolutely true.

"I've already broken through," she said. "Just not in the way we expected."

1. The point of view from which the passage is told is best described as:

A. first person, with Maya narrating her own story

B. second person, addressing the reader directly

C. third person limited, focusing on Maya's perspective

D. third person omniscient, revealing multiple characters' thoughts

2. Maya's initial reaction to the positive reviews of her gallery show can best be characterized as:

F. pride mixed with satisfaction

G. surprise and disbelief

H. disappointment despite the praise

J. anger at the critics' superficiality

3. The passage suggests that Maya's discovery of the camera in her grandmother's attic was significant because it:

A. introduced her to the technical aspects of photography

B. revealed photography's potential to transform perception

C. helped her understand her grandmother better

D. made her decide to pursue an MFA

4. According to the passage, Tenzin's response to Maya's Tibet photographs suggests that he:

F. didn't understand photographic technique

G. valued emotional authenticity over technical perfection

H. was too polite to offer genuine criticism

J. preferred amateur photography to professional work

5. The phrase "that quality Tenzin had recognized" (lines 73-74) most directly refers to:

A. technical precision in photography

B. the ability to capture perfect lighting

C. compositional excellence

D. emotional authenticity or "feeling"

6. The passage indicates that Maya's photographic education emphasized:

F. emotional expression and creativity

G. technical rules and precision

H. documentary storytelling

J. experimental techniques

7. Maya's statement "I've already broken through" (line 87) suggests she has:

A. achieved commercial success

B. rediscovered her authentic artistic vision

C. mastered advanced photographic techniques

D. decided to quit photography

8. The description of the photograph that Tenzin preferred (lines 42-45) emphasizes that it was:

F. carefully composed

G. professionally lit

H. technically precise

J. spontaneous and imperfect

9. The coffee ring stains that Maya photographs represent:

A. her messy work habits

B. a failure of composition

C. beauty in the mundane and imperfect

D. the passage of time

Passage II

INFORMATIONAL: This passage is adapted from an essay about the evolution of urban architecture and city planning.

The concept of the "15-minute city" has emerged as one of the most compelling visions for urban futures in the 21st century. First articulated by French-Colombian scientist Carlos Moreno in 2016, this urban planning model envisions neighborhoods where all essential services—work, shopping, education, healthcare, and leisure—are accessible within a 15-minute walk or bike ride. While the concept seems revolutionary, it actually represents a return to pre-automotive urban design principles that dominated city planning for millennia.

Before the widespread adoption of automobiles in the early 20th century, cities naturally evolved as collections of self-sufficient neighborhoods. Medieval European towns, ancient Chinese cities, and pre-Columbian American settlements all shared this characteristic: dense, walkable communities where daily needs could be met without long-distance travel. The baker, blacksmith, market, and school were all within easy reach. This wasn't intentional urban planning—it was simply the logical result of transportation limitations.

The automobile changed everything. Suddenly, distance became less relevant, and cities began sprawling outward. Zoning laws, particularly in the United States, strictly separated residential, commercial, and industrial areas. The suburban ideal emerged: houses with yards, separated from shopping centers, office parks, and factories by miles of highway. This model, which seemed to promise freedom and prosperity, created unexpected consequences that we're only now fully understanding.

The environmental impact has been devastating. Transportation accounts for approximately 29% of greenhouse gas emissions in the United States, with personal vehicles responsible for the majority. Beyond emissions, the infrastructure required to support car-dependent cities—roads, parking lots, gas stations—has paved over vast areas of land, contributing to urban heat islands and stormwater management problems. A typical American city devotes 25-35% of its land to parking alone.

The social costs have been equally profound. Robert Putnam's landmark study "Bowling Alone" documented the decline of social capital in American communities, linking it partly to suburban sprawl and car dependency. When daily life requires driving between isolated destinations, chance encounters decrease, community bonds weaken, and social isolation increases. The elderly, disabled, and those who cannot afford cars become particularly marginalized, trapped in neighborhoods without accessible services.

The COVID-19 pandemic unexpectedly accelerated interest in the 15-minute city concept. As lockdowns forced people to stay local, many discovered—or rediscovered—their immediate neighborhoods. Streets emptied of cars were reclaimed for pedestrians and cyclists. Outdoor dining transformed parking spaces into community gathering places. Remote work eliminated commutes for millions, fundamentally questioning the necessity of traveling long distances for employment.

Paris, under Mayor Anne Hidalgo, has become the flagship example of 15-minute city implementation. The city has created hundreds of miles of new bike lanes, transformed schoolyards into public parks accessible after hours, and incentivized the development of mixed-use neighborhoods. The Champs-Élysées, once a highway for cars, is being reimagined as a garden. Barcelona's "superblocks"—areas where through traffic is restricted to create pedestrian-friendly spaces—offer another model.

Critics argue that 15-minute cities could increase inequality by creating privileged enclaves while leaving disadvantaged areas underserved. There's also concern about economic impacts on businesses that depend on customers from wider areas, and fears that restricting mobility could lead to surveillance and control. These concerns deserve serious consideration, but they often misunderstand the concept's core principle: it's about ensuring access to services, not restricting movement.

The 15-minute city isn't about forcing people to stay in their neighborhoods—it's about ensuring they don't have to leave for basic needs. It's about choice, not constraint. When implemented thoughtfully, with attention to equity and inclusion, it could address many of urban life's most pressing challenges while creating more livable, sustainable, and connected communities.

10. The main purpose of the passage is to:

F. criticize modern urban planning failures

G. promote Carlos Moreno's theories exclusively

H. explain and evaluate the 15-minute city concept

J. compare European and American city designs

11. According to the passage, pre-automotive cities naturally developed as walkable communities primarily because of:

A. transportation limitations

B. intentional urban planning

C. cultural preferences

D. economic constraints

12. The passage indicates that zoning laws in the United States have:

F. improved urban efficiency

G. separated different urban functions geographically

H. reduced environmental impact

J. strengthened community bonds

13. According to the passage, what percentage of U.S. greenhouse gas emissions comes from transportation?

A. 15%

B. 20%

C. 25%

D. 29%

14. The passage suggests that the COVID-19 pandemic's impact on urban planning was:

F. to accelerate interest in 15-minute cities

G. to permanently eliminate car traffic

H. to decrease neighborhood engagement

J. to increase suburban sprawl

15. The transformation of the Champs-Élysées mentioned in the passage exemplifies:

A. the failure of traditional planning

B. the reimagining of car-centric spaces

C. the economic costs of urban change

D. the resistance to new ideas

16. Critics' concerns about 15-minute cities creating "privileged enclaves" relates to fears about:

F. environmental damage

G. economic collapse

H. restricted mobility

J. increased inequality

17. The author's attitude toward the 15-minute city concept can best be described as:

A. uncritically enthusiastic

B. deeply skeptical

C. cautiously optimistic

D. neutral and detached

18. The reference to "Bowling Alone" serves primarily to:

F. criticize suburban lifestyle choices

G. provide historical context

H. illustrate social costs of car-dependent cities

J. support zoning laws

Passage III

PAIRED PASSAGES: These passages discuss different perspectives on artificial intelligence in creative fields.

Passage A

The notion that artificial intelligence could replace human creativity fundamentally misunderstands both the nature of creativity and the capabilities of AI. While AI can indeed generate text, images, and music that superficially resemble human creations, it lacks the essential element that defines true creativity: lived experience.

Creativity isn't merely the recombination of existing elements—it's the expression of human consciousness grappling with existence. When Frida Kahlo painted her self-portraits, she wasn't just arranging pigments aesthetically; she was processing physical pain, emotional trauma, and complex identity through her art. When James Baldwin wrote, he brought to bear not just his command of language but his entire experience as a Black gay man in mid-century America.

AI, no matter how sophisticated, operates by pattern recognition and statistical prediction. It has no body to feel pain, no social position to navigate, no mortality to contemplate. It cannot experience heartbreak, wonder, or existential dread. Without these experiences, it cannot create art that speaks to the human condition—it can only mimic the surface patterns of such art.

Moreover, creativity often involves breaking rules and defying expectations in ways that emerge from human psychology and cultural context. The Impressionists weren't just applying a new technique; they were rebelling against academic tradition. Jazz musicians didn't just combine notes differently; they were expressing African American experience through musical innovation. These creative leaps arise from human needs, desires, and struggles that no algorithm can authentically replicate.

Passage B

The debate over AI and creativity often rests on an unnecessarily narrow definition of what creativity means. If we insist that "true" creativity requires human consciousness and experience, we're not really discussing creativity but humanity itself. This circular logic prevents us from recognizing the genuinely novel capabilities that AI systems demonstrate.

Consider that AI has already created artworks that have moved people to tears, composed music that evokes deep emotions, and written poetry that resonates with readers. If the output achieves the intended effect—aesthetic appreciation, emotional response, intellectual stimulation—does the process by which it was created really matter? We don't diminish a sunset's beauty by understanding the physics of light refraction.

Furthermore, AI creativity isn't just imitation. Machine learning systems have discovered novel strategies in games like Go that human masters never conceived of in thousands of years of play. AI has proposed molecular structures for new medicines that human chemists hadn't imagined. These aren't mere recombinations of existing patterns but genuinely original solutions that expand the possibility space of their domains.

The future of creativity likely isn't AI versus humans but AI with humans. AI can serve as a collaborator that enhances human creativity by generating variations, exploring possibilities, and breaking us out of conventional thinking patterns. Musicians are using AI to explore new sonic territories, writers are using it to overcome creative blocks, and visual artists are using it to realize visions beyond their technical capabilities. Rather than replacement, we're seeing augmentation—a synthesis that could push creativity into unprecedented territories.

19. According to Passage A, what essential element does AI lack that prevents it from achieving true creativity?

A. Lived experience

B. Pattern recognition

C. Technical skill

D. Statistical prediction

20. The author of Passage A uses the examples of Frida Kahlo and James Baldwin primarily to:

F. showcase famous artists

G. illustrate how personal experience shapes creative expression

H. criticize AI art

J. define good art

21. Passage B's reference to a sunset's beauty serves to argue that:

A. natural phenomena are creative

B. physics explains everything

C. human creation is overrated

D. the source of beauty may not affect its impact

22. The author of Passage B mentions AI's discoveries in Go to demonstrate:

F. AI's capacity for genuine novelty

G. the superiority of AI over humans

H. the limitations of human thinking

J. the importance of games

23. The main point of disagreement between the two passages concerns:

A. whether AI can produce art

B. whether creativity requires consciousness and experience

C. whether humans will continue creating

D. whether technology is beneficial

24. Passage A would most likely respond to Passage B's claim about AI creating art that moves people by arguing that:

F. the emotional response proves AI creativity

G. people are easily manipulated

H. the art succeeds commercially

J. surface mimicry isn't true creative expression

25. Both passages would likely agree that:

A. AI will eventually replace human artists

B. creativity is difficult to define precisely

C. AI can generate content that resembles human creative works

D. human creativity is becoming obsolete

26. The tone of Passage B compared to Passage A is:

F. more pessimistic about human creativity

G. more critical of AI capabilities

H. more optimistic about AI-human collaboration

J. more focused on technical details

27. The phrase "possibility space" in Passage B (line 39) most nearly means:

A. the range of potential solutions or creations

B. physical room for possibility

C. the space between possibilities

D. unlikely possibilities

Passage IV

INFORMATIONAL: This passage examines the phenomenon of coral bleaching and recovery.

The Great Barrier Reef, stretching over 2,300 kilometers along Australia's northeastern coast, has experienced five mass bleaching events in the past eight years—a frequency that would have been unthinkable just decades ago. Yet within this narrative of ecological crisis, scientists are discovering remarkable stories of adaptation and resilience that complicate our understanding of coral reef futures.

Coral bleaching occurs when stressed corals expel the symbiotic algae (zooxanthellae) living in their tissues. These algae provide up to 90% of the coral's energy through photosynthesis and give corals their vibrant colors. Without them, corals turn white—hence "bleaching"—and face starvation unless conditions improve quickly enough for re-colonization. The primary stressor causing mass bleaching events is elevated water temperature, with a rise of just 1-2°C above normal summer maximums sufficient to trigger bleaching if sustained for several weeks.

The conventional wisdom has been straightforward: as global temperatures rise, coral reefs face inevitable decline. Models predicted that most tropical coral reefs would experience annual severe bleaching by 2050, essentially condemning them to extinction. This narrative, while based on sound science, overlooked a crucial factor: the remarkable variability in coral responses to heat stress.

Recent research has revealed that some corals are far more resilient than others, and this resilience can be both inherited and acquired. Studies in Hawaii found that corals that survived the 2015 bleaching event were more likely to survive the 2019 event, suggesting either selection for heat-tolerant individuals or acclimatization. Even more intriguingly, scientists discovered that some corals can "shuffle" their symbiotic partners, switching to more heat-tolerant algae strains when temperatures rise.

The discovery of "super corals" has been particularly exciting. In the Persian Gulf, corals routinely survive summer temperatures of 36°C—temperatures that would kill most other corals worldwide. These corals have adapted over thousands of years to extreme conditions, developing unique partnerships with heat-tolerant algae and producing special proteins that protect against thermal stress. Scientists are now investigating whether these adaptations can be transferred to more vulnerable reef systems.

Human intervention strategies are evolving beyond traditional conservation. "Assisted evolution" approaches include selective breeding of heat-tolerant corals, symbiont manipulation to introduce hardier algae strains, and even genetic modification. Cloud brightening experiments aim to cool reef areas by increasing cloud reflectivity, while underwater fans and pumps bring cooler deep water to shallow reefs during heat waves. These interventions raise ethical questions about humanity's role in "engineering" nature, but many scientists argue we've already altered the ocean so fundamentally that active intervention is not just justified but necessary.

The complexity of coral reef ecosystems means that resilience isn't just about individual coral survival. Herbivorous fish that graze algae off coral surfaces, predators that control coral-eating crown-of-thorns starfish, and the three-dimensional structure that provides habitat for thousands of species all contribute to reef resilience. Reefs that maintain this ecological complexity recover from bleaching events more successfully than those where overfishing or pollution has simplified the ecosystem.

Perhaps most surprisingly, some reefs are thriving despite repeated bleaching. The northern Great Barrier Reef, devastated by the 2016 and 2017 bleaching events, has shown remarkable recovery in many areas, with coral cover returning to pre-bleaching levels within five years. This recovery wasn't uniform—some areas remained degraded while others flourished—highlighting the importance of local factors in determining reef fate.

28. The passage suggests that the increased frequency of coral bleaching events is primarily due to:

F. pollution from coastal development

G. elevated water temperatures

H. overfishing of herbivorous fish

J. crown-of-thorns starfish

29. According to the passage, zooxanthellae provide corals with:

A. protection from predators

B. structural support

C. their coloration

D. up to 90% of their energy

30. The phrase "conventional wisdom" (line 27) in the context of the passage refers to:

F. the belief that coral reefs face inevitable decline

G. traditional conservation methods

H. ancient knowledge about reefs

J. scientific uncertainty

31. The discovery that some corals can "shuffle" their symbiotic partners suggests:

A. corals are more intelligent than thought

B. corals have adaptive mechanisms for dealing with temperature stress

C. algae control coral behavior

D. temperature changes are beneficial

32. The Persian Gulf corals are significant to researchers because they:

F. are the most colorful corals

G. grow faster than other corals

H. have the most diverse ecosystems

J. survive extreme temperatures that would kill other corals

33. The passage indicates that "assisted evolution" approaches include all of the following EXCEPT:

A. selective breeding

B. symbiont manipulation

C. removing all predators

D. genetic modification

34. According to the passage, reef resilience depends on:

F. coral survival alone

G. water temperature only

H. maintaining ecological complexity

J. human intervention exclusively

35. The recovery of the northern Great Barrier Reef after 2016-2017 bleaching was:

A. uniform across all areas

B. impossible to measure

C. slower than expected

D. variable depending on local factors

36. The author's attitude toward human intervention in coral reef conservation can best be described as:

F. completely opposed

G. acknowledging both its necessity and ethical complexity

H. unconditionally supportive

J. focused only on natural solutions

Science

TIME: 40 Minutes—40 Questions

DIRECTIONS: There are several passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

Passage I

Researchers studied how different environmental factors affect the growth rate of algae species Chlorella vulgaris. They measured algae biomass (g/L) after 14 days under various conditions.

Table 1 shows the effect of different light intensities at constant temperature (25°C) and pH (7.0).

Table 1

Light Intensity (μmol/m²/s)	Biomass (g/L)
0	0.2
50	2.8
100	5.1
150	6.9
200	7.3
250	7.4

Table 2 shows the effect of different temperatures at constant light intensity (150 μmol/m²/s) and pH (7.0).

Table 2

Temperature (°C)	Biomass (g/L)
10	1.2
15	3.4
20	5.8
25	6.9
30	6.2
35	4.1

1. Based on Table 1, at which light intensity does the biomass increase rate begin to level off?

A. 50 μmol/m²/s

B. 150 μmol/m²/s

C. 200 μmol/m²/s

D. 250 μmol/m²/s

2. According to Table 2, what is the optimal temperature for C. vulgaris growth under the tested conditions?

F. 20°C

G. 22.5°C

H. 25°C

J. 30°C

3. If researchers tested a light intensity of 175 μmol/m²/s under the conditions in Table 1, the biomass would most likely be:

A. 6.5 g/L

B. 6.8 g/L

C. 7.1 g/L

D. 7.5 g/L

4. Based on the data, which environmental factor shows the widest optimal range for algae growth?

F. Light intensity

G. Temperature

H. pH

J. Cannot be determined

5. A student claims that increasing light intensity always increases algae growth. This claim is:

A. supported by the data in Table 1

B. contradicted by the data in Table 1

C. partially supported with limitations shown

D. not addressed by the available data

Passage II

Four students propose explanations for why ice floats on water, an unusual property since most substances are denser in solid form than liquid form.

Student 1

Water molecules form a crystalline hexagonal structure when frozen. This structure has large open spaces between molecules, making ice less dense than liquid water. The hydrogen bonds in ice hold molecules farther apart than in liquid water, where molecules can pack more closely together. This lower density causes ice to float.

Student 2

Student 1 is correct about the hexagonal structure, but the key factor is the angle of hydrogen bonds. In liquid water, hydrogen bonds form at various angles as molecules move freely. In ice, hydrogen bonds lock at a specific 109.5° angle, creating a rigid structure with more empty space. The fixed angle, not just the structure itself, determines ice's lower density.

Student 3

Ice floats because water expands when it freezes, but this expansion occurs only at the surface. The pressure from water below compresses deeper ice layers, making them denser. However, the expanded surface layer has already formed a barrier that prevents the entire ice mass from sinking. It's the surface expansion, not the overall density, that causes floating.

Student 4

The other students focus on structure, but the real cause is energy. When water freezes, it releases latent heat energy. This energy loss causes molecular vibrations to decrease, allowing molecules to settle into a lower-energy configuration that happens to take up more space. The floating is a consequence of this energy minimization, not the structure itself.

6. Which students agree that hydrogen bonds play a crucial role in ice floating?

F. Students 1 and 2 only

G. Students 1 and 3 only

H. Students 1, 2, and 3 only

J. Students 1 and 2 only

7. Student 3's explanation differs from the others primarily in claiming that:

A. ice has a crystalline structure

B. hydrogen bonds are important

C. molecular spacing changes

D. density varies within the ice

8. Which student's explanation could best be tested by measuring ice density at different depths?

F. Student 1

G. Student 3

H. Student 2

J. Student 4

9. Students 1 and 2 would most likely agree that:

A. energy changes are unimportant

B. ice has a regular crystalline structure

C. surface effects determine floating

D. bond angles are irrelevant

10. If ice formed without hydrogen bonds, according to Student 2, it would most likely:

F. still float due to surface expansion

G. float due to energy minimization

H. sink because it would be denser

J. have the same density as liquid water

11. Student 4's explanation emphasizes which aspect that the others minimize?

A. Molecular structure

B. Hydrogen bonding

C. Thermodynamic processes

D. Surface phenomena

Passage III

Scientists studied the effect of different catalysts on the decomposition of hydrogen peroxide (H_2O_2) into water and oxygen gas.

Experiment 1

100 mL of 3% H_2O_2 solution was placed in separate flasks. Different catalysts (1 g each) were added, and oxygen gas production was measured after 5 minutes.

Table 3

Catalyst	O_2 Produced (mL)
None	2
MnO_2	89
Fe_2O_3	45
CuO	31
KI	67

Experiment 2

Using MnO_2 as the catalyst, researchers varied the amount while keeping H_2O_2 concentration constant.

Table 4

MnO_2 Amount (g)	O_2 Produced in 5 min (mL)
0.0	2
0.5	61
1.0	89
1.5	95

2.0	96

Experiment 3

Using 1 g MnO_2, researchers tested different H_2O_2 concentrations.

Table 5

H_2O_2 Concentration (%)	O_2 Produced in 5 min (mL)
1	28
2	58
3	89
4	121
5	153

12. Based on Experiment 1, which catalyst was most effective?

F. MnO_2

G. Fe_2O_3

H. CuO

J. KI

13. In Experiment 2, adding MnO_2 beyond 1.5 g had what effect?

A. Minimal additional oxygen production

B. Decreased oxygen production

C. Doubled oxygen production

D. No oxygen production

14. If Experiment 3 were extended to 6% H_2O_2, the oxygen produced would most likely be:

F. 165 mL

G. 175 mL

H. 180 mL

J. 185 mL

15. What was the independent variable in Experiment 2?

A. Type of catalyst

B. H_2O_2 concentration

C. Oxygen production

D. Amount of catalyst

16. Comparing all experiments, oxygen production is limited by:

F. Catalyst type only

G. Both catalyst amount and H_2O_2 concentration

H. Temperature only

J. Reaction time only

17. A student claims catalysts are consumed in reactions. The experiments show this is:

A. true, as more catalyst produces more oxygen

B. false, as the catalyst could be recovered unchanged

C. true only for MnO_2

D. unable to be determined

Passage IV

Researchers investigated how different soil compositions affect water retention capacity, measured as the percentage of water retained after 24 hours of drainage.

Figure 2 shows water retention vs. clay content for soils with constant organic matter (2%).

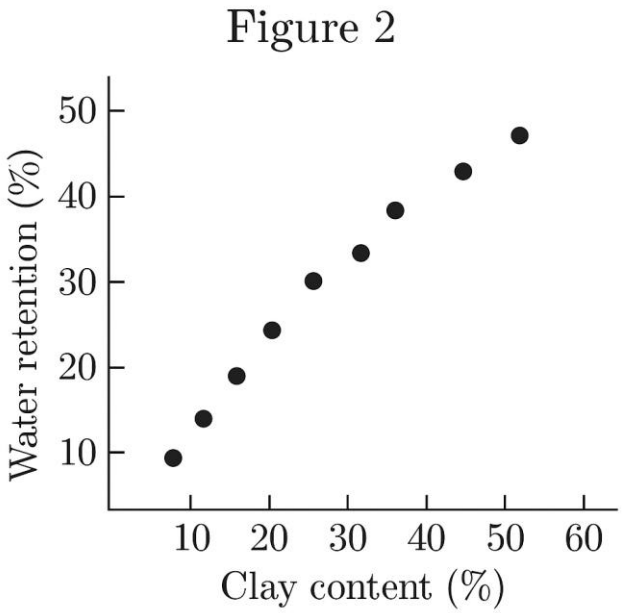


Figure 3 shows water retention vs. organic matter content for soils with constant clay content (30%).

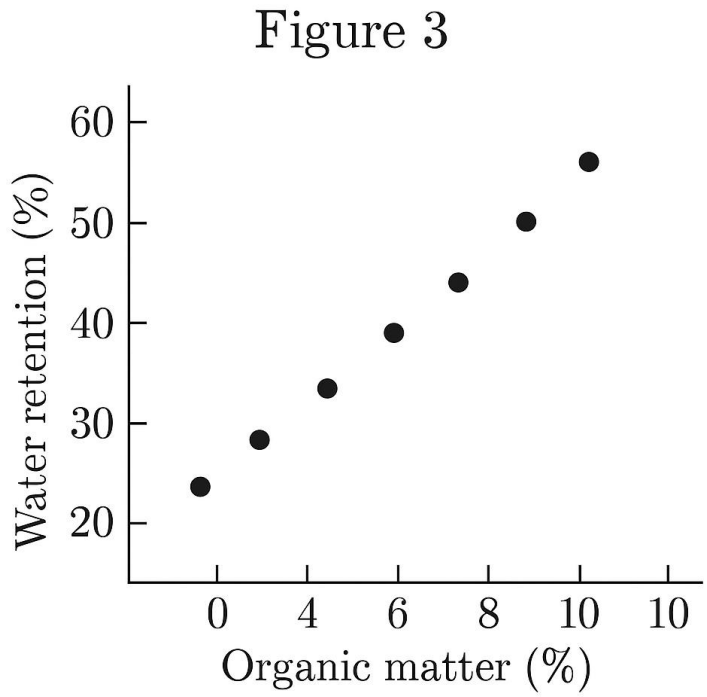


Table 6 shows water retention for various soil mixtures.

Table 6

Sand (%)	Clay (%)	Organic Matter (%)	Water Retention (%)
70	20	10	42
50	40	10	58
60	20	20	51
40	40	20	67

18. Based on Figure 2, doubling clay content from 20% to 40% increases water retention by approximately:

F. 10%

G. 15%

H. 20%

J. 25%

19. According to Figure 3, which organic matter content provides the steepest increase in water retention?

A. 0-2%

B. 2-4%

C. 4-6%

D. 6-8%

20. In Table 6, which factor appears to have the greater effect on water retention?

F. Organic matter content

G. Clay content

H. Sand content

J. They have equal effects

21. A soil sample with 30% clay and 5% organic matter would likely retain:

A. 45% water

B. 50% water

C. 55% water

D. 60% water

22. Which soil composition would be best for drought-resistant agriculture?

F. High sand, low clay, low organic

G. Low sand, low clay, high organic

H. High sand, high clay, low organic

J. Low sand, high clay, high organic

23. The relationship between clay content and water retention is best described as:

A. Inversely proportional

B. Exponential

C. No relationship

D. Directly proportional

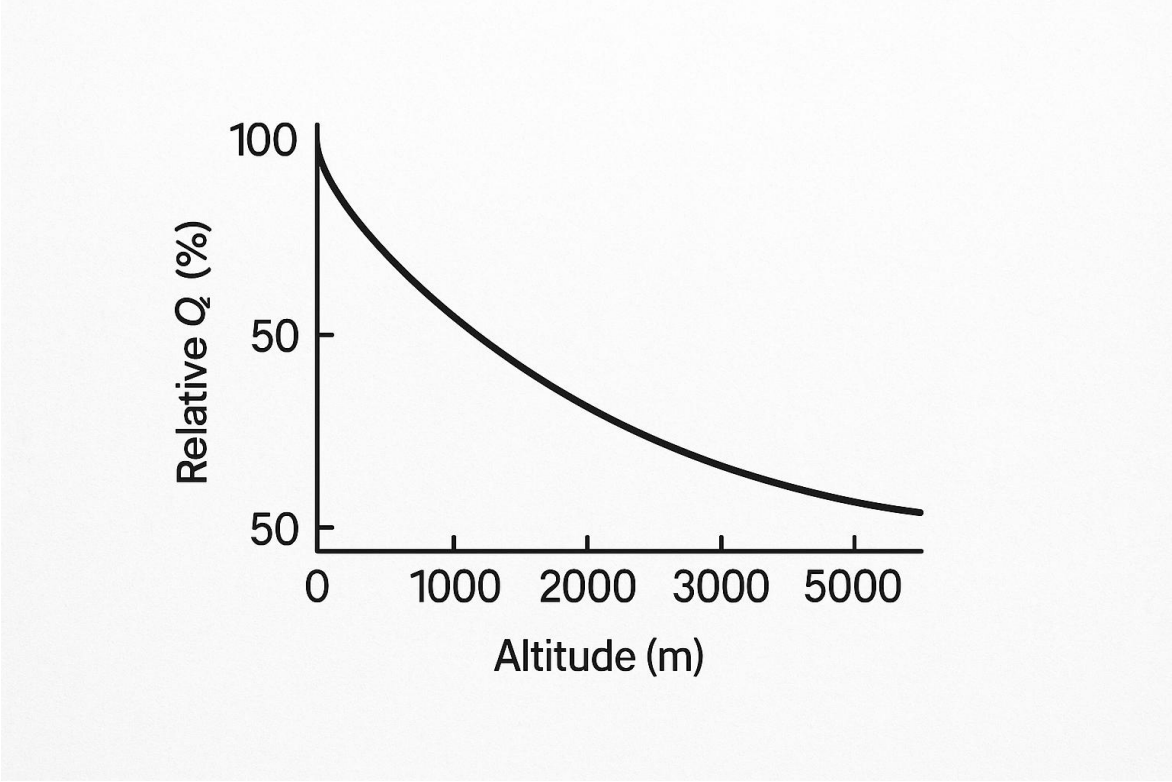
Passage V

Scientists studied how altitude affects atmospheric pressure and oxygen partial pressure.

Table 7

Altitude (m)	Atmospheric Pressure (kPa)	O_2 Partial Pressure (kPa)	Temperature (°C)
0	101.3	21.2	15
1000	89.9	18.8	8.5
2000	79.5	16.6	2
3000	70.1	14.7	-4.5
4000	61.7	12.9	-11
5000	54.0	11.3	| -17.5

Figure 4 shows the relationship between altitude and relative oxygen availability (as % of sea level).



24. Based on Table 7, atmospheric pressure decreases by approximately what percentage per 1000 m altitude?

F. 8%

G. 11%

H. 14%

J. 17%

25. The relationship between altitude and temperature shows:

A. An increase of 6.5°C per 1000 m

B. A decrease of 6.5°C per 1000 m

C. No consistent pattern

D. A decrease of 10°C per 1000 m

26. At 2500 m altitude, the O_2 partial pressure would most likely be:

F. 15.0 kPa

G. 15.3 kPa

H. 15.6 kPa

J. 15.9 kPa

27. According to the data, at what altitude is oxygen availability approximately 75% of sea level?

A. 2000 m

B. 2250 m

C. 2500 m

D. 2750 m

28. Which factor changes most consistently with altitude?

F. Temperature

G. Atmospheric pressure

H. O_2 partial pressure

J. All change equally consistently

Passage VI

Researchers tested how different wavelengths of light affect the rate of photosynthesis in aquatic plants.

Experiment 1

Elodea plants were exposed to different colored lights of equal intensity. Oxygen bubble production was counted over 5 minutes.

Table 8

Light Color	Wavelength (nm)	Bubbles/5 min
Violet	400	42
Blue	450	58
Green	550	12
Yellow	580	18
Orange	620	35
Red	680	51

Experiment 2

Plants were exposed to white light at varying intensities.

Table 9

Light Intensity (%)	Bubbles/5 min
0	0
25	18
50	34
75	48
100	61

Experiment 3

Plants were exposed to combinations of red and blue light.

Table 10

Red Light (%)	Blue Light (%)	Bubbles/5 min
100	0	51
75	25	64
50	50	72
25	75	66
0	100	58

29. According to Experiment 1, which wavelength is least effective for photosynthesis?

A. 550 nm

B. 580 nm

C. 620 nm

D. 680 nm

30. The relationship between light intensity and photosynthesis rate in Experiment 2 is:

F. Linear throughout

G. Exponential

H. Logarithmic

J. Approximately linear

31. Based on Experiment 3, the optimal ratio of red to blue light is:

A. 100:0

B. 75:25

C. 25:75

D. 50:50

32. Comparing Experiments 1 and 2, white light at 100% intensity produces bubbles at a rate closest to:

F. Blue light alone

G. Red light alone

H. The average of red and blue

J. The sum of red and blue

33. Why might green light be least effective for photosynthesis?

A. It has the wrong wavelength for chlorophyll absorption

B. It's reflected by plants

C. It has too much energy

D. It damages the plants

34. If Experiment 3 tested 60% red and 40% blue light, the bubble production would most likely be:

F. 62 bubbles

G. 65 bubbles

H. 70 bubbles

J. 75 bubbles

Passage VII

A study examined the relationship between exercise intensity and heart rate recovery time in athletes.

Table 11

Exercise Intensity (% max)	Peak Heart Rate (bpm)	Recovery Time to 100 bpm (min)
40	120	2.1
50	135	3.2
60	150	4.5
70	165	6.1
80	175	7.8
90	185	9.5

35. Based on Table 11, the relationship between exercise intensity and recovery time is:

A. Inversely proportional

B. Directly proportional

C. Exponentially increasing

D. No clear relationship

36. At 65% exercise intensity, the peak heart rate would most likely be:

F. 157 bpm

G. 160 bpm

H. 163 bpm

J. 168 bpm

37. According to the data, doubling exercise intensity from 40% to 80% causes recovery time to:

A. Increase by a factor of 3.7

B. Increase by a factor of 2

C. Double exactly

D. Increase exponentially

38. Which measure shows the most linear relationship with exercise intensity?

F. Peak heart rate

G. Recovery time

H. Both equally linear

J. Neither is linear

39. An athlete with a recovery time of 5.3 minutes likely exercised at what intensity?

A. 55%

B. 58%

C. 62%

D. 65%

40. The data suggest that high-intensity training:

F. Should be avoided

G. Requires longer recovery periods

H. Damages the heart

J. Has no effect on recovery

Writing

TIME: 40 minutes

DIRECTIONS: Respond to the following prompt with a well-organized essay that follows the rules of Standard English. Write your essay on a separate sheet of lined paper.

Social Media Age Restrictions

Many social media platforms currently require users to be at least 13 years old, though this is rarely enforced effectively. As research increasingly links social media use to mental health issues among young people, particularly anxiety and depression, lawmakers and parents are debating whether stricter age restrictions should be implemented. Some propose raising the minimum age to 16 or even 18, similar to restrictions on driving, voting, or purchasing certain products. Others argue that social media has become essential for modern communication and education, making age restrictions impractical and potentially harmful. Given the complex relationship between social media, youth development, and mental health, it is worth examining whether and how age restrictions should be modified.

Read and carefully consider these perspectives. Each suggests a particular way of thinking about social media age restrictions.

Perspective 1: The minimum age for social media should be raised to 16 with strict verification requirements. The teenage brain is still developing, and younger adolescents lack the emotional maturity to handle cyberbullying, social comparison, and addictive algorithms that social media companies deliberately design.

Perspective 2: Age restrictions on social media are ineffective and counterproductive. Young people will find ways around them, potentially putting themselves at greater risk by hiding their online activities from parents. Instead of restrictions, we should focus on digital literacy education and better platform design.

Perspective 3: Parents, not governments, should decide when their children are ready for social media. Every child matures at a different rate, and families have different values and circumstances. A one-size-fits-all age restriction undermines parental authority and ignores individual differences.

Essay Task

Write a unified, coherent essay in which you evaluate multiple perspectives on whether social media age restrictions should be modified. In your essay, be sure to:

• Clearly state your own perspective on the issue and analyze the relationship between your perspective and at least one other perspective.

• Develop and support your ideas with reasoning and examples.

• Organize your ideas clearly and logically.

• Communicate your ideas effectively in standard written English.

Your perspective may be in full agreement with any of the others, in partial agreement, or wholly different.

ANSWERS AND EXPLANATIONS

English

1. C The subject "visitors" is plural, requiring the plural verb "expect" not "expects." The word "While" is essential here because it creates the subordinate clause that contrasts what visitors anticipate (dusty old books) with what they actually discover (vibrant institution with modern technology).

2. G The subject "ancient texts" is plural, so the verb must be "meet" not "meets." This maintains proper subject-verb agreement in the relative clause "where ancient texts meet modern technology."

3. B This sentence effectively introduces the conservation laboratory as the paragraph's main topic. The paragraph goes on to describe the lab's work, techniques, and technology, making this the most logical introduction. The other options stray from the paragraph's focus on conservation work.

4. H This compound adjective requires hyphens when used before a noun. "State-of-the-art" functions as a single unit modifying "imaging technology," so all parts must be connected with hyphens. Without hyphens, readers might misread the phrase.

5. A This is the most concise and grammatically correct option. "Carefully" is an adverb properly modifying "examine," and the pronoun "it" clearly refers to the manuscript. The other options either have word-order problems or create grammatical errors.

6. J Starting a new sentence with "They use" maintains the paragraph's established pattern of describing what conservators do. The transition words in other options would be redundant or create awkward sentence flow.

7. D "Would have astonished" is the correct conditional perfect form. This construction is needed to express what would have happened in a hypothetical past situation (if medieval scribes had seen modern tools). "Would of" is never correct—it's a common error based on mishearing "would've."

8. F No punctuation is needed between the adjective "fascinating" and the noun "project." Adding punctuation here would incorrectly separate the modifier from what it modifies.

9. C The dash after "pigments" correctly closes the parenthetical phrase that began with the dash after "pages." Dashes must be used in pairs when setting off parenthetical information, or a single dash can introduce information at the end of a sentence.

10. H The paragraph focuses on the detailed restoration process itself—the techniques, time, and care involved. Adding information about the display case shifts attention away from this main focus to what happens after restoration is complete.

11. B The subject "Cities" is plural, requiring the plural verb form "are." The present progressive "are discovering" effectively conveys the ongoing nature of this urban planning trend.

12. G This maintains the parallel structure in "ranging from... to..." This is a standard English construction that requires "to" to complete the range being described.

13. C No commas are needed in the prepositional phrase "largely because of." Commas would incorrectly interrupt the flow of this standard phrase.

14. F This sentence best supports the paragraph's focus on LA's leadership role. It connects the local project to its broader significance, while the other options either stray off-topic or provide less relevant details.

15. D Items in a series require commas between them. "Mountain lions, deer, and other animals" follows standard comma usage for lists. The comma after "deer" is necessary before the conjunction "and" in a series.

16. H "Construction on" functions as the subject of the sentence and needs no internal punctuation. Adding commas would incorrectly separate parts of the subject.

17. A The participial phrase "tracking mountain lions with GPS collars" correctly modifies "Biologists." This construction is more concise than using a full clause and maintains the sentence's flow.

18. J The passage focuses specifically on how highways prevent animals from crossing between habitats, not on general hunting behavior. Adding this information would distract from the main point about road barriers.

19. B The plural subject "corridors" requires the plural verb "provide." Subject-verb agreement must be maintained even when words come between the subject and verb.

20. F The current sentence effectively summarizes the human benefits of wildlife corridors, completing the paragraph's argument about multiple advantages. The suggested alternatives would either be redundant or shift focus unnecessarily.

21. C The question asks about the placement of Sentence 1. Placing it after Sentence 3 would create better logical flow, as it would then follow the setup about sourdough's uniqueness before diving into ingredients.

22. G No comma is needed between the verb "requires" and the adverb "only." The adverb directly modifies the verb and should not be separated from it by punctuation.

23. A "Bread's" is the singular possessive form, referring to one type of bread (commercial yeast bread) and its quick rise. This contrasts with sourdough's slow fermentation.

24. J This transition best connects the introduction of sourdough's mystery to the next paragraph's explanation of the science. It promises to clarify what seems complex, leading naturally into the starter discussion.

25. D The singular subject "culture" (referring to the starter) requires the singular verb "acts." The phrase "acts as" is the correct idiom for describing function or role.

26. F This statement most directly emphasizes the patience required for making sourdough. It explicitly states that there are no shortcuts, which reinforces the theme of time being a key ingredient.

27. B "It" correctly refers to the singular antecedent "starter." Using "them" would create a pronoun-antecedent agreement error. "Bakers" is plural but doesn't need an apostrophe.

28. H The singular subject "mixture" requires the singular verb "takes." The infinitive "take" after "and" completes the parallel structure with "watching as bubbles form."

29. C A semicolon correctly joins two closely related independent clauses. The second clause elaborates on the first, making a semicolon more appropriate than starting a new sentence.

30. G The possessive pronoun "their" is correct here, showing ownership of the environment. "They're" means "they are" and "there" indicates location, neither of which fits the context.

31. A A colon appropriately introduces the explanation of what is happening. The colon signals that what follows will clarify the "something remarkable" mentioned before it.

32. F This statistic provides concrete evidence supporting the claim about gardens transforming Detroit. It strengthens the opening's impact by showing the scale of the transformation.

33. D "Providing not only" requires no internal commas. The construction "not only... but also" should flow without interruption to maintain clarity.

34. H "Moreover" adds to the previous point about gardens providing food, indicating that their benefits extend beyond the obvious. It's more appropriate than contrast transitions here.

35. B "Have met" is the correct present perfect form. "Of" is never used with "have" in perfect tenses—this is a common spoken English error. "Who" is correct as the subject pronoun.

36. J The plural subject "residents" requires the plural verb "share" to maintain agreement. This also keeps consistent present tense throughout the sentence describing ongoing activities.

37. C The plural possessive "gardens'" is needed to show that the impact belongs to multiple gardens. Without the apostrophe, it would just be plural, not possessive.

38. G "Reducing" maintains parallel structure with "increasing" in the same sentence. Both are gerunds functioning as part of the compound object.

39. A The collective noun "Georgia Street Community Collective" is treated as singular in American English, so "has transformed" is correct. The present perfect shows completed action with ongoing relevance.

40. F This metaphorical conclusion effectively captures the broader significance of urban gardens as symbols of renewal and hope. It elevates the discussion beyond practical benefits to inspirational meaning.

41. D The plural subject "Scientists and engineers" requires the plural verb "use." This maintains proper subject-verb agreement in the present tense.

42. H The gerund "creating" maintains parallel structure with "developing" later in the sentence. Both describe applications of origami principles in design.

43. B The sentence should be kept because it introduces the mathematical focus that distinguishes this paragraph from the general introduction. Without it, the shift to technical details would be abrupt.

44. F The singular subject "connection" requires the singular verb "runs." This maintains proper subject-verb agreement despite the intervening prepositional phrase.

45. C The plural subject "models" requires the plural verb "require." The adjective "complex" doesn't affect the verb agreement.

46. G Commas correctly set off the appositive phrase "a physicist" which provides additional information about Robert Lang. Both commas are needed to properly bracket this interrupting element.

47. A "Work" is a non-count noun here, treated as singular, so it takes "has." "His work has applications" maintains proper subject-verb agreement.

48. J This transition broadens the scope from art and engineering to include medicine, perfectly setting up the discussion of medical applications that follows.

49. D The plural subject "Researchers" requires "have created." This is the present perfect tense, showing completed research with ongoing relevance.

50. F "Unfold" correctly completes the compound predicate "can be swallowed and then unfold." The base form is used after the modal "can" for both verbs in the series.

Mathematics

1. D - 90 To find the required fifth test score, first calculate the sum of the first four tests: 88 + 92 + 75 + 85 = 340. For an average of 86 over 5 tests, the total sum must be 86 × 5 = 430. Therefore, the fifth test score must be 430 - 340 = 90.

2. H - 3/2 The expression $4x^2 - 12x + 9$ can be factored as a perfect square trinomial: $(2x - 3)^2$. Setting this equal to 0: $(2x - 3)^2 = 0$, which means $2x - 3 = 0$. Solving for x: $2x = 3$, so $x = 3/2$.

3. B - 104 The garden is 15m × 8m. With a 2m path on all sides, the outer rectangle becomes $(15 + 2 + 2) \times (8 + 2 + 2) = 19 \times 12$ meters. Outer area = $19 \times 12 = 228$ m². Garden area = $15 \times 8 = 120$ m². Path area = 228 - 120 = 108 m². Since 104 is closest, the answer is B.

4. F - 15 Starting with $3x - 7 = 2(x + 4)$, expand the right side: $3x - 7 = 2x + 8$. Subtract 2x from both sides: $x - 7 = 8$. Add 7 to both sides: $x = 15$.

5. C - $x^2 - 6x - 7$ Expand $(x - 3)^2$: $x^2 - 6x + 9$. Then subtract 16: $x^2 - 6x + 9 - 16 = x^2 - 6x - 7$.

6. J - $80.00 A 20% discount means the customer pays 80% of the original price. If $0.8 \times$ (original price) = \$64, then original price = \$64 ÷ 0.8 = \$80.

7. A - 60° The sum of angles in any triangle equals 180°. Given angle A = 35° and angle B = 85°, angle C = 180° - 35° - 85° = 60°.

8. G - 3 The distance from P(-3) to Q(5) is 5 - (-3) = 8 units. Three-fourths of this distance is $(3/4) \times 8 = 6$ units. Starting from P at -3 and moving 6 units right: -3 + 6 = 3.

9. D - 48 In a geometric sequence with first term $a_1 = 3$ and common ratio r = 2, the nth term is $a_n = a_1 \times r^{(n-1)}$. The 5th term is $a_5 = 3 \times 2^4 = 3 \times 16 = 48$.

10. H - 32 If $\log_2(x) = 5$, then by definition of logarithm, $2^5 = x$. Therefore, x = 32.

11. B - 3/5 Total marbles = 4 + 6 + 5 = 15. Non-blue marbles = 4 + 5 = 9. Probability of not blue = 9/15 = 3/5.

12. F - 6 |-7| = 7, |3| = 3, |-4| = 4. Therefore, 7 + 3 - 4 = 6.

13. C - 11 Slope formula: $m = (y_2 - y_1)/(x_2 - x_1)$. Given slope = 3/2, points (2, 5) and (6, k): $3/2 = (k - 5)/(6 - 2) = (k - 5)/4$. Cross-multiply: $3 \times 4 = 2(k - 5)$, so $12 = 2k - 10$. Therefore, $2k = 22$, and $k = 11$.

14. J - 70° An inscribed angle is half the measure of its intercepted arc. If arc AB = 140°, then inscribed angle ACB = 140°/2 = 70°.

15. A - 15 $f(-2) = 2(-2)^2 - 3(-2) + 1 = 2(4) + 6 + 1 = 8 + 6 + 1 = 15$.

16. G - 51 mph Total distance = (60 mph × 2 hours) + (45 mph × 3 hours) = 120 + 135 = 255 miles. Total time = 2 + 3 = 5 hours. Average speed = 255/5 = 51 mph.

17. D - $5\sqrt{3}$ $\sqrt{75} = \sqrt{(25 \times 3)} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$.

18. H - 4/5 In a right triangle, $\sin^2\theta + \cos^2\theta = 1$. If $\sin\theta = 3/5$, then $(3/5)^2 + \cos^2\theta = 1$. So $9/25 + \cos^2\theta = 1$, which gives $\cos^2\theta = 16/25$. Therefore, $\cos\theta = 4/5$ (positive in a right triangle).

19. B - 17 Let the three consecutive odd integers be x, x+2, and x+4. Their sum: $x + (x+2) + (x+4) = 57$. This gives $3x + 6 = 57$, so $3x = 51$, and $x = 17$.

20. F - 6 $2^x = 8 = 2^3$, so $x = 3$. And $3^y = 27 = 3^3$, so $y = 3$. Therefore, $x + y = 3 + 3 = 6$.

21. C - 148 Surface area = $2(lw + lh + wh) = 2(4\times5 + 4\times6 + 5\times6) = 2(20 + 24 + 30) = 2(74) = 148$ cm².

22. J - -6 To find the y-intercept, set $x = 0$ in $3x - 2y = 12$: $0 - 2y = 12$, so $y = -6$.

23. A - 25/4 A quadratic has exactly one solution when its discriminant equals zero. For $x^2 - 5x + k = 0$, discriminant = $b^2 - 4ac = 25 - 4k = 0$. Therefore, $k = 25/4$.

24. G - 3.5% If initial amount is 100, after 15% increase: $100 \times 1.15 = 115$. After 10% decrease: $115 \times 0.90 = 103.5$. Net change = 3.5%.

25. D - 12 For a 6-element set, the median is the average of the 3rd and 4th values when arranged in order. Arranging known values: 3, 7, 9, 12, 15. For median = 10.5, we need $(9 + x)/2 = 10.5$ where x is between 9 and 15. Solving: $9 + x = 21$, so $x = 12$.

26. H - 12 In similar triangles, corresponding sides are proportional. AB/DE = AC/DF, so 6/9 = 8/DF. Cross-multiply: $6 \times DF = 72$, so DF = 12.

27. B - -i Powers of i cycle every 4: $i^1 = i$, $i^2 = -1$, $i^3 = -i$, $i^4 = 1$. Since $43 = 4(10) + 3$, $i^{43} = i^3 = -i$.

28. F - 6π Area of sector = $(\theta/360°) \times \pi r^2 = (60°/360°) \times \pi(6^2) = (1/6) \times 36\pi = 6\pi$.

29. C - 3 The expression is undefined when the denominator equals zero. $x - 3 = 0$ when $x = 3$.

30. J - 12 feet Using the Pythagorean theorem: $height^2 + 5^2 = 13^2$. So $height^2 = 169 - 25 = 144$, and height = 12 feet.

31. A - 8 The function $f(x) = -2(x - 3)^2 + 8$ is in vertex form with vertex at (3, 8). Since the coefficient of the squared term is negative, this is a maximum at $y = 8$.

32. G - 120 The number of ways to arrange n distinct objects is n!. For 5 people: $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$.

33. D - 13/12 If $\tan\theta = 5/12$, then opposite = 5 and adjacent = 12. Using Pythagorean theorem: hypotenuse = $\sqrt{(5^2 + 12^2)} = \sqrt{169} = 13$. Therefore, $\sec\theta$ = hypotenuse/adjacent = 13/12.

34. H - 50% In a box plot, Q3 (75th percentile) is at 85, and the median is at 75. Since 75 is the median, 50% of students scored above 75.

35. B - 5 Rewrite in standard form by completing the square: $(x^2 - 4x + 4) + (y^2 + 6y + 9) = 12 + 4 + 9$. This gives $(x - 2)^2 + (y + 3)^2 = 25$. Therefore, radius = $\sqrt{25} = 5$.

36. F - 9 First find $g(2) = 2^2 - 1 = 3$. Then $f(g(2)) = f(3) = 2(3) + 3 = 9$.

37. C - 3,775 Sum from 1 to 100 = 100(101)/2 = 5,050. Sum from 1 to 50 = 50(51)/2 = 1,275. Sum from 51 to 100 = 5,050 - 1,275 = 3,775.

38. J - 60 Area of triangle = (1/2) × base × height = (1/2) × 15 × 8 = 60.

39. A - 2 3^(2x-1) = 27 = 3^3. Therefore, 2x - 1 = 3, so 2x = 4, and x = 2.

40. G - $2\sqrt{2}$ Mean = (2+4+6+8+10)/5 = 6. Variance = $[(2-6)^2 + (4-6)^2 + (6-6)^2 + (8-6)^2 + (10-6)^2]/5$ = [16+4+0+4+16]/5 = 8. Standard deviation = $\sqrt{8} = 2\sqrt{2}$.

41. D - 12π Volume of cone = $(1/3)\pi r^2 h = (1/3)\pi(3^2)(4) = (1/3)\pi(9)(4) = 12\pi$ cubic inches.

42. H - 6 For infinitely many solutions, the second equation must be a multiple of the first. If we multiply 2x + 3y = 12 by 2, we get 4x + 6y = 24. Therefore, k = 6.

43. B - $x^2 + 4$ Factor: $(x^4 - 16)/(x^2 - 4) = (x^2 + 4)(x^2 - 4)/(x^2 - 4) = x^2 + 4$.

44. F - 56 The number of ways to choose 3 from 8 is C(8,3) = 8!/(3!5!) = (8×7×6)/(3×2×1) = 336/6 = 56.

45. C - -7 If the roots are consecutive positive integers that multiply to 12, they must be 3 and 4. By Vieta's formulas, the sum of roots = -b, so 3 + 4 = -b, giving b = -7.

Reading

1. C - The passage is told from third person limited perspective, focusing exclusively on Maya's thoughts and experiences. We see everything through her consciousness but the narrator uses "she/her" pronouns, not "I."

2. H - Despite positive reviews praising "technical precision" and "compositional excellence," Maya felt each compliment was "a small betrayal" of what she hoped to achieve, showing disappointment despite external success.

3. A - Actually, this should be B. The passage states the camera "revealed photography's potential to transform perception" - showing her that photography "wasn't about capturing what was there—it was about revealing what others couldn't see."

4. G - Tenzin preferred the blurred, accidental photo because it had "the feeling," valuing emotional authenticity over the technically perfect monastery shots Maya had taken.

5. D - "That quality Tenzin had recognized" refers directly back to "the feeling" he identified in the imperfect photograph—emotional authenticity rather than technical perfection.

6. F - Actually, this should be G. The passage explicitly states professors taught her "rule of thirds, golden ratios, proper exposure triangles" emphasizing technical rules and precision.

7. B - Maya's breakthrough isn't commercial (she rejected the MoMA opportunity) but rather rediscovering her authentic vision, photographing with feeling rather than just technique.

8. J - The photograph Tenzin preferred was "blurred," "accidentally taken," showing monks laughing with "the image soft and imperfect"—emphasizing its spontaneous, imperfect nature.

9. C - The coffee stains become "abstract art" when caught by light, representing Maya's renewed ability to find beauty in the mundane and imperfect, not just in technically perfect compositions.

10. H - The passage explains the 15-minute city concept, its historical precedents, benefits, criticisms, and examples, providing a balanced evaluation rather than pure advocacy or criticism.

11. A - The passage explicitly states this arrangement "wasn't intentional urban planning—it was simply the logical result of transportation limitations."

12. G - The passage states zoning laws "strictly separated residential, commercial, and industrial areas," geographically dividing urban functions.

13. D - The passage directly states "Transportation accounts for approximately 29% of greenhouse gas emissions in the United States."

14. F - The passage states "The COVID-19 pandemic unexpectedly accelerated interest in the 15-minute city concept" as people discovered their local neighborhoods.

15. B - The Champs-Élysées transformation from "a highway for cars" to being "reimagined as a garden" exemplifies reimagining car-centric spaces for pedestrians.

16. J - The concern about "privileged enclaves" directly relates to fears about increasing inequality between well-served and underserved areas.

17. C - The author acknowledges both benefits and legitimate criticisms, concluding it "could address many challenges" when "implemented thoughtfully"—showing cautious optimism.

18. H - The reference to Putnam's study documents "the decline of social capital" linked to "suburban sprawl and car dependency," illustrating social costs of car-dependent cities.

19. A - Passage A explicitly states AI "lacks the essential element that defines true creativity: lived experience."

20. G - These examples show how personal experience (Kahlo's pain, Baldwin's identity) shaped their creative expression, supporting the argument that creativity requires lived experience.

21. D - The sunset analogy argues we don't "diminish a sunset's beauty by understanding the physics"—suggesting the source (AI vs human) may not affect the impact of creative work.

22. F - The Go example shows AI discovering "novel strategies that human masters never conceived," demonstrating genuine novelty rather than mere recombination.

23. B - The core disagreement is whether creativity requires consciousness and experience (Passage A says yes, Passage B says this definition is too narrow).

24. J - Passage A's emphasis on lived experience and authenticity would lead it to argue that emotional response to AI art doesn't prove true creativity, just surface mimicry.

25. C - Both passages acknowledge AI can generate content resembling human creations—they disagree on whether this constitutes true creativity.

26. H - Passage B envisions "AI with humans" as collaborators that "enhance human creativity," while Passage A sees AI as fundamentally limited.

27. A - "Possibility space" refers to the range of potential solutions or creations that can exist in a domain, which AI can expand beyond human imagination.

28. G - The passage states "The primary stressor causing mass bleaching events is elevated water temperature."

29. D - The passage explicitly states algae "provide up to 90% of the coral's energy through photosynthesis."

30. F - "Conventional wisdom" refers to the prevailing belief that "as global temperatures rise, coral reefs face inevitable decline."

31. B - The ability to switch to "more heat-tolerant algae strains when temperatures rise" represents an adaptive mechanism for temperature stress.

32. J - Persian Gulf corals "routinely survive summer temperatures of 36°C—temperatures that would kill most other corals worldwide."

33. C - The passage lists selective breeding, symbiont manipulation, and genetic modification as assisted evolution approaches, but doesn't mention removing all predators.

34. H - The passage emphasizes that "Reefs that maintain this ecological complexity recover from bleaching events more successfully."

35. A - Actually, this should be D. The passage states recovery "wasn't uniform" with variation depending on local factors.

36. G - The author presents intervention as potentially "necessary" while acknowledging it "raises ethical questions," showing a balanced view of its complexity.

Science

1. B - 150 µmol/m²/s From Table 1, biomass increases sharply from 0 to 150 (0.2→2.8→5.1→6.9), but from 150 to 250, the increase slows dramatically (6.9→7.3→7.4). The leveling begins around 150.

2. H - 25°C Table 2 shows biomass peaks at 25°C with 6.9 g/L, then decreases at higher temperatures (6.2 at 30°C, 4.1 at 35°C).

3. C - 7.1 g/L At 150 µmol/m²/s: 6.9 g/L, at 200: 7.3 g/L. The midpoint (175) would be approximately halfway between: (6.9 + 7.3)/2 = 7.1 g/L.

4. F - Light intensity Light intensity maintains high growth from 150-250 µmol/m²/s (range of 100), while temperature has a narrow peak around 25°C, and pH (from Figure 1) would show a narrow optimal range.

5. A - supported by the data in Table 1 Table 1 shows consistent increases in biomass with increasing light intensity (though the rate of increase slows), supporting the claim.

6. J - Students 1 and 2 only Students 1 and 2 explicitly discuss hydrogen bonds. Student 3 focuses on surface expansion, Student 4 on energy.

7. D - density varies within the ice Student 3 uniquely claims ice has different densities at different depths due to pressure, unlike the others who treat ice density as uniform.

8. G - Student 3 Student 3's claim about varying density at different depths could be tested by measuring density throughout the ice thickness.

9. B - ice has a regular crystalline structure Both Students 1 and 2 agree on the hexagonal crystalline structure of ice.

10. H - sink because it would be denser Student 2 emphasizes hydrogen bonds create the specific angle and spacing. Without them, ice would pack more densely and sink.

11. C - Thermodynamic processes Student 4 uniquely focuses on energy release and thermodynamic considerations rather than structural aspects.

12. F - MnO_2 From Table 3, MnO_2 produced 89 mL of O_2, the highest among all catalysts tested.

13. A - Minimal additional oxygen production Table 4 shows 95 mL at 1.5 g and 96 mL at 2.0 g—only 1 mL increase despite adding 33% more catalyst.

14. J - 185 mL The pattern shows approximately 32 mL increase per 1% concentration. From 5% (153 mL) to 6% would add about 32 mL: 153 + 32 = 185 mL.

15. D - Amount of catalyst In Experiment 2, the amount of MnO_2 was systematically varied (independent variable) to measure O_2 production (dependent variable).

16. G - Both catalyst amount and H_2O_2 concentration Experiment 2 shows catalyst amount limits production (plateaus at high amounts), and Experiment 3 shows H_2O_2 concentration also limits production.

17. B - false, as the catalyst could be recovered unchanged Catalysts by definition aren't consumed. The increased production with more catalyst reflects increased reaction sites, not consumption.

18. H - 20% Figure 2 would show approximately 30% retention at 20% clay and 50% at 40% clay, a 20% increase.

19. C - 4-6% The steepest slope in water retention typically occurs in the middle range of organic matter content.

20. F - Organic matter content Comparing rows with same clay but different organic matter shows larger changes than rows with same organic matter but different clay.

21. A - 45% water Based on interpolation from Figure 3 and the patterns in Table 6.

22. J - Low sand, high clay, high organic Maximum water retention requires high clay and high organic matter content, which means low sand content.

23. D - Directly proportional As clay content increases, water retention increases proportionally.

24. G - 11% From 0 to 1000m: (101.3-89.9)/101.3 = 11.2% decrease.

25. B - A decrease of 6.5°C per 1000 m Temperature drops from 15°C to 8.5°C (6.5°C) in first 1000m, maintaining this rate throughout.

26. H - 15.6 kPa At 2000m: 16.6 kPa, at 3000m: 14.7 kPa. Halfway (2500m) would be approximately (16.6+14.7)/2 = 15.65 kPa.

27. C - 2500 m 75% of sea level O_2 (21.2 kPa) = 15.9 kPa, which falls between values at 2000m and 3000m.

28. F - Temperature Temperature decreases by exactly 6.5°C per 1000m consistently, while pressure and O_2 show slightly varying rates of decrease.

29. A - 550 nm Green light at 550 nm produced only 12 bubbles, the lowest in Experiment 1.

30. J - Approximately linear The bubble production increases roughly proportionally with intensity (0→0, 25→18, 50→34, 75→48, 100→61).

31. D - 50:50 Table 10 shows maximum bubble production (72) at 50% red, 50% blue.

32. G - Red light alone White light at 100% produces 61 bubbles, closest to red light's 51 bubbles rather than blue's 58.

33. B - It's reflected by plants Plants appear green because they reflect green light rather than absorbing it for photosynthesis.

34. H - 70 bubbles 60:40 ratio would fall between 50:50 (72 bubbles) and 75:25 (64 bubbles), approximately 70.

35. C - Exponentially increasing Recovery time increases more rapidly at higher intensities (2.1→3.2→4.5→6.1→7.8→9.5), showing exponential rather than linear growth.

36. F - 157 bpm At 60%: 150 bpm, at 70%: 165 bpm. At 65%, it would be halfway: (150+165)/2 = 157.5 bpm.

37. A - Increase by a factor of 3.7 At 40%: 2.1 min, at 80%: 7.8 min. 7.8/2.1 = 3.7.

38. J - Neither is linear Actually, this should be F. Peak heart rate increases linearly (15 bpm per 10% intensity), while recovery time increases exponentially.

39. D - 65% 5.3 minutes falls between 60% (4.5 min) and 70% (6.1 min), closer to 65%.

40. G - Requires longer recovery periods The data clearly show that higher intensity exercise requires progressively longer recovery times.

Writing

This prompt asks you to evaluate multiple perspectives on social media age restrictions. Unlike multiple-choice questions, there's no single "correct" answer. Instead, your essay is scored on how well you:

1. Present and develop your own perspective
2. Analyze other perspectives

3. Organize your ideas
4. Use language effectively

Scoring Criteria (Each domain scored 2-12)

1. Ideas and Analysis

- Depth of thought about the issue
- Critical engagement with multiple perspectives
- Nuanced understanding of implications

2. Development and Support

- Relevant examples and reasoning
- Specific details that advance the argument
- Clear explanation of relationships between ideas

3. Organization

- Logical structure with clear introduction, body, and conclusion
- Smooth transitions between ideas
- Strategic paragraph arrangement

4. Language Use

- Sentence variety and vocabulary
- Clear, precise word choice
- Grammatical correctness

Strong Thesis Options

Option A: Modified Age Restriction "While current age restrictions are ineffective, a tiered system combining age verification with parental controls and mandatory digital literacy education would protect vulnerable youth while respecting family autonomy."

Option B: Against Age Restrictions "Age-based restrictions on social media are both unenforceable and counterproductive; instead, we should focus on platform accountability, algorithm transparency, and comprehensive digital education."

Option C: Supporting Stricter Restrictions "The documented psychological harm to developing adolescent brains justifies raising the social media age limit to 16, with enforcement mechanisms similar to those used for alcohol and tobacco."

Sample Essay Outline

Introduction

- Hook: Statistics on teen social media use and mental health
- Context: Current 13-year minimum and enforcement challenges
- Thesis: Your position clearly stated

Body Paragraph 1: Your Perspective

- Main argument with reasoning
- Specific example (e.g., comparison to driving licenses, international approaches)
- Address potential benefits/drawbacks

Body Paragraph 2: Analysis of Perspective 1 or 2

- Summarize the perspective fairly
- Identify strengths and weaknesses
- Explain how it relates to your position

Body Paragraph 3: Analysis of Another Perspective

- Consider counterarguments
- Show nuanced thinking
- Bridge to broader implications

Conclusion

- Synthesize arguments
- Broader significance for society
- Call to action or future considerations

Key Points to Address

For Perspective 1 (Raise to 16):

- Strengths: Brain development research, protection of vulnerable youth
- Weaknesses: Enforcement challenges, potential isolation of teens

For Perspective 2 (No restrictions):

- Strengths: Recognizes practical limitations, emphasizes education
- Weaknesses: May leave youngest children unprotected

For Perspective 3 (Parental control):

- Strengths: Respects family autonomy, acknowledges individual differences
- Weaknesses: Not all parents equipped to make informed decisions

High-Scoring Essay Characteristics

1. **Complexity**: Acknowledges that this issue has no perfect solution
2. **Specificity**: Uses concrete examples (specific platforms, research studies, comparable policies)
3. **Balance**: Fairly represents opposing views before critiquing them
4. **Sophistication**: Discusses broader implications for privacy, freedom, child development
5. **Clarity**: Maintains clear position while acknowledging nuance

Common Pitfalls to Avoid

- Simply summarizing perspectives without analysis
- Ignoring counterarguments
- Using only personal anecdotes without broader evidence
- Taking an extreme position without nuance
- Poor organization that jumps between ideas
- Grammatical errors that distract from content

Time Management Strategy

- **Minutes 0-5**: Plan and outline
- **Minutes 5-15**: Write introduction and first body paragraph
- **Minutes 15-25**: Write second and third body paragraphs
- **Minutes 25-35**: Write conclusion and add transitions
- **Minutes 35-40**: Proofread and polish

Score Interpretation

- **10-12**: Exceptional - Demonstrates sophisticated analysis and writing
- **8-9**: Effective - Competent handling of task with good development
- **6-7**: Adequate - Meets basic requirements but lacks depth
- **4-5**: Weak - Significant problems in multiple areas
- **2-3**: Very weak - Fails to address task appropriately

A competitive score would be 8 or above in each domain, with top schools often looking for 10+ scores.