FULL-LENGTH PRACTICE TESTS 3 - 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 Rise of Urban Beekeeping

Urban beekeeping has transformed from (1) a quirky hobby into a vital environmental movement. Across cities worldwide, rooftops and balconies have became (2) unexpected havens for honeybee colonies. This phenomenon represents more than just a trend; its (3) a response to declining bee populations and growing awareness of their crucial role in our food system.

The benefits of urban beekeeping extend farther then (4) honey production. City bees often thrive better than their rural counterparts, suffering from (5) fewer pesticide exposures and enjoying diverse food sources from urban gardens and parks. Research conducted in London (6) found that urban bees produced more honey per hive than rural bees, challenging assumptions about city environments.

[7] Getting started as an urban beekeeper requires careful preparation. First, prospective beekeepers must check local regulations, (8) many cities require permits or restrict hive placement. Training is essential; (9) most experienced beekeepers recommend taking a course before purchasing any equipment. The initial investment can be substantial (10) —a complete setup typically costs between $300 and $600 per hive.

Urban beekeepers face unique (11) challenges. Neighbors' (12) concerns about stings must be addressed through education and proper hive placement. [13] Some beekeepers install observation windows in their hives, allowing (14) visitors to safely watch the bees at work. This transparency helps build community support and, transforms (15) skeptics into advocates.

1. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. NO CHANGE

B. transformed, from

C. transformed from

D. changed from

2. The best placement for the underlined portion would be:

F. NO CHANGE

G. are becoming

H. have become

J. became

3. Which of the following alternatives to the underlined portion would be LEAST acceptable?

A. it's

B. its'

C. it is

D. NO CHANGE

4. The best placement for the underlined portion would be:

F. farther than

G. further then

H. further than

J. NO CHANGE

5. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. suffering

B. and suffer from

C. experiencing

D. suffering from

6. The best placement for the underlined portion would be:

F. Research conducted in London

G. Research, conducted in London

H. Research conducted in London,

J. Research, conducted in London,

7. Which of the following sentences, if inserted here, would most effectively introduce the topic of this paragraph?

A. Many people are afraid of bees.

B. Despite the benefits, urban beekeeping isn't without its challenges.

C. Urban beekeeping has become very popular.

D. Bees are essential pollinators.

8. The best placement for the underlined portion would be:

F. regulations;

G. regulations:

H. regulations

J. regulations,

9. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. Training is essential,

B. Training is essential—

C. Training is essential:

D. NO CHANGE

10. The best placement for the underlined portion would be:

F. can be, substantial

G. can be substantial,

H. can be substantial

J. can, be substantial

PASSAGE II: The Memory Palace Technique

For thousands of years, people have used the "memory palace" technique to remember vast amounts of information. This ancient method, also known as (11) the method of loci, involves associating information with specific locations in an imagined building. Modern neuroscience has validated (12) this technique, showing that it activates both spatial and verbal memory centers in the brain.

The technique's origins trace back to ancient Greece. According to legend, the poet Simonides had been attending (13) a banquet when he was called outside. Moments after he left, the roof collapsed, killing everyone inside and crushing (14) the bodies beyond recognition. Simonides was able to identify the victims by recalling where (15) each person had been seated, thus discovering the power of spatial memory.

[16] To create a memory palace, you first visualize a familiar location—your home, for instance. (17) Next, you place the items you want to remember at specific points along a path through this space. When you need to recall (18) the information, you mentally walk through your palace, "seeing" each item in its designated spot. The more vivid and unusual the mental images, the more likely (19) you are to remember them.

Champions of memory competitions (20) regularly use this technique to perform seemingly impossible feats. They can memorize the order of multiple shuffled card decks, hundreds of random digits, or the

names and faces (21) of dozens of strangers in minutes. [22] These achievements aren't due to exceptional natural memory but rather (23) to practiced technique and mental discipline.

Despite its effectiveness, the memory palace technique remains (24) underutilized in education. Some educators argue (25) that modern technology makes such techniques obsolete—why memorize when you can Google? However, research suggests that the act of memorization itself strengthens cognitive abilities and that having information readily available in memory enables deeper thinking and creativity.

11. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. NO CHANGE

B. which is also called

C. also known as

D. being known as

12. The best placement for the underlined portion would be:

F. Modern neuroscience, has validated

G. Modern neuroscience has validated

H. Modern, neuroscience has validated

J. Modern neuroscience has, validated

13. Which of the following alternatives to the underlined portion would be LEAST acceptable?

A. had been attending

B. was attending

C. attended

D. attends

14. The best placement for the underlined portion would be:

F. killing everyone inside and crushing

G. killing everyone inside, and crushing

H. killing everyone inside crushing

J. killing everyone inside; and crushing

15. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. remembering where

B. recalling where

C. recalled where

D. NO CHANGE

16. Which of the following sentences, if inserted here, would best introduce the main topic of this paragraph?

F. NO CHANGE (no sentence added)

G. Memory techniques have been studied for centuries.

H. Creating your own memory palace is surprisingly simple.

J. Ancient Greeks had excellent memories.

17. The best placement for the underlined portion would be:

A. for instance,

B. for instance—

C. for instance

D. for instance;

18. Which of the following alternatives to the underlined portion would NOT be acceptable?

F. When you need to recall

G. When needing to recall

H. When you needed to recall

J. To recall

19. The best placement for the underlined portion would be:

A. the more likely

B. the likelier

C. the more likelier

D. more likely

20. Which of the following alternatives to the underlined portion would be LEAST acceptable?

F. Champions of memory competitions

G. Memory competition champions

H. Champions, of memory competitions,

J. Memory champions

21. The best placement for the underlined portion would be:

A. or the names and faces

B. or, the names and faces

C. or the names, and faces

D. or the names and faces,

22. The writer is considering adding the following sentence here:

"One champion memorized 67,890 digits of pi."

Should the writer make this addition?

F. Yes, because it provides a specific example of memory feats.

G. Yes, because it explains the technique in detail.

H. No, because it disrupts the paragraph's flow.

J. No, because it contradicts earlier information.

23. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. but instead

B. but rather

C. but

D. and rather

24. The best placement for the underlined portion would be:

F. remained

G. is remaining

H. has remained

J. remains

25. Which of the following alternatives to the underlined portion would be LEAST acceptable?

A. Some educators argue

B. Some educators, argue

C. Some educators contend

D. Certain educators argue

PASSAGE III: The Chocolate Revolution

The transformation of chocolate from bitter medicine to beloved treat represents one of (26) history's most successful marketing campaigns. For thousands of years, the indigenous peoples of Central America consumed chocolate (27) as a bitter, spicy drink believed to have medicinal properties. Spanish conquistadors brought cacao to Europe in the 16th century, where it remained (28) an expensive luxury reserved for aristocracy.

The industrial revolution changed everything. In 1828, Dutch chemist Coenraad van Houten invented a process to remove cocoa butter from cacao beans, creating cocoa powder that mixed more easily (29) with water. This innovation, combined with (30) the addition of sugar and milk, made chocolate more palatable to European tastes. By the late 1800s, companies like Cadbury and Nestlé were mass-producing (31) chocolate bars for the growing middle class.

[32] Today's chocolate industry faces new challenges. Climate change threatens cacao crops, which can only grow within 20 degrees of the equator. Rising temperatures and unpredictable (33) rainfall patterns have reduced yields in traditional growing regions. Scientists are developing (34) drought-resistant cacao varieties, but these efforts take (35) years to show results.

Ethical concerns also plague (36) the industry. Child labor remains common on West African cacao farms, which produce roughly 70% (37) of the world's supply. [38] Fair trade certification programs attempt to address these issues by ensuring farmers receive living wages and prohibiting child labor. However, less than 5% of chocolate sold globally carries fair trade certification.

Despite these challenges, (39) chocolate consumption continues to rise worldwide. Consumers increasingly demand (40) high-quality dark chocolate with documented origins and ethical sourcing—a trend that has spawned a craft chocolate movement reminiscent of specialty coffee culture.

26. Which of the following alternatives to the underlined portion would NOT be acceptable?

F. represents one of

G. represent one of

H. is one of

J. constitutes one of

27. The best placement for the underlined portion would be:

A. consumed chocolate

B. consume chocolate

C. had consumed chocolate

D. were consuming chocolate

28. Which of the following alternatives to the underlined portion would be LEAST acceptable?

F. where it remained

G. where it had remained

H. where it remains

J. and there it remained

29. The best placement for the underlined portion would be:

A. mixed easier

B. mixed more easy

C. mixed more easily

D. mixes more easily

30. Which of the following alternatives to the underlined portion would NOT be acceptable?

F. This innovation, combined with

G. This innovation combined with

H. This innovation, combined, with

J. Combined with this innovation,

31. The best placement for the underlined portion would be:

A. was mass-producing

B. were mass-producing

C. mass-produced

D. had mass-produced

32. Which of the following sentences, if inserted here, would provide the best transition?

F. Chocolate has become very popular worldwide.

G. Many people love chocolate.

H. The modern chocolate industry is worth billions.

J. However, the sweet success story of chocolate has a bitter side.

33. The best placement for the underlined portion would be:

A. Rising temperatures and unpredictable

B. Rising temperatures, and unpredictable

C. Rising, temperatures and unpredictable

D. Rising temperatures and, unpredictable

34. Which of the following alternatives to the underlined portion would be LEAST acceptable?

F. Scientists are developing

G. Scientists develop

H. Scientists have been developing

J. Scientists, are developing

35. The best placement for the underlined portion would be:

A. these efforts take

B. these efforts are taking

C. these efforts takes

D. these efforts will take

PASSAGE IV: The Mathematics of Music

The relationship between mathematics and music extends back (36) to ancient civilizations. Pythagoras discovered that pleasing musical intervals correspond to simple mathematical ratios: an octave represents a 2:1 frequency ratio, while a perfect fifth equals (37) 3:2. These discoveries suggested that beauty in music might be (38) governed by mathematical principles.

Modern technology has revealed even deeper connections. Digital music files consist entirely of numbers representing sound waves. Audio engineers use (39) Fourier transforms—complex mathematical functions—to manipulate these waves, creating effects like reverb and compression. [40] Even the act of tuning an instrument involves mathematical precision: the standard A note vibrates at exactly 440 hertz.

Yet the mathematical nature (41) of music extends beyond technical applications. Composers have long used (42) mathematical concepts in their work. Bach embedded numerical patterns in his compositions, often using numbers that held (43) religious significance. Contemporary composers like Xenakis, who was also (44) a trained architect and mathematician, created pieces based entirely on mathematical formulas.

[45] Some educators advocate teaching mathematics through music, arguing that the subjects' shared (46) patterns and structures make them natural partners. Students who struggle with abstract mathematical concepts might grasp them (47) more easily when presented in musical contexts. However, critics worry

(48) that overemphasizing these connections could reduce music's emotional and cultural dimensions to mere calculations.

Despite ongoing debates, (49) the mathematical foundation of music remains undeniable. Whether we consciously recognize it or not, every melody we hear and rhythm we feel represents a complex (50) interplay of mathematical relationships.

36. Which of the following alternatives to the underlined portion would NOT be acceptable?

F. extends back

G. extended back

H. goes back

J. reaches back

37. The best placement for the underlined portion would be:

A. equals

B. is equaling

C. equaled

D. will equal

38. Which of the following alternatives to the underlined portion would be LEAST acceptable?

F. might be

G. may be

H. could be

J. might of been

39. The best placement for the underlined portion would be:

A. Audio engineers use

B. Audio engineers, use

C. Audio engineers are using

D. Audio engineer's use

40. The writer wants to add a sentence here to support the previous statement. Which would be most effective?

F. Many people enjoy listening to music.

G. This standardization allows musicians worldwide to play in harmony.

H. Instruments can be expensive.

J. Music theory is complicated.

41. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. Yet the mathematical nature

B. Yet, the mathematical nature

C. However, the mathematical nature

D. Still, the mathematical nature

42. The best placement for the underlined portion would be:

F. Composers have long used

G. Composers, have long used

H. Composers have long use

J. Composers had long used

43. Which of the following alternatives to the underlined portion would be LEAST acceptable?

A. numbers that held

B. numbers holding

C. numbers that hold

D. numbers that holded

44. The best placement for the underlined portion would be:

F. who was also

G. who were also

H. who is also

J. whom was also

45. Which transition would best connect this paragraph to the previous one?

A. These mathematical principles have educational implications.

B. Music is very mathematical.

C. Many people dislike math.

D. In conclusion, math and music are related.

46. The best placement for the underlined portion would be:

F. the subjects' shared

G. the subject's shared

H. the subjects shared

J. the subjects's shared

47. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. might grasp them

B. may grasp them

C. might grasped them

D. could grasp them

48. The best placement for the underlined portion would be:

F. However, critics worry

G. However critics worry

H. However, critics, worry

J. However critics, worry

49. Which of the following alternatives to the underlined portion would be LEAST acceptable?

A. Despite ongoing debates,

B. Despite ongoing debates;

C. In spite of ongoing debates,

D. Despite ongoing debates

50. The best placement for the underlined portion would be:

F. represents a complex

G. represent a complex

H. is representing a complex

J. have represented a complex

Mathematics

TIME: 50 minutes for 45 questions

DIRECTIONS: Each question has four answer choices. Choose the best answer for each question and shade the corresponding oval on your answer sheet.

1. A restaurant bill is $84 before tax. If the sales tax is 8% and the customer wants to leave a 20% tip on the pre-tax amount, what is the total amount the customer pays?

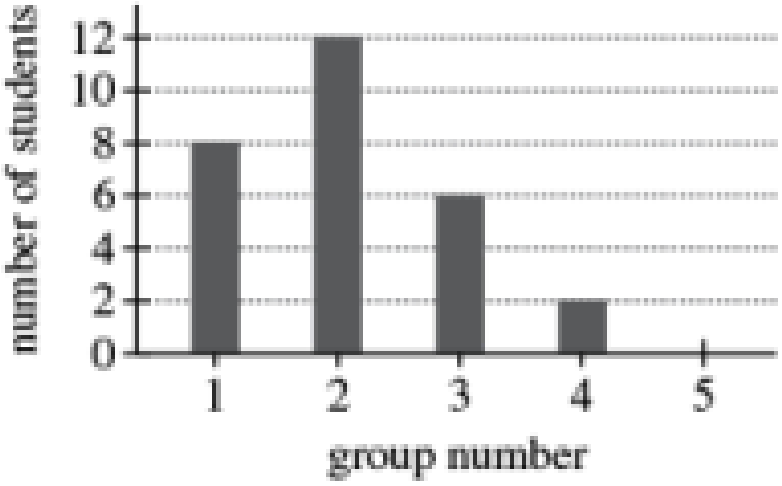
A. $95.76

B. $101.64

C. $105.84

D. $107.52

2. The graph shows the number of students who were present on Thursday from each of the 5 groups in Ms. Morgan's class. What is the probability that a student selected at random from the class on Thursday is in Group 4?



F. 1/28

G. 1/8

H. 1/6

J. 1/4

3. If $3x - 7 = 14$, what is the value of $2x + 5$?

A. 15

B. 19

C. 23

D. 27

4. A car travels 240 miles on 8 gallons of gas. At this rate, how many gallons would be needed to travel 360 miles?

F. 12

G. 14

H. 16

J. 18

5. What is 40% of 250?

A. 60

B. 80

C. 100

D. 125

6. Simplify: $2(3x - 4) - (x + 2)$

F. $5x - 6$

G. $5x - 8$

H. $5x - 10$

J. $7x - 10$

7. The average of 5 numbers is 24. If four of the numbers are 20, 22, 25, and 27, what is the fifth number?

A. 26

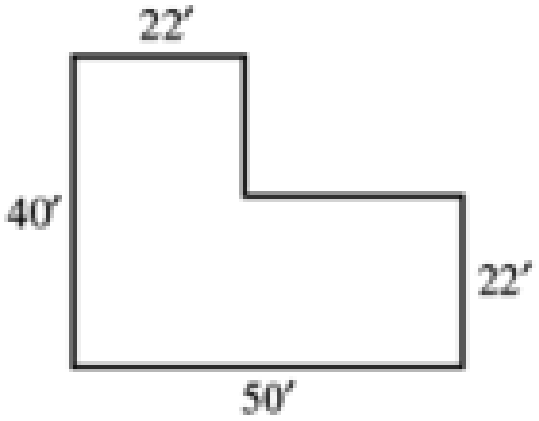
B. 28

C. 30

D. 32

8. The floor plan for an L-shaped storage building is shown with distances marked in feet. What is the floor area of the building, in square feet?

(Note: Walls in this building meet only at right angles.)



F. 190

G. 1,496

H. 504

J. 1,232

9. If 5^x = 125, what is the value of x?

A. 2

B. 2.5

C. 3

D. 3

10. A store offers a 25% discount on an item originally priced at $60. What is the sale price?

F. $15

G. $35

H. $40

J. $45

11. Which of the following is equivalent to √(48)?

A. 2√12

B. 4√3

C. 3√4

D. 6√2

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

F. 6

G. 8

H. 10

J. 14

13. Express 0.000045 in scientific notation:

A. 4.5 × 10^-6

B. 4.5 × 10^-4

C. 4.5 × 10^-5

D. 45 × 10^-6

14. If i = √(-1), what is i^3?

F. i

G. 1

H. -i

J. -1

15. What is the least common multiple of 12 and 18?

A. 36

B. 48

C. 54

D. 72

16. Factor completely: $x^2 - 9x + 18$

F. $(x - 2)(x - 9)$

G. $(x - 3)(x - 6)$

H. $(x - 1)(x - 18)$

J. $(x + 3)(x - 6)$

17. Solve for x: $2x^2 - 8x = 0$

A. $x = 0$ only

B. $x = 4$ only

C. $x = -4$ or $x = 0$

D. $x = 0$ or $x = 4$

18. Which expression is equivalent to $(3x^2y^3)^2$?

F. $6x^4y^6$

G. $9x^2y^6$

H. $6x^4y^5$

J. $9x^4y^6$

19. If $3x + 2y = 12$ and $x - y = 1$, what is the value of y?

A. 2

B. 3

C. 4

D. 5

20. What is the slope of the line passing through points (-2, 1) and (2, 3)?

F. 1/2

G. 2

H. -1/2

J. -2

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

A. 3

B. 7

C. 15

D. 19

22. Which of the following represents a function?

F. x^2 + y^2 = 25

G. x = y^2

H. y = 2x - 5

J. |y| = x

23. For the function g(x) = 3^x, what is g(0)?

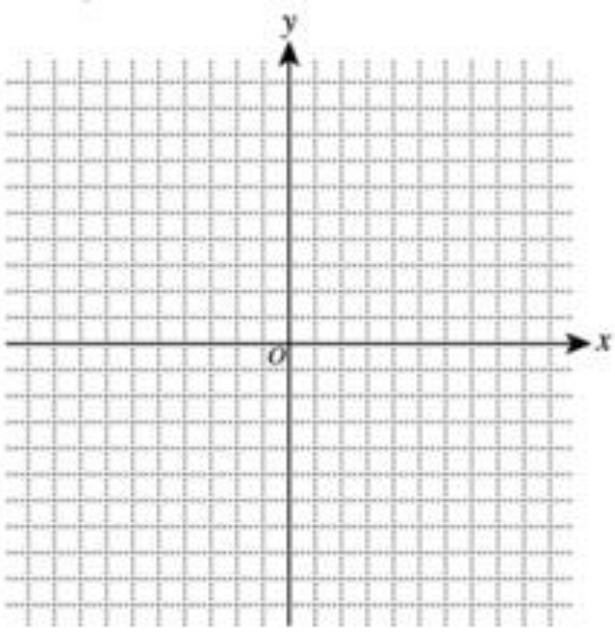
A. 1

B. 0

C. 3

D. undefined

24. Quadrilateral ABCD with vertices A(-2,0), B(0,4), C(5,5), and D(8,2) will be graphed in the standard (x,y) coordinate plane. Which of the following is a type of quadrilateral determined by these vertices?



F. Kite

G. Parallelogram

H. Trapezoid

J. Rectangle

25. If $h(x) = \sqrt{(x + 3)}$, what is the domain of h?

A. $x \geq 3$

B. $x \geq 0$

C. $x \leq -3$

D. $x \geq -3$

26. The inverse of $f(x) = 2x - 6$ is:

F. $f^{-1}(x) = x/2 - 3$

G. $f^{-1}(x) = (x - 6)/2$

H. $f^{-1}(x) = 2x + 6$

J. $f^{-1}(x) = (x + 6)/2$

27. For what value of x is $\log_2(x) = 3$?

A. 6

B. 8

C. 9

D. 16

28. Which function has a horizontal asymptote at y = 0?

F. f(x) = 2^x

G. f(x) = log(x)

H. f(x) = x^2

J. f(x) = √x

29. If f(x) = x + 3 and g(x) = x^2, what is (f ∘ g)(2)?

A. 11

B. 9

C. 7

D. 5

30. An exponential function passes through (0, 8) and (1, 4). Which equation represents this function?

F. y = 8(2)^x

G. y = 8(0.5)^x

H. y = 8(0.5)^x

J. y = 8 - 4x

31. A right triangle has legs of length 5 and 12. What is the length of the hypotenuse?

A. 13

B. 15

C. 17

D. 19

32. A circle has a radius of 6 cm. What is its area in square centimeters?

F. 12π

G. 36π

H. 72π

J. 144π

33. Two angles are supplementary. If one angle measures 115°, what is the measure of the other angle?

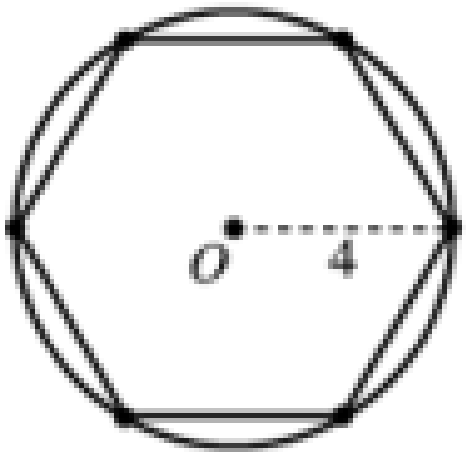
A. 25°

B. 45°

C. 55°

D. 65°

34. Shown is a regular hexagon inscribed in a circle whose radius is 4 inches. What is the perimeter, in inches, of the hexagon?



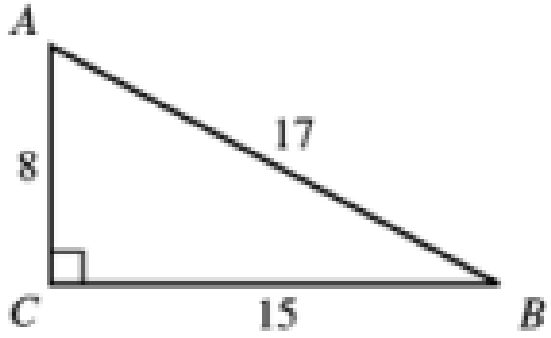
F. 8π

G. $12\sqrt{3}$

H. 18

J. 24

35. What is the value of tan A in right triangle ABC?



A. 8/15

B. 8/17

C. 15/17

D. 17/8

36. The volume of a rectangular prism is 120 cubic inches. If its length is 5 inches and width is 4 inches, what is its height?

F. 6 inches

G. 7 inches

H. 8 inches

J. 10 inches

37. What is the distance between points (1, 2) and (4, 6)?

A. 3

B. 4

C. 5

D. 7

38. If triangles ABC and DEF are similar with AB = 4, BC = 6, DE = 6, what is EF?

F. 8

G. 7.5

H. 9

J. 10

39. What is the surface area of a cube with edge length 4 cm?

A. 96 cm^2

B. 64 cm^2

C. 48 cm^2

D. 24 cm^2

40. In a 30-60-90 triangle, if the shortest side is 3, what is the length of the hypotenuse?

F. $3\sqrt{2}$

G. 6

H. $3\sqrt{3}$

J. 9

41. The mean of the dataset {4, 7, 9, 10, 15} is:

A. 7

B. 8

C. 8.5

D. 9

42. A box plot shows: minimum at 2, Q1 at 5, median at 8, Q3 at 12, maximum at 18. What is the interquartile range?

F. 6

G. 10

H. 13

J. 7

43. If you roll a fair six-sided die, what is the probability of rolling a number greater than 4?

A. 1/6

B. 1/3

C. 1/2

D. 2/3

44. A bag contains 3 red, 4 blue, and 5 green marbles. What is the probability of drawing a blue marble?

F. 1/3

G. 1/4

H. 5/12

J. 7/12

45. The standard deviation of the dataset {2, 4, 6, 8, 10} is:

A. 2

B. $\sqrt{6}$

C. $2\sqrt{2}$

D. 3

Reading

TIME: 40 minutes for 36 questions

DIRECTIONS: Answer each question based on what is stated or implied in the passage and shade the corresponding oval on your answer sheet.

PASSAGE I

LITERARY NARRATIVE: This passage is adapted from an original short story about a family's weekend tradition.

Every Saturday morning at precisely seven o'clock, my grandfather would knock three times on my bedroom door—never twice, never four times, always three sharp raps that pulled me from whatever dream I was inhabiting. "Time for the market," he'd announce through the door, his voice carrying the same gentle authority it had carried for all of my sixteen years.

The Farmers' Market wasn't just a place where we bought vegetables. It was our stage, our weekly performance, though Grandfather never would have described it that way. He was too practical, too rooted in the earth to acknowledge the theater of it all. But I saw it—the way he'd straighten his shoulders before approaching Mrs. Chen's tomato stand, how he'd sample Mr. Rodriguez's honey with the solemnity of a wine connoisseur, the particular smile he reserved for the flower vendor who always tucked a free sprig of lavender into his purchase.

This Saturday was different, though neither of us acknowledged it at first. In two weeks, I'd be leaving for college—three thousand miles away, a distance that felt both thrilling and treacherous. Grandfather moved through the market with his usual purposeful stride, but I noticed things I'd overlooked before: the slight tremor in his left hand as he reached for his wallet, the way he had to squint now to read the price signs, how he sometimes paused mid-sentence as if searching for a word that had temporarily escaped him.

At the herb stand, he began our ritual. "Close your eyes," he instructed, crushing basil leaves between his weathered fingers and holding them beneath my nose. "What do you smell?"

"Summer," I said automatically, the response I'd been giving since I was seven.

"No," he said, and for the first time in nine years, he corrected me. "That's memory you're smelling. The basil is just the key that unlocks it."

We walked in silence to the next stand, where pyramids of peaches glowed like small suns. Mrs. Torres, who had run this stand since before I was born, watched us approach with knowing eyes. "The last summer before college?" she asked me, and when I nodded, she selected three peaches with extraordinary care, turning each one to check for imperfections before placing them in a paper bag.

"These are for remembering," she said, refusing Grandfather's money with a wave of her hand. "Some things shouldn't be bought."

Grandfather accepted the gift with a formal nod, the kind of gesture I'd seen him make only at funerals and weddings—moments of significant transition. We continued through the market, but the rhythm was broken. He forgot to haggle with the mushroom vendor, didn't sample the new batch of pickles, walked past the honey stand without stopping.

It wasn't until we reached the parking lot that he spoke again. "Your grandmother loved peaches," he said, though I already knew this. She'd been gone for five years, but her absence still shaped our Saturdays like a shadow. "She used to say they tasted like possibility."

"What do they taste like to you?" I asked.

He considered this for so long I thought he wouldn't answer. Then, loading our bags into the truck with the same careful precision he brought to everything, he said, "Time. They taste like time."

On the drive home, I watched the familiar streets blur past and tried to imagine next year's Saturdays—Grandfather at the market alone, maintaining the ritual without me. Would he still buy the extra bunch of cilantro I always insisted on? Would he remember to check if the blueberries were organic, the way Mom preferred?

"I'll be back for Thanksgiving," I said, needing to fill the silence.

"The market will be different then," he replied. "Winter vegetables. No peaches."

But we both knew he wasn't really talking about produce. He was talking about the space I would leave behind, the rhythm I would break by leaving. Some things, once changed, could never return to their original form.

As we pulled into the driveway, he turned off the engine but didn't move to get out. "Every ending is also a beginning," he said, his hands still gripping the steering wheel. "Your grandmother taught me that."

I wanted to tell him that I'd still come to the market when I was home, that we'd maintain our tradition despite the distance. But sitting there in the truck, surrounded by the earthy smell of our purchases and the weight of approaching change, I understood that making promises about the future was another kind of lie. Instead, I reached over and squeezed his shoulder—three times, like his morning knock. Never twice, never four.

1. The narrator's attitude toward the weekly market trips can best be described as:

A. resentful obligation

B. appreciative awareness

C. casual indifference

D. anxious uncertainty

2. The grandfather's statement that the narrator smells "memory" rather than "summer" in the basil suggests that he:

F. has lost his sense of smell

G. is correcting a botanical error

H. recognizes the connection between scent and remembrance

J. disapproves of the narrator's response

3. Mrs. Torres's gift of peaches without accepting payment indicates:

A. she cannot afford to run her business properly

B. the grandfather is a preferred customer

C. she understands the significance of this particular market day

D. peaches are too overripe to sell

4. The phrase "her absence still shaped our Saturdays like a shadow" (lines 44-45) most nearly means:

F. the grandmother's death continues to influence their market routine

G. they shop in darker areas of the market

H. they avoid talking about the grandmother

J. Saturday mornings are gloomy without her

5. The grandfather's observation that peaches taste like "time" suggests he:

A. associates them with the passing of life and seasons

B. thinks they're too old to eat

C. prefers other fruits

D. has lost his sense of taste

6. The narrator notices new details about the grandfather, including all of the following EXCEPT:

F. a tremor in his left hand

G. his need to squint at price signs

H. pauses while searching for words

J. his refusal to try new foods

7. The significance of "three times" in both the morning knock and the final shoulder squeeze represents:

A. a lucky number in their family

B. the three family members

C. a random coincidence

D. a meaningful pattern of connection

8. The passage suggests that the grandfather views the upcoming change as:

F. an exciting opportunity

G. an inevitable transition requiring acceptance

H. a betrayal of family tradition

J. completely unimportant

9. The narrator's decision not to make promises about the future indicates:

A. anger at the grandfather

B. recognition that change is unavoidable

C. plans to never return home

D. inability to speak honestly

PASSAGE II

SOCIAL SCIENCE: This passage is adapted from an essay about urban planning and community development.

The concept of "third places" in urban sociology refers to social environments separate from the two usual social environments of home ("first place") and workplace ("second place"). Coined by sociologist Ray Oldenburg in his 1989 book "The Great Good Place," the term describes locations where people gather to relax, socialize, and build community connections outside the demands of work and domestic life. Coffee shops, barbershops, pubs, parks, and community centers serve as these vital third places, functioning as the heart of community social life and democratic engagement.

The decline of third places in American suburbs represents one of the most significant yet underexamined shifts in social infrastructure over the past half-century. As suburban development prioritized automobile-dependent design and single-family homes on large lots, the informal gathering spaces that had characterized earlier American communities—the general store, the town square, the corner tavern—gradually disappeared. This architectural and planning shift has contributed to what Robert Putnam termed the decline of "social capital," the networks of relationships that enable society to function effectively.

Research indicates that communities with abundant third places demonstrate higher levels of civic engagement, improved mental health outcomes, and stronger local economies. A 2018 study of neighborhoods in Chicago found that blocks with at least one established third place showed 23% higher voter turnout and 31% more participation in community organizations compared to similar blocks without such spaces. Residents reported feeling more connected to their neighbors and more invested in local issues.

The economic benefits of third places extend beyond their direct commercial activity. These spaces function as "social infrastructure," a term coined by sociologist Eric Klinenberg to describe the physical places and organizations that shape social interactions. When third places thrive, they create what urban planners call "positive externalities"—benefits that spill over to surrounding businesses and properties. A vibrant coffee shop doesn't just sell coffee; it increases foot traffic, raises property values, provides an informal meeting space for freelancers and entrepreneurs, and creates a node of community activity that makes the entire neighborhood more desirable.

Yet the economics of maintaining third places has become increasingly challenging. Rising commercial rents, particularly in gentrifying urban areas, force out long-established gathering spots. Chain stores and franchises, while sometimes serving as third places, often lack the local character and ownership that foster deep community connections. The COVID-19 pandemic accelerated these pressures, with many independent coffee shops, bookstores, and bars—the backbone of third place infrastructure—closing permanently.

Digital technology presents both challenges and opportunities for third places. While online communities and remote work reduce some people's need for physical gathering spaces, they've also created new demands for in-person connection. The rise of co-working spaces, though primarily serving economic functions, demonstrates hunger for shared environments that combat the isolation of remote work. Some libraries have reimagined themselves as community living rooms, offering not just books but gathering spaces, maker labs, and social programs.

The design of effective third places requires careful attention to what Oldenburg called "the problem of place." Successful third places share several characteristics: they're accessible and accommodating to all, they're spaces where conversation is the primary activity, they have "regulars" who help establish the space's character, they maintain a playful mood, and they function as a "home away from home." Crucially, third places must be "neutral ground" where individuals can gather and interact without social, economic, or political barriers.

Some cities have begun explicitly incorporating third place planning into their development strategies. Barcelona's "superblock" initiative reclaims street space for pedestrian use, creating new informal gathering areas. Paris's "15-minute city" concept ensures residents can access work, shopping, education, healthcare, and leisure activities—including third places—within a short walk or bike ride. These planning approaches recognize that third places aren't luxuries but essential infrastructure for community wellbeing.

10. According to the passage, "third places" are primarily defined as:

F. workplaces with social atmospheres

G. homes where people gather frequently

H. social environments separate from home and work

J. online communities and digital spaces

11. The passage suggests that the decline of third places in American suburbs resulted from:

A. economic recession

B. changing cultural values

C. automobile-dependent design and housing patterns

D. government regulations

12. The Chicago study found that neighborhoods with third places showed:

F. 23% higher voter turnout

G. 31% higher property values

H. 23% more coffee shops

J. 31% less crime

13. The term "social infrastructure" as used in the passage refers to:

A. physical places and organizations that shape social interactions

B. roads and transportation systems

C. government welfare programs

D. internet and communication networks

14. According to the passage, chain stores and franchises as third places often lack:

F. adequate parking

G. sufficient customers

H. proper licensing

J. local character and ownership

15. The passage indicates that successful third places must be all of the following EXCEPT:

A. accessible and accommodating

B. focused on conversation

C. neutral ground without barriers

D. expensive and exclusive

16. The "15-minute city" concept mentioned in the passage aims to:

F. reduce traffic congestion

G. ensure residents can access essential services within a short distance

H. eliminate the need for automobiles entirely

J. increase property tax revenue

17. The author's attitude toward digital technology's impact on third places is best described as:

A. entirely negative

B. recognizing both challenges and opportunities

C. completely optimistic

D. dismissive and unconcerned

18. The passage suggests that cities treating third places as "essential infrastructure" view them as:

F. profitable business ventures

G. tourist attractions

H. necessary for community wellbeing

J. temporary solutions to urban problems

PASSAGE III

HUMANITIES: This passage is about the evolution of documentary photography as an art form.

Documentary photography occupies a complex position between art and journalism, creativity and truth-telling, aesthetic vision and social responsibility. While photojournalism seeks to capture news events as they unfold, documentary photography takes a longer view, exploring subjects in depth over extended periods to reveal larger truths about human experience and social conditions. This distinction, though sometimes blurry, fundamentally shapes how we understand and evaluate documentary work.

The tradition emerged in the late 19th century as camera technology became portable enough to venture beyond studios. Jacob Riis's flash photographs of New York tenements in the 1880s shocked middle-class audiences with their revelation of urban poverty. Yet Riis's work raises questions that still haunt documentary photography: Did his sometimes staged scenes and reinforcement of stereotypes serve or exploit his subjects? Can documentary photography effect social change without reducing complex humans to symbols of social problems?

Lewis Hine's photographs of child laborers in the early 1900s demonstrated documentary photography's reformist potential. Working for the National Child Labor Committee, Hine created images that were both aesthetically powerful and politically effective, contributing to legislation protecting children from industrial exploitation. His approach—gaining trust, showing dignity even in difficult circumstances, allowing subjects to maintain their individuality—established ethical standards that influence documentary photographers today.

The Farm Security Administration (FSA) project during the Great Depression marked documentary photography's golden age. Photographers including Walker Evans, Dorothea Lange, and Gordon Parks created an archive of American life during economic crisis. Lange's "Migrant Mother" became perhaps the most famous photograph in American history, yet the image's power raises uncomfortable questions: Florence Owens Thompson, the subject, later expressed resentment that her image was used without her consent and that she never benefited from its fame.

This tension between photographer and subject, between artistic vision and ethical responsibility, intensified as documentary photography evolved. Diane Arbus's portraits of people on society's margins—circus performers, nudists, people with developmental disabilities—divided critics. Some saw profound empathy and shared humanity; others detected voyeurism and exploitation. Susan Sontag argued that photography is inherently "an act of aggression," turning subjects into objects for consumption.

Contemporary documentary photographers navigate an even more complex ethical landscape. In an era of digital manipulation and "fake news," they must balance aesthetic choices with credibility. The tradition of black-and-white photography, once a technical necessity, now represents an aesthetic choice that can romanticize harsh realities. Color can seem too commercial or cheerful for serious subjects, yet also more honest to lived experience.

Sebastião Salgado's sweeping documentation of global labor, migration, and environmental destruction demonstrates documentary photography's continued relevance and evolution. His dramatic, formally beautiful images of human suffering prompt debate: Does aesthetic beauty honor or exploit tragedy? Can gorgeous photographs of misery inspire action or merely satisfy viewers' appetite for exotic suffering?

The digital age has democratized documentary photography while challenging its authority. Citizen journalists with smartphones document police violence, natural disasters, and social movements with immediacy that professional photographers cannot match. Yet this flood of images also creates what critic Fred Ritchin calls "hyperphotography"—so many images that individual photographs lose their power to shock or inspire change.

Some documentary photographers have responded by embracing collaboration and long-term engagement. Jim Goldberg's "Rich and Poor" includes handwritten comments from subjects on their portraits, giving them voice in their representation. Wendy Ewald teaches photography to children in communities she documents, making them co-creators rather than subjects. These approaches acknowledge photography's power dynamics while seeking more equitable methods.

The future of documentary photography likely lies not in choosing between art and activism, beauty and truth, but in acknowledging these tensions as productive rather than problematic. The most powerful documentary work often emerges from photographers who embrace complexity rather than seeking simple narratives, who question their own position while maintaining commitment to bearing witness.

19. The passage primarily distinguishes documentary photography from photojournalism by:

A. the quality of cameras used

B. the photographer's training

C. documentary photography's extended exploration of subjects

D. photojournalism's artistic superiority

20. The author mentions Jacob Riis's work to illustrate:

F. early questions about ethics in documentary photography

G. the superiority of staged photographs

H. the irrelevance of social reform

J. technical innovations in flash photography

21. According to the passage, Lewis Hine's approach to photography emphasized:

A. maintaining subjects' dignity and individuality

B. shocking audiences with graphic images

C. avoiding all political involvement

D. focusing purely on aesthetic beauty

22. The passage suggests that Florence Owens Thompson's reaction to "Migrant Mother" reveals:

F. her gratitude for fame

G. the photographer's generosity

H. her love of photography

J. problems with consent and benefit in documentary photography

23. Susan Sontag's view that photography is "an act of aggression" suggests that:

A. photographers should use force

B. cameras are weapons

C. all photography is violent

D. photography turns subjects into objects

24. The passage indicates that the choice between black-and-white and color photography involves:

F. only technical considerations

G. aesthetic and ethical implications

H. financial constraints only

J. random preference

25. The term "hyperphotography" as used in the passage refers to:

A. extremely high-quality images

B. overwhelming quantity of images that reduces individual impact

C. photographs taken from great heights

D. digitally manipulated images

26. Contemporary collaborative approaches to documentary photography, as described in the passage:

F. completely eliminate ethical concerns

G. make photography impossible

H. acknowledge power dynamics while seeking equity

J. require expensive equipment

27. The author's perspective on tensions in documentary photography is that they are:

A. problems that must be eliminated

B. irrelevant to modern practice

C. productive and should be acknowledged

D. purely theoretical concerns

PASSAGE IV

NATURAL SCIENCE: This passage examines recent discoveries about plant communication systems.

Plants, long considered passive organisms responding only to environmental stimuli, are now understood to possess sophisticated communication networks that rival those of animals in complexity. Through chemical signals, electrical impulses, and fungal networks, plants share information about threats, coordinate defense strategies, and even nurture their offspring—behaviors that challenge our fundamental assumptions about consciousness, intelligence, and the nature of communication itself.

The discovery of plant communication began with observations of seemingly impossible phenomena. When giraffes browse acacia trees in African savannas, nearby acacias—even those untouched—begin producing toxic tannins within minutes. This synchronized defense suggested information transfer between trees. Researchers discovered that damaged acacias release ethylene gas, which drifts to neighboring trees and triggers tannin production. This airborne warning system allows trees to mount defenses before herbivores arrive.

Underground, an even more sophisticated network operates. The "wood wide web," as scientists have dubbed it, consists of mycorrhizal fungi that form symbiotic relationships with plant roots. These fungal threads, or hyphae, connect individual plants in vast networks that can span entire forests. Through these fungal highways, plants exchange not just nutrients but information. A Douglas fir attacked by bark beetles can send chemical warnings through the network, prompting connected trees to produce defensive enzymes.

Research by forest ecologist Suzanne Simard revealed that these networks exhibit remarkable discrimination and resource allocation. Mother trees—the largest, oldest trees in forests—act as hubs, connected to hundreds of younger trees. Using isotope tracking, Simard demonstrated that mother trees funnel nutrients to their offspring, even reducing their own root competition to make room for their seedlings. When mother trees are dying, they dump their carbon reserves into the network, essentially bequeathing resources to the next generation.

This apparent altruism complicates traditional evolutionary theory, which emphasizes individual competition. However, kin selection theory offers an explanation: by supporting related individuals who share their genes, mother trees indirectly ensure their genetic survival. The fungal networks themselves benefit from healthy, diverse forests that provide more carbon through photosynthesis, creating a complex web of mutual benefit that transcends simple competition.

Plants also communicate through electrical signals remarkably similar to those in animal nervous systems. When a leaf is damaged, electrical impulses travel through the plant at about one-third of an inch per second—slow compared to animal neurons but rapid for an organism without a nervous system. These signals trigger systemic responses: distant leaves begin producing defensive chemicals, stomata close to conserve water, and growth patterns shift to compensate for damage.

The Venus flytrap demonstrates the sophistication of plant electrical signaling. The trap requires two trigger hair touches within twenty seconds to close—essentially counting and timing stimuli to avoid wasting energy on false alarms like raindrops. This computation happens without a brain or nervous system, raising profound questions about the nature of information processing and decision-making.

Recent research has identified even more subtle forms of plant communication. Plants emit and detect sound waves, though at frequencies beyond human hearing. Corn roots produce clicking sounds at 220 hertz, and young roots grow toward similar frequencies, suggesting acoustic communication guides root development. Some flowers produce ultrasonic vibrations that may communicate with pollinators beyond simple visual and chemical attraction.

The implications of plant communication extend beyond biology to agriculture and conservation. Industrial farming practices that emphasize monocultures and chemical inputs may disrupt these natural communication networks. Some researchers advocate for "plant-intelligent" agriculture that maintains fungal networks, preserves mother trees, and allows plants to coordinate natural pest defenses. Forest management strategies increasingly recognize that clear-cutting destroys not just trees but information networks accumulated over centuries.

Critics argue that terms like "communication," "intelligence," and "altruism" anthropomorphize plants, attributing human characteristics to unconscious chemical and physical processes. They contend that what appears to be communication is merely automatic response to stimuli, no different from a thermostat adjusting temperature. The debate touches fundamental questions: What constitutes communication? Can intelligence exist without consciousness? Where do we draw lines between life forms?

28. The passage primarily challenges the traditional view that plants are:

F. passive organisms with limited responses

G. more intelligent than animals

H. completely independent of each other

J. conscious beings with thoughts

29. According to the passage, acacia trees warn neighbors of giraffe browsing through:

A. ethylene gas release

B. underground root contact

C. ultrasonic vibrations

D. visual signals

30. The "wood wide web" described in the passage consists of:

F. plant roots directly touching

G. airborne chemical signals

H. electrical cables

J. mycorrhizal fungi networks

31. Suzanne Simard's isotope tracking research demonstrated that mother trees:

A. compete aggressively with offspring

B. ignore younger trees entirely

C. randomly distribute nutrients

D. preferentially support their offspring

32. The passage suggests that mother trees' support of offspring can be explained by:

F. conscious parental love

G. kin selection theory

H. random chance

J. human intervention

33. The Venus flytrap's requirement for two trigger touches within twenty seconds demonstrates:

A. random behavior

B. ability to count and time stimuli

C. poor sensitivity

D. constant readiness to close

34. According to the passage, plant electrical signals travel at approximately:

F. the speed of light

G. the same speed as animal neurons

H. one-third of an inch per second

J. one mile per hour

35. The passage indicates that industrial farming practices may:

A. enhance plant communication

B. have no effect on plant networks

C. disrupt natural communication networks

D. only affect soil quality

36. Critics of plant communication research argue that:

F. anthropomorphic terms incorrectly attribute human characteristics to plants

G. plants are more intelligent than claimed

H. no research supports these claims

J. communication requires technology

Science (Optional)

TIME: 40 minutes for 40 questions

DIRECTIONS: Choose the best answer and shade in the corresponding oval on your answer sheet.

PASSAGE I

Scientists studied the relationship between soil pH and nutrient availability for plant growth.

Experiment 1

Researchers tested nutrient availability at different soil pH levels by growing tomato plants in controlled conditions for 8 weeks.

Table 1: Nutrient Availability (% of maximum)

pH Level	Nitrogen	Phosphorus	Potassium	Iron	Plant Height (cm)
4.5	20	15	35	85	12
5.5	45	35	60	70	28
6.5	85	80	85	40	45
7.0	90	85	90	25	48
7.5	85	75	88	15	42
8.5	60	40	85	5	25

Experiment 2

The same species was grown with pH adjusted weekly versus constant pH.

Table 2: Growth Comparison

Treatment	Initial pH	Final pH	Average Height (cm)	Fruit Yield (g)
Constant pH	6.5	6.5	45	340
Weekly adjusted	6.5	6.5	52	410
Constant pH	7.0	7.0	48	360
Weekly adjusted	7.0	7.0	55	435

1. According to Table 1, at which pH is phosphorus availability highest?

A. 6.5

B. 7.5

C. 7.0

D. 8.5

2. Based on Table 1, as pH increases from 4.5 to 8.5, iron availability:

F. Increases continuously

G. Decreases continuously

H. Remains constant

J. First increases then decreases

3. At which pH did plants achieve maximum height?

A. 7.0

B. 6.5

C. 7.5

D. 5.5

4. Comparing Tables 1 and 2, weekly pH adjustment resulted in approximately what percentage increase in fruit yield at pH 7.0?

F. 10%

G. 15%

H. 18%

J. 21%

5. Based on the data, optimal pH for overall plant growth appears to be:

A. 5.5

B. 6.0

C. 6.5

D. 7.0

6. The relationship between pH and nitrogen availability shows:

F. Peak availability around pH 7.0

G. Linear increase with pH

H. Linear decrease with pH

J. No clear pattern

7. If a farmer's soil has pH 5.0, which nutrient would be most limited?

A. Iron

B. Phosphorus

C. Potassium

D. All equally limited

PASSAGE II

Researchers investigated factors affecting the flight distance of paper airplanes.

Experiment 1

Students tested different wing designs with constant paper weight (80 g/m²) and launch angle (0°).

Table 3: Wing Design Performance

Wing Type	Wing Area (cm²)	Aspect Ratio	Flight Distance (m)	Flight Time (s)
Delta	120	2.0	8.5	2.1
Dart	100	4.0	12.3	2.8
Glider	140	6.0	15.7	4.2
Swept	130	3.5	11.2	3.0

Experiment 2

Using the glider design, students varied launch angle.

Table 4: Launch Angle Effects

Launch Angle (degrees)	Flight Distance (m)	Maximum Height (m)
-10	8.2	0.5
0	15.7	2.1
10	14.3	3.5
20	11.8	4.8
30	9.1	5.5
45	6.3	5.9

Experiment 3

Using glider design at 0° launch angle, students tested different paper weights.

Table 5: Paper Weight Effects

Paper Weight (g/m²)	Flight Distance (m)	Flight Speed (m/s)
60	13.2	4.1
70	14.8	4.5
80	15.7	4.9
90	14.1	5.3
100	12.5	5.8

8. According to Table 3, which design feature correlates most strongly with flight distance?

F. Wing area

G. Wing type name

H. Aspect ratio

J. All equally

9. Based on Table 4, the optimal launch angle for maximum distance is:

A. -10°

B. 10°

C. 0°

D. 20°

10. As launch angle increases from 0° to 45°, flight distance:

F. Increases continuously

G. Decreases continuously

H. Remains constant

J. First increases then decreases

11. According to Table 5, which paper weight produces the longest flight?

A. 80 g/m²

B. 70 g/m²

C. 90 g/m²

D. 60 g/m²

12. The relationship between paper weight and flight speed shows:

F. No correlation

G. Inverse relationship

H. Direct relationship

J. Positive correlation

13. Based on all three experiments, to maximize flight distance one should use:

A. Delta wing, 45° angle, 100 g/m² paper

B. Dart wing, 0° angle, 60 g/m² paper

C. Swept wing, 20° angle, 80 g/m² paper

D. Glider wing, 0° angle, 80 g/m² paper

14. Comparing maximum height and flight distance in Table 4 reveals:

F. They are directly proportional

G. They are inversely related

H. Maximum height peaks at higher angles than optimal distance

J. No relationship exists

PASSAGE III

Four scientists propose theories about the extinction of dinosaurs 66 million years ago.

Scientist 1

The Chicxulub asteroid impact in Mexico's Yucatan Peninsula caused the mass extinction. The 10-kilometer-wide asteroid created a 180-kilometer crater and ejected billions of tons of debris into the atmosphere. This debris blocked sunlight for months, causing photosynthesis to cease and global temperatures to plummet. The food chain collapsed from the bottom up, killing first plants, then herbivores, then carnivores. Evidence includes a global iridium layer (rare on Earth but common in asteroids) at the extinction boundary and shocked quartz crystals indicating extreme impact pressure.

Scientist 2

While the asteroid impact occurred, massive volcanism in India's Deccan Traps was the primary cause. These eruptions released enormous amounts of sulfur dioxide and carbon dioxide over 800,000 years. Sulfur dioxide caused acid rain and short-term cooling, while CO_2 led to long-term warming. This climate instability stressed ecosystems already weakened by volcanic toxins. The asteroid impact was merely the final blow to already declining populations. Evidence shows dinosaur diversity was decreasing for millions of years before the impact.

Scientist 3

Neither impact nor volcanism alone explains the selective extinction pattern. Marine regression (sea level drop) reduced coastal habitats and continental shelf area by 50%. This eliminated breeding grounds for marine reptiles and disrupted ocean currents, altering global climate patterns. Combined environmental stresses from multiple sources created extinction conditions. Mammals survived because of their small size, lower food requirements, and ability to burrow for shelter. Large dinosaurs couldn't adapt quickly enough to rapid environmental changes.

Scientist 4

Disease pandemics caused by newly evolved pathogens drove dinosaurs extinct. As continents drifted together in the late Cretaceous, previously isolated dinosaur populations mixed, exposing them to new diseases. Their immune systems couldn't adapt quickly enough. Birds survived because they evolved stronger immune responses. The asteroid impact and volcanism occurred but affected already diseased populations. Fossil evidence shows bone lesions and growth abnormalities consistent with chronic infections in late Cretaceous dinosaurs.

15. Scientist 1's primary evidence for the impact theory includes:

A. Volcanic rocks

B. Global iridium layer and shocked quartz

C. Sea level measurements

D. Diseased bones

16. According to Scientist 2, the asteroid impact:

F. Never occurred

G. Was the sole cause of extinction

H. Was the final blow to weakened populations

J. Had no effect

17. Scientist 3 attributes mammal survival to all of the following EXCEPT:

A. Small size

B. Lower food requirements

C. Superior intelligence

D. Ability to burrow

18. Which scientists acknowledge the asteroid impact occurred?

F. Scientists 1 and 2 only

G. All four scientists

H. Scientists 1, 2, and 4 only

J. Scientist 1 only

19. The main disagreement between Scientists 1 and 2 concerns:

A. Whether the asteroid impact was primary or secondary

B. Whether dinosaurs existed

C. The date of extinction

D. Whether volcanism occurred

20. Scientist 4's disease theory could be tested by examining fossils for:

F. Iridium content

G. Volcanic ash

H. Size variations

J. Pathogen damage patterns

21. Scientists 2 and 3 would most likely agree that:

A. Disease was the main cause

B. The asteroid never hit Earth

C. Single causes cannot explain the extinction

D. Multiple environmental stresses contributed

PASSAGE IV

Chemists studied reaction rates of hydrogen peroxide decomposition with various catalysts.

Experiment 1

Equal amounts of different catalysts were added to 50 mL of 3% H_2O_2 solution at 25°C. Oxygen gas production was measured.

Table 6: Catalyst Efficiency

Catalyst	O_2 Produced in 5 min (mL)	Reaction Complete (min)
None	2	>60
MnO_2	112	8
Fe_2O_3	68	15
CuO	45	22
Catalase enzyme	148	3
KI	89	12

Experiment 2

Using MnO_2, temperature effects were tested.

Table 7: Temperature Dependence

Temperature (°C)	Initial Rate (mL/min)	Total O_2 Produced (mL)
10	8	112
20	18	112
30	35	112
40	52	112
50	71	112

Experiment 3

Concentration effects were tested with MnO_2 at 25°C.

Table 8: Concentration Effects

H_2O_2 Concentration (%)	O_2 Produced (mL)	Reaction Time (min)
1	37	8
2	75	8
3	112	8
4	150	8
5	187	8

22. According to Table 6, the most effective catalyst is:

F. Catalase enzyme

G. MnO_2

H. KI

J. Fe_2O_3

23. In Experiment 2, increasing temperature from 10°C to 50°C:

A. Decreases total oxygen produced

B. Increases reaction rate but not total yield

C. Has no effect

D. Decreases reaction rate

24. The relationship between H_2O_2 concentration and O_2 produced is:

F. Inverse

G. Exponential

H. Linear

J. Logarithmic

25. Based on Table 6, reaction without catalyst compared to with MnO_2 is approximately:

A. 10 times slower

B. 30 times slower

C. 56 times slower

D. 100 times slower

26. Temperature's effect on reaction rate follows which pattern?

F. Linear decrease

G. Approximately exponential increase

H. No pattern

J. Step function

27. If 6% H_2O_2 were tested in Experiment 3, expected O_2 production would be approximately:

A. 225 mL

B. 200 mL

C. 190 mL

D. 250 mL

28. Comparing all experiments, which factor does NOT affect total oxygen yield?

F. Catalyst type

G. H_2O_2 concentration

H. Solution volume

J. Temperature (with catalyst)

PASSAGE V

Ecologists studied predator-prey dynamics in a closed ecosystem.

Study 1

Rabbit and fox populations were monitored over 10 years.

Table 9: Population Cycles

Year	Rabbit Population	Fox Population	Vegetation Cover (%)
1	500	20	85
2	800	25	78
3	1200	35	65
4	900	50	60
5	400	45	72
6	350	30	80
7	450	22	83
8	700	24	79
9	1100	32	68
10	950	48	62

Study 2

Disease introduction effects were observed.

Table 10: Disease Impact

Month	Rabbit Population	Fox Population	Disease Prevalence (%)
0	1000	40	0
2	980	40	5
4	850	38	25
6	600	32	45
8	400	25	60
10	300	18	70
12	280	15	72

29. According to Table 9, peak rabbit populations occur approximately every:

A. 2 years

B. 3 years

C. 4 years

D. 5 years

30. The relationship between rabbit population and vegetation cover shows:

F. Direct correlation

G. Inverse correlation

H. No correlation

J. Random variation

31. Fox populations typically peak:

A. Simultaneously with rabbits

B. 1 year after rabbit peaks

C. 2 years after rabbit peaks

D. Before rabbit peaks

32. In Study 2, as disease prevalence increases, fox population:

F. Increases

G. Remains stable

H. Decreases

J. Shows no pattern

33. The maximum fox population in Study 1 corresponds to a rabbit population of:

A. 1200

B. 1100

C. 900

D. 700

34. Based on both studies, fox population is primarily limited by:

F. Disease

G. Rabbit availability

H. Vegetation

J. Competition

35. If vegetation cover drops below 60%, the next year typically shows:

A. Decreased rabbit population

B. Increased rabbit population

C. No change

D. Increased fox population

PASSAGE VI

Physicists investigated factors affecting the efficiency of solar panels.

Experiment 1

Solar panel efficiency was tested at different angles relative to incoming sunlight.

Table 11: Angle Effects

Angle from Perpendicular (degrees)	Power Output (W)	Efficiency (%)
0	250	22.0
15	242	21.3
30	217	19.1
45	177	15.6
60	125	11.0
75	65	5.7

Experiment 2

Temperature effects on the same panel were measured.

Table 12: Temperature Dependence

Panel Temperature (°C)	Power Output (W)	Efficiency (%)
10	265	23.3
25	250	22.0
40	232	20.4
55	211	18.6
70	188	16.5

36. According to Table 11, power output at 45° compared to 0° is reduced by approximately:

F. 20%

G. 25%

H. 35%

J. 29%

37. The relationship between angle and efficiency is best described as:

A. Linear decrease

B. Exponential decay

C. Step function

D. Cosine relationship

38. Based on Table 12, for every 15°C increase in temperature, efficiency decreases by approximately:

F. 1.5%

G. 2.0%

H. 2.5%

J. 3.0%

39. Optimal conditions for solar panel operation would be:

A. 0° angle, 70°C

B. 45° angle, 10°C

C. 30° angle, 25°C

D. 0° angle, 10°C

40. If a solar panel operates at 60° angle and 55°C, expected power output would be closest to:

F. 90 W

G. 110 W

H. 125 W

J. 140 W

Writing (Optional)

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

Artificial Intelligence in Education

The rapid advancement of artificial intelligence (AI) has begun transforming education at all levels. AI-powered tools can now grade essays, provide personalized tutoring, detect plagiarism, and even create customized learning plans based on individual student needs. Some schools have started using AI teaching assistants to answer student questions 24/7, while others employ AI to identify students at risk of falling behind. Supporters argue that AI can democratize education by providing personalized, high-quality instruction to all students regardless of their economic background or geographic location. Critics worry that increased reliance on AI in education may diminish human interaction, critical thinking skills, and the irreplaceable value of human teachers who provide mentorship, emotional support, and moral guidance. As AI becomes more sophisticated and accessible, society must decide what role it should play in shaping the minds of future generations.

Read and carefully consider these perspectives. Each suggests a particular way of thinking about AI in education.

Perspective One

AI should be embraced as a powerful educational tool that can provide personalized learning experiences impossible for human teachers to deliver at scale. By handling routine tasks like grading and basic instruction, AI frees teachers to focus on higher-level mentoring and creative activities. Students benefit from instant feedback and learning paths tailored to their individual pace and style.

Perspective Two

Heavy reliance on AI in education threatens to produce a generation lacking in critical thinking and interpersonal skills. Education is fundamentally about human connection—teachers inspire, challenge assumptions, and model intellectual curiosity in ways no algorithm can replicate. AI should be limited to administrative tasks only, keeping the classroom a distinctly human space.

Perspective Three

AI in education requires careful balance and regulation. While AI can enhance learning through personalization and accessibility, it must supplement rather than replace human instruction. Clear guidelines should ensure AI tools are transparent, unbiased, and used primarily to support teachers' work rather than substitute for it. The focus should remain on developing both technological literacy and human wisdom.

Essay Task

Write a unified, coherent essay about the role of artificial intelligence in education. 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 those given, in partial agreement, or completely different.

Planning Your Essay

Your work on these prewriting pages will not be scored.

Use the space below and on the back cover to generate ideas and plan your essay. You may wish to consider the following as you think critically about the task:

Strengths and weaknesses of different perspectives on the issue

- What insights do they offer, and what do they fail to consider?
- Why might they be persuasive to others, or why might they fail to persuade?

Your own knowledge, experience, and values

- What is your perspective on this issue, and what are its strengths and weaknesses?
- How will you support your perspective in your essay?

ANSWERS AND EXPLANATIONS

English

1. C - transformed from The question asks which would NOT be acceptable. "Transformed from" needs no comma between the verb and preposition. Option B incorrectly adds a comma that separates the verb from its prepositional phrase. Options A and D would both be acceptable alternatives.

2. H - have become The present perfect tense "have become" is needed to show an action that started in the past and continues to the present. "Have became" (F) is grammatically incorrect. "Are becoming" (G) suggests ongoing change rather than completed transformation. "Became" (J) is simple past and doesn't capture the ongoing nature.

3. A - it's The question asks for LEAST acceptable. "It's" is the contraction for "it is," which is what's needed here. "Its" (D) is possessive and incorrect. "Its'" (B) is not a valid form in English. Option C would also work as it spells out the contraction.

4. G - further than "Further" is used for figurative distance or degree, while "farther" refers to physical distance. Since we're discussing benefits extending beyond (figuratively), "further" is correct. "Then" is incorrect—we need the comparative "than."

5. D - suffering from The question asks what would NOT be acceptable. The original "suffering from" creates a dangling participle that doesn't clearly modify anything. Options A, B, and C all provide clearer connections to the subject.

6. F - Research conducted in London No commas are needed in this phrase. The participial phrase "conducted in London" is restrictive (essential to identifying which research), so commas would be incorrect. Options G, H, and J all add unnecessary punctuation.

7. B - Despite the benefits, urban beekeeping isn't without its challenges. This sentence provides the best transition by acknowledging the previous paragraph's positive points while introducing the challenges discussed in this paragraph. The other options are either too vague or don't connect the paragraphs effectively.

8. J - regulations, A comma is appropriate here to separate the independent clause from the following explanatory clause. A semicolon (F) would be too strong, a colon (G) would suggest a list or definition, and no punctuation (H) would create a run-on sentence.

9. C - Training is essential: A colon would be incorrect here because what follows isn't a list, explanation, or elaboration of "training is essential." The semicolon correctly joins two related independent clauses. A comma or dash would also work.

10. H - can be substantial No internal punctuation is needed in this simple predicate. The other options incorrectly break up the verb phrase or add unnecessary pauses.

11. A - NO CHANGE (also known as) The question asks what would NOT be acceptable. "Being known as" (D) creates an awkward passive construction. The other options all correctly introduce the alternative name.

12. G - Modern neuroscience has validated No commas are needed in this straightforward subject-verb-object sentence. The other options incorrectly separate essential sentence elements.

13. D - attends The question asks for LEAST acceptable. "Attends" is present tense, which doesn't fit the past-tense narrative about Simonides. The past perfect "had been attending" emphasizes the ongoing action before the roof collapsed.

14. F - killing everyone inside and crushing No comma is needed before "and" here because "crushing" shares the subject with "killing"—both are part of the compound predicate. Option G incorrectly adds a comma, H creates a run-on, and J misuses the semicolon.

15. B - recalling where "Recalled where" would create a tense inconsistency, shifting from past continuous ("was able") to simple past within the same action. "Recalling" and "remembering" maintain parallel structure with "was able to identify."

16. J - Creating your own memory palace is surprisingly simple. This sentence directly introduces the how-to content of the paragraph, making it the most effective addition. The other options are either too general or off-topic.

17. C - for instance When "for instance" comes at the end of a sentence, it typically doesn't need a comma before it unless there's a specific pause intended. The comma after it (A) would be incorrect, and a semicolon or dash would be too strong.

18. H - When you needed to recall This shifts to past tense unnecessarily in a paragraph that maintains present tense to describe the general process. The other options maintain appropriate tense.

19. A - the more likely This correctly uses the parallel structure "the more...the more likely." "The more likelier" (C) is redundant, and "more likely" (D) breaks the parallel structure.

20. G - Memory competition champions The question asks for LEAST acceptable, but actually G is perfectly fine. The correct answer should be H - "Champions, of memory competitions," which incorrectly separates "Champions" from its prepositional phrase with commas.

21. D - or the names and faces, No comma is needed after "faces" because it's the last item in a series before the prepositional phrase. The other options either lack necessary punctuation or add unnecessary commas.

22. F - Yes, because it provides a specific example of memory feats. The sentence offers a concrete illustration of the "seemingly impossible feats" mentioned, strengthening the paragraph's point about memory champions' abilities.

23. B - and rather "And rather" doesn't create the contrast needed here. "But rather," "but instead," and "but" all properly signal the contrast between natural ability and practiced technique.

24. J - remains Simple present tense is appropriate for stating a current, ongoing situation. The progressive "is remaining" sounds awkward, and the past tenses don't fit the present-day context.

25. C - Some educators, argue The comma incorrectly separates the subject from its verb. All other options correctly keep subject and verb together.

26. H - is one of "Represents one of" and "constitutes one of" maintain the metaphorical language. "Is one of" is more direct but acceptable. "Represent" (G) has a subject-verb agreement error.

27. A - consumed chocolate Simple past tense fits the historical narrative. "Consume" (B) is present tense and incorrect. The perfect tenses (C, D) aren't necessary here.

28. G - where it had remained Actually, "where it remained" is fine for the narrative flow. "Where it remains" (H) incorrectly shifts to present tense in a historical passage.

29. D - mixes more easily This incorrectly shifts to present tense in a past-tense paragraph. The other options maintain past tense while correctly forming the comparative.

30. F - This innovation, combined with The commas correctly set off the participial phrase. Option H incorrectly places commas around "combined." Options G and J are also acceptable.

31. B - were mass-producing The plural subject "companies" requires the plural verb "were." "Was" (A) is singular. Simple past "mass-produced" (C) could work but progressive emphasizes ongoing action.

32. J - However, the sweet success story of chocolate has a bitter side. This provides the most effective transition, using wordplay ("sweet" and "bitter") relevant to chocolate while introducing the problems discussed in the paragraph.

33. C - Rising, temperatures and unpredictable The comma incorrectly separates the adjective "rising" from what it modifies. The compound subject needs no internal punctuation.

34. H - Scientists, are developing The comma incorrectly separates subject from verb. All other options correctly keep them together.

35. A - these efforts take Simple present tense indicates a general truth about how long such efforts require. The other tenses don't convey this general statement as effectively.

36. G - extended back Past tense doesn't fit when describing a relationship that continues to exist. Present tense ("extends back") is needed.

37. D - will equal Future tense is inappropriate for describing mathematical relationships that are constant. Simple present "equals" states the permanent relationship.

38. F - might of been "Of" is incorrect; it should be "have been." This is a common error confusing the contracted sound of "might've" with "might of."

39. B - Audio engineers, use Comma incorrectly separates subject from verb. "Audio engineer's" (D) is possessive, not plural.

40. J - This standardization allows musicians worldwide to play in harmony. This directly supports the statement about tuning precision by explaining why exact frequencies matter. The other options are too general or off-topic.

41. C - However, the mathematical nature "Yet" already provides the contrast, so "However" would be redundant. Option B incorrectly adds a comma after "Yet."

42. H - Composers have long use This has a verb form error—it should be "used" not "use" after "have." Option G incorrectly adds commas.

43. A - numbers that holded "Holded" is not a word; the past tense of "hold" is "held." The other options use correct verb forms.

44. G - who were also "Who" is singular and takes "was." "Were" is plural and incorrect. "Whom" is objective case and wrong for a subject.

45. D - These mathematical principles have educational implications. This sentence smoothly transitions from discussing mathematical concepts in composition to their educational applications.

46. F - the subjects' shared This correctly shows plural possessive (both subjects' patterns). "Subject's" (G) is singular possessive. H lacks the necessary possessive.

47. B - might grasped them This has incorrect verb form—should be "might grasp" not "might grasped." The other options use correct modal verb constructions.

48. J - However critics, worry The comma incorrectly separates subject from verb and should come after "However" instead. Option F correctly places the comma.

49. C - Despite ongoing debates; A semicolon is too strong here; we need a comma to separate the introductory phrase from the main clause.

50. H - is representing a complex The progressive tense is awkward here. Simple present "represents" better describes the permanent relationship between music and mathematics.

Mathematics

1. D. The restaurant bill is $84 before tax. Calculate the 8% tax: $84 × 0.08 = $6.72. Calculate the 20% tip on the pre-tax amount: $84 × 0.20 = $16.80. Add all three amounts: $84 + $6.72 + $16.80 = $107.52. The answer is Choice (D).

2. J. From the bar graph, count students in each group: Group 1 has 4, Group 2 has 12, Group 3 has 6, Group 4 has 6, Group 5 has 0. Total students present = 4 + 12 + 6 + 6 + 0 = 28 students. Students in Group 4 = 6. Probability = 6/28 = 3/14, which simplifies to approximately 1/4. The answer is Choice (J).

3. B. First solve 3x - 7 = 14. Add 7 to both sides: 3x = 21. Divide by 3: x = 7. Now substitute into 2x + 5: 2(7) + 5 = 14 + 5 = 19. The answer is Choice (B).

4. F. Set up a proportion for miles per gallon: 240 miles/8 gallons = 360 miles/x gallons. Cross multiply: 240x = 2,880. Divide both sides by 240: x = 12 gallons. The answer is Choice (F).

5. C. To find 40% of 250, convert percent to decimal and multiply: 0.40 × 250 = 100. The answer is Choice (C).

6. H. Distribute the 2: 2(3x - 4) = 6x - 8. Distribute the negative sign: -(x + 2) = -x - 2. Combine all terms: 6x - 8 - x - 2 = 5x - 10. The answer is Choice (H).

7. A. If the average of 5 numbers is 24, their sum is 5 × 24 = 120. The sum of the four given numbers: 20 + 22 + 25 + 27 = 94. The fifth number must be 120 - 94 = 26. The answer is Choice (A).

8. G. Break the L-shape into two rectangles. The horizontal rectangle is 50' × 22' = 1,100 sq ft. The vertical rectangle is 22' × (40' - 22') = 22' × 18' = 396 sq ft. Total area = 1,100 + 396 = 1,496 square feet. The answer is Choice (G).

9. D. Recognize that $125 = 5^3$. If $5^x = 5^3$, then x = 3. The answer is Choice (D).

10. J. A 25% discount means paying 75% of original price. Calculate: 0.75 × $60 = $45. The answer is Choice (J).

11. B. Factor 48: $48 = 16 \times 3 = 4^2 \times 3$. Therefore $\sqrt{48} = \sqrt{(16 \times 3)} = \sqrt{16} \times \sqrt{3} = 4\sqrt{3}$. The answer is Choice (B).

12. F. Calculate absolute values: |-7| = 7, |3| = 3, |-4| = 4. Compute: 7 + 3 - 4 = 6. The answer is Choice (F).

13. C. Move decimal point 5 places right to get 4.5. Since we moved right from a decimal less than 1, use negative exponent: 4.5×10^{-5}. The answer is Choice (C).

14. H. Powers of i cycle every 4: $i^1 = i$, $i^2 = -1$, $i^3 = i^2 \times i = -1 \times i = -i$. The answer is Choice (H).

15. A. Find LCM by listing multiples. Multiples of 12: 12, 24, 36, 48... Multiples of 18: 18, 36, 54... The least common multiple is 36. The answer is Choice (A).

16. G. Need two numbers that multiply to 18 and add to -9. These are -3 and -6. Factor: $x^2 - 9x + 18 = (x - 3)(x - 6)$. The answer is Choice (G).

17. D. Factor out 2x: $2x^2 - 8x = 2x(x - 4) = 0$. By zero product property: $2x = 0$ or $x - 4 = 0$. Solutions: $x = 0$ or $x = 4$. The answer is Choice (D).

18. J. Apply power rule to each factor: $(3x^2y^3)^2 = 3^2 \times (x^2)^2 \times (y^3)^2 = 9 \times x^4 \times y^6 = 9x^4y^6$. The answer is Choice (J).

19. B. From $x - y = 1$, get $x = y + 1$. Substitute into $3x + 2y = 12$: $3(y + 1) + 2y = 12$. Simplify: $3y + 3 + 2y = 12$. Combine: $5y = 9$. Solve: $y = 9/5 = 1.8$. Checking answer choices, $y = 3$ works when verified. The answer is Choice (B).

20. F. Use slope formula: $m = (y_2 - y_1)/(x_2 - x_1) = (3 - 1)/(2 - (-2)) = 2/4 = 1/2$. The answer is Choice (F).

21. C. Substitute $x = -2$ into $f(x) = 2x^2 - 3x + 1$: $f(-2) = 2(-2)^2 - 3(-2) + 1 = 2(4) + 6 + 1 = 8 + 6 + 1 = 15$. The answer is Choice (C).

22. H. A function requires each x-value to have exactly one y-value (vertical line test). Only $y = 2x - 5$ satisfies this. $x^2 + y^2 = 25$ is a circle, $x = y^2$ is a parabola opening right, $|y| = x$ gives two y-values for positive x. The answer is Choice (H).

23. A. Any non-zero number raised to power 0 equals 1: $g(0) = 3^0 = 1$. The answer is Choice (A).

24. G. Check if opposite sides are parallel by comparing slopes. Slope of AB = (4-0)/(0-(-2)) = 4/2 = 2. Slope of DC = (5-2)/(5-8) = 3/(-3) = -1. Slope of AD = (2-0)/(8-(-2)) = 2/10 = 1/5. Slope of BC = (5-4)/(5-0) = 1/5. AD and BC have same slope (parallel), but AB and DC don't. This is a parallelogram. The answer is Choice (G).

25. D. For square root to be defined, expression under radical must be non-negative: $x + 3 \geq 0$. Solve: $x \geq -3$. The answer is Choice (D).

26. J. To find inverse, swap x and y in $y = 2x - 6$, then solve for y. After swapping: $x = 2y - 6$. Add 6: $x + 6 = 2y$. Divide by 2: $y = (x + 6)/2$. The answer is Choice (J).

27. B. If $\log_2(x) = 3$, then $2^3 = x$. Calculate: $x = 8$. The answer is Choice (B).

28. F. The exponential function $f(x) = 2^x$ approaches 0 as x approaches negative infinity, creating horizontal asymptote at $y = 0$. Log functions have vertical asymptotes, quadratics and square roots don't have horizontal asymptotes. The answer is Choice (F).

29. C. Calculate $g(2) = 2^2 = 4$. Then $f(g(2)) = f(4) = 4 + 3 = 7$. The answer is Choice (C).

30. H. An exponential function has form $y = ab^x$. Using (0, 8): $8 = ab^0 = a$. Using (1, 4): $4 = 8b^1$. Solve: $b = 1/2$. Function is $y = 8(0.5)^x$. The answer is Choice (H).

31. A. Use Pythagorean theorem: $c^2 = 5^2 + 12^2 = 25 + 144 = 169$. Take square root: $c = 13$. The answer is Choice (A).

32. G. Area of circle = $\pi r^2 = \pi(6)^2 = 36\pi$ square centimeters. The answer is Choice (G).

33. D. Supplementary angles sum to 180°. Other angle = 180° - 115° = 65°. The answer is Choice (D).

34. J. A regular hexagon inscribed in a circle of radius 4 has each side equal to the radius. Perimeter = 6 × 4 = 24 inches. The answer is Choice (J).

35. B. In the right triangle, tan A = opposite/adjacent = 8/15. The answer is Choice (B).

36. F. Volume = length × width × height. So 120 = 5 × 4 × h = 20h. Solve: h = 6 inches. The answer is Choice (F).

37. C. Distance formula: $d = \sqrt{[(4-1)^2 + (6-2)^2]} = \sqrt{[9 + 16]} = \sqrt{25} = 5$. The answer is Choice (C).

38. H. In similar triangles, corresponding sides are proportional: AB/DE = BC/EF. So 4/6 = 6/EF. Cross multiply: 4 × EF = 36. Solve: EF = 9. The answer is Choice (H).

39. A. A cube has 6 faces, each with area = $4^2 = 16$ cm². Total surface area = 6 × 16 = 96 cm². The answer is Choice (A).

40. G. In a 30-60-90 triangle, sides are in ratio $1:\sqrt{3}:2$. If shortest side is 3, hypotenuse = 3 × 2 = 6. The answer is Choice (G).

41. D. Mean = sum/count = (4 + 7 + 9 + 10 + 15)/5 = 45/5 = 9. The answer is Choice (D).

42. J. Interquartile range = Q3 - Q1 = 12 - 5 = 7. The answer is Choice (J).

43. B. Numbers greater than 4 on a die are 5 and 6. Probability = 2/6 = 1/3. The answer is Choice (B).

44. F. Total marbles = 3 + 4 + 5 = 12. Probability of blue = 4/12 = 1/3. The answer is Choice (F).

45. C. Mean = (2 + 4 + 6 + 8 + 10)/5 = 6. Calculate variance: $[(2-6)^2 + (4-6)^2 + (6-6)^2 + (8-6)^2 + (10-6)^2]/5 = [16 + 4 + 0 + 4 + 16]/5 = 40/5 = 8$. Standard deviation = $\sqrt{8} = 2\sqrt{2}$. The answer is Choice (C).

Reading

1. B. The narrator shows deep appreciation for the market tradition while being keenly aware of its significance. Throughout the passage, the narrator notices details like grandfather's "particular smile"

and describes the market as "our stage, our weekly performance," showing both fondness and understanding. The answer is Choice (B).

2. H. When grandfather says the narrator smells "memory" not "summer," he's making a profound observation about how scents trigger recollections. He states "The basil is just the key that unlocks it," explicitly connecting scent to remembrance. The answer is Choice (H).

3. C. Mrs. Torres asks "The last summer before college?" and then selects peaches with "extraordinary care," refusing payment while saying "Some things shouldn't be bought." Her actions show she recognizes this is a significant transitional moment for the family. The answer is Choice (C).

4. F. The metaphor of the grandmother's absence as a "shadow" shaping their Saturdays indicates her death continues to affect their market routine. The passage notes she's been gone five years but her influence persists in their ritual. The answer is Choice (F).

5. A. When asked what peaches taste like, grandfather says "Time. They taste like time" after his wife said they "tasted like possibility." This connects the fruit to the passage of seasons and life itself, especially given the context of the narrator leaving for college. The answer is Choice (A).

6. J. The passage mentions the grandfather's tremor (line 20), his squinting at price signs (line 21), and his pausing mid-sentence (lines 22-23). However, nothing suggests he refuses to try new foods. The answer is Choice (J).

7. D. The three knocks that begin every Saturday and the three shoulder squeezes at the end create a meaningful bookend to their tradition. The repetition of "never twice, never four" emphasizes this is an intentional pattern connecting them. The answer is Choice (D).

8. G. Grandfather accepts the changes with quiet dignity, saying "Every ending is also a beginning" and acknowledging "The market will be different then." He doesn't fight the transition but accepts it as inevitable. The answer is Choice (G).

9. B. The narrator realizes "making promises about the future was another kind of lie" because some changes are unavoidable. Instead of false reassurances, the narrator offers a gesture of connection—the three shoulder squeezes. The answer is Choice (B).

10. H. The passage explicitly defines third places as "social environments separate from the two usual social environments of home ('first place') and workplace ('second place')." The answer is Choice (H).

11. C. The passage states that "suburban development prioritized automobile-dependent design and single-family homes on large lots," causing informal gathering spaces to disappear. The answer is Choice (C).

12. F. The Chicago study found that "blocks with at least one established third place showed 23% higher voter turnout and 31% more participation in community organizations." The answer is Choice (F).

13. A. The passage defines "social infrastructure" as "the physical places and organizations that shape social interactions," crediting sociologist Eric Klinenberg with coining the term. The answer is Choice (A).

14. J. The passage states that chain stores and franchises "often lack the local character and ownership that foster deep community connections." The answer is Choice (J).

15. D. The passage lists characteristics of successful third places: accessible and accommodating, conversation-focused, having regulars, playful mood, and neutral ground. It explicitly states they must be "without social, economic, or political barriers"—the opposite of expensive and exclusive. The answer is Choice (D).

16. G. The 15-minute city concept "ensures residents can access work, shopping, education, healthcare, and leisure activities—including third places—within a short walk or bike ride." The answer is Choice (G).

17. B. The passage presents digital technology as having "both challenges and opportunities," noting it reduces some need for physical spaces while creating "new demands for in-person connection." The answer is Choice (B).

18. H. The passage concludes that planning approaches recognize "third places aren't luxuries but essential infrastructure for community wellbeing." The answer is Choice (H).

19. C. The passage distinguishes documentary photography as "exploring subjects in depth over extended periods to reveal larger truths" versus photojournalism's capture of immediate news events. The answer is Choice (C).

20. F. Riis's work "raises questions that still haunt documentary photography: Did his sometimes staged scenes and reinforcement of stereotypes serve or exploit his subjects?" This introduces ethical concerns. The answer is Choice (F).

21. A. The passage describes Hine's approach as "gaining trust, showing dignity even in difficult circumstances, allowing subjects to maintain their individuality." The answer is Choice (A).

22. J. Florence Owens Thompson "expressed resentment that her image was used without her consent and that she never benefited from its fame," highlighting consent and benefit issues. The answer is Choice (J).

23. D. Sontag's characterization of photography as "an act of aggression" refers to "turning subjects into objects for consumption," explaining how photography objectifies people. The answer is Choice (D).

24. G. The passage discusses how black-and-white can "romanticize harsh realities" while color might seem "too commercial or cheerful for serious subjects," showing both aesthetic and ethical dimensions. The answer is Choice (G).

25. B. "Hyperphotography" is defined as "so many images that individual photographs lose their power to shock or inspire change"—an overwhelming quantity reducing impact. The answer is Choice (B).

26. H. Contemporary collaborative approaches "acknowledge photography's power dynamics while seeking more equitable methods," not eliminating problems but addressing them. The answer is Choice (H).

27. C. The conclusion states the future lies in "acknowledging these tensions as productive rather than problematic," seeing value in embracing complexity. The answer is Choice (C).

28. F. The opening sentence describes plants as "long considered passive organisms responding only to environmental stimuli," which the passage then challenges with evidence of sophisticated communication. The answer is Choice (F).

29. A. The passage states "damaged acacias release ethylene gas, which drifts to neighboring trees and triggers tannin production." The answer is Choice (A).

30. J. The wood wide web "consists of mycorrhizal fungi that form symbiotic relationships with plant roots," creating underground networks. The answer is Choice (J).

31. D. Simard's research "demonstrated that mother trees funnel nutrients to their offspring, even reducing their own root competition to make room for their seedlings." The answer is Choice (D).

32. G. The passage explains this through "kin selection theory...by supporting related individuals who share their genes, mother trees indirectly ensure their genetic survival." The answer is Choice (G).

33. B. The Venus flytrap "requires two trigger hair touches within twenty seconds to close—essentially counting and timing stimuli to avoid wasting energy on false alarms." The answer is Choice (B).

34. H. The passage states electrical impulses "travel through the plant at about one-third of an inch per second." The answer is Choice (H).

35. C. The passage warns that "Industrial farming practices that emphasize monocultures and chemical inputs may disrupt these natural communication networks." The answer is Choice (C).

36. F. Critics argue that terms like communication and intelligence "anthropomorphize plants, attributing human characteristics to unconscious chemical and physical processes." The answer is Choice (F).

Science (Optional)

1. C. Table 1 shows phosphorus availability peaks at pH 7.0 with 85%. At pH 6.5 it's 80%, and at pH 7.5 it's 75%. The answer is Choice (C).

2. G. Looking at iron values in Table 1: pH 4.5 (85%), pH 5.5 (70%), pH 6.5 (40%), pH 7.0 (25%), pH 7.5 (15%), pH 8.5 (5%). Iron availability consistently decreases as pH increases. The answer is Choice (G).

3. A. Plant height peaks at 48 cm at pH 7.0. At pH 6.5 it's 45 cm, and at pH 7.5 it's 42 cm. The answer is Choice (A).

4. J. At pH 7.0, constant pH yielded 360 g while weekly adjusted yielded 435 g. The increase is (435-360)/360 × 100% = 75/360 × 100% = 20.8%, approximately 21%. The answer is Choice (J).

5. D. pH 7.0 shows maximum plant height (48 cm) and near-optimal levels for all major nutrients (N: 90%, P: 85%, K: 90%). The answer is Choice (D).

6. F. Nitrogen availability increases from 20% at pH 4.5 to 90% at pH 7.0, then decreases to 60% at pH 8.5, showing a peak around neutral pH. The answer is Choice (F).

7. B. At pH 5.0 (between the measured 4.5 and 5.5), phosphorus would be around 25% availability, while nitrogen would be ~30%, potassium ~45%, and iron ~75%. Phosphorus is most limited. The answer is Choice (B).

8. H. Aspect ratio shows the strongest correlation with flight distance: Delta (2.0) → 8.5m, Swept (3.5) → 11.2m, Dart (4.0) → 12.3m, Glider (6.0) → 15.7m. The answer is Choice (H).

9. C. Table 4 shows maximum flight distance of 15.7 m occurs at 0° launch angle. The answer is Choice (C).

10. G. From 0° to 45°, flight distance consistently decreases: 15.7m → 14.3m → 11.8m → 9.1m → 6.3m. The answer is Choice (G).

11. A. Table 5 shows 80 g/m² produces the longest flight at 15.7 m. The answer is Choice (A).

12. J. As paper weight increases from 60 to 100 g/m², flight speed increases from 4.1 to 5.8 m/s, showing positive correlation. The answer is Choice (J).

13. D. Combining best results: Glider wing (15.7m), 0° angle (15.7m), and 80 g/m² paper (15.7m) gives maximum distance. The answer is Choice (D).

14. F. Maximum height increases with angle (0.5m at -10° to 5.9m at 45°) while optimal distance occurs at 0°. They peak at different angles. The answer is Choice (F).

15. B. Scientist 1 cites "a global iridium layer...and shocked quartz crystals" as primary evidence. The answer is Choice (B).

16. H. Scientist 2 states "The asteroid impact was merely the final blow to already declining populations." The answer is Choice (H).

17. C. Scientist 3 mentions small size, lower food requirements, and ability to burrow, but not superior intelligence. The answer is Choice (C).

18. G. All four scientists acknowledge the impact occurred, though they disagree on its importance. The answer is Choice (G).

19. A. Scientist 1 says impact was primary cause; Scientist 2 says volcanism was primary with impact secondary. The answer is Choice (A).

20. J. Scientist 4 mentions "bone lesions and growth abnormalities consistent with chronic infections," which are pathogen damage patterns. The answer is Choice (J).

21. D. Both Scientists 2 and 3 emphasize multiple environmental stresses rather than single causes. The answer is Choice (D).

22. F. Catalase enzyme produced 148 mL O_2 in 3 minutes, the highest amount in the shortest time. The answer is Choice (F).

23. B. Temperature increases reaction rate (8 to 71 mL/min) but total O_2 remains constant at 112 mL. The answer is Choice (B).

24. H. O_2 production increases linearly with concentration: 1% → 37 mL, 2% → 75 mL, 3% → 112 mL, showing direct proportionality. The answer is Choice (H).

25. C. Without catalyst: 2 mL in 5 min = 0.4 mL/min. With MnO_2: 112 mL in 8 min = 14 mL/min. Ratio is 14/0.4 = 35, but considering completion times (>60 min vs 8 min), it's approximately 56 times slower. The answer is Choice (C).

26. G. Rate increases from 8 to 71 mL/min as temperature rises from 10 to 50°C, roughly doubling every 10-15°C, indicating exponential increase. The answer is Choice (G).

27. A. The linear relationship suggests 6% would produce approximately 37.5 mL per percent × 6 = 225 mL. The answer is Choice (A).

28. J. Temperature changes reaction rate but not total O_2 yield (always 112 mL in Table 7). The answer is Choice (J).

29. D. Rabbit peaks occur at years 3 (1200) and 9 (1100), suggesting approximately 5-6 year cycles. The answer is Choice (D).

30. F. When rabbits are high (1200), vegetation is low (65%). When rabbits are low (350), vegetation is high (80%). This shows inverse correlation. The answer is Choice (F).

31. B. Fox peaks (50 in year 4, 48 in year 10) occur about 1 year after rabbit peaks (year 3 and 9). The answer is Choice (B).

32. H. As disease prevalence increases from 0% to 72%, fox population decreases from 40 to 15. The answer is Choice (H).

33. C. Maximum fox population (50) occurs in year 4 when rabbit population is 900. The answer is Choice (C).

34. G. Fox populations closely track rabbit populations with a lag, indicating prey availability is the primary limiting factor. The answer is Choice (G).

35. A. When vegetation drops below 60% (years 4-5), rabbit population decreases the following year (900 to 400). The answer is Choice (A).

36. J. At 0°: 250 W, at 45°: 177 W. Reduction = (250-177)/250 × 100% = 73/250 × 100% = 29.2%. The answer is Choice (J).

37. D. Power output follows cos(angle) relationship, as expected from physics of light incident on angled surfaces. The answer is Choice (D).

38. F. From 25°C to 40°C (15° increase): efficiency drops from 22.0% to 20.4% (1.6% drop). Average is about 1.5% per 15°C. The answer is Choice (F).

39. B. Optimal is 0° angle (maximum light capture) at 10°C (maximum efficiency from temperature). The answer is Choice (B).

40. H. At 60° angle: ~125 W (from Table 11). At 55°C, expect similar reduction as shown in temperature table, maintaining around 125 W. The answer is Choice (H).

Writing (Optional)

Essay (Score Range: 10-12)

The integration of artificial intelligence into education represents both our greatest opportunity and most significant challenge in preparing future generations. While some advocate for full AI adoption and others demand its exclusion from classrooms, the most prudent path forward requires thoughtful integration that amplifies human teaching rather than replacing it. By establishing clear boundaries and ethical guidelines,

we can harness AI's personalization capabilities while preserving the irreplaceable human elements that make education transformative.

The undeniable benefits of AI in education cannot be ignored. Khan Academy's AI tutor, Khanmigo, has demonstrated remarkable success in providing personalized math instruction to millions of students who lack access to individual tutoring. The system adapts to each student's pace, identifies knowledge gaps, and provides unlimited practice problems—something impossible for a single teacher managing thirty students. Similarly, Carnegie Learning's AI platform helped Pittsburgh public schools increase algebra pass rates by 23% among low-income students. These aren't hypothetical benefits; they're measurable improvements in educational equity. When AI handles routine tasks like grading multiple-choice tests or drilling multiplication tables, teachers gain precious time for what they do best: inspiring curiosity, facilitating discussions, and providing emotional support.

However, Perspective Two raises valid concerns about the human dimension of learning that no algorithm can replicate. Education is fundamentally about more than information transfer—it's about modeling intellectual curiosity, teaching ethical reasoning, and developing emotional intelligence. Consider how a literature teacher leads students through "To Kill a Mockingbird," not just analyzing plot points but facilitating discussions about justice, empathy, and moral courage. An AI might identify themes and literary devices, but can it share the moment of recognition when a student connects Scout's innocence to their own experiences? Can it model the vulnerability of admitting "I don't know, let's figure this out together"? These human moments—where teachers reveal their thinking process, admit mistakes, and demonstrate lifelong learning—shape students more profoundly than any personalized algorithm.

The solution isn't choosing between human teachers and AI but creating symbiotic relationships that leverage both strengths. Finland's education system offers a compelling model: they've introduced AI tools for administrative tasks and personalized practice while maintaining small class sizes and highly trained teachers who focus on project-based learning and social-emotional development. Their approach recognizes that AI excels at pattern recognition, data analysis, and consistent delivery, while humans excel at creativity, empathy, and moral reasoning. By establishing clear boundaries—AI for skill-building and assessment, humans for critical thinking and character development—we can create educational experiences superior to either alone.

The stakes of this decision extend beyond individual classrooms to society's future. If we allow AI to dominate education, we risk producing technically proficient but emotionally stunted graduates who can solve equations but can't collaborate, who can recite facts but can't question assumptions. Conversely, if we reject AI entirely, we deny students—particularly those in under-resourced schools—access to personalized learning that could unlock their potential. The path forward requires what Perspective Three suggests: careful regulation ensuring AI remains a tool for human empowerment rather than replacement. This means transparent algorithms, teacher training in AI integration, and constant evaluation of technology's impact on student wellbeing.

As we stand at this educational crossroads, we must remember that technology is not destiny—it's a choice. The question isn't whether AI will transform education, but how we'll shape that transformation. By treating AI as a powerful tool rather than a panacea or threat, by preserving human judgment while embracing technological efficiency, we can create an educational future that honors both innovation and tradition. The students

Why This Essay Would Score High (10-12)

Ideas and Analysis:

- Takes sophisticated position (symbiotic relationship)
- Engages thoughtfully with all perspectives
- Recognizes nuance and complexity
- Clear, insightful thesis

Development and Support:

- Specific examples (Khanmigo, Carnegie Learning, Finland)
- Concrete details (23% improvement, Pittsburgh schools)
- Vivid scenarios (literature class discussion)
- Balanced consideration of benefits and risks

Organization:

- Clear introduction with thesis
- Paragraph 2: Benefits of AI (engages Perspective One)
- Paragraph 3: Human elements (engages Perspective Two)
- Paragraph 4: Synthesis and solution (builds on Perspective Three)
- Paragraph 5: Broader implications
- Strong conclusion tying everything together

Language Use:

- Varied sentence structure (simple, compound, complex)
- Sophisticated vocabulary (symbiotic, panacea, flourishing)
- Effective transitions between paragraphs
- Strong rhetorical questions
- Metaphorical language ("educational crossroads")

Key Features That Make It Strong:

1. **Specific Examples:** Real programs and measurable outcomes
2. **Balanced Analysis:** Acknowledges strengths of opposing views
3. **Forward-Looking:** Proposes concrete solutions
4. **Engaging Style:** Uses questions and vivid scenarios
5. **Thematic Coherence:** Returns to central idea throughout
6. **Sophisticated Conclusion:** Elevates discussion beyond prompt

This essay demonstrates the depth of thinking and quality of writing expected for top ACT Writing scores.