June 2014

ACT From 72C

ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose "NO CHANGE." In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

PASSAGE I

The Triangular Snowflake

[1]

Snowflakes form from tiny water droplets, (1) following a specific process of chemical bonding as they freeze, which results in a six-sided figure. The rare "triangular" snowflake, similarly, (2) confounded scientists for years because it apparently defied the basic laws of chemistry. [A] The seemingly triangular shape of those snowflakes suggests that forming (3) through a different process of chemical bonding. [B] By re-creating snowflake formation, a discovery has revealed to scientists Kenneth Libbrecht and Hannah Arnold the cause of this apparent variation. (4)

[2]

Snowflakes begin to form when water in the atmosphere freezes it causes (5) the water molecules to bond into a hexagonal shape. During the flake's descent from Earth's upper atmosphere, other water vapor molecules bumps (6) into the hexagonal structure.

1. A. NO CHANGE
   B. form, from tiny, water droplets,
   C. form from tiny, water, droplets
   D. form, from tiny water droplets

2. F. NO CHANGE
   G. for example,
   H. additionally,
   J. however,

3. A. NO CHANGE
   B. the manner in which formatior
   C. which had formed
   D. that they form

4. F. NO CHANGE
   G. the discovery of the cause of this apparent variation has been made by scientists Kenneth Libbrecht and Hannah Arnold.
   H. scientists Kenneth Libbrecht and Hannah Arnold have discovered the cause of this apparent variation.
   J. the cause of this apparent variation has been discovered by scientists Kenneth Libbrecht and Hannah Arnold.

5. A. NO CHANGE
   B. freezes, causing
   C. freezes, it causes
   D. freezes, this causes

6. F. NO CHANGE
   G. has bumped
   H. bumped
   J. bump

Bypassing the liquid water phase, those molecules (7) condense directly onto the established hexagonal pattern. As a result, the flake grows outward into bigger and more complex hexagonal arrangements surrounding the original hexagonal shape at the center of the flake. [C]

[3]

In 2009, Libbrecht and Arnold's experiments revealed that triangular snowflakes begin with the same process of chemical bonding and forms (8) a hexagonal shape. The triangular shape is an illusion resulting from one significant addition to the process (9) dust.

[4]

Triangular snowflakes begin to form when a tiny dust particle or other such impurity collides with the flake as it falls, thereby pushing one edge upward. [D] The downward edge of the snowflake encounters more wind resistance than the rest of the flake. The greater the pressure from the wind, (10) causes bonds to form quick (11) at this edge than in the rest of the snowflake.

[5]

The resulting snowflake has three long sides and three sides that are so short they are difficult to detect. Although these snowflakes appear to have a triangular shape—(12) they actually have a hexagonal pattern. Such snowflakes offer evidence that even when impurities interfere, the basic laws of chemistry still apply. (13)

7. If the writer were to delete the underlined portion (adjusting the capitalization as needed), the sentence would primarily lose:

A. an explanation of the process water molecules undergo to change from liquid to vapor to solid.
B. a detail that mentions a step some water molecules skip in changing from vapor to solid.
C. a visual description of what water vapor molecules look like.
D. an explanation of how molecules react to various air temperatures.

8. **F.** NO CHANGE
G. were they to form
H. if they formed
J. form

9. **A.** NO CHANGE
B. process is
C. process:
D. process;

10. **F.** NO CHANGE
G. pressure from the wind, which
H. the pressure, as the wind
J. pressure from the wind

11. **A.** NO CHANGE
B. more quickly
C. most quickly
D. quickest

12. **F.** NO CHANGE
G. shape,
H. shape;
J. shape:

13. Which choice most effectively concludes the sentence and the essay?

A. NO CHANGE
B. scientists can be certain that a solution to even the most confusing event will be found.
C. snowflakes will still fall if atmospheric conditions are favorable.
D. snowflakes come in many different shapes and sizes.

Questions 14 and 15 ask about the preceding passage as a whole.

14. The writer is considering adding the following sentence to the essay:

> This growth can take the form of either branching (which forms stable, symmetrical shapes) or faceting (which forms unstable, complex shapes).

If the writer were to add this sentence, it would most logically be placed at Point:

F. A in Paragraph 1.
G. B in Paragraph 1.
H. C in Paragraph 2.
J. D in Paragraph 4.

15. Suppose the writer's primary purpose had been to offer an example of a discovery that changed the way scientists viewed the basic laws of chemistry. Would this essay accomplish that purpose?

A. Yes, because it describes how the observation of triangular snowflakes has led scientists to discover that their understanding of the basic laws of chemistry is flawed.
B. Yes, because it describes how scientists have applied the knowledge they've gained through studying snowflakes to other areas of chemistry.
C. No, because it focuses on how scientists are struggling to determine how triangular snowflakes are formed.
D. No, because it explains that triangular snowflakes appeared to, but don't actually, violate the basic laws of chemistry.

PASSAGE II

Climbing Mt. Fuji

[1]

Bundled up in wool sweaters and thick coats, and we watched (16) the sun setting on Mt. Fuji in Japan. It was August and our clothes were stifling, but we would have needed (17) the warmth from our bodies sealed around us as we hiked into the high altitudes. Three friends and I stepped away from the crowd of other hikers and spoke our intention: "Sunset at the base, sunrise at the top." [A]

[2]

As we hiked, a patchwork of clouds swept across the darkening sky, hiding all traces of our surroundings outside our flashlights' beams. The trail gradually changed from compact dirt to a jumble of volcanic rocks. [B]

16. **F.** NO CHANGE
G. coats while watching
H. coats, we watched
J. coats watching

17. **A.** NO CHANGE
B. would need
C. will need
D. need

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We tried to steady ourselves with our walking sticks but slipped and stumbled because of the jumbled rocks we were slipping on. (18)

[3]

Every thousand feet, we came to a small station constructed of tin and cement, barely able to block the wind. At each one, we noted the roof piled high on (19) fallen rocks and felt both unsettled and reassured by this evidence of the station's protective ability. We rested uneasily for a moment as a clerk burned the station brand into our walking sticks which it was proof of (20) our progress through the darkness.

[4]

As we neared the summit, the whole group of hikers—thinly spread across the mountain for most (21) of the route—condensed, forming (22) an illuminated line along the trail. [C] Our pace slowed. Progressing along the trail, (23) we reached the summit just five minutes before dawn. [D]

In the half-light of the rising sun: (24) we began to make out the dark lines of the cliffs' at the crater's (25) edge.

18. **F.** NO CHANGE
G. even though we used our walking sticks.
H. despite any efforts to remain steady.
J. with each step.

19. **A.** NO CHANGE
B. piling high with
C. piled high with
D. piling high on

20. **F.** NO CHANGE
G. sticks, it was proof of
H. sticks, proof of
J. sticks proved

21. **A.** NO CHANGE
B. the most part
C. majority
D. more

22. **F.** NO CHANGE
G. they formed
H. there was
J. we saw

23. Which choice emphasizes the slowness of the ascent and supports the idea that the narrator's group of friends did not set their own pace?
A. NO CHANGE
B. Able to advance only a few steps at a time,
C. Moving forward with each step,
D. Climbing higher in altitude,

24. **F.** NO CHANGE
G. sun—
H. sun,
J. sun;

25. **A.** NO CHANGE
B. cliff's at the craters'
C. cliffs at the crater's
D. cliffs at the craters

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We crouched down on jutting pieces of rock and waited for the shifting clouds to clear. We waited for the sun. [26]

[5]

Generally, a sudden gap in the clouds left us blinking (27) as the sunlight squelched out (28) the severe landscape of gray volcanic rock. We leaned against each other, spent. Perhaps there is truth in the old Japanese saying: A wise man climbs Mt. Fuji, but only a fool climbs it twice.

26. If the writer were to delete the preceding sentence, the paragraph would primarily lose:

F. a restatement of an idea that emphasizes the hikers' anticipation when they reached the summit.
G. a statement that introduces the idea of waiting, which is the focus of the following paragraph.
H. an unnecessary detail that contradicts information presented earlier in the paragraph.
J. a clear image that conveys what the hikers saw when they reached the summit.

27. A. NO CHANGE
B. Furthermore,
C. Once again,
D. Finally,

28. Which choice most dramatically emphasizes the ruggedness of the landscape?

F. NO CHANGE
G. shattered over
H. smothered
J. went over

Questions 29 and 30 ask about the preceding passage as a whole.

29. The writer wants to add the following sentence to the essay:

> We clipped small flashlights onto our coats, picked up our walking sticks, and started up the trail with the other hikers as the sun dipped below the trees.

The sentence would most logically be placed at Point:

A. A in Paragraph 1.
B. B in Paragraph 2.
C. C in Paragraph 4.
D. D in Paragraph 4.

30. Suppose the writer's primary purpose had been to describe the experience of doing something difficult. Would this essay accomplish that purpose?

F. Yes, because it tells about a variety of challenges the hikers faced along their journey.
G. Yes, because it focuses primarily on the hikers' need for walking sticks and other tools to make it up the trail.
H. No, because it focuses on the rewarding nature of the experience but does not describe the hike as challenging.
J. No, because it focuses mainly on the beauty of the surrounding landscape.

PASSAGE III

The Pottery of Mata Ortiz

In the early 1950s, a twelve-year-old boy named, Juan Quezada, (31) gathered firewood in the mountains near the village of Mata Ortiz in Chihuahua, Mexico. Though he dreamed of becoming an artist, Quezada spent all of his free time selling firewood to help support his family.

31. A. NO CHANGE
B. boy named Juan Quezada
C. boy, named Juan Quezada
D. boy named Juan Quezada,

In the mountains, Quezada found shards of pots, and an occasional complete pot, (32) painted with intricate red and black designs. These were artifacts from his ancestors, the Paquimé (or Casas Grandes) Indians, who lived in the area from about AD 1000 to AD 1400. Fascinated by the geometric designs, Quezada wondered, if he could make pots like these? (33)

[34] He dug the clay, soaked it, and tried to shape it into a pot. In time, he figured out how his ancestors had mixed the clay with volcanic ash to keep it from cracking and had used minerals found nearby to create paints. When it was time to paint his pots, Quezada designed his own complex geometric patterns.

As an adult, Quezada found a job with the railroad, but he always made time for his art. By 1976 he was selling pots to travelers and had taught (35) several members of his family how to make pots. Three of Quezada's pots were discovered in a junk shop ir New Mexico by anthropologist Spencer MacCallum, who at first thought they were prehistoric. [36]

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His search for their creator led him (37) to Mata Ortiz and an eventual (38) partnership with Quezada.

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

F. pots—along with an occasional complete pot—
G. pots, along with an occasional complete pot,
H. pots, (and an occasional complete pot)
J. pots (and an occasional complete pot)

33. **A.** NO CHANGE
B. wondered if he could make pots like these.
C. wondered, if he could make pots like these.
D. wondered if he could make pots like these?

34. Which of the following true statements would provide the best transition from the preceding paragraph to this paragraph?

F. The village of Mata Ortiz is only three streets wide but stretches for a mile between the Casas Grandes River and the railroad tracks.
G. The patterns on Mata Ortiz pottery that Quezada admired are based on the techniques of the ancient Paquimé.
H. Quezada began working with clay from the mountains.
J. Quezada's painted designs became increasingly complex.

35. **A.** NO CHANGE
B. a dedication to teaching
C. a teacher of
D. has taught

36. In the preceding sentence, the clause "who at first thought they were prehistoric" primarily serves to indicate:

F. how closely Quezada had created his pots within the Paquimé tradition.
G. that Quezada's technique as a potter wasn't very well developed yet.
H. how strikingly simple Quezada's pots were in shape and design.
J. that the style of Quezada's pots was outmoded.

37. **A.** NO CHANGE
B. lead himself
C. led himself
D. lead him

38. Which choice most strongly suggests that Quezada's partnership with MacCallum was not formed right away upon MacCallum's arrival in Mata Ortiz?

F. NO CHANGE
G. a circumstantial
H. a momentary
J. a timely

MacCallum showed Quezada's pots to art dealers in the United States, the places in which (39) art galleries were soon offering Quezada thousands of dollars for them.

[1] Quezada helped his village with the money he earned selling pottery, but he wanted to do more so. (40) [2] So he taught people from Mata Ortiz to make pots. [3] Today there are more than four hundred potters around, all of (41) which (42) make their pots by hand, following the traditions of the Paquimé Indians. [4] The village is thriving, and many museums proudly display the pottery of Mata Ortiz. [5] Each artist brought something unique to they're (43) creations. [44]

39. **A.** NO CHANGE
B. and it would happen there that
C. where
D. DELETE the underlined portion.

40. **F.** NO CHANGE
G. more then that.
H. more of them.
J. more.

41. **A.** NO CHANGE
B. people creating art now,
C. potters in Mata Ortiz,
D. DELETE the underlined portion and place a comma after the word *hundred.*

42. **F.** NO CHANGE
G. whom
H. them
J. who

43. **A.** NO CHANGE
B. his or herselves
C. hers or his
D. his or her

44. For the sake of the logic and coherence of this paragraph, Sentence 5 should be placed:
F. where it is now.
G. before Sentence 1.
H. after Sentence 1.
J. after Sentence 2.

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer's primary purpose had been to write an essay summarizing the history of pottery making in Mexico. Would this essay accomplish that purpose?
A. Yes, because it discusses ancient pottery shards and complete pots from the Paquimé Indians and compares that pottery to modern designs.
B. Yes, because it demonstrates the quality of the ancient pottery of the Mata Ortiz area.
C. No, because it focuses instead on how one artist based his creations on ancient pottery techniques and shared those techniques with other artists.
D. No, because it focuses instead on describing the Casas Grandes culture in ancient Mexico.

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PASSAGE IV

Beaux Arts Architecture in the Spotlight

On West 45th Street in New York City, wedged between buildings more than twice it's height, stands the Lyceum Theatre. Tourists and New Yorkers alike regularly filling this theater to its 900-seat capacity. Most are there to attend a performance; a few, for example, are likely to be architecture buffs they come to admire the stunning building itself. Built in 1903, the theater exemplifies the Beaux Arts architectural style, which fuses elements of classical Greek and Roman design with Renaissance and Baroque details.

The Beaux Arts revival of classical Greek and Roman architecture is apparent on first view of the theater. The Lyceum's facade—the exterior front, or "face," of the building—features half a dozen Corinthian columns. Above the columns extends a horizontal stone band called a frieze; carved into it are the classical theatrical masks that represent comedy and tragedy. [51]

46. **F.** NO CHANGE
G. they're
H. their
J. its

47. **A.** NO CHANGE
B. alike, regularly filling
C. alike, regularly fill
D. alike regularly fill

48. **F.** NO CHANGE
G. consequently,
H. however,
J. in fact,

49. **A.** NO CHANGE
B. there to
C. whom
D. they

50. **F.** NO CHANGE
G. frieze; into which are carved
H. frieze. Into which are carved
J. frieze, carved into it are

51. The writer is considering adding the following sentence:

> Masks figured prominently in classical Greek theater performances, in part due to the fact that one actor would usually play several characters.

Should the writer make this addition here?

A. Yes, because it connects the paragraph's point about theatrical masks to the larger subject of classical Greek theater.
B. Yes, because it explains the masks' significance to classical Greek theater and architecture.
C. No, because it only addresses classical Greek theater and doesn't include information about Roman theater.
D. No, because it deviates from the paragraph's focus on the Lyceum Theatre's architecture.

Demonstrating the Beaux Arts infusion of Renaissance and Baroque details, tall, arched French windows, symmetrically placed between the columns, lighten the imposing gray limestone structure. [A] Above the windows and frieze, an exterior balcony spans the width of the gray (52) building. [B] The balcony is fenced with a balustrade, (53) a stone railing supported by a row of waist-high, vase-shaped pillars. [C] The ornate interior of the building is consistent with its elaborate exterior. [D] Not just one but two marble-finished grand staircases lead from the foyer to the midlevel seating area, called the mezzanine. Inside the theater itself, elegant chandeliers illuminate (54) rose-colored walls that have gold accents. (55) In keeping with sumptuous Beaux Arts style, curved rows of plush purple chairs embrace the stage. [56] [57]

52. F. NO CHANGE
G. gray limestone
H. limestone
J. DELETE the underlined portion.

53. A. NO CHANGE
B. balustrade. Which is
C. balustrade. It being
D. balustrade, this is

54. F. NO CHANGE
G. elegantly chandelier illuminates
H. elegantly chandelier illuminate
J. elegant chandeliers illuminates

55. Which choice maintains the essay's positive tone and most strongly mimics the elaborate style of decor being described at this point in the essay?
A. NO CHANGE
B. embellished with myriad gold accents.
C. marred with gaudy accents of gold.
D. accented with gold.

56. If the writer were to delete the preceding sentence, the essay would primarily lose details that:
F. illustrate one of the Lyceum Theatre's features that deviates from Beaux Arts architecture.
G. contribute to the description of the Lyceum Theatre's elaborate interior.
H. support the essay's claim that Beaux Arts architecture was most popular in the twentieth century.
J. clarify an unfamiliar architectural term used in the essay.

57. The writer wants to divide this paragraph into two in order to separate details about the building's outdoor features from details about its indoor features. The best place to begin the new paragraph would be at Point:
A. A.
B. B.
C. C.
D. D.

Patrons credit the handsome Beaux Arts aesthetic (58)

with adding enhancement to their theatergoing experience. (59) Though smaller and more cramped than many newer theaters—audience members often note that legroom is limited—the Lyceum's distinctive atmosphere continues to delight theater fans as well as architecture enthusiasts.

58. **F.** NO CHANGE
G. In the same manner, patrons
H. On one hand, patrons
J. For instance, patrons

59. **A.** NO CHANGE
B. adding enhancement to the experience of
C. adding to the experience of
D. enhancing

Question 60 asks about the preceding passage as a whole.

60. Suppose the writer's primary purpose had been to explain how a building illustrates a particular architectural style. Would this essay accomplish that purpose?

F. Yes, because it describes the architectural styles of several New York theater buildings.
G. Yes, because it enumerates a number of the Lyceum Theatre's Beaux Arts features.
H. No, because it focuses more specifically on the set design for the Lyceum Theatre's productions.
J. No, because it focuses on more than one architectural style.

PASSAGE V

Mother Jones: True to the Spirit of Her Cause

The autobiography by Mary Harris Jones is riddled with factual inaccurate. (61) Jones even fudges her date of birth, she falsely lists (62) May 1, International Workers' Day, and ages herself by nearly a decade. These untruths—whether deliberate exaggerations or slips of the memory—ultimately matters (63) very little, for (64) the autobiography isn't about the life of Mary Harris Jones. Jones became famous for her work. (65)

61. **A.** NO CHANGE
B. factually inaccuracies.
C. factual inaccuracies.
D. factually inaccurate.

62. **F.** NO CHANGE
G. birth: she falsely lists
H. birth; falsely listing
J. birth, falsely listing:

63. **A.** NO CHANGE
B. has mattered
C. had mattered
D. matter

64. **F.** NO CHANGE
G. little. For
H. little; for
J. little,

65. Given that all the choices are true, which one provides the best transition into the rest of the essay?

A. NO CHANGE
B. Born in Cork, Ireland, in 1837, Jones immigrated to the United States in the mid-1800s.
C. Rather, it's the story of her public persona, the radical labor activist "Mother Jones."
D. Instead, this essay will show you why Jones's role in history is so important.

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When Mary Harris Jones got involved in labor politics in the 1860s, it was rare for a woman to attend, let alone address, union meetings. Jones, however, became one of the movement's most powerful and controversial advocate's. [66] She traveled the United States, from the coal mines of Appalachia to the railroad yards of the West, rallying workers to join unions and fight for better working conditions. Specifically, Jones helped organize efforts to ensure that employers complied with laws governing workday hours and child labor.

The moniker "Mother Jones" was conferred on Jones by members of the American Railway Union. She herself, [67] adopted the name and, subsequently, a corresponding public persona. Her audiences came to expect "Mother Jones." [68] By 1900, the white-haired, calico-frocked figure was no longer known as Mary Harris Jones, [69] the media, union leaders and workers, and even U.S. presidents referred to her as Mother Jones.

Embracing the very role used to confine women to the domestic sphere, Jones subversively redefined the boundaries of home and family.

66. **F.** NO CHANGE
G. movement's most powerful and controversial advocates'.
H. movement's most powerful and controversial advocates.
J. movements most powerful and controversial advocates.

67. **A.** NO CHANGE
B. She, herself,
C. She, herself
D. She herself

68. At this point, the writer is considering adding the following true statement:

> To meet their expectations, Jones crafted her speech, dress, and mannerisms based on cultural notions of motherhood.

Should the writer make this addition here?

F. Yes, because it highlights the contrast between Jones's personal style and her audiences'.
G. Yes, because it adds details about what types of changes Jones made to create her public persona.
H. No, because it detracts from the focus of the paragraph by introducing unrelated details.
J. No, because it doesn't indicate the effect Jones's public persona had on audiences.

69. **A.** NO CHANGE
B. Jones, in fact,
C. Jones in fact
D. Jones;

"My address is like my shoes," she said. "It travels with me wherever I go." She was the matriarch who staunchly protected workers. [71]

And protect them she did: When workers went on strike, Jones secured food donations and temporary living arrangements. Where companies prevented the formation of unions, she fought for workers' right to organize. Instead of these tireless efforts on there behalf, workers trusted Mother Jones and, by extension, the labor unions she represented.

70. If the writer were to delete the underlined portion, the paragraph would primarily lose a quotation that:

F. questions the distinction between Mary Harris Jones and her public persona, Mother Jones.
G. reinforces the essay's characterization of Mother Jones as a happy-go-lucky vagabond.
H. reiterates the point that Jones enjoyed the travel opportunities her work provided.
J. provides support for the claim that Jones redefined the boundaries of home.

71. In the preceding sentence, the writer is considering replacing "workers" with "her family of workers." Should the writer make this revision?

A. Yes, because it completes the metaphor comparing Jones to the head of a family.
B. Yes, because it makes clear that Jones cared most about workers who were family relatives.
C. No, because it unnecessarily repeats information established earlier in the essay.
D. No, because it introduces an unrelated comparison between workers and family.

72. **F.** NO CHANGE
G. protections, to name a few, included:
H. she defined protection as:
J. she did this by:

73. **A.** NO CHANGE
B. Because of
C. Without
D. Despite

74. **F.** NO CHANGE
G. they're behalves,
H. their behalf,
J. their behalve's,

Question 75 asks about the preceding passage as a whole.

75. Suppose the writer's goal had been to summarize women's contributions to early-twentieth-century labor law reform. Would this essay accomplish that goal?

A. Yes, because it shows that Mother Jones was a well-known and respected labor agitator.
B. Yes, because it introduces a prominent figure in labor history.
C. No, because it focuses more specifically on labor law reform in the nineteenth century.
D. No, because it focuses more specifically on one figure in the labor movement.

END OF TEST 1

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

MATHEMATICS TEST

60 Minutes—60 Questions

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

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

DO YOUR FIGURING HERE.

1. The monthly fees for single rooms at 5 colleges are \$370, \$310, \$380, \$340, and \$310, respectively. What is the mean of these monthly fees?

   A. \$310
   B. \$340
   C. \$342
   D. \$350
   E. \$380

2. Disregarding sales tax, how much will you save when you buy a \$12.00 compact disc that is on sale for 25% off?

   F. \$0.30
   G. \$0.48
   H. \$3.00
   J. \$5.00
   K. \$9.00

3. Given $f = cd^3$, $f = 450$, and $d = 10$, what is c ?

   A. 0.45
   B. 4.5
   C. 15
   D. 45
   E. 150

4. Jorge's current hourly wage for working at Denti Smiles is \$12.00. Jorge was told that at the beginning of next month, his new hourly wage will be an increase of 6% of his current hourly wage. What will be Jorge's new hourly wage?

   F. \$12.06
   G. \$12.60
   H. \$12.72
   J. \$18.00
   K. \$19.20

5. The first term is 1 in the geometric sequence 1, −3, 9, −27, ···. What is the SEVENTH term of the geometric sequence?

   A. −243
   B. −30
   C. 81
   D. 189
   E. 729

DO YOUR FIGURING HERE.

6. If $\sqrt{a} = b$ and $b = 36$, $a = ?$

F. 6
G. 18
H. 72
J. 324
K. 1,296

7. The shipping rate for customers of Ship Quick consists of a fee per box and a price per pound for each box. The table below gives the fee and the price per pound for customers shipping boxes of various weights.

Weight of box (pounds)	Fee	Price per pound
Less than 10	$ 5.00	$1.00
10–25	$10.00	$0.65
More than 25	$20.00	$0.30

Gregg wants Ship Quick to ship 1 box that weighs 15 pounds. What is the shipping rate for this box?

A. $ 9.75
B. $16.50
C. $19.75
D. $20.00
E. $24.50

8. The table below shows the number of cars Jing sold each month last year. What is the median of the data in the table?

Month	Number of cars sold
January	25
February	15
March	22
April	19
May	16
June	13
July	19
August	25
September	26
October	27
November	28
December	29

F. 13
G. 16
H. 19
J. 20.5
K. 23.5

9. Students studying motion observed a cart rolling at a constant rate along a straight line. The table below gives the distance, d feet, the cart was from a reference point at 1-second intervals from $t = 0$ seconds to $t = 5$ seconds.

t	0	1	2	3	4	5
d	14	20	26	32	38	44

Which of the following equations represents this relationship between d and t ?

A. $d = t + 14$
B. $d = 6t + 8$
C. $d = 6t + 14$
D. $d = 14t + 6$
E. $d = 34t$

DO YOUR FIGURING HERE.

10. If $x + \frac{5}{8} = \frac{5}{24}$, then $x = ?$

F. 3

G. $\frac{5}{6}$

H. $\frac{1}{3}$

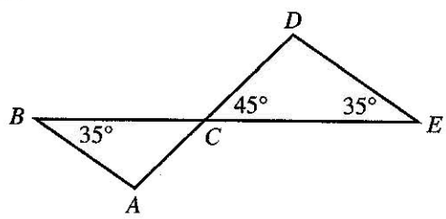
J. 0

K. $-\frac{5}{12}$

11. The absolute value of which of the following numbers is the greatest?

A. −0.4
B. −0.042
C. −0.0048
D. 0.04
E. 0.047

12. In the figure below, C is the intersection of $\overline{AD}$ and $\overline{BE}$. If it can be determined, what is the measure of $\angle BAC$?



F. 80°
G. 100°
H. 110°
J. 115°
K. Cannot be determined from the given information

13. This month, Kami sold 70 figurines in 2 sizes. The large figurines sold for \$12 each, and the small figurines sold for \$8 each. The amount of money he received from the sales of the large figurines was equal to the amount of money he received from the sales of the small figurines. How many large figurines did Kami sell this month?

A. 20
B. 28
C. 35
D. 42
E. 50

14. Given that $\sqrt{2x} - 11 = 1$, $x = ?$

F. −50
G. 24
H. 36
J. 50
K. 72

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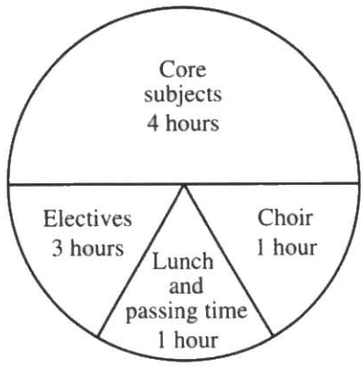
DO YOUR FIGURING HERE.

15. Antwan drew the circle graph below describing his time spent at school in 1 day. His teacher said that the numbers of hours listed were correct, but that the central angle measures for the sectors were not correct. What should be the central angle measure for the Core subjects sector?



A. 72°
B. 80°
C. 160°
D. 200°
E. 288°

16. The area of a rectangular sheet of paper is 32 square inches. The length of the sheet of paper is twice its width. What is the perimeter, in inches, of the sheet of paper?

F. 4
G. 8
H. 12
J. 16
K. 24

17. A car accelerated from 88 feet per second (fps) to 220 fps in exactly 3 seconds. Assuming the acceleration was constant, what was the car's acceleration, in feet per second per second, from 88 fps to 220 fps ?

A. $\frac{1}{44}$

B. $29\frac{1}{3}$

C. 44

D. $75\frac{1}{3}$

E. $102\frac{2}{3}$

18. In scientific notation, 670,000,000 + 700,000,000 = ?

F. 1.37×10^{-9}
G. 1.37×10^{7}
H. 1.37×10^{8}
J. 1.37×10^{9}
K. 137×10^{15}

DO YOUR FIGURING HERE.

19. In a plane, the distinct lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at A, where A is between C and D. The measure of $\angle BAC$ is $47°$. What is the measure of $\angle BAD$?

A. $43°$
B. $47°$
C. $94°$
D. $133°$
E. $137°$

20. Which of the following expressions is equivalent to $\frac{(3x)^2}{x^5}$?

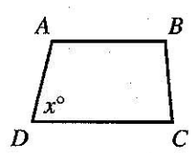
F. $\frac{3}{x^3}$
G. $\frac{6}{x^3}$
H. $\frac{9}{x^3}$
J. $3x^7$
K. $6x^7$

21. Whenever $4x + 7 = 2x - g$, which of the following expressions must be equal to x ?

A. $\frac{-g-7}{2}$
B. $\frac{-g+7}{2}$
C. $\frac{-g+7}{6}$
D. $\frac{g}{2}$
E. $-\frac{7}{4}$

22. For trapezoid $ABCD$ shown below, $\overline{AB} \parallel \overline{DC}$, the measures of the interior angles are distinct, and the measure of $\angle D$ is $x°$. What is the degree measure of $\angle A$ in terms of x ?

F. $(180 - x)°$
G. $(180 - 0.5x)°$
H. $(180 + 0.5x)°$
J. $(180 + x)°$
K. $x°$



23. Which of the following expressions is equivalent to $\frac{1}{2}y^2(6x + 2y + 12x - 2y)$?

A. $9xy^2$
B. $18xy$
C. $3xy^2 + 12x$
D. $9xy^2 - 2y^3$
E. $3xy^2 + 12x - y^3 - 2y$

DO YOUR FIGURING HERE.

24. Sara and Behzad are saving to make a down payment on a house. With an initial deposit of $8,000, they have opened an account that compounds interest at an annual rate of 2.1%. Assuming that Sara and Behzad make no additional deposits or withdrawals, which of the following expressions gives the dollar value of the account 4 years after the initial deposit?

(Note: For an account with an initial deposit of P dollars that compounds interest at an annual rate of $r\%$, the value of the account t years after the initial deposit is $P\left(1 + \frac{r}{100}\right)^t$ dollars.)

F. $8{,}000(1.021)^4$
G. $8{,}000(1.21)^4$
H. $8{,}000(3.1)^4$
J. $8{,}000(121)^4$
K. $8{,}000 + 8{,}000(0.21)^4$

25. Right triangle $\triangle RST$ has its right angle at vertex S. The length of $\overline{ST}$ is 6.0 feet and the length of $\overline{RS}$ is 2.5 feet. Which of the following values is closest to the length, in feet, of $\overline{RT}$?

A. 3.5
B. 4.3
C. 5.5
D. 6.5
E. 8.5

26. An artist makes a profit of $(500p - p^2)$ dollars from selling p paintings. What is the fewest number of paintings the artist can sell to make a profit of at least $60,000 ?

F. 100
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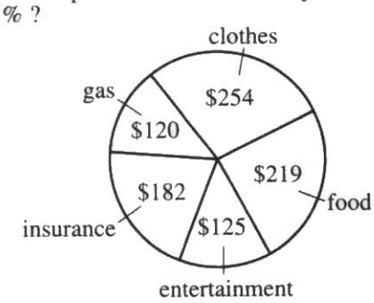
G. 150
H. 200
J. 300
K. 600

27. Last month, Lucie had total expenditures of $900. The pie chart below breaks down these expenditures by category. The category in which Lucie's expenditures were greatest is what percent of her total expenditures, to the nearest 1% ?



A. 24%
B. 28%
C. 32%
D. 34%
E. 39%

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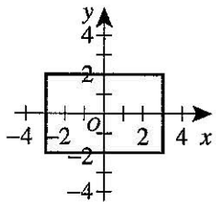
DO YOUR FIGURING HERE.

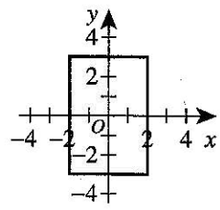
28. When the system of inequalities below is graphed in the standard (x,y) coordinate plane, one of the following graphs is that of the solution set of the system. Which graph?

$$\begin{cases} -3 \le x \le 3 \\ -2 \le y \le 2 \end{cases}$$

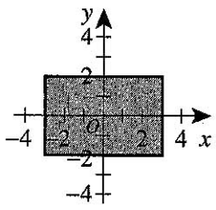
F.



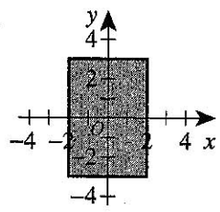
J.



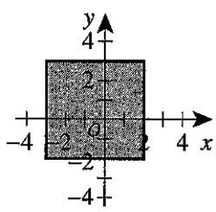
G.



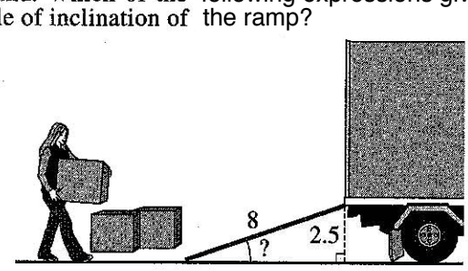
K.



H.



29. Janelle is loading a truck by using a ramp, as shown below. The ramp is 8 feet long, and the end of the ramp that is resting on the truck is 2.5 feet above the level ground. Which of the following expressions gives the angle of inclination of the ramp?



A. $\text{Arccos}\left(\frac{2.5}{8}\right)$

B. $\text{Arcsin}\left(\frac{2.5}{8}\right)$

C. $\text{Arctan}\left(\frac{2.5}{8}\right)$

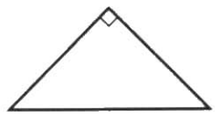
D. $\text{Arccos}\left(\frac{8}{2.5}\right)$

E. $\text{Arcsin}\left(\frac{8}{2.5}\right)$

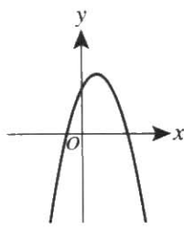
DO YOUR FIGURING HERE.

30. What is the perimeter, in inches, of the isosceles right triangle shown below, whose hypotenuse is $8\sqrt{2}$ inches long?

F. 8
G. $8 + 8\sqrt{2}$
H. $8 + 16\sqrt{2}$
J. 16
K. $16 + 8\sqrt{2}$



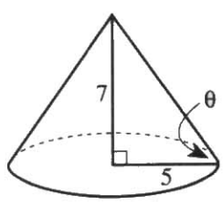
31. The equation $y = ax^2 + bx + c$ is graphed in the standard (x,y) coordinate plane below for real values of a, b, and c. When $y = 0$, which of the following best describes the solutions for x ?



A. 2 distinct positive real solutions
B. 2 distinct negative real solutions
C. 1 positive real solution and 1 negative real solution
D. 2 real solutions that are not distinct
E. 2 distinct solutions that are not real

32. The radius of the base of the right circular cone shown below is 5 inches, and the height of the cone is 7 inches. Solving which of the following equations gives the measure, θ, of the angle formed by a slant height of the cone and a radius?

F. $\tan\theta = \frac{5}{7}$
G. $\tan\theta = \frac{7}{5}$
H. $\sin\theta = \frac{5}{7}$
J. $\sin\theta = \frac{7}{5}$
K. $\cos\theta = \frac{7}{5}$



33. A formula to estimate the monthly payment, p dollars, on a short-term loan is

$$p = \frac{\frac{1}{2}ary + a}{12y}$$

where a dollars is the amount of the loan, r is the annual interest rate expressed as a decimal, and y years is the length of the loan. When a is multiplied by 2, what is the effect on p ?

A. p is divided by 6
B. p is divided by 2
C. p does not change
D. p is multiplied by 2
E. p is multiplied by 4

DO YOUR FIGURING HERE.

34. To make a 750-piece jigsaw puzzle more challenging, a puzzle company includes 5 extra pieces in the box along with the 750 pieces, and those 5 extra pieces do not fit anywhere in the puzzle. If you buy such a puzzle box, break the seal on the box, and immediately select 1 piece at random, what is the probability that it will be 1 of the extra pieces?

F. $\frac{1}{5}$

G. $\frac{1}{755}$

H. $\frac{1}{750}$

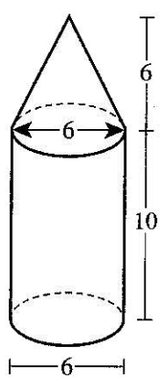
J. $\frac{5}{755}$

K. $\frac{5}{750}$

35. The length of a rectangle is 3 inches more than twice the width of the rectangle. The perimeter of the rectangle is 36 inches. What is the width of the rectangle, in inches?

A. 4
B. 5
C. 9
D. 11
E. 13

36. The solid shown below is composed of a right circular cylinder and a right circular cone with base diameters and heights given in centimeters. The cylinder and the cone have equal base diameters. What is the volume, in cubic centimeters, of the solid?



(Note: The volume of a right circular cylinder with base radius r and height h is $\pi r^2 h$. The volume of a right circular cone with base radius r and height h is $\frac{1}{3}\pi r^2 h$.)

F. 72π
G. 96π
H. 108π
J. 144π
K. 360π

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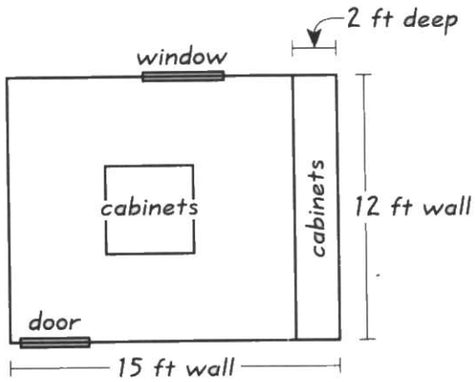
DO YOUR FIGURING HERE.

Use the following information to answer questions 37–39.

Gianna is converting a 12-foot-by-15-foot room in her house to a craft room. Gianna will install tile herself but will have CC Installations build and install the cabinets. The scale drawing shown below displays the location of the cabinets in the craft room (0.25 inch represents 2 feet).



Cabinets will be installed along one of the 12-foot walls from floor to ceiling, and 4 cabinets that are each 3 feet tall will be installed in the middle of the room. These are the only cabinets that will be installed, and each of them will be 2 feet wide and 2 feet deep. CC Installations has given Gianna an estimate of $2,150.00 for building and installing the cabinets.

37. A 15-foot wall is how many inches long in the scale drawing?

A. 1.5
B. 1.875
C. 3
D. 3.375
E. 3.75

38. Gianna will install tile on the portion of the floor that will NOT be covered by cabinets. What is the area, in square feet, of the portion of the floor that will NOT be covered by cabinets?

F. 72
G. 90
H. 140
J. 156
K. 164

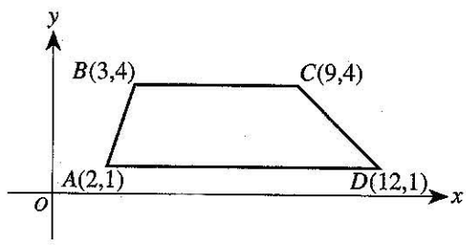
39. CC Installations' estimate consists of a $650.00 charge for labor, plus a fixed charge per cabinet. The labor charge and the charge per cabinet remain the same for any number of cabinets built and installed. CC Installations would give Gianna what estimate if the craft room were to have twice as many cabinets as Gianna is planning to have?

A. $2,800.00
B. $3,000.00
C. $3,450.00
D. $3,650.00
E. $4,300.00

DO YOUR FIGURING HERE.

Use the following information to answer questions 40–42.

Trapezoid $ABCD$ is graphed in the standard (x,y) coordinate plane below.



40. What is the slope of $\overline{CD}$?

F. -3

G. -1

H. 1

J. $\frac{5}{21}$

K. $\frac{3}{2}$

41. When $ABCD$ is reflected over the y-axis to $A'B'C'D'$, what are the coordinates of D' ?

A. $(-12, 1)$
B. $(-12, -1)$
C. $(12, -1)$
D. $(1, 12)$
E. $(1, -12)$

42. Which of the following vertical lines cuts $ABCD$ into 2 trapezoids with equal areas?

F. $x = 2.5$
G. $x = 3.5$
H. $x = 4.5$
J. $x = 5.5$
K. $x = 6.5$

---

43. Given that $a\begin{bmatrix} 2 & 6 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} x & 27 \\ y & z \end{bmatrix}$ for some real number a, what is $x + z$?

A. $\frac{4}{3}$

B. $\frac{27}{2}$

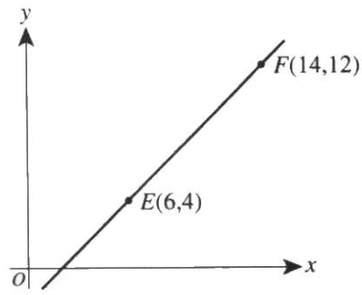
C. 26

D. 27

E. 48

DO YOUR FIGURING HERE.

44. The points $E(6,4)$ and $F(14,12)$ lie in the standard (x,y) coordinate plane shown below. Point D lies on $\overline{EF}$ between E and F such that the length of $\overline{EF}$ is 4 times the length of $\overline{DE}$. What are the coordinates of D ?



F. (7, 5)
G. (8, 6)
H. (8, 8)
J. (10, 8)
K. (12,10)

45. A certain triangle has a perimeter of x meters. One side of the triangle is 60 meters long, another side is $\frac{1}{3}$ the length of the perimeter, and the third side is $\frac{1}{4}$ the length of the perimeter. What is the perimeter, in meters, of the triangle?

A. 15
B. 35
C. 84
D. 95
E. 144

46. The difference (larger minus smaller) between 2 numbers is 15. If n represents the larger number, which expression below represents the average (arithmetic mean) of the 2 numbers?

F. 7.5
G. $n + 7.5$
H. $n + 15$
J. $n - 15$
K. $n - 7.5$

47. $\frac{4}{\sqrt{2}} + \frac{2}{\sqrt{3}} = ?$

A. $\frac{4\sqrt{3} + 2\sqrt{2}}{\sqrt{5}}$

B. $\frac{4\sqrt{3} + 2\sqrt{2}}{\sqrt{6}}$

C. $\frac{6}{\sqrt{2} + \sqrt{3}}$

D. $\frac{6}{\sqrt{5}}$

E. $\frac{8}{\sqrt{6}}$

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DO YOUR FIGURING HERE.

48. A square in the standard (x,y) coordinate plane has vertices at (1,3), (2,1), (4,2), and (3,4). Where do the diagonals of the square intersect?

F. $\left(\frac{3}{2}, 2\right)$

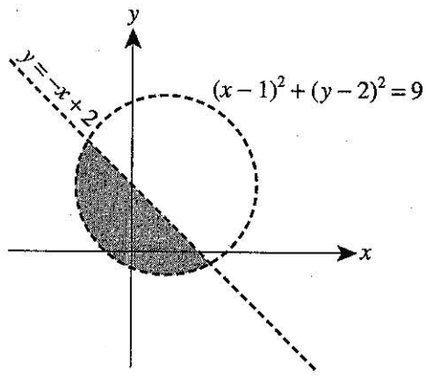
G. $(2, 3)$

H. $\left(2, \frac{3}{2}\right)$

J. $\left(\frac{5}{2}, \frac{5}{2}\right)$

K. $\left(\frac{7}{2}, 3\right)$

49. The shaded region in the graph below represents the solution set to which of the following systems of inequalities?



A. $\begin{cases} y < -x + 2 \\ (x-1)^2 + (y-2)^2 < 9 \end{cases}$

B. $\begin{cases} y > -x + 2 \\ (x-1)^2 + (y-2)^2 < 9 \end{cases}$

C. $\begin{cases} y > -x + 2 \\ (x-1)^2 + (y-2)^2 > 9 \end{cases}$

D. $\begin{cases} y < -x + 2 \\ (x-1)^2 + (y-2)^2 > 9 \end{cases}$

E. $\begin{cases} (y-2) < 3 \\ (x-1) > 3 \end{cases}$

50. In the standard (x,y) coordinate plane, line a contains the points (−4,2) and (−1,−3), and line b contains the points (3,0) and (7,0). At what point does line a intersect line b ?

F. $\left(-\frac{14}{5}, 0\right)$

G. $\left(\frac{107}{35}, \frac{3}{7}\right)$

H. $\left(0, -\frac{14}{3}\right)$

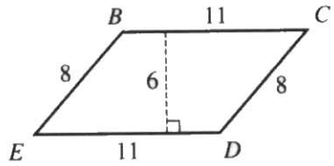
J. $\left(3, -\frac{29}{3}\right)$

K. $\left(7, -\frac{49}{3}\right)$

DO YOUR FIGURING HERE.

51. In the figure below, the side lengths and the length of an altitude of parallelogram *BCDE* are given in feet. What is the area, in square feet, of *BCDE* ?

A. 25
B. 38
C. 48
D. 66
E. 88



52. The square below is divided into 3 rows of equal area. In the top row, the region labeled A has the same area as the region labeled B. In the middle row, the 3 regions have equal areas. In the bottom row, the 4 regions have equal areas. What fraction of the square's area is in a region labeled A ?

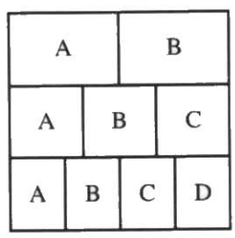
F. $\frac{1}{9}$

G. $\frac{3}{9}$

H. $\frac{6}{9}$

J. $\frac{13}{12}$

K. $\frac{13}{36}$



53. Which of the following is a quadratic equation that has $-\frac{2}{3}$ as its only solution?

A. $9x^2 + 12x + 4 = 0$
B. $9x^2 - 12x + 4 = 0$
C. $9x^2 + 6x + 4 = 0$
D. $9x^2 + 4 = 0$
E. $9x^2 - 4 = 0$

54. Bonkosi mixes 60 milliliters of Solution A with 40 milliliters of Solution X. Solution A has a 40% hydrochloric acid concentration; Solution X has an unknown hydrochloric acid concentration. When Bonkosi tests the resulting 100-milliliter solution, she finds that it has a 36% hydrochloric acid concentration. What is the hydrochloric acid concentration of Solution X ?

F. 19%
G. 24%
H. 30%
J. 32%
K. 38%

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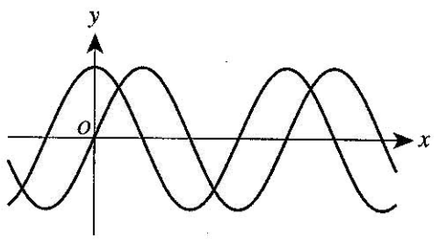
DO YOUR FIGURING HERE.

55. What are the real number values of x that make the equation $\sqrt[4]{x^{12}} = x^3$ true?

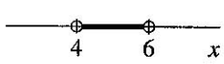
A. All real numbers
B. $x < 0$
C. $x > 0$
D. $x \leq 0$
E. $x \geq 0$

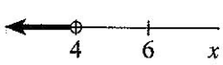
56. The functions $y = \sin x$ and $y = \sin(x + a) + b$, for constants a and b, are graphed in the standard (x,y) coordinate plane below. The functions have the same maximum value. One of the following statements about the values of a and b is true. Which statement is it?

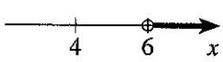


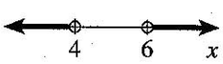
F. $a < 0$ and $b = 0$
G. $a < 0$ and $b > 0$
H. $a = 0$ and $b > 0$
J. $a > 0$ and $b < 0$
K. $a > 0$ and $b > 0$

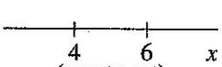
57. Which of the following number line graphs shows the solution set to the inequality $|x - 5| < -1$?

A.


B.


C.


D.


E.


(empty set)

DO YOUR FIGURING HERE.

58. The sides of an acute triangle measure 14 cm, 18 cm, and 20 cm, respectively. Which of the following equations, when solved for θ, gives the measure of the smallest angle of the triangle?

(Note: For any triangle with sides of length a, b, and c that are opposite angles A, B, and C, respectively, $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ and $c^2 = a^2 + b^2 - 2ab \cos C$.)

F. $\frac{\sin \theta}{14} = \frac{1}{18}$

G. $\frac{\sin \theta}{14} = \frac{1}{20}$

H. $\frac{\sin \theta}{20} = \frac{1}{14}$

J. $14^2 = 18^2 + 20^2 - 2(18)(20)\cos \theta$

K. $20^2 = 14^2 + 18^2 - 2(14)(18)\cos \theta$

59. For all values of x where the expression is defined,

$$\frac{\frac{3}{x-5}}{1 - \frac{2}{x-5}} = ?$$

A. -3

B. $-\frac{3}{2}$

C. $-\frac{3}{x^2 - 25}$

D. $\frac{3}{x-7}$

E. $\frac{3}{x-3}$

60. Mr. Martin wants to plant 7 trees evenly spaced along a straight fence 300 feet long, with 1 of the trees at each end of the fence. About how many feet apart should he plant the trees?

F. 33
G. 38
H. 43
J. 50
K. 60

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

READING TEST

35 Minutes—40 Questions

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

Passage I

PROSE FICTION: This passage is adapted from the novel *The Ground Beneath Her Feet* by Salman Rushdie (©1999 by Salman Rushdie).

Art Deco is an architectural and decorative style that was popular in the first half of the twentieth century.

When you grow up, as I did, in a great city, during what just happens to be its golden age, you think of it as eternal. Always was there, always will be. The grandeur of the metropolis creates the illusion of permanence. The peninsular Bombay into which I was born certainly seemed perennial to me. Malabar and Cumballa hills were our Capitol and Palatine, the Brabourne Stadium was our Colosseum, and as for the glittering Art Deco sweep of Marine Drive, well, that was something not even Rome could boast. I actually grew up believing Art Deco to be the "Bombay style," a local invention, its name derived, in all probability, from the imperative of the verb "to see." *Art dekho*. Lo and behold art. (When I began to be familiar with images of New York, I at first felt a sort of anger. The Americans had so much; did they have to possess our "style" as well? But in another, more secret part of my heart, the Art Deco of Manhattan, built on a scale so much grander than our own, only increased America's allure, made it both familiar and awe-inspiring, our little Bombay writ large.)

In reality that Bombay was almost brand-new when I knew it; what's more, my parents' construction firm of Merchant & Merchant had been prominent in its making. In the ten years before my own coming into the world, the city had been a gigantic building site; as if it were in a hurry to become, as if it knew it had to provide itself in finished condition by the time I was able to start paying attention to it . . . No, no, I don't really think along such solipsistic lines. I'm not over-attached to history, or Bombay. Me, I'm the under-attached type.

But let me confess that, even as a child, I was insanely jealous of the city in which I was raised, because it was my parents' other love. They loved each other (good), they loved me (very good), and they loved her (not so good). Bombay was my rival. It was on account of their romance with the city that they drew up that weekly rota (list) of shared parental responsibilities. When my mother wasn't with me—when I was riding on my father's shoulders, or staring, with him, at the fish in the Taraporewala Aquarium—she was out there with *her*, with Bombay; out there bringing her into being. (For of course construction work never stops completely, and supervising such work was Ameer's particular genius. My mother the master builder. Like her father before her.) And when my father handed me over to her, he went off, wearing his local-history hat and a khaki jacket full of pockets, to dig in the foundations of building sites for the secrets of the city's past, or else sat hatless and coatless at a designing board and dreamed his lo-and-behold dreams.

Maps of the early town afforded my father great joy, and his collection of old photographs of the edifices and *objets* of the vanished city was second to none. In these faded images were resurrected the demolished Fort, the "breakfast bazaar" market outside the Teen Darvaza or Bazaargate, and the humble mutton shops and umbrella hospitals of the poor, as well as the fallen palaces of the great. The early city's relics filled his imagination as well as his photo albums. It was from my father that I learned of Bombay's first great photographers, Raja Deen Dayal and A. R. Haseler, whose portraits of the city became my first artistic influences, if only by showing me what I did not want to do. Dayal climbed the Rajabai tower to create his sweeping panoramas of the birth of the city; Haseler went one better and took to the air. Their images were awe-inspiring, unforgettable, but they also inspired in me a desperate need to get back down to ground level. From the heights you see only pinnacles. I yearned for the city streets, the knife grinders, the water carriers, the pavement moneylenders, the peremptory soldiers, the railway hordes, the chess players in the Irani restaurants, the snake-buckled schoolchildren, the beggars, the fishermen, the moviemakers, the dockers, the book sewers, the loom operators, the priests. I yearned for life.

When I said this to my father he showed me photos, still lives of storefronts and piers, and told me I was too young to understand. "See where people lived and worked and shopped," he clarified, with a rare flash of irritation, "and it becomes plain what they were like." For all his digging, Vivvy Merchant was content with the surfaces of his world. I, his photographer son, set out to prove him wrong, to show that a camera can see beyond the surface, beyond the trappings of the actual, and penetrate to its flesh and heart.

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1. The passage as a whole can primarily be characterized as the narrator's:
   A. explanation of the relationship the narrator and his parents had with the city of Bombay.
   B. description of important buildings and locations in Bombay.
   C. argument for Bombay's prominence in the world of architecture.
   D. concerns about the emotional environment in which the narrator was raised.

2. The narrator describes the photos by Bombay's first great photographers as primarily inspiring the narrator to:
   F. turn away from a career in photography.
   G. create grand panoramas of the new Bombay.
   H. produce images that his father would add to his collection.
   J. photograph subjects that depict everyday life on Bombay's streets.

3. In lines 25–31, the narrator muses over, then rejects, the notion that:
   A. Merchant & Merchant played an important role in the building of Bombay.
   B. he started paying attention to Bombay at a young age.
   C. his anticipated birth was one of the causes of the rush to finish the building of Bombay.
   D. Bombay had been a gigantic building site in the years before he was born.

4. In lines 32–43, the narrator uses which of the following literary devices to describe Bombay?
   F. Alliteration
   G. Allusion
   H. Personification
   J. Simile

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5. Which of the following statements best captures how the narrator's parents balanced their parental duties with their work at the construction company?
   A. The narrator's mother did the majority of the work at the construction company, while the narrator's father took care of the narrator.
   B. The narrator's parents traded off responsibility for taking care of the narrator and working at the construction company.
   C. The narrator's father worked at his designing board, while the narrator's mother took the narrator along to building sites.
   D. The narrator's parents both worked at the construction company, while the narrator stayed home with a babysitter.

6. As it is used in line 9, the word *sweep* most nearly means:
   F. overwhelming victory.
   G. wide-ranging search.
   H. complete removal.
   J. broad area.

7. In the context of the passage, the primary function of lines 6–10 is to:
   A. compare architectural landmarks in Bombay to those elsewhere.
   B. help illustrate how the term "art deco" was derived.
   C. contradict the idea that Bombay was in its golden age when the narrator was a child.
   D. provide examples of "Bombay style" architecture in Rome.

8. The narrator as a child viewed the work his parents did for Merchant & Merchant with a strong sense of:
   F. joy; the work provided the family with enough money to live extravagant lives.
   G. fear; the narrator knew his parents were often so exhausted they were careless about safety.
   H. jealousy; the work pulled the narrator's parents away from him and directed their attention to the city.
   J. respect; his parents were known for their quality workmanship throughout the city.

9. As it is used in line 38, the phrase *drew up* most nearly means:
   A. extended.
   B. prepared.
   C. approached.
   D. straightened.

10. In the last paragraph, the narrator's father shows the narrator the photos of storefronts and piers in order to:
   F. teach the narrator about the commercial progress the people who work in Bombay have made.
   G. convince the narrator that Dayal and Haseler were Bombay's first great photographers.
   H. clarify his claim that his photo collection was not about modern-day Bombay but rather about the early twentieth century.
   J. illustrate that photos of places can reveal as much about the people who spent time there as photos of the people themselves.

Passage II

SOCIAL SCIENCE: This passage is adapted from *Great Waters: An Atlantic Passage* by Deborah Cramer (©2001 by Deborah Cramer).

The Sargasso Sea is a part of the northern Atlantic Ocean.

As the *Cramer* idles through the Sargasso Sea, waiting for the wind to rise, the sea is flat and empty. Nothing demarcates or divides the smooth expanse of water dissolving into the horizon. This vast, unroughened surface, this breadth of uniform sea, deceives. But for a few lonely oceanic islands, the unperturbed surface offers no hint of the grand and sweeping energies hidden below.

Only one thousand miles offshore, the *Cramer* has already sailed through some of Atlantic's deepest waters. Contrary to what one might guess, Atlantic's deepest waters, like those in other oceans, are along her edges. As we continue east, toward the middle of the sea, the bottom rises. The unmarked plains of the abyss, here flattened by layers of sediment, give way to rising foothills and then to mountains. The first maps of Atlantic seafloor noted, albeit crudely, this rise. Early efforts to plumb Atlantic's depths proved outrageously inaccurate: one naval officer paid out eight miles (thirteen kilometers) of hemp rope from a drifting ship and concluded the sea had no bottom. Eventually, sailors more or less successfully calculated depth by heaving overboard cannonballs tied to bailing twine. When they hit bottom, the sailors measured and snipped the twine and then moved on, leaving a trail of lead strung out across the seafloor. These crude soundings, forming the basis of the first map of Atlantic's basin, published in 1854, identified a prominent rise halfway between Europe and America.

For many years no one could explain why the basin of Atlantic, unlike a bowl, deepened at its edges and shoaled in its center. People assumed that this "Middle Ground," "Telegraph Plateau," or "Dolphin Rise," as it was variously called, was an ancient and drowned land bridge, or a lost continent, but sailors repairing transatlantic telegraph cable unknowingly produced evidence to prove otherwise. Wrestling with the broken cable, they accidentally twisted off a piece of the "plateau" and dredged up a twenty-one-pound (ten-kilogram) chunk of dense black volcanic rock. It was some of the youngest, freshest rock on earth, and it was torn not from a piece of continent sunk beneath the waves, but from the very foundation of the sea.

Today, highly sophisticated sound waves bring the hazy images of those early soundings into sharp focus, revealing that one of the largest and most salient geographic features on the planet lies on the floor of the ocean. Hidden beneath the waves is an immense submerged mountain range, the backbone of the sea. More extensive, rugged, and imposing than the Andes, Rockies, or Himalayas, it covers almost as much of earth's surface as the dry land of continents. Winding like the seam of a baseball, it circles the planet in a long, sinuous path, running the entire length of Atlantic, slashing the basin neatly in two. Its mountains are stark and black, as black as the sea itself, lit only at their peaks by a thin, patchy covering of white, the skeletal remains of tiny microscopic animals that once lived at the surface. Peaks as high as Mount St. Helens sit in a watery world of blackness, more than a mile below the surface, beyond the reach of light, beyond the sight of sailors.

A great valley, eclipsing any comparable feature on dry land, runs through these mountains. Arizona's Grand Canyon, one of earth's most spectacular places, extends for about 280 miles (450 kilometers). A lesser-known canyon of similar depth but considerably greater length lies hidden in the mountains of the ridge. Although offset in many places by breaks in the mountains, the rift valley, as the canyon is called, extends the length of Atlantic for 11,000 miles (17,700 kilometers). Here in this bleak and forbidding place, where the water is almost freezing, subterranean fires have lifted mounds of fresh lava onto the seafloor. Scientists visiting the rift valley for the first time named the volcanic hills in this otherworldly setting after distant, lifeless planets.

Yet, what had seemed so foreign to scientists is an integral part of earth's very being, for at the ridge our own planet gives birth. The floor of the rift valley is torn; from the gashes has sprung the seafloor underlying all of Atlantic. Here the youngest, newest pieces are made. Earth is still cooling from her tumultuous birth four and a half billion years ago. Heat, leaking from the molten core and from radioactive decay deep inside the planet, rises toward earth's surface, powering the volcanoes that deliver the ridge to the sea.

11. The author's attitude toward the main subject of the passage can best be described as:

A. awe and fascination.
B. disbelief and cynicism.
C. amusement and nostalgia.
D. boredom and indifference.

12. The passage makes clear that "Middle Ground," "Telegraph Plateau," and "Dolphin Rise" were names that people gave to what was actually:

F. an island in Atlantic.
G. a transatlantic telegraph cable.
H. an ancient and drowned land bridge.
J. the immense mountain range in Atlantic's basin.

13. In the first paragraph, the author describes the stillness of the Sargasso Sea as the *Cramer* passes through it primarily to emphasize that the stillness:

A. won't last long, for the sea will become rough when the wind rises.
B. makes it easy for a passenger on the *Cramer* to spot oceanic islands that break the water's surface.
C. is in dramatic contrast to the power of what exists on and under the seafloor far below.
D. makes it seem as if the *Cramer*'s wake is dividing the unbroken expanse of water into two.

14. The passage states that compared to Arizona's Grand Canyon, the canyon that lies within the mountains in Atlantic's basin is considerably:

F. deeper.
G. older.
H. wider.
J. longer.

15. The main purpose of the information in lines 71–76 is to:

A. describe in detail scientists' expectations for their first trip to the rift valley.
B. characterize the rift valley as an alien, seemingly barren place.
C. provide statistics about several geographic properties of the rift valley.
D. list the names that scientists gave to the volcanic hills in the rift valley.

16. One of the main purposes of the last paragraph is to state that the:

F. gashes in the rift valley continue to increase in width.
G. seafloor of Atlantic has cooled.
H. entire Atlantic seafloor has issued from the gashes in the rift valley.
J. volcanoes on Earth's dry land have created the newest, youngest pieces of Atlantic seafloor.

17. The author most strongly implies that people commonly assume the deepest waters of an ocean are:

A. about one thousand miles offshore.
B. at the middle of the ocean.
C. dotted with islands.
D. located in trenches.

18. As it is used in line 19, the phrase *paid out* most nearly means:

F. dispensed.
G. ascertained.
H. suggested.
J. compensated.

19. According to the passage, the mountain range in Atlantic's basin covers nearly the same amount of Earth's surface as does:

A. Mount St. Helens.
B. the Himalayas.
C. the Pacific Ocean.
D. the dry land of continents.

20. According to the passage, the white cover on the peaks of the mountains in Atlantic's basin is:

F. skeletal remains of microscopic animals.
G. thin layers of sedimentary volcanic ash.
H. patches of ice.
J. salt deposits.

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Passage III

HUMANITIES: Passage A is adapted from the essay "Just This Side of Byzantium" by Ray Bradbury (©1975 by Ray Bradbury), which is the introduction to a later edition of Bradbury's 1957 novel *Dandelion Wine*. Passage B is adapted from *Dandelion Wine* (©1957 by Ray Bradbury).

Passage A by Ray Bradbury

I began to learn the nature of surprises, thankfully, when I was fairly young as a writer. Before that, like every beginner, I thought you could beat, pummel, and thrash an idea into existence. Under such treatment, of course, any decent idea folds up its paws, turns on its back, fixes its eyes on eternity, and dies.

It was with great relief, then, that in my early twenties I floundered into a word-association process in which I simply got out of bed each morning, walked to my desk, and put down any word or series of words that happened along in my head.

I would then take arms against the word, or for it, and bring on an assortment of characters to weigh the word and show me its meaning in my own life. An hour or two hours later, to my amazement, a new story would be finished and done. The surprise was total and lovely. I soon found that I would have to work this way for the rest of my life.

First I rummaged my mind for words that could describe my personal nightmares, fears of night and time from my childhood, and shaped stories from these.

Then I took a long look at the green apple trees and the old house I was born in and the house next door where lived my grandparents, and all the lawns of the summers I grew up in, and I began to try words for all that.

I had to send myself back, with words as catalysts, to open the memories out and see what they had to offer.

So from the age of twenty-four to thirty-six hardly a day passed when I didn't stroll myself across a recollection of my grandparents' northern Illinois grass, hoping to come across some old half-burnt firecracker, a rusted toy, or a fragment of letter written to myself in some young year hoping to contact the older person I became to remind him of his past, his life, his people, his joys, and his drenching sorrows.

Along the way I came upon and collided, through word-association, with old and true friendships. I borrowed my friend John Huff from my childhood in Arizona and shipped him East to Green Town so that I could say good-bye to him properly.

Along the way, I sat me down to breakfasts, lunches, and dinners with the long dead and much loved.

Thus I fell into surprise. I came on the old and best ways of writing through ignorance and experiment and was startled when truths leaped out of bushes like quail before gunshot. I blundered into creativity as any child learning to walk and see. I learned to let my senses and my Past tell me all that was somehow true.

Passage B by Ray Bradbury

The facts about John Huff, aged twelve, are simple and soon stated. He could pathfind more trails than anyone since time began, could leap from the sky like a chimpanzee from a vine, could live underwater two minutes and slide fifty yards downstream from where you last saw him. The baseballs you pitched him he hit in the apple trees, knocking down harvests. He ran laughing. He sat easy. He was not a bully. He was kind. He knew the names of all the wild flowers and when the moon would rise and set. He was, in fact, the only god living in the whole of Green Town, Illinois, during the twentieth century that Douglas Spaulding knew of.

And right now he and Douglas were hiking out beyond town on another warm and marble-round day, the sky blue blown-glass reaching high, the creeks bright with mirror waters fanning over white stones. It was a day as perfect as the flame of a candle.

Douglas walked through it thinking it would go on this way forever. The sound of a good friend whistling like an oriole, pegging the softball, as you horse-danced, key-jingled the dusty paths; things were at hand and would remain.

It was such a fine day and then suddenly a cloud crossed the sky, covered the sun, and did not move again.

John Huff had been speaking quietly for several minutes. Now Douglas stopped on the path and looked over at him.

"John, say that again."

"You heard me the first time, Doug."

"Did you say you were—going away?"

John took a yellow and green train ticket solemnly from his pocket and they both looked at it.

"Tonight!" said Douglas. "My gosh! Tonight we were going to play Red Light, Green Light and Statues! How come, all of a sudden? You been here in Green Town all my life. You just don't pick up and leave!"

"It's my father," said John. "He's got a job in Milwaukee. We weren't sure until today . . . "

They sat under an old oak tree on the side of the hill looking back at town. Out beyond, in sunlight, the town was painted with heat, the windows all gaping. Douglas wanted to run back in there where the town, by its very weight, its houses, their bulk, might enclose and prevent John's ever getting up and running off.

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Questions 21–25 ask about Passage A.

21. When Bradbury claims, "Thus I fell into surprise" (line 46), he's most nearly referring to the:
   A. discovery that for him the secret to a creative outpouring was to use a word-association method to write fiction.
   B. long-forgotten experiences he would remember when he would talk with his childhood friends in person.
   C. realization that he wrote more effectively about his current experiences than about his past.
   D. several methods other writers taught him to help him write honest, authentic stories.

22. Passage A indicates that Bradbury believes all beginning writers think that they can:
   F. learn the nature of surprises.
   G. force an idea into creation.
   H. use one word as a catalyst for a story.
   J. become a good writer through experiment.

23. Bradbury's claim "I would then take arms against the word, or for it" (line 12) most strongly suggests that during his writing sessions, Bradbury would:
   A. attempt to find the one word that for him was the key to understanding John Huff.
   B. often reject a word as not being a catalyst for meaningful writing.
   C. deliberately choose to write only about a word that inspired his fears.
   D. feel as though he were struggling to find a word's significance to him.

24. In the seventh paragraph of Passage A (lines 30–37), Bradbury explains his habit, over many years as a writer, of almost daily:
   F. looking at and writing about objects from his childhood that he had saved.
   G. wishing he had kept more letters from his childhood to trigger his memories.
   H. driving past his grandparents' property, hoping to notice something that would remind him of his past.
   J. thinking about his grandparents' property, hoping to remember something that would bring his past into focus.

25. Passage A explains that when writing about the character John Huff, Bradbury had:
   A. placed John in a town in Arizona, where Bradbury himself had grown up.
   B. included John in stories about a town in Arizona and in stories about Green Town.
   C. "moved" John to a town other than the town in which the real-life John Huff had grown up.
   D. "borrowed" John to use as a minor character in many of his stories.

Questions 26 and 27 ask about Passage B.

26. In the first paragraph of Passage B (lines 52–63), the narrator describes John Huff in a manner that:
   F. emphasizes John's physical strength and intelligence, to indicate John's view of himself.
   G. exaggerates John's characteristics and actions, to reflect Douglas's idolization of John.
   H. highlights John's reckless behavior, to show that Douglas was most fond of John's rebelliousness.
   J. showcases John's talents, to make clear why both children and adults admired John.

27. Within Passage B, the image in lines 74–76 functions figuratively to suggest that:
   A. John's leaving on a stormy night was fitting, given Douglas's sadness.
   B. John's disappointment about moving was reflected in his mood all day.
   C. the mood of the day changed dramatically and irreversibly once John shared his news.
   D. the sky in Green Town became cloudy at the moment John told Douglas he was moving.

Questions 28–30 ask about both passages.

28. Both Passage A and Passage B highlight Bradbury's use of:
   F. a first person omniscient narrator to tell a story.
   G. satire and irony to develop characters.
   H. allegory to present a complex philosophical question.
   J. sensory details and imaginative description to convey ideas.

29. Based on Bradbury's description in Passage A of his writing process, which of the following methods hypothetically depicts a way Bradbury might have begun to write the story in Passage B?
   A. Taking notes while interviewing old friends after first deciding to write a story about two boys
   B. Forming two characters, determining that he would like to tell a story about loss, and then beginning to write a scene
   C. Writing down the words *train ticket* and then spending an hour writing whatever those words brought to his mind
   D. Outlining the plot of a story about two boys that would end with one boy leaving on a train

30. Elsewhere in the essay from which Passage A is adapted, Bradbury writes:

> Was there a real boy named John Huff?
>
> There was. And that was truly his name. But he didn't go away from me, I went away from him.

How do these statements apply to both the information about Bradbury's approach as a storyteller provided in Passage A and the story of John Huff provided in Passage B?

F. They reveal that Bradbury believed that to surprise readers is a fiction writer's most important task.
G. They reinforce that Bradbury used his life experiences to create fiction but also altered those experiences as he pleased.
H. They prove that Bradbury felt such pain over leaving John that he had to reverse events to be able to write the story.
J. They indicate that Bradbury rarely used his life experiences to create fiction.

Passage IV

NATURAL SCIENCE: This passage is adapted from the article "The Jaws That Jump" by Adam Summers (©2006 by Natural History Magazine, Inc.).

Recently I was reminded of just how powerful ants can be when inflicting damage on intruders. A team of biomechanists has studied the incredibly speedy bite of a group of Central and South American ants. The team clocked the bite as the fastest on the planet—and discovered that it also gives the ants the unique ability to jump with their jaws, adding to an impressive array of already known defenses.

Trap-jaw ants nest in leaf litter, rather than underground or in mounds. There they often feed on well-armored and elusive prey, including other species of ants. As they stalk their dinner, the trap-jaws hold their mandibles wide apart, often cocked open at 180 degrees or more by a latch mechanism. When minute trigger hairs on the inner edge of the mandible come in contact with something, the jaws snap shut at speeds now known to reach 145 miles per hour. No passerby could outrace that. The astoundingly high speed gives the jaws, despite their light weight, enough force to crack open the armor of most prey and get at the tasty meat inside.

The key to the jaws' speed (and their even more amazing acceleration) is that the release comes from stored energy produced by the strong but slow muscles of the jaw. Think how an archer slowly draws an arrow in a bowstring against the flex of a bow: nearly all the energy from the archer's muscles pours into the flexing of the bow. When released, the energy stored in the bow wings the arrow toward its target much faster than the archer could by throwing the arrow like a javelin. The biomechanics of energy storage is the domain of Sheila N. Patek and Joseph E. Baio, both biomechanists at the University of California, Berkeley. They teamed up with two ant experts, Brian L. Fisher of the California Academy of Sciences in San Francisco and Andrew V. Suarez of the University of Illinois at Urbana-Champaign, to look at the trap-jaw ant *Odontomachus bauri*.

Fisher, Suarez, and other field biologists had already noted that catching *O. bauri* was like grabbing for popping popcorn—and very hot popcorn at that, because a painful sting goes with an ant's trap-jaw bite. The insects bounced around in a dizzying frenzy and propelled themselves many times their body length when biologists or smaller intruders approached them. Patek and Baio made high-speed video images of their movements, and discovered that the secret of their self-propulsion was the well-executed "firing" of their mandibles. They also observed that mandibles started to decelerate before they meet—possibly to avoid self-inflicted damage. Most important, the ants had two distinct modes of aerial locomotion.

In the so-called escape jump, an ant orients its head and jaws perpendicular to the ground, then slams its face straight down. That triggers the cocked mandibles to release with a force 400 times the ant's body weight, launching the insect ten or more body lengths nearly straight into the air. The ant doesn't seem to go in any particular direction, but the jump is presumably fast and unpredictable enough to help the insect evade, say, the probing tongue of a lizard. Not only can the jumping ant gain height and sow confusion, but it may also get to a new vantage point from which to relaunch an attack.

The second kind of jaw-propelled locomotion is even more common than escape jumping. If an intruder enters the ants' nest, one of the ants bangs its jaws against the intruder, which triggers the trap-jaw and propels the interloper (if small enough) in one direction, out of the nest, and the ant in the other. Often the force sends the ant skimming an inch off the ground for nearly a foot. The attack, for obvious reasons, is known as the "bouncer defense." In the wild, gangs of defending ants team up to attack hostile strangers, sending them head over heels out of the nest.

From an evolutionary point of view, the trap-jaws are an intriguing story. The ants clearly evolved an entirely new function, propulsion, for a system that was already useful—chewing up prey. Several lineages of trap-jaw ants have independently hit on the tactic of storing energy in their jaws to penetrate well-defended prey. In *Odontomachus*, the horizontal, bouncer-defense jump could have arisen out of attempts to bite intruders, but the high, escape jump—with jaws aimed directly at the ground—must have arisen from a different, perhaps accidental kind of behavior. Such a serendipitous event would have been a rare instance in which banging one's head against the ground got good results

31. The primary purpose of the passage is to:
   A. provide an overview of the mechanics and key operations of the jaws of trap-jaw ants.
   B. analyze Patek and Baio's techniques for filming two defensive maneuvers of trap-jaw ants.
   C. compare the jaws of *Odontomachus bauri* to the jaws of other species of ants.
   D. describe the evolution of the ability of trap-jaw ants to perform an escape jump.

32. The sentence in lines 73–75 and the last sentence of the passage are examples of the author's rhetorical technique of:
   F. weaving sarcasm into a mostly casual and playful article.
   G. interjecting a lighthearted tone into a primarily technical article.
   H. integrating a slightly combative tone into an article that mostly praises two scientists' work.
   J. incorporating personal anecdotes into an article that mostly reports data.

33. As it is used in lines 81–82, the phrase *well-defended prey* most nearly refers to prey that:
   A. have a hard outer shell.
   B. attack with a lethal bite.
   C. travel and attack in groups.
   D. move quickly.

34. The passage makes clear that the main source of the speed of the jaws of the trap-jaw ant is the:
   F. ease of movement of the hinge of the jaw.
   G. continuous, steady firing of the jaw's mandibles.
   H. light weight of the jaw in relation to the ant's body weight.
   J. release of energy stored by muscles of the jaw.

35. The author uses the analogy of trying to grab popcorn as it pops in order to describe the trap-jaw ants' ability to:
   A. generate heat with their jaw movements.
   B. move to high ground in order to attack prey.
   C. attack intruders by tossing them out of the nest.
   D. bounce around frantically when intruders approach.

36. One main purpose of the last paragraph is to suggest that unlike their bouncer-defense jump, the trap-jaw ants' escape jump may have arisen through:
   F. the ants' trying and failing to bite intruders.
   G. a change in the structure of the mandibles of several lineages of ants.
   H. an accidental behavior of the ants.
   J. the ants' experiencing a positive outcome when they would attack in a large group.

37. As it is used in line 31, the word *domain* most nearly means:
   A. living space.
   B. area of expertise.
   C. taxonomic category.
   D. local jurisdiction.

38. The passage points to which of the following as a characteristic of trap-jaw ants' mandibles that prevents the ants from harming themselves with their powerful bite?
   F. A hinge prevents the mandibles from snapping together forcefully.
   G. Mandibles with cushioned inner edges provide a buffer when the mandibles snap shut.
   H. A latch mechanism prevents the mandibles from closing completely.
   J. The mandibles begin to decelerate before they meet.

39. As described in the passage, one benefit of the trap-jaw ant's escape jump is that it allows an ant to:
   A. land in position to launch a new attack on a predator.
   B. confuse a predator with a quick, sudden sting.
   C. signal to other ants using a predictable movement.
   D. point itself in whichever direction it chooses to escape.

40. When a trap-jaw ant uses the bouncer-defense jump effectively on an intruder, which creature(s), if any, will be propelled either out of the nest or in another direction?
   F. The intruder only
   G. The attacking ant only
   H. The attacking ant and the intruder
   J. Neither the attacking ant nor the intruder

END OF TEST 3

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO A PREVIOUS TEST.

SCIENCE TEST

35 Minutes—40 Questions

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

You are NOT permitted to use a calculator on this test.

Passage I

Researchers studied how diet and the ability to smell food can affect the life span of normal fruit flies (Strain N) and fruit flies unable to detect many odors (Strain X).

Study 1

Three tubes (Tubes 1–3), each with *15% sugar yeast* (SY) *medium* (a diet with 15% sugar and 15% killed yeast), were prepared. Then, 200 virgin female Strain N fruit flies less than 24 hr old were added to each tube. No additional substance was added to Tube 1. Additional odors from live yeast were added to Tube 2, and live yeast was added to Tube 3. The percent of fruit flies alive was determined every 5 days for 75 days (see Figure 1).

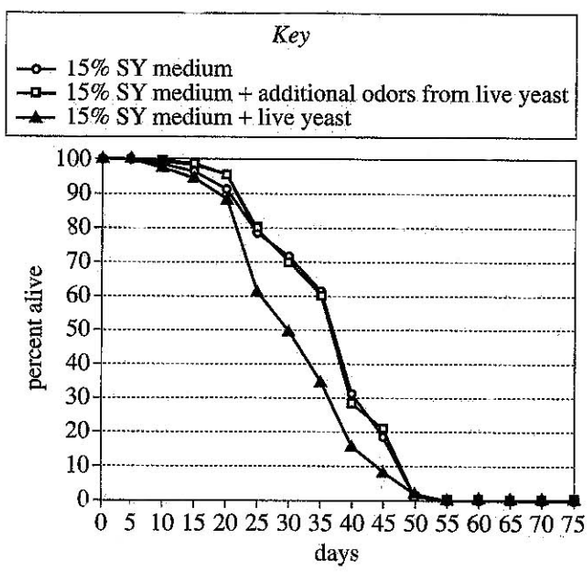


Figure 1

Study 2

Three tubes (Tubes 4–6), each with 5% SY medium (a diet with 5% sugar and 5% killed yeast), were prepared. Then, 200 virgin female Strain N fruit flies less than 24 hr old were added to each tube. No additional substance was added to Tube 4. Additional odors from live yeast were added to Tube 5, and live yeast was added to Tube 6. The percent of fruit flies alive was determined every 5 days for 75 days (see Figure 2).

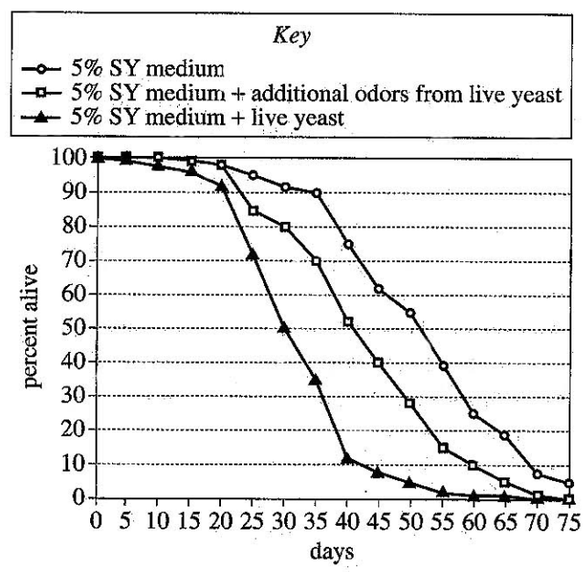


Figure 2

Study 3

Strain N fruit flies were modified to produce Strain X fruit flies. Strain X fruit flies lack *Or83b* (a protein required to detect a wide range of odors); therefore, they cannot detect many odors. The average life span was determined for virgin female Strain N and virgin female Strain X fruit flies fed with various SY media (see Table 1).

Table 1

Strain	SY medium		Average life span (days)
	% sugar	% killed yeast	
Strain N	3	3	50.1
	5	5	50.1
	7.5	7.5	43.9
	10	10	44.8
	15	15	41.6
Strain X	3	3	61.6
	5	5	62.5
	7.5	7.5	58.9
	10	10	58.6
	15	15	55.6

Table and figures adapted from Sergiy Libert et al., "Regulation of *Drosophila* Life Span by Olfaction and Food-Derived Odors." ©2007 by the American Association for the Advancement of Science.

1. In which of Studies 1 and 2 did some of the fruit flies live for more than 75 days, and what diet were those fruit flies fed?
   - **A.** Study 1; 5% SY medium
   - **B.** Study 1; 15% SY medium
   - **C.** Study 2; 5% SY medium
   - **D.** Study 2; 15% SY medium

2. During Studies 1 and 2, why did the size of the fruit fly population in each tube decrease rather than increase?
   - **F.** The birthrate was 0, because the initial population contained only males.
   - **G.** The birthrate was 0, because the initial population contained only virgin females.
   - **H.** The death rate was 0, because the initial population contained only males.
   - **J.** The death rate was 0, because the initial population contained only virgin females.

3. Suppose that an additional trial in Study 3 had been performed using a 12% SY medium (a diet with 12% sugar and 12% killed yeast). The average life span of the Strain X fruit flies in this trial would most likely have been:
   - **A.** less than 55.6 days.
   - **B.** between 55.6 days and 58.6 days.
   - **C.** between 58.6 days and 61.6 days.
   - **D.** greater than 61.6 days.

4. The researchers had predicted that decreasing a fruit fly's ability to detect odors would increase its life span. Are the results of Study 3 consistent with this prediction?
   - **F.** No; for each SY medium tested, the average life span of Strain X fruit flies was longer than the average life span of Strain N fruit flies.
   - **G.** No; for each SY medium tested, the average life span of Strain N fruit flies was longer than the average life span of Strain X fruit flies.
   - **H.** Yes; for each SY medium tested, the average life span of Strain X fruit flies was longer than the average life span of Strain N fruit flies.
   - **J.** Yes; for each SY medium tested, the average life span of Strain N fruit flies was longer than the average life span of Strain X fruit flies.

5. Suppose the researchers wanted to determine whether a defect in the ability to detect odors would change the life span of fruit flies fed 15% SY medium when live yeast is added to the diet or when additional odors from live yeast are added to the diet. Which of the following experiments should be performed?
   - **A.** Repeat Study 1 except with Strain X fruit flies
   - **B.** Repeat Study 1 except with Strain N fruit flies
   - **C.** Repeat Study 2 except with Strain X fruit flies
   - **D.** Repeat Study 2 except with Strain N fruit flies

6. The results for which 2 tubes should be compared to determine how a reduced calorie diet affects life span in the absence of live yeast and additional odors from live yeast?
   - **F.** Tube 1 and Tube 4
   - **G.** Tube 1 and Tube 2
   - **H.** Tube 2 and Tube 5
   - **J.** Tube 5 and Tube 6

Passage II

In the fall, monarch butterflies (*Danaus plexippus*) in eastern North America migrate to Mexico, where they overwinter in high-altitude forests of *oyamel fir* (an evergreen conifer). The butterflies store (accumulate) body lipids to use as a source of energy at a later time. Consider the following 3 hypotheses pertaining to when the butterflies store lipids and when the energy from the stored lipids is used, with respect to migration and overwintering.

Hypothesis 1

Monarch butterflies require energy from stored lipids for migration and during the overwintering period. The butterflies first store lipids before they begin their migration. During migration, as stored lipids are converted to energy, lipid mass continuously decreases. When the butterflies reach the overwintering sites, ending their migration, they must store lipids again before beginning the overwintering period.

Hypothesis 2

Monarch butterflies require energy from stored lipids for migration but not during the overwintering period. The butterflies store lipids before they begin their migration. During migration, as stored lipids are converted to energy, lipid mass continuously decreases. Because energy from stored lipids is not required during the overwintering period, the butterflies do not store lipids while at the overwintering sites.

Hypothesis 3

Monarch butterflies require energy from stored lipids during the overwintering period but not for migration. The butterflies do not store lipids before they begin their migration. Instead, lipids are stored during migration; therefore, lipid mass continuously increases from the beginning of migration until the end of migration. The butterflies arrive at the overwintering sites with enough lipids to provide themselves with energy during the overwintering period, so they do not store lipids while at the overwintering sites.

7. Which hypothesis, if any, asserts that monarch butterflies store lipids during 2 distinct periods?

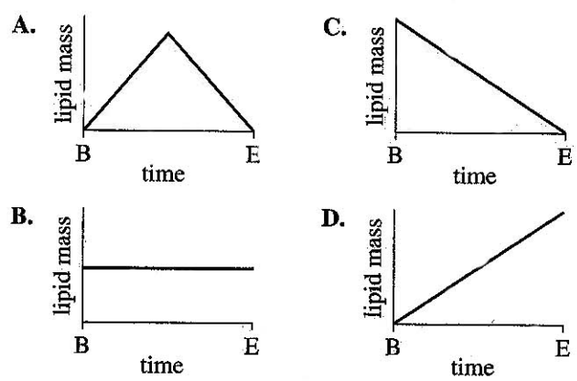
   A. Hypothesis 1
   B. Hypothesis 2
   C. Hypothesis 3
   D. None of the hypotheses

8. Which hypothesis, if any, asserts that monarch butterflies require energy from stored lipids neither for migration nor during the overwintering period?

   F. Hypothesis 1
   G. Hypothesis 2
   H. Hypothesis 3
   J. None of the hypotheses

9. Based on Hypothesis 3, which of the following figures best depicts the change in the lipid mass of a monarch butterfly from the beginning of migration to the end of migration?

   (Note: In each figure, B represents the beginning of migration and E represents the end of migration.)



10. Assume that changes in the body mass of a monarch butterfly are caused only by changes in the mass of the butterfly's stored lipids. The statement "The percent of a monarch butterfly's body mass that is made up of lipids is greater at the beginning of migration than at the end of migration" is supported by which of the hypotheses?

F. Hypothesis 1 only
G. Hypothesis 2 only
H. Hypotheses 1 and 2 only
J. Hypotheses 1, 2, and 3

11. To store lipids, monarch butterflies convert sugar from nectar they have consumed into lipids. A supporter of which hypothesis, if any, would be likely to claim that to ensure the butterflies can store lipids for the overwintering period, nectar must be present at the butterflies' overwintering sites?

A. Hypothesis 1
B. Hypothesis 2
C. Hypothesis 3
D. None of the hypotheses

12. Which of the following statements about lipids in monarch butterflies is consistent with all 3 hypotheses?

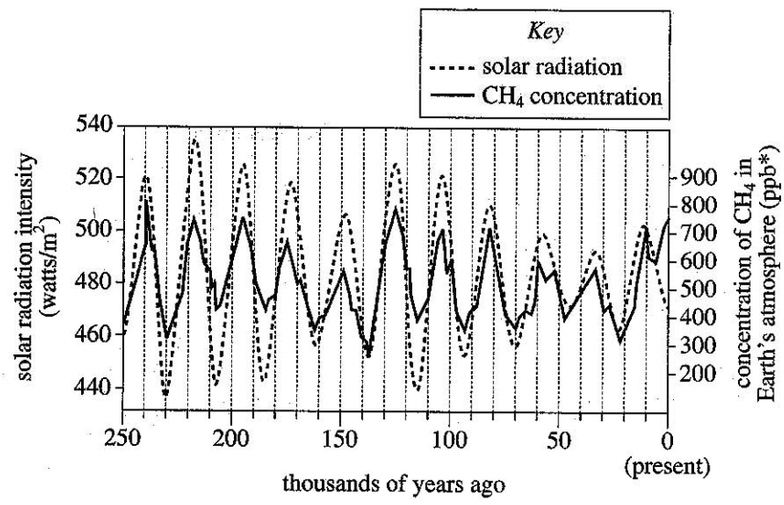
F. The butterflies' lipid masses do not change during the overwintering period.
G. The butterflies' lipid masses change during migration.
H. The butterflies use energy from stored lipids during the overwintering period.
J. The butterflies use energy from stored lipids for migration.

13. When the monarch butterflies use their stored lipids, the lipids must be broken down to produce energy-rich molecules that can be readily used by cells. Which of the following molecules is produced as a direct result of the breakdown of the lipids?

A. ATP
B. Starch
C. DNA
D. Amino acids

Passage III

Greenhouse gases such as methane (CH_4) warm Earth's climate. Figure 1 shows the concentration of CH_4 in Earth's atmosphere and the solar radiation intensity at Earth's surface for tropical Europe and Asia over the past 250,000 years. As the figure shows, the CH_4 concentration and the solar radiation intensity have increased and decreased at the same times over most of this period. Figure 2 shows the same types of data for the same region over the past 11,000 years. This figure is consistent with the hypothesis that the greenhouse gases from human activities may have begun warming Earth's climate thousands of years earlier than once thought.



*ppb = parts per billion

Figure 1

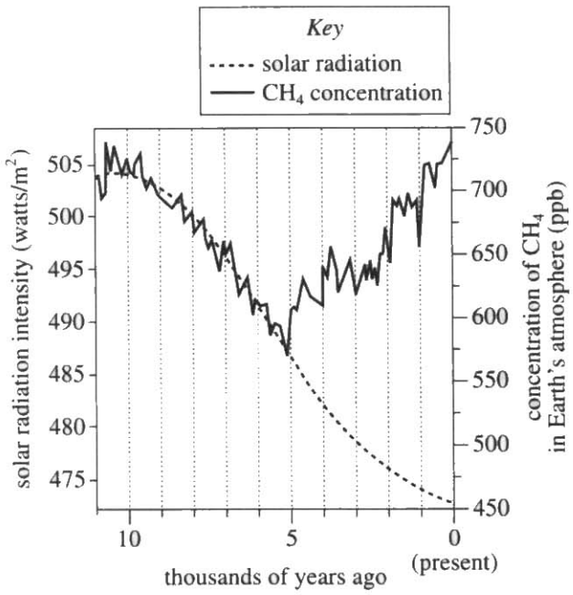


Figure 2

Figures adapted from William Ruddiman, *Plows, Plagues & Petroleum*. ©2005 by Princeton University Press.

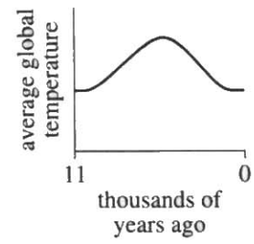
14. According to Figure 2, the solar radiation intensity 8,000 years ago was closest to which of the following?

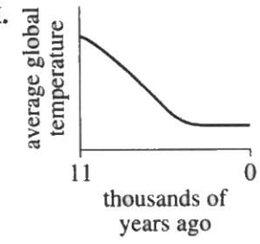
F. 490 watts/m^2
G. 495 watts/m^2
H. 500 watts/m^2
J. 505 watts/m^2

15. According to Figure 2, if the trend in the CH_4 concentration had continued to match the trend in the solar radiation intensity, the CH_4 concentration at present would most likely be:

A. less than 550 ppb.
B. between 550 ppb and 600 ppb.
C. between 600 ppb and 650 ppb.
D. greater than 650 ppb.

16. Suppose that whenever the CH_4 concentration increases, a corresponding, immediate increase in average global temperature occurs, and that whenever the CH_4 concentration decreases, a corresponding, immediate decrease in average global temperature occurs. Based on Figure 2, which of the following graphs best represents a plot of average global temperature over the past 11,000 years?

F.


H.


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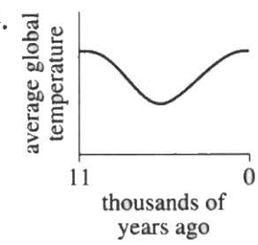
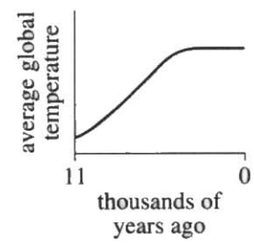


J.


17. Based on Figure 1, the average solar radiation intensity over the past 250,000 years was closest to which of the following?

A. 400 watts/m^2
B. 440 watts/m^2
C. 480 watts/m^2
D. 520 watts/m^2

18. One *solar radiation cycle* is the time between a maximum in the solar radiation intensity and the next maximum in the solar radiation intensity. According to Figure 1, the average length of a solar radiation cycle during the past 250,000 years was:

F. less than 15,000 years.
G. between 15,000 years and 35,000 years.
H. between 35,000 years and 55,000 years.
J. greater than 55,000 years.

Passage IV

An *ideal gas* is a hypothetical gas that behaves exactly as predicted by the ideal gas law. Depending on the conditions, an ideal gas may or may not be a good model for a real gas. The *compressibility factor* (z) is a value that quantifies the deviation of a gas from ideal behavior. Figure 1 shows, for an ideal gas and for 5 real gases, how z varies with pressure (in atmospheres, atm) at 0°C. Table 1 shows how the volume of 1 *mole* (6×10^{23} atoms or molecules) of gas varies with pressure for an ideal gas, for 3 of those 5 real gases, and for air.

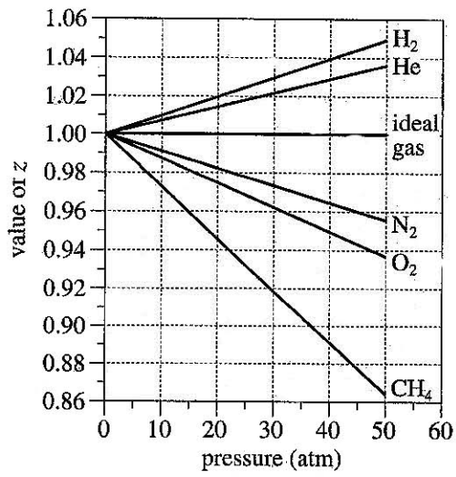


Figure 1

Table 1

Pressure (atm)	Volume (in mL) of gas at 0°C				
	ideal gas	He	N_2	CH_4	air
10	2,241	2,258	2,219	2,180	2,216
20	1,121	1,136	1,098	1,061	1,096
30	747.2	763.7	725.4	686.0	723.4
40	560.4	577.0	539.5	499.2	536.8

Figure and table adapted from E. D. Eastman and G. R. Rollefson, *Physical Chemistry*, 1st ed. ©1947 by McGraw-Hill Book Co.

19. Based on Table 1, at 0°C and 15 atm, the volume of 1 mole of air will most likely be closest to which of the following?

A. 600 mL
B. 900 mL
C. 1,500 mL
D. 2,500 mL

20. According to Figure 1, as pressure increases from 1 atm to 50 atm at 0°C, the compressibility factor of an ideal gas:

F. increases only.
G. decreases only.
H. increases, then decreases.
J. remains constant.

21. A chemist claimed that CH_4 will deviate more from ideal behavior than will H_2. Does Figure 1 support this claim?

A. Yes, because the magnitude of the slope of the line for CH_4 is less than it is for H_2.
B. Yes, because the magnitude of the slope of the line for CH_4 is greater than it is for H_2.
C. No, because the magnitude of the slope of the line for CH_4 is less than it is for H_2.
D. No, because the magnitude of the slope of the line for CH_4 is greater than it is for H_2.

22. Based on Figure 1 and Table 1, at 0°C and 30 atm, the volume of 1 mole of O_2 will most likely be:

F. less than 686 mL.
G. between 686 mL and 725 mL.
H. between 725 mL and 764 mL.
J. greater than 764 mL.

23. Based on Table 1, at 40 atm, the volume of 1 mole of CH_4 at a temperature of –30°C will most likely be:

A. less than 500 mL.
B. between 500 mL and 1,000 mL.
C. between 1,000 mL and 2,000 mL.
D. greater than 2,000 mL.

Passage V

In 2 experiments, a student pulled each of 3 blocks in a straight line across a flat, horizontal surface.

In Experiment 1, the student measured the *pulling force* (the force required to move each block at a constant speed) and plotted the pulling force, in newtons (N), versus block mass, in kilograms (kg). The results are shown in Figure 1.

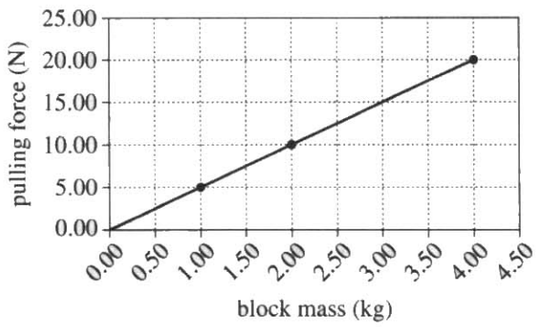


Figure 1

In Experiment 2, the student measured the speed versus time of a 2.00 kg block, a 2.50 kg block, and a 3.00 kg block as each block was pulled across the surface with a constant 30 N force. The results are shown in Figure 2.

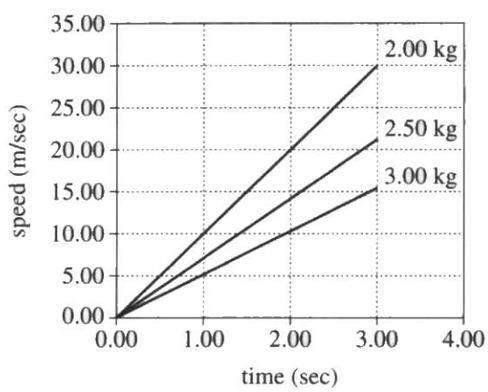


Figure 2

24. Based on Figure 2, what is the order of the 3 blocks, from the block that required the shortest time to reach 15 m/sec to the block that required the longest time to reach 15 m/sec ?

F. 2.00 kg block, 2.50 kg block, 3.00 kg block
G. 2.00 kg block, 3.00 kg block, 2.50 kg block
H. 3.00 kg block, 2.00 kg block, 2.50 kg block
J. 3.00 kg block, 2.50 kg block, 2.00 kg block

25. Based on Figure 2, what was the approximate value of the acceleration of the 3.00 kg block?

A. 0.0 m/sec^2
B. 5.0 m/sec^2
C. 15.0 m/sec^2
D. 20.0 m/sec^2

26. Based on Figure 1, the results of Experiment 1 are best modeled by which of the following equations?

F. Block speed (m/sec) = 0.2 × time (sec)
G. Block speed (m/sec) = 5.0 × time (sec)
H. Pulling force (N) = 0.2 × block mass (kg)
J. Pulling force (N) = 5.0 × block mass (kg)

27. At each of the times plotted in Figure 2 (except 0.00 sec), as block mass increased, block speed:

A. increased only.
B. decreased only.
C. varied, but with no general trend.
D. remained the same.

28. Based on Figure 1, an applied force of 30.00 N would most likely have been required to maintain the constant speed of a block having a mass of:

F. 4.00 kg.
G. 5.00 kg.
H. 6.00 kg.
J. 7.00 kg.

Passage VI

A typical *acid-base indicator* is a compound that will be one color over a certain lower pH range but will be a different color over a certain higher pH range. In the small range between these pH ranges—the *transition range*—the indicator's color will be an intermediate of its other 2 colors.

Students studied 5 acid-base indicators using colorless aqueous solutions of different pH and a *well plate* (a plate containing a matrix of round depressions—*wells*—that can hold small volumes of liquid).

Experiment 1

The students added a pH = 0 solution to 5 wells in the first column of the well plate, then added a pH = 1 solution to the 5 wells in the next column, and so on, up to pH = 7. Next, they added a drop of a given indicator (in solution) to each of the wells in a row, and then repeated this process, adding a different indicator to each row. The color of the resulting solution in each well was then recorded in Table 1 (B = blue, G = green, O = orange, P = purple, R = red, Y = yellow).

Table 1

Indicator	Color in solution with a pH of:							
	0	1	2	3	4	5	6	7
Metanil yellow	R	R	O	Y	Y	Y	Y	Y
Resorcin blue	R	R	R	R	R	P	P	B
Curcumin	Y	Y	Y	Y	Y	Y	Y	Y
Hessian bordeaux	B	B	B	B	B	B	B	B
Indigo carmine	B	B	B	B	B	B	B	B

Experiment 2

Experiment 1 was repeated with solutions that had a pH of 8 or greater (see Table 2).

Table 2

Indicator	Color in solution with a pH of:						
	8	9	10	11	12	13	14
Metanil yellow	Y	Y	Y	Y	Y	Y	Y
Resorcin blue	B	B	B	B	B	B	B
Curcumin	O	R	R	R	R	R	R
Hessian bordeaux	B	R	R	R	R	R	R
Indigo carmine	B	B	B	B	G	Y	Y

Experiment 3

Students were given 4 solutions (Solutions I–IV) of unknown pH. The well plate was used to test samples of each solution with 4 of the 5 indicators (see Table 3).

Table 3

Indicator	Color in Solution:			
	I	II	III	IV
Metanil yellow	Y	Y	Y	O
Resorcin blue	B	B	R	R
Curcumin	R	R	Y	Y
Indigo carmine	B	Y	B	B

Tables adapted from David R. Lide, ed., *CRC Handbook of Chemistry and Physics*, 78th ed. ©1997 by CRC Press LLC.

29. One way Experiment 2 differed from Experiment 3 was that in Experiment 2:

A. the solutions to which indicators were added were of known pH.
B. the solutions to which indicators were added were of unknown pH.
C. metanil yellow was used.
D. metanil yellow was not used.

30. Based on the description of the well plate and how it was used, the empty well plate would most likely have been which of the following colors?

F. Black
G. Blue
H. Red
J. White

31. Based on the results of Experiments 1 and 2, which of the following is a possible transition range for curcumin?

A. pH = 3.9 to pH = 7.3
B. pH = 4.2 to pH = 6.6
C. pH = 7.4 to pH = 8.6
D. pH = 8.4 to pH = 9.5

32. A chemist has 2 solutions, one of pH = 1 and one of pH = 6. Based on the results of Experiments 1 and 2, could indigo carmine be used to distinguish between these solutions?

F. No; indigo carmine is blue at both pH = 1 and pH = 6.
G. No; indigo carmine is blue at pH = 1 and is yellow at pH = 6.
H. Yes; indigo carmine is blue at both pH = 1 and pH = 6.
J. Yes; indigo carmine is blue at pH = 1 and is yellow at pH = 6.

33. A student claimed that Solution III has a pH of 7.3. Are the results of Experiments 1–3 consistent with this claim?

A. No, because in Solution III metanil yellow was yellow.
B. No, because in Solution III resorcin blue was red.
C. Yes, because in Solution III metanil yellow was yellow.
D. Yes, because in Solution III resorcin blue was red.

34. Based on the results of Experiments 1–3, which of Solutions I–IV has the *lowest* pH ?

F. Solution I
G. Solution II
H. Solution III
J. Solution IV

Passage VII

Drilling mud (DM) is a suspension of clay particles in water. When a well is drilled, DM is injected into the hole to lubricate the drill. After this use, the DM is brought back up to the surface and then disposed of by spraying it on adjacent land areas.

A cover of DM on plants and soil can affect the *albedo* (proportion of the total incoming solar radiation that is reflected from a surface), which in turn can affect the soil temperature. The effect of a cover of DM on the albedo and the soil temperature of an unsloped, semiarid grassland area was studied from July 1 to August 9 of a particular year.

On June 30, 3 plots (Plots 1–3), each 10 m by 40 m, were established in the grassland area. For all the plots, the types of vegetation present were the same, as was the density of the vegetation cover. At the center of each plot, a soil temperature sensor was buried in the soil at a depth of 2.5 cm. An instrument that measures incoming and reflected solar radiation was suspended 60 cm above the center of each plot.

An amount of DM equivalent to 40 cubic meters per hectare (m^3/ha) was then sprayed evenly on Plot 2. (One hectare equals 10,000 m^2.) An amount equivalent to 80 m^3/ha was sprayed evenly on Plot 3. No DM was sprayed on Plot 1.

For each plot, the albedo was calculated for each cloudless day during the study period using measurements of incoming and reflected solar radiation taken at noon on those days (see Figure 1).

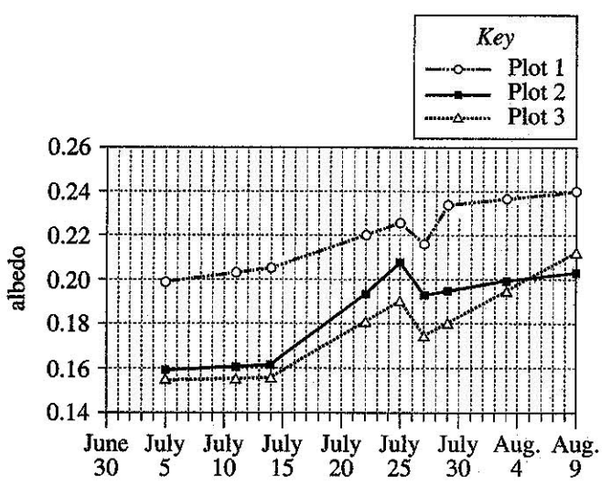


Figure 1

For each plot, the sensor recorded the soil temperature every 5 sec over the study period. From these data, the average soil temperature of each plot was determined for each day (see Figure 2).

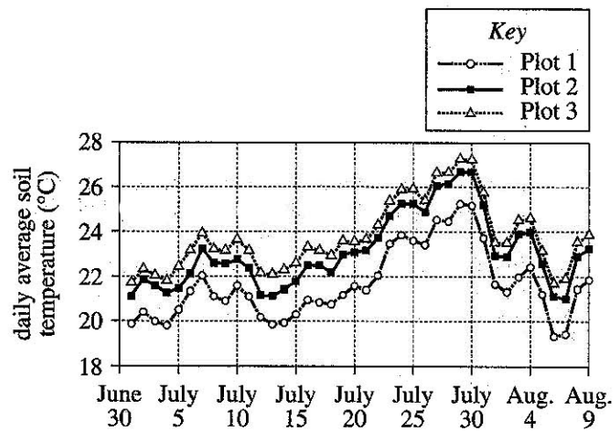


Figure 2

Figures adapted from Francis Zvomuya et al., "Surface Albedo and Soil Heat Flux Changes Following Drilling Mud Application to a Semiarid, Mixed-Grass Prairie." ©2008 by the Soil Science Society of America.

35. Albedo was measured at noon because that time of day is when solar radiation reaching the ground is:

A. 100% reflected.
B. 100% absorbed.
C. least intense.
D. most intense.

36. Why was the study designed so that the 3 plots had the same types of vegetation present and the same density of vegetation cover? These conditions ensured that any variations in albedo and soil temperature would most likely be attributable only to variations among the plots in the:

F. amount of DM sprayed.
G. type of soil present.
H. plot area.
J. plot slope.

37. For each plot, the number of temperature readings recorded by the soil temperature sensor every minute was closest to which of the following?

A. 5
B. 12
C. 50
D. 60

38. According to Figure 1 and the description of the study, was July 20 a cloudless day?

F. No, because albedo data were not collected on that day.
G. No, because albedo data were collected on that day.
H. Yes, because albedo data were not collected on that day.
J. Yes, because albedo data were collected on that day.

39. According to the results of the study, did the presence of a cover of DM increase or decrease the albedo, and did the presence of a cover of DM increase or decrease the soil temperature?

	albedo	soil temperature
A.	increase	increase
B.	increase	decrease
C.	decrease	decrease
D.	decrease	increase

40. Based on Figure 1, on August 3, what percent of incoming solar radiation was NOT reflected from Plot 2 ?

F. 20%
G. 40%
H. 60%
J. 80%

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

Form 19K
ACT Writing Test Prompt
(June 2014)

Administrators debate whether high school students should be required to take a public speaking class in which students are taught how to research topics and present the results of that research to their classmates. Some administrators support requiring students to take a public speaking class because these administrators think such a class would prepare students to effectively communicate information to their peers, teachers, or supervisors once students are in college or pursuing their careers. Other administrators do not support requiring students to take a public speaking class because these administrators think that having to speak formally in front of their peers could make some students too uncomfortable to perform well in the class. In your opinion, should high school students be required to take a public speaking class?

In your essay, take a position on this question. You may write about either one of the two points of view given, or you may present a different point of view on this question. Use specific reasons and examples to support your position.

Six-Point Holistic Scoring Rubric for the ACT Writing Test

Papers at each level exhibit *all* or *most* of the characteristics described at each score point.

Score = 6

Essays within this score range demonstrate effective skill in responding to the task.

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a critical context for discussion. The essay addresses complexity by examining different perspectives on the issue, or by evaluating the implications and/or complications of the issue, or by fully responding to counterarguments to the writer's position. Development of ideas is ample, specific, and logical. Most ideas are fully elaborated. A clear focus on the specific issue in the prompt is maintained. The organization of the essay is clear: the organization may be somewhat predictable or it may grow from the writer's purpose. Ideas are logically sequenced. Most transitions reflect the writer's logic and are usually integrated into the essay. The introduction and conclusion are effective, clear, and well developed. The essay shows a good command of language. Sentences are varied and word choice is varied and precise. There are few, if any, errors to distract the reader.

Score = 5

Essays within this score range demonstrate competent skill in responding to the task.

The essay shows a clear understanding of the task. The essay takes a position on the issue and may offer a broad context for discussion. The essay shows recognition of complexity by partially evaluating the implications and/or complications of the issue, or by responding to counterarguments to the writer's position. Development of ideas is specific and logical. Most ideas are elaborated, with clear movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained. The organization of the essay is clear, although it may be predictable. Ideas are logically sequenced, although simple and obvious transitions may be used. The introduction and conclusion are clear and generally well developed. Language is competent. Sentences are somewhat varied and word choice is sometimes varied and precise. There may be a few errors, but they are rarely distracting.

Score = 4

Essays within this score range demonstrate adequate skill in responding to the task.

The essay shows an understanding of the task. The essay takes a position on the issue and may offer some context for discussion. The essay may show some recognition of complexity by providing some response to counterarguments to the writer's position. Development of ideas is adequate, with some movement between general statements and specific reasons, examples, and details. Focus on the specific issue in the prompt is maintained throughout most of the essay. The organization of the essay is apparent but predictable. Some evidence of logical sequencing of ideas is apparent, although most transitions are simple and obvious. The introduction and conclusion are clear and somewhat developed. Language is adequate, with some sentence variety and appropriate word choice. There may be some distracting errors, but they do not impede understanding.

Score = 3

Essays within this score range demonstrate some developing skill in responding to the task.

The essay shows some understanding of the task. The essay takes a position on the issue but does not offer a context for discussion. The essay may acknowledge a counterargument to the writer's position, but its development is brief or unclear. Development of ideas is limited and may be repetitious, with little, if any, movement between general statements and specific reasons, examples, and details. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. The organization of the essay is simple. Ideas are logically grouped within parts of the essay, but there is little or no evidence of logical sequencing of ideas. Transitions, if used, are simple and obvious. An introduction and conclusion are clearly discernible but underdeveloped. Language shows a basic control. Sentences show a little variety and word choice is appropriate. Errors may be distracting and may occasionally impede understanding.

Score = 2

Essays within this score range demonstrate inconsistent or weak skill in responding to the task.

The essay shows a weak understanding of the task. The essay may not take a position on the issue, or the essay may take a position but fail to convey reasons to support that position, or the essay may take a position but fail to maintain a stance. There is little or no recognition of a counterargument to the writer's position. The essay is thinly developed. If examples are given, they are general and may not be clearly relevant. The essay may include extensive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is maintained, but focus on the specific issue in the prompt may not be maintained. There is some indication of an organizational structure, and some logical grouping of ideas within parts of the essay is apparent. Transitions, if used, are simple and obvious, and they may be inappropriate or misleading. An introduction and conclusion are discernible but minimal. Sentence structure and word choice are usually simple. Errors may be frequently distracting and may sometimes impede understanding.

Score = 1

Essays within this score range show little or no skill in responding to the task.

The essay shows little or no understanding of the task. If the essay takes a position, it fails to convey reasons to support that position. The essay is minimally developed. The essay may include excessive repetition of the writer's ideas or of ideas in the prompt. Focus on the general topic is usually maintained, but focus on the specific issue in the prompt may not be maintained. There is little or no evidence of an organizational structure or of the logical grouping of ideas. Transitions are rarely used. If present, an introduction and conclusion are minimal. Sentence structure and word choice are simple. Errors may be frequently distracting and may significantly impede understanding.

No Score

Blank, Off-Topic, Illegible, Not in English, or Void

English				Mathematics				Readling		Science	
1	A			1	C	31	C	1	A	1	C
2	J			2	H	32	G	2	J	2	G
3	D			3	A	33	D	3	C	3	B
4	H			4	H	34	J	4	H	4	H
5	B			5	E	35	B	5	B	5	A
6	J	41	C	6	K	36	H	6	J	6	F
7	B	42	G	7	C	37	B	7	A	7	A
8	J	43	D	8	K	38	H	8	H	8	J
9	C	44	J	9	C	39	D	9	B	9	D
10	J	45	C	10	K	40	G	10	J	10	H
11	B	46	J	11	A	41	A	11	A	11	A
12	G	47	D	12	G	42	K	12	J	12	G
13	A	48	H	13	B	43	D	13	C	13	A
14	H	49	B	14	K	44	G	14	J	14	H
15	D	50	F	15	C	45	E	15	B	15	A
16	H	51	D	16	K	46	K	16	H	16	G
17	B	52	J	17	C	47	B	17	B	17	C
18	J	53	A	18	J	48	J	18	F	18	G
19	C	54	F	19	D	49	A	19	D	19	C
20	H	55	B	20	H	50	F	20	F	20	J
21	A	56	G	21	A	51	D	21	A	21	B
22	F	57	C	22	F	52	K	22	G	22	G
23	B	58	F	23	A	53	A	23	D	23	A
24	H	59	D	24	F	54	H	24	J	24	F
25	C	60	G	25	D	55	E	25	C	25	B
26	F	61	C	26	H	56	F	26	G	26	J
27	D	62	G	27	B	57	E	27	C	27	B
28	G	63	D	28	G	58	J	28	J	28	H
29	A	64	F	29	B	59	D	29	C	29	A
30	F	65	C	30	K	60	J	30	G	30	J
31	B	66	H					31	A	31	C
32	H	67	D					32	G	32	F
33	B	68	G					33	A	33	B
34	H	69	D					34	J	34	J
35	A	70	J					35	D	35	D
36	F	71	A					36	H	36	F
37	A	72	F					37	B	37	B
38	F	73	B					38	J	38	F
39	C	74	H					39	A	39	D
40	J	75	D					40	H	40	J

ACT Resource Links

ACT Online Practice Tests: https://www.crackab.com/act/

※ **ACT English Practice Tests:**

https://www.crackab.com/act/english/

※ **ACT Math Practice Tests:**

https://www.crackab.com/act/math/

※ **ACT Reading Practice Tests:**

https://www.crackab.com/act/reading/

※ **ACT Science Practice Tests:**

https://www.crackab.com/act/science/

ACT Grammar: https://www.crackab.com/act/grammar/

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https://www.cracksat.net

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http://www.cracksat.net/sat-downloads/

AP Exams Practice Tests:

https://www.crackap.com

https://www.apstudy.net

Explanation of Procedures Used to Obtain Scale Scores from Raw Scores

On each of the four tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it off to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

ACT Test 72C	Your Scale Score
English	_____
Mathematics	_____
Reading	_____
Science	_____
Sum of scores	_____
Composite score (sum ÷ 4)	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

Scale Score	Raw Scores				Scale Score
	Test 1 English	Test 2 Mathematics	Test 3 Reading	Test 4 Science	
36	75	59-60	40	40	36
35	72-74	58	39	39	35
34	71	56-57	38	38	34
33	70	55	37	—	33
32	68-69	53-54	35-36	37	32
31	67	52	34	36	31
30	66	51	33	35	30
29	65	49-50	32	—	29
28	63-64	47-48	31	34	28
27	62	44-46	30	32-33	27
26	60-61	42-43	29	31	26
25	58-59	40-41	28	29-30	25
24	56-57	38-39	27	26-28	24
23	53-55	35-37	25-26	24-25	23
22	51-52	34	24	23	22
21	48-50	32-33	22-23	21-22	21
20	45-47	30-31	21	19-20	20
19	43-44	28-29	19-20	17-18	19
18	41-42	25-27	18	16	18
17	39-40	21-24	17	14-15	17
16	36-38	16-20	15-16	13	16
15	32-35	12-15	14	12	15
14	29-31	10-11	12-13	11	14
13	27-28	8-9	11	10	13
12	25-26	6-7	9-10	9	12
11	23-24	5	8	7-8	11
10	20-22	4	6-7	6	10
9	18-19	—	—	5	9
8	15-17	3	5	4	8
7	12-14	2	4	—	7
6	10-11	—	3	3	6
5	8-9	—	—	2	5
4	6-7	1	2	—	4
3	4-5	—	—	1	3
2	2-3	—	1	—	2
1	0-1	0	0	0	1