Form 69A

(December 2010)

The ACT® 2010/2011

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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

Along the Bike Path

[1] On the first warm day of spring, it's still (1) light out when I got on my bike to ride from my job in the city to my apartment in a small town ten miles away. [2] I turned onto (2) the bike path and left the busy street behind. [3] From the path, I could see through the trees to parking lots crowded with cars lining (3) up to enter rush hour traffic. [4] As the path curved toward the river, rowers came into view. [5] With impossibly long oars, they pulled their slender boats against the gentle (4) current. [6] The slow dip, dip, dip seemed like an invitation to move for (5) a relaxed pace. [7] Meanwhile, people on benches chatted with each other, or looked out over the river, or tossed crumbs

1. **A.** NO CHANGE
   B. it will still be
   C. it was still
   D. its still

2. Which of the following alternatives to the underlined portion would NOT be acceptable?
   F. to get on
   G. at the entrance to
   H. over
   J. into

3. **A.** NO CHANGE
   B. cars, they were lining
   C. cars were lined
   D. cars, I saw them lined

4. Which of the following alternatives to the underlined portion would NOT be acceptable?
   F. slight
   G. gently moving
   H. light
   J. mildly flimsy

5. **A.** NO CHANGE
   B. at
   C. by
   D. around

to the ducks. [8] I caught snatch's of conversation and
6

kept moving. [7]

At the edge of the city, I stopped on a bridge to

rest. Below, a small pond glittered in the evening light.
8

Turtles, dozens of them, lined up bumper to bumper on
9
a few fallen logs. One or two of the creatures plunged

into the water as I watched, but the others seemed content
10
to stay put.

[1] I pedaled on and found myself

passing backyards, playgrounds, and ball fields.

[2] Coasting along, I got used to other bikers passing

me, their headlamps shining narrow beams in the dusk.
11
[3] The air grew cool as I glided under a canopy of

trees, as if entering a tunnel through the twilight.

[4] When I emerged on the other side, I pulled over

to fill my water bottle at a drinking fountain looking
12
up at the sky. [5] It was a rich aquamarine, dotted

with early evening stars. [6] Two approaching

runners and their scruffily but friendly dogs came
13
to a stop at the fountain to quench their thirst.

6. F. NO CHANGE
G. snatches'
H. snatches,
J. snatches

7. The writer wants to divide this paragraph into two in order to separate the reference to automobile traffic from the description of the scene along the river. The best place to begin the new paragraph would be at the beginning of Sentence:

A. 3.
B. 4.
C. 5.
D. 6.

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

F. glared
G. sparkled
H. twinkled
J. shone

9. A. NO CHANGE
B. Turtles dozens of them
C. Turtles, dozens, of them
D. Turtles dozens of them,

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

F. was watching, but the
G. watched the
H. watched. The
J. watched; the

11. Given that all the choices are true, which one best indicates that twilight had arrived on the bike path?

A. NO CHANGE
B. one by one by one.
C. even though I was riding at a steady pace.
D. as I slowed down to enjoy my surroundings.

12. F. NO CHANGE
G. and looked
H. to look
J. giving a look

13. A. NO CHANGE
B. they're scruffy but friendly
C. there scruffy but friendlier
D. their scruffy but friendly

[7] I was less than five minutes from my door. [14]

It struck me then that in my rushed manner of speeding [15] to get to work that morning, I had seen no scenery, only a blur. As I got back on my bike to pedal the short distance home, the moon appeared through the trees, and the runners and their dogs disappeared in the distance.

14. Upon reviewing this paragraph, the writer discovers that some information has been left out and composes the following sentence incorporating that information:

    Some kids were deep into a game of softball; others were making the most of slides and swing sets.

    This sentence would most logically be placed after Sentence:

    F. 1.
    G. 3.
    H. 5.
    J. 6.

15. A. NO CHANGE
    B. rush in haste
    C. hurried way of rushing
    D. rush

PASSAGE II

The Best-Kept Secret in Town

When I was growing up, my parents did not allow me to go to the county dump. In my imagination, it was a place where huge piles of garbage emitted an overpowering stench. [16] I could picture everything rotting, rusty, and in complete ruins.

Recently, my view of garbage dumps—or landfills, as they are usually called now—changed dramatically. This happened after I heard some residents in the community where I now live talk favorable about [17] the landfill. They said it is much more than a place to dispose of garbage. They were right. On a Saturday morning outing, I discovered a surprisingly orderly facility, it was [18] at the end of a short drive from the center of town.

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

    F. odor.
    G. aroma.
    H. whiff.
    J. smell.

17. A. NO CHANGE
    B. more favorable of
    C. favorably about
    D. in favor with

18. F. NO CHANGE
    G. facility
    H. facility, there it was
    J. facility, I found it

I was a little bewildered when I arrived until I
19
received directions to the many stations on the premises.

19. Given that all the choices are true, which one best establishes the tone of approval that is sustained in the rest of the paragraph?
    A. NO CHANGE
    B. When I pulled up to the place that I had been curious about,
    C. Having asked for information about the resources available,
    D. When I checked in at the attractive gatehouse—a surprise in itself—

In addition, to a place for unsalvageable debris,
20
there were separate areas for materials that are suitable for reuse. For instance, I saw designated spots for this and that. Not only could visitors drop off what
21

20. F. NO CHANGE
    G. addition to a place,
    H. addition, to a place,
    J. addition to a place

21. Given that all the choices are true, which one provides the most specific and relevant information?
    A. NO CHANGE
    B. all kinds of materials that have been arranged.
    C. lumber, tin, brick, and even Styrofoam.
    D. a vast array of assorted items in many categories.

they didn't need, they could haul away what they did
22
need. Nevertheless, piles of wood chips, ideal for
23

22. F. NO CHANGE
    G. what it was in the way of something
    H. what they considered something that
    J. something of what

23. A. NO CHANGE
    B. On the contrary, piles
    C. In spite of it all, piles
    D. Piles

use as garden mulch were available too. I helped
24
myself to enough to cover my backyard flower beds.

24. F. NO CHANGE
    G. use as garden mulch,
    H. use, as garden mulch
    J. use; as garden mulch

Now a landfill fan, a particular appreciation exists for
25
the section for hazardous household materials, where visitors are permitted to select anything from household paint to mosquito repellent. If I have leftover red from painting my porch, for instance, one can trade it for
26

25. A. NO CHANGE
    B. appreciation has grown for
    C. to have an appreciation for
    D. I particularly appreciate

26. F. NO CHANGE
    G. you
    H. they
    J. I

someone else's leftover yellow to paint my bookshelves.
27

27. A. NO CHANGE
    B. elses'
    C. elses
    D. else

Everybody benefits from this system. Fewer toxic
28
substances go into the ground, and more people save money by reusing perfectly good materials.

28. Which of the following alternatives to the underlined portion would NOT be acceptable?
    F. in
    G. by
    H. because of
    J. into

In some cases it is necessary to call ahead for an appointment, and there may be a small fee to drop off or certain items are picked up. However, the landfill operates during convenient hours, and the staff is friendly and knowledgeable. The biggest waste would be to overlook the existence of this community resource.

29. A. NO CHANGE
    B. which
    C. for which
    D. which there

30. F. NO CHANGE
    G. certain items are picked up by people.
    H. pick up certain items.
    J. pick them up.

PASSAGE III

I. M. Pei: Translating Spirit into Space

What does the National Gallery of Art in Washington, D.C., the Louvre in Paris, and the Rock and Roll Hall of Fame in Cleveland have in common? In addition to being museums, however, all three buildings benefit from designs by the celebrated architect I. M. Pei.

[1] His name, which in Cantonese means "to inscribe brightly," was prophetically chosen, Pei has inscribed his brilliant architectural designs on cityscapes around the world. [2] Pei came to the United States at the age of eighteen to study architecture. [3] In 1955 he founded his own architectural firm in New York City. [4] Ieoh Ming Pei was born in Canton, China, in 1917. [5] Since that time, Pei has designed more than fifty buildings, including the John F. Kennedy Library and the Hancock Tower in Boston and the Bank of China in Hong Kong. [6] Many of his buildings have won major design awards. [34]

31. A. NO CHANGE
    B. do
    C. has
    D. DELETE the underlined portion.

32. F. NO CHANGE
    G. museums, therefore,
    H. museums, consequently,
    J. museums,

33. A. NO CHANGE
    B. chosen
    C. chosen:
    D. chosen, while

34. For the sake of the logic and coherence of this paragraph, Sentence 4 should be placed:
    F. where it is now.
    G. before Sentence 1.
    H. after Sentence 5.
    J. after Sentence 6.

1

Pei's first concern as an architect is identifying the spirit of a place and translates [35] that spirit mentioned here into architectural design. [36]

35. A. NO CHANGE
    B. translation
    C. translated
    D. translating

36. Which of the following phrases from the preceding sentence is LEAST necessary and could most easily be deleted?
    F. as an architect
    G. the spirit of a place
    H. mentioned here
    J. into architectural design

However, [37] Pei's design for the Rock and Roll Hall of Fame, with its [38] bold use of glass walls and ceilings and multiple tiers connected by escalators that direct the eye upward, appropriately reflects a celebratory and rollicking spirit.

37. A. NO CHANGE
    B. Still,
    C. So, when
    D. Thus,

38. F. NO CHANGE
    G. it's
    H. its'
    J. their

Similarly, Pei's design for the Morton H. Meyerson Symphony Center in Dallas, Texas, echoes the aim of city planners who [39] wished to revitalize the Arts District while announcing Dallas's emergence as an international cultural [40] center. To achieve this twofold aim, Pei designed an inward-facing music chamber and an outward-facing lobby that houses a restaurant. [41] The building's multiple functions invite the public to share in the city's central cultural space.

39. A. NO CHANGE
    B. planners whom
    C. planners, whom
    D. planners of who

40. F. NO CHANGE
    G. international culturally
    H. internationally culturally
    J. internationally culture

41. A. NO CHANGE
    B. that a restaurant is housed with.
    C. that were to house a restaurant.
    D. which if it were to house a restaurant.

While Pei's signature designs will continue to impress generations of city dwellers, perhaps his greatest contribution as an architect lies beyond the physical structures he designed. [42] In the end,

rigorous attention to harmonizing tangible space by Pei [43] with its intangible spirit may prove to be his most

exciting [44] legacy.

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

> In 1986, Pei was one of twelve naturalized American citizens to receive the Medal of Honor from then-president Ronald Reagan.

Should the writer make this addition here?

- **F.** Yes, because it gives important information that improves the logical flow of this paragraph.
- **G.** Yes, because it clarifies what the "contribution" referred to in the preceding sentence was.
- **H.** No, because it does not fulfill the expectation set up in the preceding sentence.
- **J.** No, because it contradicts the point made earlier in the essay that Pei was born in China.

43.
- **A.** NO CHANGE
- **B.** rigorous attention of Pei's to harmonizing tangible space
- **C.** Pei's rigorous attention to harmonizing tangible space
- **D.** harmonizing tangible space to which Pei's rigorous attention was paid

44. Which choice most effectively emphasizes that Pei's contributions will last a long time?

- **F.** NO CHANGE
- **G.** enduring
- **H.** immaterial
- **J.** important

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer had intended to write a brief essay describing the technical challenges of architectural design. Would this essay accomplish the writer's goal?

- **A.** Yes, because it tells of the many architectural designs of Pei.
- **B.** Yes, because it demonstrates that Pei is one of the world's most celebrated architects.
- **C.** No, because it reveals that Pei's signature designs borrow from many styles.
- **D.** No, because it focuses on Pei's biography and his contributions to architecture.

PASSAGE IV

The History of Monopoly

[1]

As a child, I disliked playing the board game Monopoly. My brothers racing car (46) and my thimble game pieces would go around and around the board, and we would buy property after property with our play money. There always came a point—usually after an hour or two—when I would shout out in boredom, "Who *invented* this game?"

[2]

[1] The game originated at the end of the nineteenth century with a young Quaker named Elizabeth Magie. [2] George believed that while the renting of property produced an increase in land values and benefited property owners; (47) higher land values placed a burden on the working class, who (48) were asked to pay more to rent. [3] Magie was a follower of Henry George, a political economist. [4] In 1904, Magie patented "The Landlord's Game" (49) as a tool for teaching George's ideas. [50]

46. F. NO CHANGE
G. brother's racing car
H. brother's racing car,
J. brothers racing car,

47. A. NO CHANGE
B. owners—
C. owners,
D. owners

48. F. NO CHANGE
G. whom
H. and whom
J. and

49. A. NO CHANGE
B. Game," this game was
C. Game" it was
D. Game" being

50. For the sake of the logic and coherence of this paragraph, Sentence 3 should be placed:

F. where it is now.
G. before Sentence 1.
H. after Sentence 1.
J. after Sentence 4.

[3]

The game enjoyed modest popularity, particularly among Quakers and later among economics students at several East Coast colleges. Everywhere it was played, people made adjustments, naming game spaces after local streets and landmarks (51) and sometimes inventing new rules. [52] In turn, the game eventually lost Magie's message about social responsibility and became almost about (53) the acquisition of property.

[4]

During the Great Depression of the 1930s, salesman Charles Darrow came across the game in Atlantic City, New Jersey. Darrow must have sensed the potential of a game though, (54) during a time of economic hardship, would allow people to play at property would be bought (55) and amassing a fortune. However, (56) Darrow produced thousands of copies of the Atlantic City version of the game and sold them at department stores. In 1933 Darrow signed a contract with Parker Brothers to mass-produce the game in the form in which it's best known today.

51. A. NO CHANGE
    B. spaces on the board after nearby town streets and places that someone might consider noteworthy
    C. game spaces after streets or whatever
    D. the spaces on which the game is played after some local stuff

52. If the writer were to delete the preceding sentence, the paragraph would primarily lose:
    F. a sense of Magie's reaction to the ways her game was changed by its players.
    G. an explanation of one important process through which the game of Monopoly changed.
    H. examples of the new rules players invented for the game.
    J. a list of the places where the game was first played in its modern form.

53. Which choice most strongly emphasizes that players came to embrace the acquisition of property as a positive goal for the game?
    A. NO CHANGE
    B. a chance to experience
    C. a celebration of
    D. related to

54. F. NO CHANGE
    G. considering,
    H. that,
    J. DELETE the underlined portion and place a comma after the word *game*.

55. A. NO CHANGE
    B. buying property
    C. property to buy
    D. had bought property

56. F. NO CHANGE
    G. Yet,
    H. Besides,
    J. DELETE the underlined portion.

[5]

The popularity of Monopoly has since spread across the globe. [57] The longest game of Monopoly is reported to have lasted 1,680 hours—the equivalent of seventy days, exceeding more than over 1,500 hours, of nonstop playing.

57. Which of the following true statements, if added here, would best illustrate the claim made in the preceding sentence?
    - A. The total amount of play money included in a standard Monopoly game is $15,140.
    - B. It's printed in twenty-six languages and is available in eighty countries.
    - C. It's estimated that more than two hundred million Monopoly sets have been sold.
    - D. More than twenty game pieces have been created since the game was first introduced, including a purse, horse, and lantern.

58. F. NO CHANGE
    - G. are reported
    - H. is told
    - J. are told

59. A. NO CHANGE
    - B. 24-hour periods, or days, of nonstop engagement in
    - C. days of continuous nonstop
    - D. days of nonstop

Question 60 asks about the preceding passage as a whole.

60. Upon reviewing the essay and finding that an idea has been left out, the writer composes the following sentence incorporating that idea:

    The length of that game alone proves that some people have much more patience for Monopoly than I'll ever have.

    If the writer were to add this sentence to the essay, the sentence would most logically be placed:
    - F. after the last sentence in Paragraph 3.
    - G. before the first sentence in Paragraph 4.
    - H. after the last sentence in Paragraph 4.
    - J. after the last sentence in Paragraph 5.

PASSAGE V

The Dancing Pears

The morning sun shines through wind-whipped branches creates an odd effect in the artist's studio. In the flickering light, three golden pears on a shelf appear to be dancing. Capturing moments such as this in a watercolor still life has become the lifework of artist Karen Horn.

61. A. NO CHANGE
    - B. shone
    - C. shining
    - D. shined

As a child at a tender age, Horn was captivated by the visual arts. In college, she explored and refined this fascination, however, her personal life would not sit still for her art. She married and moved to a farm in northern California, where her daughter was born. [64]

The rigors of parenting and a simple, back-to-basics lifestyle have teached Horn much about time. In order that making money is the main goal, the clock has the power to rule, allowing no time to wait, to wonder, to dance with pears. But Horn calls time her secret ally.

She chooses simple subjects for her watercolors; flowers and fruit from her garden, a neighbor's hand-carved wooden bowl, a treasured seashell, her grandmother's tablecloth. [68] Her personal connections contribute to the sense to these objects of intimacy in her paintings.

62. F. NO CHANGE
G. child while growing up,
H. child, in her youth,
J. child,

63. A. NO CHANGE
B. fascination, however
C. fascination however
D. fascination; however,

64. The writer is thinking about deleting the phrase "a farm in" from the preceding sentence. Should this phrase be kept or deleted?
F. Kept, because it offers a detail relevant to the upcoming discussion of Horn's life and art.
G. Kept, because it identifies precisely where in northern California Horn moved to.
H. Deleted, because it has nothing to do with Horn's life or art.
J. Deleted, because its removal would eliminate redundant information from the sentence.

65. A. NO CHANGE
B. has teached
C. have taught
D. has taught

66. F. NO CHANGE
G. Whereas making
H. When making
J. Making

67. A. NO CHANGE
B. watercolors:
C. watercolors,
D. watercolors

68. If the writer were to delete the phrase "from her garden" and the words "hand-carved" and "treasured" from the preceding sentence, the sentence would lose description that primarily:
F. provides sensory details about the appearance of Horn's home.
G. reveals that Horn herself raises or crafts everything that appears in her watercolors.
H. illustrates the point about intimacy made in this paragraph's last sentence.
J. inserts irrelevant details that distract the reader from this paragraph's main focus.

69. The best placement for the underlined portion would be:
A. where it is now.
B. after the word *connections*.
C. after the word *contribute*.
D. after the word *paintings* (and before the period).

Going to the shelf to switch the fattest dancing pear with one of its partners, the artist says that she is often struck by the seeming contradiction that a spontaneous moment can involve something unexpected and delightful. [70] It takes years for a pear tree to grow large enough to yield fruit, months for the fruit to reach its prime, hours of waiting for the perfect light that makes the fruit seem to dance, and many more hours of painting as if the [71] moment crystallizes into an image on paper. [72] And only when someone sees the painting and catches his or her breath audibly with surprise and [73] pleasure does [74] a watercolor become truly magical.

Today, Karen Horn's watercolors are featured in galleries from coast to coast. Her works are often sold before a showing of her art opens, [75] and pressure is mounting to produce more paintings more quickly. Horn pauses before moving the fattest pear again and then declares that she doesn't have the time to go faster.

70. Which choice fits best in the context of this sentence and leads most effectively into the next sentence?

- **F.** NO CHANGE
- **G.** happen on the spur of the moment.
- **H.** be a long time in the making.
- **J.** surprise or shock us.

71.
- **A.** NO CHANGE
- **B.** before
- **C.** that
- **D.** DELETE the underlined portion.

72. Upon reviewing the preceding sentence and finding that some information has been left out, the writer composes the following phrase incorporating that information:

> days to arrange the fruit into a compelling still life,

This phrase would most logically be placed:

- **F.** after the word *takes*.
- **G.** after the words *yield fruit* (and after the comma).
- **H.** after the word *prime* (and after the comma).
- **J.** after the word *dance* (and after the comma).

73.
- **A.** NO CHANGE
- **B.** quickly takes in air
- **C.** breathes
- **D.** gasps

74.
- **F.** NO CHANGE
- **G.** was
- **H.** is
- **J.** DELETE the underlined portion.

75. Given that all the choices are true, which one most clearly and effectively expresses Horn's popularity and commercial success as an artist?

- **A.** NO CHANGE
- **B.** despite how nervous she is about exhibiting her work,
- **C.** to customers she doesn't know,
- **D.** when she least expects them to,

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. Mr. Chiang announced the grade distribution for this week's book reports. Of the 24 students in the class, 8 received A's for their book reports, 11 received B's, and 5 received C's. When a student is chosen at random to be the first one to read his or her book report to the class, what is the probability that the student chosen had received an A for the book report?

   A. $\frac{5}{24}$
   B. $\frac{1}{3}$
   C. $\frac{11}{24}$
   D. $\frac{1}{2}$
   E. $\frac{8}{11}$

2. A puzzle board with a 3-foot-by-4-foot rectangular top surface is to be made from cedar. The cedar has a price of $3 per square foot of top surface area. What is the price of the cedar needed to make this puzzle board?

   F. $15
   G. $21
   H. $36
   J. $42
   K. $72

3. A point at $(-5,8)$ in the standard (x,y) coordinate plane is shifted right 8 units and down 5 units. What are the new coordinates of the point?

   A. $(-13,13)$
   B. $(0, 0)$
   C. $(3, 3)$
   D. $(3,13)$
   E. $(13,13)$

DO YOUR FIGURING HERE.

4. A warehouse dispatcher is arranging the delivery of 83,000 condensers. She will use 2 large-size trucks, each carrying a maximum of 18,000 condensers. The remaining trucks are small-size trucks, each carrying a maximum of 7,000 condensers. Each truck she uses will make exactly 1 trip. Along with the 2 large-size trucks, what is the minimum number of small-size trucks needed to deliver all the condensers?

F. 4
G. 6
H. 7
J. 9
K. 10

5. A positive integer x is divisible by 15, 25, and 30. Which of the following is the smallest possible value of x ?

A. 75
B. 90
C. 120
D. 150
E. 450

6. In $\triangle ABC$, $\angle A$ and $\angle C$ are congruent, and the measure of $\angle B$ is 96°. What is the measure of $\angle A$?

F. 42°
G. 48°
H. 60°
J. 84°
K. 96°

7. What is the value of x in the equation $-2(x - 7) = 20$?

A. −13.5
B. −6.5
C. −3
D. 3
E. 17

8. For all real values of x, which of the following expressions is equal to $x^3 \cdot x^3 \cdot x^3 \cdot x^3$?

F. x^{12}
G. x^{81}
H. $3x^4$
J. $4x^3$
K. $(4x)^3$

9. What is 10% of 10% of 1 ?

A. 0.001
B. 0.01
C. 0.1
D. 1.0
E. 10.0

DO YOUR FIGURING HERE.

Use the following information to answer questions 10–12.

The table below gives the price per gallon of unleaded gasoline at Gus's Gas Station on January 1 for 5 consecutive years in the 1990s. At Gus's, a customer can purchase a car wash for $4.00.

Year	Price
1	$1.34
2	$1.41
3	$1.41
4	$1.25
5	$1.36

10. What is the mean price per gallon, to the nearest $0.01, on January 1 for the 5 years listed in the table?

F. $1.25
G. $1.33
H. $1.34
J. $1.35
K. $1.41

11. The price for gas on January 1 of Year 6 was 3% higher than the price on January 1 of Year 5. To the nearest $0.01, how much was the price per gallon on January 1 of Year 6 ?

A. $1.39
B. $1.40
C. $1.66
D. $1.77
E. $2.39

12. On January 1 of Year 5, Anamosa bought gas and a car wash at Gus's. She put 11.38 gallons of gas in her car and 1.85 gallons of gas in a container for her snowblower. To the nearest $0.01, how much did Anamosa pay for the gas for her car and snowblower, and a car wash?

F. $15.48
G. $17.23
H. $17.99
J. $19.48
K. $21.99

---

13. What is the value of $|x + y| + (x + y)^2$ when $x = 2$ and $y = -3$?

A. −6
B. −4
C. −2
D. 0
E. 2

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

14. The decimal representation of 3.9×10^{-93} is:

F. a decimal point, followed by 92 zeros, then the digits 3 and 9.
G. a decimal point, followed by 93 zeros, then the digits 3 and 9.
H. a negative sign, followed by the digits 3 and 9, then 92 zeros, then a decimal point.
J. a negative sign, followed by the digits 3 and 9, then 93 zeros, then a decimal point.
K. a negative sign, followed by the digits 3 and 9, then 94 zeros, then a decimal point.

15. The number of bricks, B, needed to build a wall of length L feet and uniform height H feet can be found by the equation $B = 7LH$. A wall of uniform height that is 15 feet long is constructed using 525 bricks. What is the height, in feet, of the wall?

A. 0.5
B. 3.5
C. 5
D. 35
E. 75

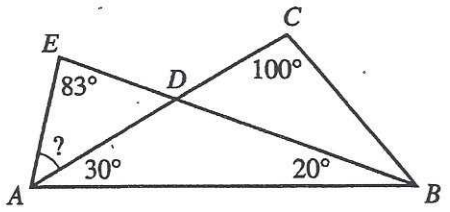
16. What is the value of $g(x) = (-3)^x + 3$ when $x = 2$?

F. -6
G. -3
H. 0
J. 9
K. 12

17. $(5c - 3d)(2d - 5c)$ is equivalent to:

A. $-cd$
B. $25cd$
C. $-25c^2 - 5cd - 6d^2$
D. $-25c^2 + 25cd - 6d^2$
E. $-6c^2d^2$

18. In the figure below, $\overline{AC}$ and $\overline{BE}$ intersect at D. What is the measure of $\angle EAD$?



F. 30°
G. 47°
H. 50°
J. 53°
K. 70°

DO YOUR FIGURING HERE.

19. The sum of the real numbers x and y is 21. Their difference is 15. What is the value of xy?

A. 18
B. 21
C. 36
D. 54
E. 315

20. After visiting Mountain State University during spring break, Meredith rents a car for 1 day to travel around the area. She has \$100 to spend on car rental. Green Tree Car Rental charges \$50 per day and \$0.25 per mile. Big Rock Car Rental charges \$60 per day and \$0.20 per mile. Which company, if either, allows her to travel more miles, and how many miles more?

(Note: Taxes are already included in the rental charges.)

F. Green Tree, 25
G. Green Tree, 40
H. Big Rock, 10
J. Big Rock, 100
K. Meredith would get the same maximum number of miles from each company.

21. For $x^2 \neq 25$, $\frac{(x-5)^2}{x^2-25} = ?$

A. $-\frac{1}{5}$
B. $\frac{1}{5}$
C. $\frac{1}{x+5}$
D. $\frac{1}{x-5}$
E. $\frac{x-5}{x+5}$

22. The directions for punch call for 3 cups of juice concentrate to be mixed with 5 cups of water. If the directions are followed, how many cups of juice concentrate will be needed to make 80 cups of punch?

F. 30
G. 32
H. 40
J. 48
K. 50

DO YOUR FIGURING HERE.

23. Which of the following inequalities is true for the fractions $\frac{3}{7}$, $\frac{5}{12}$, and $\frac{4}{9}$?

A. $\frac{5}{12} < \frac{4}{9} < \frac{3}{7}$

B. $\frac{5}{12} < \frac{3}{7} < \frac{4}{9}$

C. $\frac{4}{9} < \frac{3}{7} < \frac{5}{12}$

D. $\frac{3}{7} < \frac{5}{12} < \frac{4}{9}$

E. $\frac{3}{7} < \frac{4}{9} < \frac{5}{12}$

24. As part of a lesson on motion, students observed a cart rolling at a constant rate along a straight line. As shown in the chart below, they recorded the distance, y feet, of the cart from a reference point at 1-second intervals from $t = 0$ seconds to $t = 5$ seconds.

t	0	1	2	3	4	5
y	12	20	28	36	44	52

Which of the following equations represents this data?

F. $y = t + 12$
G. $y = 8t + 4$
H. $y = 8t + 12$
J. $y = 12t + 8$
K. $y = 20t$

25. A tortoise moves x times as fast as a snail. A hare moves y times as fast as the tortoise. The hare moves how many times as fast as the snail?

A. $\frac{y}{x}$

B. $\frac{x}{y}$

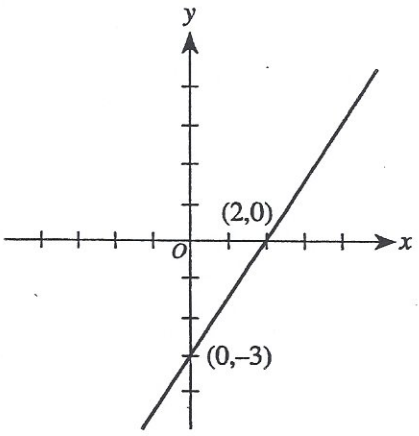
C. xy

D. $y - x$

E. $y + x$

DO YOUR FIGURING HERE.

26. The line shown below in the standard (x,y) coordinate plane is represented by one of the following equations. Which one is it?



F. $y = \frac{3}{2}x - 3$

G. $y = \frac{3}{2}x + 2$

H. $y = \frac{2}{3}x - 3$

J. $y = \frac{2}{3}x + 2$

K. $y = -\frac{3}{2}x - 3$

27. A group of 25 cells triples in number every hour. At this rate, how many cells will be in the group at the end of the 5th hour?

A. 125
B. 375
C. 3,125
D. 6,075
E. 9,375

28. Two triangles are similar. The shortest side of the smaller triangle is 9 inches long, and the shortest side of the larger triangle is 16 inches long. The perimeter of the smaller triangle is 36 inches. What is the perimeter, in inches, of the larger triangle?

F. 43
G. 48
H. 57
J. 61
K. 64

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

29. At a produce market, apples sell for $1.00 per bag and oranges for $1.75 per bag. The fruit is only sold in whole bags. You plan to buy at least 1 bag of each fruit and spend exactly $16.00. What is the maximum number of bags of oranges you can buy?

A. 4
B. 5
C. 6
D. 8
E. 9

30. In the standard (x,y) coordinate plane, what is the vertex of the parabola with the equation $y = 2(x-3)^2 - 5$?

F. (–3,–5)
G. (–3, 5)
H. (3,–5)
J. (3, 5)
K. (6,–5)

31. A diameter of a circle in the standard (x,y) coordinate plane has endpoints at (2,8) and (–2,6). Which of the following points is the center of the circle?

A. (0, 2)
B. (0, 7)
C. (0,14)
D. (2, 1)
E. (4, 2)

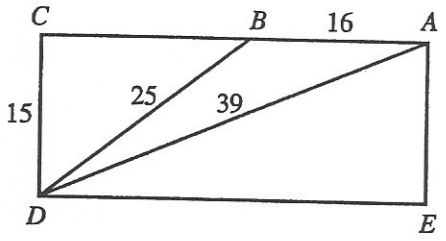
32. What is the circumference, in centimeters, of a circle with a radius of 6 cm ?

F. $\frac{6}{\pi}$
G. 3π
H. 9π
J. 12π
K. 36π

DO YOUR FIGURING HERE.

Use the following information to answer questions 33–35.

In the figure below, point B lies on side $\overline{AC}$ of rectangle $ACDE$. Line segments $\overline{AD}$ and $\overline{BD}$ are also shown. The given lengths are in inches.



33. How many inches long is $\overline{BC}$?

- **A.** 10
- **B.** 14
- **C.** 20
- **D.** 36
- **E.** $\sqrt{40}$

34. Which of the following is an expression for $\sin \angle CDA$?

- **F.** $\frac{AC}{AD}$
- **G.** $\frac{AC}{CD}$
- **H.** $\frac{AD}{AC}$
- **J.** $\frac{AD}{CD}$
- **K.** $\frac{CD}{AD}$

35. Point B is reflected across the line (not shown) that connects the midpoints of $\overline{AE}$ and $\overline{CD}$. This reflection of B is labeled F. How many inches from $\overline{AC}$ is the intersection of $\overline{CF}$ and $\overline{BD}$?

- **A.** $7\frac{1}{2}$
- **B.** 8
- **C.** $12\frac{1}{2}$
- **D.** 15
- **E.** $19\frac{1}{2}$

DO YOUR FIGURING HERE.

36. In the diagram below, B, F, and H are on $\overline{AC}$, $\overline{AE}$, and $\overline{BF}$, respectively, and $\overline{GH} \perp \overline{BF}$. The area of square $ABGF$ is $\frac{1}{4}$ the area of square $ACDE$. The area of $\triangle FGH$ is what fraction of the area of $ACDE$?

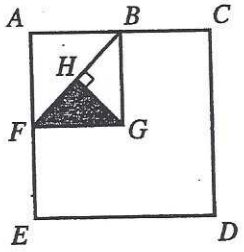
F. $\frac{1}{4}$

G. $\frac{1}{8}$

H. $\frac{1}{12}$

J. $\frac{1}{16}$

K. $\frac{1}{20}$



37. The first 3 terms of an arithmetic sequence are $2\frac{1}{6}$, $3\frac{1}{3}$, and $4\frac{1}{2}$, in that order. What is the fourth term of the sequence?

A. $4\frac{5}{6}$

B. $5\frac{1}{6}$

C. $5\frac{1}{3}$

D. $5\frac{2}{3}$

E. 6

38. Given the equations $B = x + 2$ and $y = A - 4$, which of the following expressions is equivalent to $B + A$ written in terms of x and y?

F. $x + y + 2$
G. $x + y + 6$
H. $x - y - 4$
J. $8xy$
K. $2x + 4y$

39. The perimeter of a parallelogram is 64 inches, and 1 side measures 10 inches. If it can be determined, what are the lengths, in inches, of the other 3 sides?

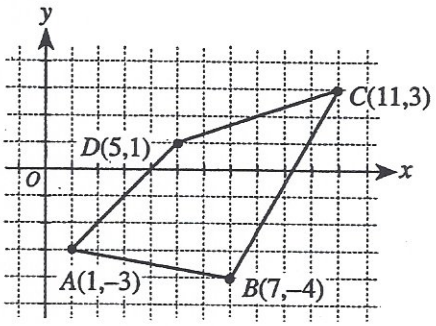
A. 10, 10, 34
B. 10, 17, 17
C. 10, 22, 22
D. 10, 27, 27
E. Cannot be determined from the given information

DO YOUR FIGURING HERE.

40. Given that m, n, and a are positive integers, which of the following statements is true whenever $a^m < (-a)^n$?

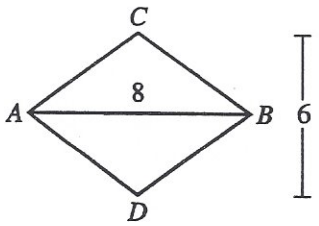
F. $m = n$ and n is odd
G. $m < n$ and n is odd
H. $m < n$ and n is even
J. $m > n$ and n is odd
K. $m > n$ and n is even

41. In quadrilateral $ABCD$ shown in the standard (x,y) coordinate plane below, what is the distance, in coordinate units, from the midpoint of $\overline{AD}$ to the midpoint of $\overline{CD}$?



A. 8
B. $\sqrt{34}$
C. $\sqrt{52}$
D. $\sqrt{104}$
E. $\sqrt{122}$

42. In rhombus $ACBD$ below, $\overline{AB}$ is 8 inches long and $\overline{CD}$ is 6 inches long. What is the area, in square inches, of $ACBD$?



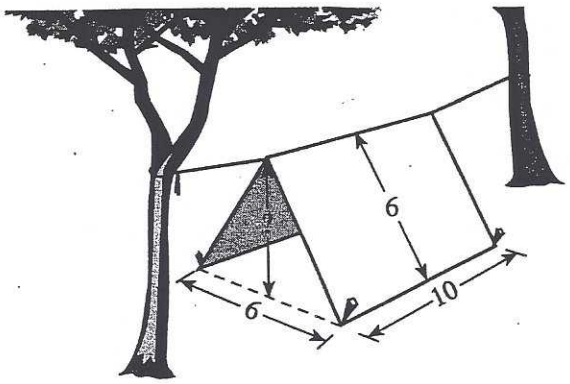
F. 12
G. 24
H. 25
J. 32
K. 48

43. In how many distinct orders can 5 students stand in line to buy yearbooks?

A. 5
B. 15
C. 25
D. 120
E. 3,125

DO YOUR FIGURING HERE.

44. A group of hikers put up the tent shown below. They draped a rectangular tarp that is 10 feet by 12 feet over a rope stretched tightly between 2 trees so that the tent's rectangular sides and base are each 6 feet wide and 10 feet long. What is the height of the tent, to the nearest foot?



F. 4
G. 5
H. 6
J. 7
K. 8

45. Which of the following statements gives the real number values of x for which $x^2 < x$ is true?

A. $0 < x < 1$
B. $-1 < x < 0$
C. $x < -1$
D. $x > 1$
E. $x = 0$ or $x = 1$

46. A teacher asked all the students in the junior class about the number of cats and/or dogs their family had. The results are given in the table below. How many students answered that their family had 1 or more cats?

		1 or more cats?	
		yes	no
1 or more dogs?	yes	48	84
	no	66	52

F. 48
G. 114
H. 132
J. 198
K. 250

DO YOUR FIGURING HERE.

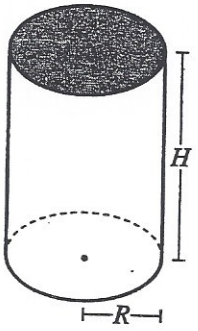
47. The Worthwhile Company's logo consists of 2 concentric circles. The radius of the outer circle of the logo on Worthwhile's building is 4 feet, and the distance between the outer circle and the inner circle is 1.75 feet. Which of the following is an expression for the area, in square feet, of the inner circle of the logo on Worthwhile's building?

A. $(4 - 1.75)^2\pi$
B. $(4 - 1.75)\pi$
C. $(4^2 - 1.75^2)\pi$
D. $2(4 - 1.75)^2\pi$
E. $2(4 - 1.75)\pi$

48. Given that A, B, C, and D are real numbers satisfying $A = B$, $C^2 = D$, and $C = \sqrt{B}$, which of the following equations is NOT necessarily true?

F. $A = C$
G. $A = D$
H. $B = D$
J. $B = C^2$
K. $B^2 = D^2$

49. The volume, V, of a right circular cylinder with radius r and height h is given by the formula $V = \pi r^2 h$. The right circular cylinder shown below has radius R and height H. A second right circular cylinder has radius $2R$ and height $3H$. The volume of the second right circular cylinder is how many times the volume of the first right circular cylinder?



A. 5
B. 6
C. 7
D. 12
E. 18

50. For right triangle $\triangle ABC$, $\sin \angle A = \frac{2}{3}$. What is $\cos \angle A$?

F. $-\frac{2}{3}$
G. $\frac{1}{3}$
H. $\frac{3}{2}$
J. $\frac{\sqrt{5}}{3}$
K. $\frac{\sqrt{13}}{3}$

DO YOUR FIGURING HERE.

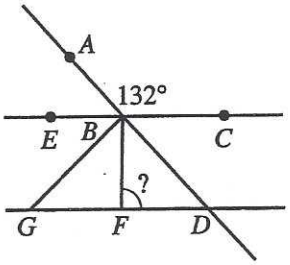
51. The line with equation $x - 4y = 12$ in the standard (x,y) coordinate plane crosses the x-axis at which of the following points?

A. $(-12, 0)$
B. $(-4,-4)$
C. $(-4, 0)$
D. $(0, 3)$
E. $(12, 0)$

52. Alexia knows that the height of an object propelled vertically from a height of 48 feet can be modeled by $h = -16t^2 + 32t + 48$, where h is the height, in feet, and t is the time, in seconds. Using this model, how many seconds will it take the object to reach a height of 64 feet?

F. 1
G. 2
H. 3
J. 16
K. 64

53. In the figure below, $\overleftrightarrow{EC}$ is parallel to $\overleftrightarrow{GD}$, B lies on $\overleftrightarrow{AD}$ and $\overleftrightarrow{EC}$, F lies on $\overleftrightarrow{GD}$, the measure of $\angle ABC$ is 132°, and $\angle EBG \cong \angle GBF \cong \angle FBD$. What is the measure of $\angle BFD$?



A. 84°
B. 86°
C. 88°
D. 89°
E. 92°

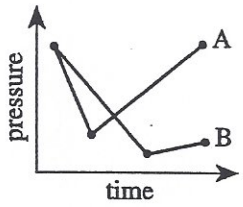
54. For a certain angle with measure θ, $\sin\theta = 0.4$. What is $\csc\theta$?

F. $\frac{5}{2}$
G. $\frac{5}{3}$
H. $\frac{1}{4}$
J. $\sqrt{0.84}$
K. $\frac{1}{\sqrt{0.84}}$

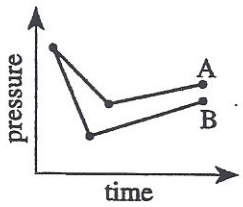
DO YOUR FIGURING HERE.

55. Simpsen Manufacturing tested the hydraulic pressure capacity of 2 brands of valves, Valve A and Valve B, on their hydraulic pressure pump. Valve B allowed a slower decrease in pressure than Valve A followed by a slower increase in pressure than Valve A. The minimum pressure for Valve A was less than the minimum pressure for Valve B. One of the following graphs best illustrates the test results. Which graph is it?

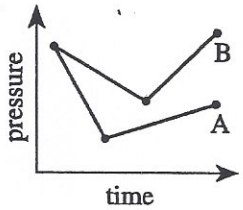
A.



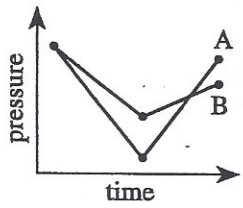
D.



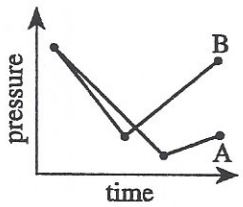
B.



E.



C.



56. Happy Soup Company stamps a 6-character product code on each can of soup it produces. Each product code consists of 5 letters (from the 26-letter alphabet) followed by a single digit (from the digits 0 to 9). The letters may repeat. How many such product codes are possible?

F. $5(26)(10)$
G. $5(4)(3)(2)$
H. $1^5(10)$
J. $26(25)(24)(23)(22)(10)$
K. $26^5(10)$

57. For all real numbers x, the value of $x - |x|$ is:

A. never zero.
B. always zero.
C. always positive.
D. sometimes positive.
E. never positive.

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

58. For all values of x such that $\sin x > 0$ and $\cos x > 0$, which of the following expressions is equivalent to $\sin x > \frac{1}{2} \cos x$?

F. $\sin x + \cos x > \frac{1}{2}$

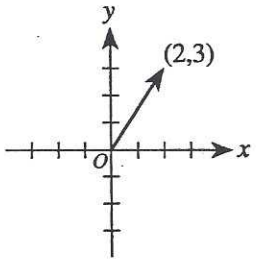
G. $\sin x - \cos x > \frac{1}{2}$

H. $\cos x - \sin x < 2$

J. $\tan x > \frac{1}{2}$

K. $\tan x < 2$

59. A vector from the origin to terminal point (2,3) is shown in the standard (x,y) coordinate plane below. The vector will be rotated counterclockwise (↺) by 90° about the origin, resulting in a new vector. What will be the coordinates of the terminal point of the new vector?



A. (–3, 2)
B. (–2,–3)
C. (–2, 3)
D. (2,–3)
E. (3,–2)

60. If $r > 0$ and $s > 0$, $\sqrt{\frac{r}{s}} + \sqrt{\frac{s}{r}}$ is equivalent to which of the following?

F. 1

G. $\frac{2\sqrt{rs}}{r+s}$

H. $2\sqrt{rs}$

J. $\frac{r+s}{rs}$

K. $\frac{r+s}{\sqrt{rs}}$

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

Passage I

PROSE FICTION: This passage is adapted from the short story "Aggi's Last Dance" by Josephine Huntington (©1997 by Joy Harjo and Gloria Bird).

A few days after the ice breakup, the seagulls returned. They arrived in flocks, soaring and diving as they searched the shallow shores for food. I paid them no mind. A few days later, while cleaning the area of beach in front of my house, I saw one large seagull lagging behind as the others swiftly soared, twisted, and glided over the open water. It took him a little longer to gain height, but his drop was done with such ease and grace that he appeared to be dancing. How lovely! I thought. Sitting on an old weathered log I watched until my back started to ache. Finally, I stood up and slowly stretched out my stiff limbs. Returning to the house, I put a kettle of water on to boil and went to lie down on my narrow cot. Behind my closed eyes a large white seagull danced before me.

The whistling of the tea kettle jarred me awake. While preparing the tea I hummed an old song. It was a tune that often came to me, but not the words. Songs and dances are passed from generation to generation. I barely remember when we last had to learn a new song or dance. Setting my cup on the yellow tabletop, my mind returned to the seagull.

The sun streaming through ruffled curtains turned to deep gold when I got up to reheat a pot of caribou stew. The bubbling stew filled the room with a delicious smell, but I hardly noticed. It's as if I were in a trance. Moving to the middle of the kitchen I took the position of a female dancer—standing with both feet together, knees slightly bent. With arms extended behind my back, I let them rise and fall . . . rise and fall . . . as if taking flight. Lowering my left arm, the right arm is stretched high above my head, first in one direction then another. I tried many different positions and changed the song a little each time. After almost stumbling into the table when leaning into a dive, I decided to stop. My legs were shaking and I was breathing hard. Resting my head against the wall, I closed my eyes, feeling tired, but excited by my new creation.

On the third Thursday of the month, I am plaiting my long silver hair into a single braid and listening to the radio when the announcer reports a chill factor of minus 60 degrees. Maybe only a few people will show up for the annual village corporation meeting this evening.

When I arrive the gymnasium is packed and noisy. Old Abe, an Elder Representative who speaks both Inupiaq and English fluently, is asked to "open with prayer." First, he prays in Inupiaq and then in English. Reports and awards for community service follow. The Midnight Sun Dancers, billed as "entertainment," appear last on the agenda.

It is after nine o'clock and people are getting restless when the dancers come forward. The audience claps as each dancer files by wearing his or her finest native garments—women in parkas of bright fabric precede male dancers in white hunting jackets. Each wears knee-length mukluks and gloves trimmed in fancy beadwork with thick bands of wolf, fox, and wolverine. I am a singer, drummer, and dancer, so I enter last. I have chosen to wear a muskrat-skin parka trimmed with black-and-white reindeer strips and wolverine tassels. The parka is old, but still beautiful. My old friend Lillie made it for me when I was sent to Washington, D.C., to dance for the president of the United States many years ago.

Drumbeats fill the air as I struggle to my feet, pull on my gloves, and walk to the center of the stage. My own high voice starts the story. With subtle movements, I thrust my neck in and out and the wolverine tassels sway rhythmically. Arms gently flutter, then I thrust my chest forward and soar heavenward. I float on a breeze, then swoop, glide, and scan the shallow shores for signs of food. With arms extended rearward, I proceed to descend. This is the most dangerous part for me—the seagull's dive—because of age my balance isn't what it once was. The flat-bottomed oogruk mukluks help, but if I should lean too far forward I fear falling in front of the whole village. When entering the dive, I concentrate on the drums, drawing my arms back as far as they will go, leaning forward, dropping lower and lower. As I near the floor I begin to beat my wings to propel myself upright, thrusting my chest forward. Slowly turning in a circle I repeat each motion. It is a few seconds before I become aware of the thunderous applause that fills the room. My face goes hot and I smile in happiness. The sound of my own people's applause fills my heart.

1. It can most reasonably be inferred that which of the following events mentioned in the passage occurred first chronologically?
   - A. The narrator dances for the president of the United States.
   - B. The narrator watches a seagull's flight while cleaning the beach in front of her house.
   - C. The narrator is given the parka that she wears while performing the seagull dance.
   - D. The narrator arrives at the village gymnasium.

2. Which of the following questions does the passage NOT directly answer?
   - F. Who made the narrator's muskrat-skin parka?
   - G. For how many years has the narrator been dancing with the Midnight Sun Dancers?
   - H. At what public gathering does the narrator perform the seagull dance?
   - J. What musical instrument accompanies the narrator's performance?

3. In the context of the passage, the main purpose of the first paragraph is to:
   - A. list the physical limitations that interfere with the narrator's ability to perform the seagull dance.
   - B. describe the narrator's experience watching a seagull's flight, which compels her to dance.
   - C. provide details about the narrator's past that explain why she joined the Midnight Sun Dancers.
   - D. relate the narrator's attitude toward nature in order to explain her decision to wear a muskrat-skin parka.

4. In the first paragraph, the narrator seems most affected by the seagull's:
   - F. size.
   - G. color.
   - H. ascent.
   - J. diving.

5. The author provides information about all of the following aspects of how the narrator lives EXCEPT:
   - A. the size of her home.
   - B. the location of her home relative to the water.
   - C. what she sleeps on.
   - D. what she eats.

6. The best summary of the third paragraph (lines 23–39) is that the narrator:
   - F. remembers a dance that she learned when she was younger.
   - G. imagines a seagull's flight as she prepares her meal.
   - H. invents a dance that re-creates something she witnessed earlier.
   - J. discovers that she is no longer able to dance because of her age.

7. If the fifth paragraph (lines 46–52) were deleted, the passage would lose all of the following EXCEPT:
   - A. a description of the reports presented by members of the village.
   - B. details that help define Old Abe's role at the village meeting.
   - C. a suggestion of the languages spoken in the village.
   - D. an indication of the Midnight Sun Dancers' role at the village meeting.

8. It can most reasonably be inferred from the passage that the majority of the songs and dances performed by the Midnight Sun Dancers were created by:
   - F. the narrator.
   - G. previous generations of dancers.
   - H. the oldest living members of the dance group.
   - J. the current female members of the dance group.

9. As it is used in lines 58 and 61, the word *trimmed* most nearly means:
   - A. embellished.
   - B. shortened.
   - C. tidied up.
   - D. condensed.

10. The narrator indicates that she is the last to enter the gymnasium before the dance because she:
    - F. is cast in the role of the seagull.
    - G. moves more slowly than the other dancers.
    - H. is favored by the audience.
    - J. performs multiple roles in the dance group.

Passage II

SOCIAL SCIENCE: This passage is adapted from the introduction to *A Renaissance in Harlem: Lost Voices of an American Community*, an anthology edited by Lionel C. Bascum that contains materials produced by Harlem-based members of the 1930s federally funded Writer's Project (©1999 by Lionel C. Bascum).

A few years after America slipped into the Great Depression, a significant social experiment got under way. In the 1930s, government policy makers conceived and launched an ambitious scheme they hoped would both lift the spirits of and provide weekly paychecks for thousands of unemployed Americans. Under this Works Progress Administration, a smaller, controversial program called the Writer's Project employed some sixty-five hundred writers in twenty-six states. WPA writers fanned out in neighborhoods of towns and cities all across America with a tantalizing assignment: record the personal histories of the people they found. They recorded more than ten thousand stories and were planning to publish them in a series of comprehensive anthologies.

One of those places where people told their stories was in Harlem. Coincidentally, just a few years before a handful of WPA writers arrived in Harlem, this section of upper Manhattan had just been recognized by social observers as the black capital of the world. The period would become widely known as the Harlem Renaissance. It was touted mainly as the most significant black cultural revival in our history and was promoted by a very small band of intellectuals who had migrated to Harlem along with thousands of other people. While these men and women promoted the art and literature they created in Harlem between 1924 and 1929, the Renaissance they are credited with starting was much more than an intellectual movement.

The driving forces behind the varied activities that made Harlem so vibrant in the twentieth century were sparked by the massive migration of black people from the rural South and the Caribbean. When these seekers from far-flung corners of the world began filling the vacant but plentiful housing Harlem had to offer, these railroad porters, domestic house cleaners, former tenant farmers, and immigrants brought their music, their literature, and their stories with them uptown to Harlem.

Their stories about daily life are still a vital part of the literature and music of Harlem. As told by the WPA writers, these tales leave an important legacy for us today. Between 1934 and 1939, African-American writers recruited to join the WPA Writer's Project took advantage of a unique opportunity to write the topical history of Harlem. Inadvertently, they created a narrative snapshot of black America's unofficial capital city during one of its most important historical periods. They created a rare picture of life on Harlem streets, in its beauty parlors, markets, apartments, and hospital waiting rooms.

The works of Harlem WPA writers such as Ralph Ellison, Zora Neale Hurston, and Dorothy West were all written in the late 1930s, which suggests that Harlem's golden era existed well beyond 1929. While none of the stories in *A Renaissance in Harlem* are fictional in the strictest sense of the word, many of them are literary versions crafted by writers who struggled to accurately tell the stories they found in creative ways. They often used the techniques of fiction, such as setting scenes, using realistic dialogue, or incorporating flashbacks. As a testament to the significance these stories held for the writers who collected them, many of these interviews became the raw material for later works of important fiction. For example, Ellison roamed Harlem, interviewing all sorts of people whose words found their way into his landmark novel, *Invisible Man.*

Despite the seemingly sacred mission, political forces opposed to the use of federal money for WPA projects moved against sponsoring New Deal Democrats. By the fall of 1939, all new funds for WPA projects had dried up. According to federal records, the WPA was effectively dead by the time America entered World War II. Thousands of the WPA manuscripts were never published. While some of these narratives were shelved, others were lost, destroyed, or distributed to various libraries and state archives. As a body of work, most of these stories would be stored away and left virtually untouched for decades. The Harlem manuscripts suffered this same fate.

A Renaissance in Harlem brings together more than forty-five stories written by the many different WPA writers who worked in Harlem. While some like Ellison eventually won worldwide acclaim, most, like Vivian Morris, remained obscure, invisible men and women despite the literary promise of their work. These stories are further evidence that there was a renaissance in Harlem, one that may have been completely missed by some of the intellectuals who first coined the phrase.

11. The main idea of the passage is that:
    - **A.** shortly after the Depression began, thousands of unemployed Americans joined the Writer's Project.
    - **B.** during the 1930s, a group of Writer's Project writers produced an important chronicle of daily life in Harlem.
    - **C.** the years between 1924 and 1929 comprise the most significant literary period in U.S. history.
    - **D.** from its headquarters in Harlem, the Writer's Project generated a narrative of cultural life in the United States.

12. The passage's tone is best described as one of:
    F. admiration.
    G. detachment.
    H. questioning.
    J. irony.

13. One of the main ideas of the fifth paragraph (lines 51–66) is that:
    A. though significant to the writers who collected them, the Writer's Project interviews seem merely like raw material today.
    B. the Writer's Project stories from Harlem are fictional in the strictest definition of the word.
    C. *Invisible Man* is the single most important work of fiction to emerge from the Writer's Project.
    D. many in the Harlem Writer's Project went to great lengths to tell accurate, creative, and literary stories.

14. According to the passage, which of the following is NOT a reason for the demise of the Writer's Project?
    F. New funds for the program became nonexistent.
    G. Political forces opposed this program of New Deal Democrats.
    H. Harlem residents objected to having their personal stories exposed to the public.
    J. Politicians relinquished their support of all WPA projects.

15. The passage best supports which of the following as a possible reason for Morris's obscurity as a writer?
    A. Her stories failed to capture the spirit of Harlem.
    B. Her WPA work was sent to a state archive.
    C. She had asked that her writing not be published in her lifetime.
    D. She stopped writing once the WPA ended.

16. As it is used in line 2, the phrase *social experiment* most nearly refers to:
    F. an endeavor to raise the morale and fortunes of unemployed Americans.
    G. a plan to initiate a cultural revival across the United States.
    H. the study of the impact of a massive black migration.
    J. a temporary program supporting aspiring writers.

17. In the context of the passage, the statement in lines 25–29 most nearly means that:
    A. a group of men and women successfully promoted the art and literature of Harlem in the 1920s.
    B. the revival in Harlem was a much broader-based movement than is usually recognized.
    C. though many people were involved, the Harlem Renaissance was primarily an intellectual movement.
    D. while a small group of artists generally receives credit for the revival in Harlem, in fact a much larger group of artists was involved.

18. The passage best supports which of the following claims about Ellison, Hurston, and West?
    F. They faded into relative obscurity after publishing books in the late 1930s.
    G. They had published important works of fiction prior to Harlem's golden era.
    H. Their work in the late 1930s is an argument for a revised definition of Harlem's golden era.
    J. Their primary motivation for joining the Writer's Project was to collect materials for future novels.

19. The passage's author mentions Writer's Project writers utilizing all of the following literary techniques in their WPA work EXCEPT:
    A. using realistic dialogue.
    B. setting scenes.
    C. incorporating flashbacks.
    D. employing extended metaphors.

20. According to the passage, *A Renaissance in Harlem* contains:
    F. a sampling of some of the best fiction written about Harlem in the 1930s.
    G. more than forty-five selections from both famous and relatively unknown writers.
    H. nearly fifty selections from previously obscure Writer's Project writers.
    J. a handful of stories that had been dismissed by Harlem intellectuals in the 1930s.

Passage III

HUMANITIES: This passage is adapted from the article "Sublime Architecture: Sacred Interiors Aglow" by Holland Cotter (©2002 by The New York Times Company).

Thanks to Vermeer and Rembrandt, art of the 17th-century Dutch Golden Age is box-office magic. One reason is obvious: both artists are charismatic stylists and humane thinkers. The same is true of Pieter Saenredam (1597–1665), their contemporary and, in the view of many connoisseurs, their equal, but who doesn't enjoy their popular fame. While they painted people, he painted buildings: church interiors in which the human figure was insignificant or absent. In fact, Saenredam is often referred to as an architectural portraitist, whose exacting eye for measurement, light and detail gives his pictures the accuracy of scientific photographs. But are they really so true to life? Or are they, like photographs, a mix of fact, error and wishful illusion?

Like Vermeer, Saenredam was a perfectionist and his output was fairly small. He was also an outstanding draftsman and—this is not true of Vermeer—many of his drawings survive. All directly related to the paintings, they offer intimate insights into his art and life.

About that life we know both a little and a lot. He was born in Assendelft. After his father died when he was 10, the family moved to Haarlem, where Saenredam stayed for the rest of his life. He studied art but, being financially independent, never had to make a living from it. At 30 he decided to devote himself to architectural subjects, or perspectives, as they were called. When he died he was buried in the Church of St. Bavo, which he had often painted.

Saenredam's fascination with Dutch churches was real, and intense enough to take him on occasional trips away from Haarlem. The longest was to Utrecht, where he stayed from June to October 1636. His long stay in Utrecht may have been forced by a plague outbreak that hit Haarlem soon after he left. In any event, his time in Utrecht was the most fruitful of his career, when he produced some of his greatest images and a visual record of his activities.

Through his drawings we can trace his whereabouts. We learn that he worked in seven different churches, five of which still exist. A soaring Gothic cathedral, called the Dom, was leveled in 1674; his drawings and paintings are the only documentation of its original appearance. The smaller, older Mariakerk—*kerk* is Dutch for church—was derelict when he visited and was pulled down in the 19th century. He spent six weeks there, more time than anywhere else, and in his many views of its interior and exterior, he captured its beauties and eccentricities, as if he were portraying a friend, newly met but instantly beloved. It inspired three paintings of its exterior, which are among the supreme masterpieces of Dutch art.

His work routine was the same for each church. First, he made highly detailed on-the-spot sketches of a building, including close-ups of specific features. Later, in the studio, he converted these studies into more polished drawings, adjusting perspective and scale. Still later—in some cases a quarter century later—he turned these drawings into paintings.

Few buildings, at least before photography, were observed with more passionate care. In his on-site drawings, Saenredam seems intent on getting every last little thing down, with epic results. Whole architectural histories can be read in the structural particulars he drew, civic histories in tomb inscriptions he transcribed, histories of religion and fashion in the ornaments he rendered.

Personal and professional stories also come across. Through certain drawings, we can place the artist at a particular church on a particular day, say June 30, 1636. An ink-wash shadow fixes the time: 8 a.m. Another shadow to the left has a different angle: 9 a.m. So we see him moving systematically across the page. Over weeks, we see him succeeding and failing, making brilliant decisions or botching a job. Some on-site drawings are awesomely exact; others wildly misjudge spatial dimensions or cram surreal amounts of data into a single image. Certain errors of judgment can be corrected later; others are disastrous, resulting in paintings that are architectural fictions.

But fiction is built into this art, just as it is into the portraits of Rembrandt and Vermeer. Reality is deliberately adjusted, edited, dramatized, simplified. A church interior cluttered with the unruly stuff of life—benches, gravestones, water-stained stones—is jotted down on paper, then refined into a network of lines and grids, finally into a painted solid, a container of light, golden-brown or dove gray: a utopian vision with one foot on earth and one foot beyond.

21. The main purpose of the passage is to:

A. explore the relationship between drawing and painting in Dutch art, using three seventeenth-century artists as case studies.
B. examine the influence of religion on Dutch art, using one seventeenth-century artist as an example.
C. discuss the life and work of a particular seventeenth-century Dutch artist.
D. rate the relative importance of the work of three seventeenth-century Dutch artists.

22. The passage characterizes Saenredam as all of the following EXCEPT:

F. predictable in his work habits.
G. comfortable financially.
H. passionately meticulous.
J. artistically inferior.

23. Based on the passage, how should the assertion that Saenredam "painted buildings" (line 8) be read?

A. Literally; he decorated the interior walls of Dutch churches.
B. Literally; Dutch churches were the subject of his paintings.
C. Ironically; the people in his paintings often stood out more than did the buildings.
D. Sarcastically; to the author, buildings are less worthy subjects for art than people are.

24. The passage most strongly implies that Saenredam viewed Haarlem as:

F. a place he was willing to leave only temporarily.
G. the center of the Dutch Golden Age in art.
H. far less agreeable than Assendelft, his birthplace.
J. a city where he could study art until he could afford to move to Utrecht.

25. It can reasonably be inferred from the last paragraph that the author believes Saenredam's work serves as:

A. a reminder of the power of art to allow the viewer to transcend reality without ignoring it.
B. evidence that the limitations of Saenredam's subject matter inhibited his artistic expression.
C. proof that Saenredam's artistic achievements surpass those of Vermeer and Rembrandt.
D. an indication that the Dutch Golden Age represents the peak of seventeenth-century art.

26. Through his comparison of Saenredam's work to photography, the author reveals his belief that photography:

F. is a more accurate representation of reality.
G. partially distorts reality.
H. ignores reality in order to promote a specific artistic vision.
J. requires a less exacting eye for measurement.

27. According to the passage, Saenredam's time in what location was "the most fruitful of his career"?

A. Utrecht
B. Haarlem
C. Assendelft
D. Amsterdam

28. The statement in lines 63–67 most nearly means that:

F. Saenredam read extensively about the history of a church before attempting to paint it.
G. Saenredam's paintings seem more like dry historical documents than vibrant works of art.
H. the wealth of details in a Saenredam painting is less important than the epic subject he took on.
J. the many precise details in Saenredam's paintings reveal much about the history of a place.

29. In the passage, the significance of June 30, 1636, is that it is:

A. the day when Saenredam began painting a Gothic cathedral called the Dom.
B. the day when Saenredam finished his painting of Mariakerk.
C. an example of a day through which Saenredam's work can be traced using evidence in his drawings.
D. an unusual workday for Saenredam, who stopped drawing at 9 a.m., much earlier than normal.

30. As it is used in line 71, the word *fixes* most nearly means:

F. establishes.
G. corrects.
H. repairs.
J. hardens.

Passage IV

NATURAL SCIENCE: This passage is adapted from the article "Hawaii's Native Palms" by Mike Grudowski (©2002 by Smithsonian Institution).

Field botanist Ken Wood works for the National Tropical Botanical Garden (NTBG), on Kauai. He spends a lot of time looking for rare palms. Today he hopes to pluck a few seeds from a fan palm of the genus *Pritchardia*, a group that encompasses Hawaii's only native palms.

There are 27 species of *Pritchardia*, 23 of which are found in Hawaii. Eight are officially classified as endangered, but Wood is convinced others as well face the threat of extinction. Not long ago, he took a census on East Maui of one of them, *P. arecina*. "There are only 500 left and there is no regeneration. When there's no regeneration, you don't need statistics to show that the species will die off."

As is the case with endangered plants and animals in general, a disproportionate number of endangered palm species are found on islands. If they didn't constitute such a varied family of plants, palms might be in even worse shape. They grow in African streams and 9,000 feet high in the Andes. They're found in sweltering mangrove swamps in Southeast Asia and in blizzard-lashed highlands in the Himalayas. Some top out at six inches, and others tower upwards of 200 feet; rattan palms (which grow as vines) can exceed 600 feet in length. "Because palms are so diverse, they've risen to dominance in many ecosystems," says Scott Zona, a palm botanist at Fairchild Tropical Garden in Coral Gables, Florida. "They're characteristic of savanna forests, rain forests, gallery forests along rivers, and mangroves."

Palms put food on the table for people directly and indirectly. Almost half a million people in the South Pacific rely entirely for their livelihood on coconut palms grown commercially on Fiji and other Pacific islands, like Samoa. Coconut oil and coconut milk are important food sources. There are very few parts of the palm that somebody, somewhere, hasn't found useful.

According to Melany Chapin, who oversees NTBG's collections of live plants, the main problem with Hawaii's native palms is that "they don't have any defense mechanisms, because they never had any native predators to contend with." For millions of years, Hawaii's lands existed in isolation. Then the Polynesians introduced rats and lizards along with their crop plants (coconut palms, taro, and breadfruit). Captain James Cook and other explorers left behind pigs, sheep, goats and cattle. Mongooses, imported from Jamaica in the 1880s to prey on rats in sugarcane fields, developed a taste for native birds.

Today, just about any time a *Pritchardia* tries to reproduce, Hawaii's biological invaders go to work. Rats devour most seeds before they can germinate. Goats munch any seedlings that manage to sprout. Pigs rut up the ground, damaging fragile root systems and causing erosion in steep terrain. Vickie Caraway, a botanist in Hawaii's Division of Forestry and Wildlife, says that introduced weeds are a big problem too. They form thick mats over the soil in many areas, preventing the palm seeds from germinating.

Habitat destruction compounds the problems. Over the centuries, much of Hawaii has been burned, bulldozed and built up with cane and pineapple fields, towns, condominiums, hotels, marinas and golf courses. The lowland dry forest, where native palms once dominated, has taken the hardest hit; more than 96 percent of it is gone. Unethical plant collectors make things worse still.

As daunting as these combined threats are, hope remains. On the north shore of Kauai, NTBG is restoring *Pritchardia* to the wild in a 1,000-acre preserve. But most of the *Pritchardia* seeds Wood and his fellow scientists bring back from their expeditions get planted in the garden's 286-acre grounds on Kauai's south shore. There and in other protected tracts, the staff is cultivating a kind of botanical menagerie of rare palms, in hopes of preserving as much genetic diversity as possible. These plants provide a significant hedge against the possibility of extinction. For instance, the only four *P. viscosa* palms known to exist in the wild grow along a trail on the eastern side of Kauai. Now those four have 16 cousins growing in captivity.

Several groups are trying to save Hawaii's palms by protecting their habitat. About two million acres of native forest and scrubland remain intact, according to the Nature Conservancy, and a quarter of them are managed by federal or state agencies, or private groups. On Maui, Oahu and Molokai, a number of land partnerships have been formed in recent years, bringing together all manner of public and private landowners in cooperative efforts to thin out invasive species and protect native ones.

31. Based on the passage as a whole, Ken Wood most likely hopes to collect seeds from a rare fan palm of the genus *Pritchardia* (lines 1–6) so he'll be able to:

A. continue to study the differences in the seeds of various palm genera.
B. bring the seeds to the NTBG on Kauai for planting.
C. plant the seeds in mangrove swamps in Asia where rare fan palms currently aren't growing.
D. transport the seeds to a mainland habitat in Florida.

32. In terms of the passage as a whole, the third and fourth paragraphs (lines 15–37) mainly serve to:

F. contrast the appearance of rattan palms with *Pritchardia* palms.
G. explain why particularly small palms are more likely to survive today in Hawaii than they would have been millions of years ago.
H. provide information about palms worldwide as a context for the discussion of Hawaiian palms.
J. argue for the need to protect the native palms of Africa and Southeast Asia as well as the native palms of Hawaii.

33. The passage suggests that compared to species of palms that grow on islands, palms that grow in mainland ecosystems are:

A. more likely to be studied by NTBG.
B. less diverse in their size and shape.
C. more useful as a food source.
D. less likely to be endangered.

34. Lines 19–25 primarily serve to illustrate the point made in the third paragraph (lines 15–30) that collectively the plants of the palm family are:

F. tolerant of cold climates.
G. endangered.
H. diverse.
J. tall.

35. It can reasonably be inferred from the passage that which of the following animals introduced to Hawaii has had the LEAST negative effect on Hawaii's native palms?

A. Goat
B. Rat
C. Pig
D. Mongoose

36. Regarding *Pritchardia*, which of the following is NOT mentioned in the passage as being vulnerable in Hawaii?

F. Seed
G. Seedling
H. Root system
J. Bark

37. As it is used in line 60, the word *compounds* most nearly means:

A. settles.
B. increases.
C. mixes.
D. fabricates.

38. The main purpose of the eighth paragraph (lines 68–81) is to describe:

F. the process of planting, caring for, and monitoring a palm tree.
G. efforts by NTBG's staff to preserve and restore *Pritchardia* species.
H. the physical characteristics of the *P. viscosa* growing along a trail on the eastern side of Kauai.
J. NTBG's need to acquire land for planting additional *Pritchardia* species.

39. As it is used in line 77, the word *hedge* most nearly means:

A. obligation.
B. distrust.
C. defense.
D. exclusion.

40. It can most reasonably be inferred from the passage that which of the following plants are native to Hawaii?

F. *P. viscosa* palms
G. Rattan palms and taro
H. Coconut palms and sugarcane
J. Breadfruit

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 seven 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

Five bicycle riders traveled during the same 35 sec time interval along a 1 km segment of a straight path. Point P was located at one end of the segment. D, measured in meters, was a rider's distance along the path from Point P at time t. Measurement of D began simultaneously for all riders at $t = 0$ sec.

Figure 1 is a graph of D versus t for Riders 1 and 2. Figure 2 is a graph of D versus t for Riders 3, 4, and 5.

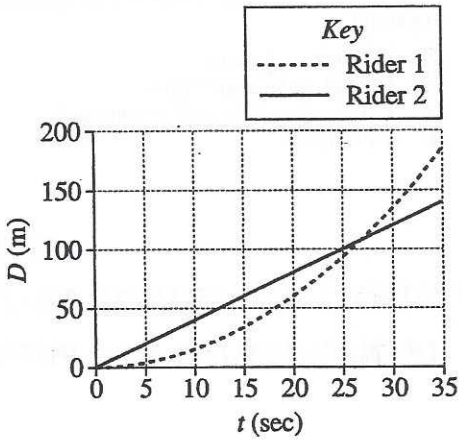


Figure 1

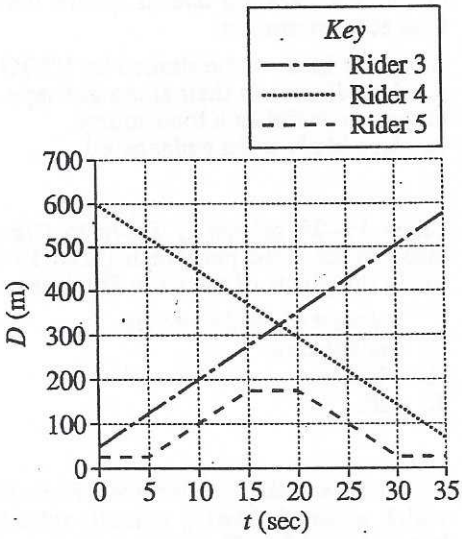


Figure 2

1. Consider two of the riders temporarily renamed Rider A and Rider B. Rider A traveled in the same direction as Rider B throughout the 35 sec interval. Initially, Rider A traveled more slowly than Rider B and fell behind. But Rider A pedaled faster and faster and, in less than 30 sec, caught up with and passed Rider B. Who were Riders A and B ?

	Rider A	Rider B
A.	Rider 1	Rider 2
B.	Rider 2	Rider 3
C.	Rider 3	Rider 5
D.	Rider 5	Rider 4

2. Based on Figures 1 and 2, which riders did NOT begin the 35 sec interval at Point P ?

   F. Riders 1 and 2 only
   G. Riders 2 and 5 only
   H. Riders 1, 2, and 4 only
   J. Riders 3, 4, and 5 only

3. Based on Figure 2, how far did Rider 4 travel between $t = 0$ sec and $t = 15$ sec ?

   A. 225 m
   B. 375 m
   C. 600 m
   D. 750 m

4. Based on Figure 1, the average speed of Rider 2 over the 35 sec interval was closest to which of the following?

   F. 1 m/sec
   G. 2 m/sec
   H. 4 m/sec
   J. 8 m/sec

5. A student stated that, based on Figure 2, Rider 5 did not travel at all between $t = 15$ sec and $t = 20$ sec. Is the student's statement correct?

   A. Yes; Rider 5's distance from Point P at $t = 15$ sec was not the same as Rider 5's distance from Point P at $t = 20$ sec.
   B. Yes; the slope of the graph over the time interval from $t = 15$ sec to $t = 20$ sec is zero.
   C. No; Rider 5's distance from Point P at $t = 15$ sec was the same as Rider 5's distance from Point P at $t = 20$ sec.
   D. No; the slope of the graph over the time interval from $t = 15$ sec to $t = 20$ sec is not zero.

Passage II

The gypsy moth, which is native to Asia and Europe, was accidentally introduced to the northeastern United States in 1869. Gypsy moth *larvae* (caterpillars) eat tree leaves and have caused serious damage to forest ecosystems in the United States. Figure 1 shows the times of the year that the different stages of the gypsy moth life cycle occur. Figure 2 shows the percent of 1,000 test plots having light, moderate, or heavy *defoliation* (leaf loss) due to gypsy moth larvae each year from 1979 to 1983. Table 1 shows the average percent defoliation by gypsy moth larvae for individual tree species in the test plots in 1981.

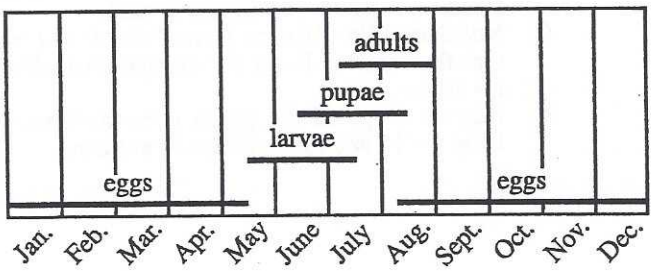


Figure 1

Figure 1 adapted from Michigan State University Extension, Gypsy Moth Education Program, "Life Cycle and Biology." ©1997 by Michigan State University.

Table 1	
Tree species	Average percent defoliation
Chestnut oak	62
Black oak	55
Scarlet oak	50
Aspen	45
Northern red oak	41
White oak	34
Hickory	31
Hard maple	28
Sassafras	26
Paper birch	23
Basswood	23
Beech	22
Elm	21
Serviceberry	19
Red maple	17
Sweet birch	17
Dogwood	15
Black cherry	12
White pine	9
Black gum	8
Ash	8
Striped maple	7
Black locust	6
Yellow birch	5
Yellow poplar	5
Pitch pine	1
Hemlock	0.1

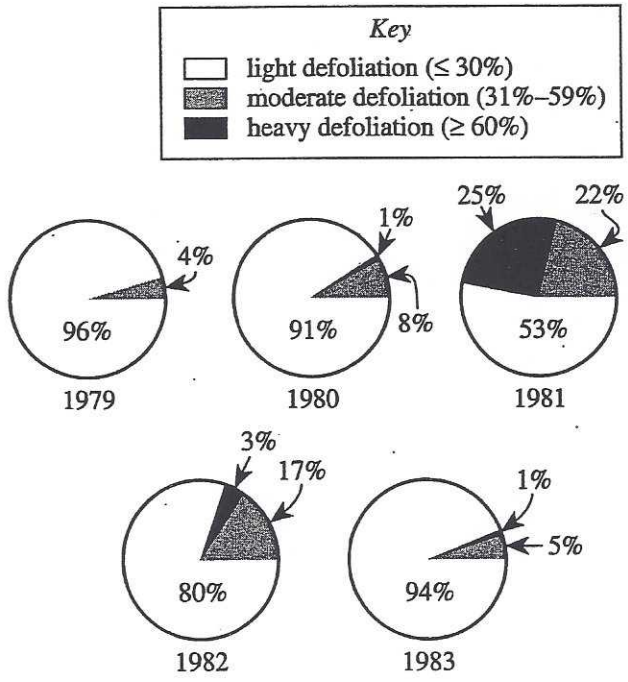


Figure 2

Table 1 and Figure 2 adapted from David A. Gansner and Owen W. Herrick, "Host Preferences of Gypsy Moth on a New Frontier of Infestation." U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station, 1985.

6. Based on Figure 1, what happens during the pupa stage of the gypsy moth life cycle?

   F. The pupa lays eggs that will hatch in the spring.
   G. The pupa lays eggs that will hatch in the fall.
   H. An adult is formed through metamorphosis.
   J. A larva is formed through metamorphosis.

7. A student hypothesized that gypsy moth populations peak every 10 years. If this hypothesis is correct, Figure 2 indicates that the next peak in the gypsy moth population most likely occurred in:

   A. 1983.
   B. 1985.
   C. 1987.
   D. 1991.

8. Based on Table 1, in the test plots in 1981 the average percent defoliation of which of the following tree species was 10 times the average percent defoliation of yellow poplar trees?

   F. Chestnut oak
   G. Scarlet oak
   H. Dogwood
   J. Yellow birch

9. On the basis of the information provided, did the majority of tree species listed in Table 1 suffer, on average, light, moderate, or heavy defoliation in the test plots in 1981 ?

   A. Light defoliation
   B. Moderate defoliation
   C. Heavy defoliation
   D. Cannot be determined from the given information

10. Based on Figure 2, for what year did exactly 80 plots show moderate defoliation?

    F. 1980
    G. 1981
    H. 1982
    J. 1983

Passage III

Introduction

Methane (CH_4) has been detected recently in Mars's atmosphere at an average concentration of 10 parts per billion by volume (ppbv). Above localized areas near Mars's equatorial region, higher CH_4 concentrations up to 250 ppbv have been detected. (On Earth, CH_4 is present in the atmosphere at an average concentration of 1,700 ppbv.)

In Mars's atmosphere, intense UV radiation promotes the reaction of CH_4 with hydroxyl radicals (OH) to form CO_2 and H_2O. However, Mars's thin atmosphere means that OH is scarce. Consequently, a molecule of CH_4 can remain in Mars's atmosphere for up to 340 years. Therefore, the CH_4 recently detected must have entered Mars's atmosphere within the past 340 years.

Four students discuss the possible source of the CH_4 in Mars's atmosphere.

Student 1

CH_4 is generated by a hydrothermal process operating a short distance beneath the surface of Mars. Hot fluids circulate through *basalt* (an igneous rock) and alter it to produce a mineral known as *serpentine*. This alteration produces H_2, which then reacts with CO_2 to produce CH_4. The CH_4 rises slowly to the surface, where it enters the atmosphere.

Student 2

CH_4 is put into Mars's atmosphere by comets. Comets are composed of several frozen materials, one of which is CH_4. Friction heats the comets as they enter the atmosphere. This heat vaporizes the frozen materials, releasing CH_4 and other gases into Mars's atmosphere.

Student 3

Large deposits of the material known as *methyl hydrate* are present at specific locations beneath Mars's surface. In this material, CH_4 molecules are held inside a cage of water ice molecules. When the deposit is disturbed, or heated slightly, the CH_4 is released from the cage. Once released, the CH_4 rises slowly to the surface, where it enters the atmosphere.

Student 4

CH_4 is produced through the activity of anaerobic bacteria that are present a short distance below Mars's surface. These bacteria, which do not require oxygen, generate CH_4 from CO_2 and H_2, or from CO and H_2O. Most of the CH_4 in Earth's atmosphere is produced in the same ways by the action of anaerobic bacteria.

11. The statement that CH_4 is produced through a process that occurs beneath Mars's surface is consistent with the models of:

- **A.** Students 1, 2, and 3 only.
- **B.** Students 1, 3, and 4 only.
- **C.** Students 1, 2, and 4 only.
- **D.** Students 2, 3, and 4 only.

12. Large deposits of methyl hydrate are present beneath the ocean floor at various locations on Earth. Based on Student 3's model, a major earthquake at one of those locations would most likely cause:

- **F.** CH_4 to be changed to serpentine.
- **G.** CO_2 to be changed to basalt.
- **H.** CH_4 to be released into Earth's atmosphere.
- **J.** CO_2 from Earth's atmosphere to be absorbed by basalt beneath the ocean floor.

13. Student 4 would most likely agree with the statement that anaerobic bacteria on Earth can produce:

- **A.** CO_2 from CH_4 and H_2O, as anaerobic bacteria do on Mars.
- **B.** CH_4 from CO_2 and H_2, as anaerobic bacteria do on Mars.
- **C.** CO_2 from CH_4 and H_2O, unlike anaerobic bacteria do on Mars.
- **D.** CH_4 from CO_2 and H_2, unlike anaerobic bacteria do on Mars.

14. Suppose it is discovered that fluids having temperatures high enough to alter rock have not been present on or beneath Mars's surface at any time during the past 10,000 years. This discovery would most strongly contradict statements made by which student?

- **F.** Student 1
- **G.** Student 2
- **H.** Student 3
- **J.** Student 4

15. If Student 2's model is correct, any CH_4 from comets would be uniformly distributed throughout Mars's atmosphere. Is the actual distribution of CH_4 in Mars's atmosphere, as described in the introduction, consistent with this distribution?

- **A.** Yes, because CH_4 concentrations vary from less than 10 ppbv in some areas to 250 ppbv in other areas.
- **B.** Yes, because a uniform CH_4 concentration of 10 ppbv is found everywhere in Mars's atmosphere.
- **C.** No, because CH_4 concentrations vary from less than 10 ppbv in some areas to 250 ppbv in other areas.
- **D.** No, because a uniform CH_4 concentration of 10 ppbv is found everywhere in Mars's atmosphere.

16. The process described by Student 1 is an example of which of the following geological processes?

F. Erosion
G. Weathering
H. Mountain-building
J. Metamorphism

17. Consider the information provided about the average concentration of CH_4 in Mars's atmosphere. If Mars's atmosphere had a volume of 10 billion liters, how many liters of CH_4 would be present in Mars's atmosphere?

A. 100
B. 1,000
C. 1 billion
D. 10 billion

Passage IV

Ozone (O_3), like household bleach, can break down molecules by a process called *oxidation*. Students did 3 experiments to study the effects of O_3 on different food colorings.

Each experiment was done using a *colorimeter*. In a colorimeter, light of a certain wavelength is directed through a sample solution onto a detector. If a compound in the solution absorbs some of the light, that light will not reach the detector (see diagram).

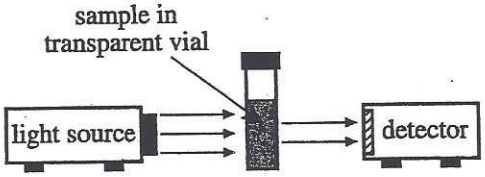


diagram of colorimeter

The solution's *absorbance* is related to the amount of light absorbed, and thus, to the concentration of the compound in the solution.

Experiment 1

Students added 0.010 mL of blue food coloring to 500.0 mL of H_2O in a large flask. A sample of this solution was added to a transparent vial. The vial was placed in a colorimeter and its absorbance was measured at 2 wavelengths, 427 nm and 603 nm. The sample was returned to the flask. The following procedure was then repeated several times in succession:

1. The solution in the flask was stirred continuously while O_3 was bubbled through the solution at a constant rate for 1 min; then the flow of O_3 was stopped.
2. A sample of the solution was placed in the transparent vial and its absorbance was measured in the colorimeter at 427 nm and at 603 nm.
3. The sample was returned to the flask.

The students then plotted absorbance versus *exposure time* (total time that O_3 was bubbled through the solution) as shown in Figure 1.

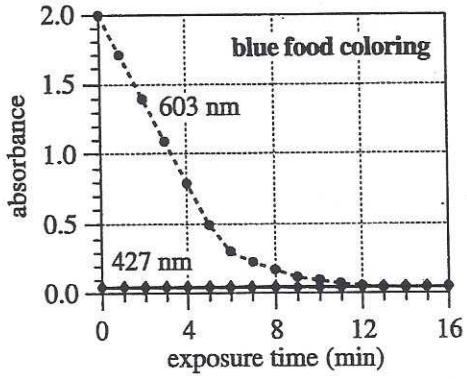


Figure 1

Experiment 2

Experiment 1 was repeated using yellow food coloring instead of blue food coloring (see Figure 2).

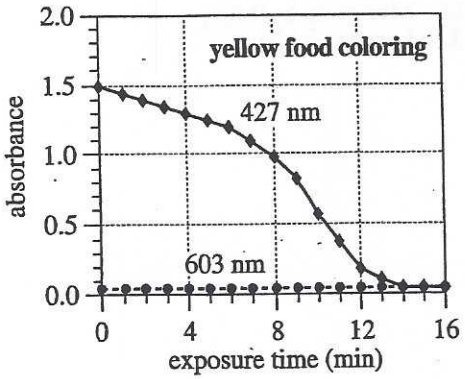


Figure 2

Experiment 3

Experiment 1 was repeated using green food coloring instead of blue food coloring (see Figure 3).

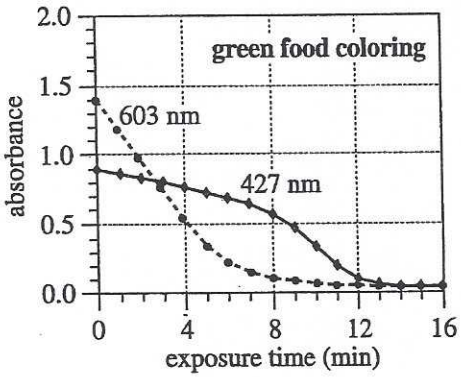


Figure 3

Figures adapted from Jorge G. Ibanez et al., "Laboratory Experiments on the Electrochemical Remediation of the Environment. Part 7: Microscale Production of Ozone." ©2005 by Division of Chemical Education, Inc., American Chemical Society.

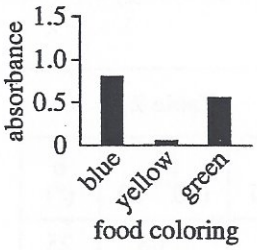
18. According to the results of Experiment 3, for green food coloring, at which of the following exposure times was the absorbance measured at 427 nm closest to the absorbance measured at 603 nm ?

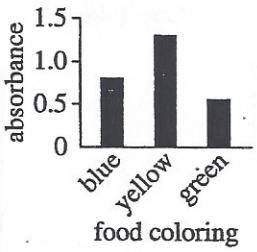
F. 0 min
G. 3 min
H. 6 min
J. 9 min

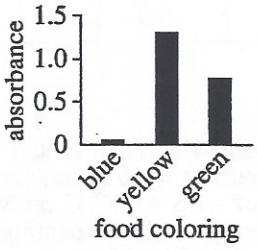
19. A student claims that a solution of blue food coloring absorbs light more strongly at 603 nm than at 427 nm. Is the claim consistent with the results of Experiment 1 for an exposure time of 0 min ?

A. No, because the absorbance was lower at 603 nm than at 427 nm.
B. No, because the absorbance was higher at 603 nm than at 427 nm.
C. Yes, because the absorbance was lower at 603 nm than at 427 nm.
D. Yes, because the absorbance was higher at 603 nm than at 427 nm.

20. Which of the following graphs best represents the results of Experiments 1–3 for 427 nm and an exposure time of 4 min ?

F.


H.


G.


J.


21. Which of the following statements about green food coloring is best supported by the results of Experiments 1–3 ? Green food coloring:

A. does not react with O_3.
B. is a mixture of blue food coloring and yellow food coloring.
C. absorbs light at 427 nm, but does not absorb light at 603 nm.
D. absorbs light at 603 nm, but does not absorb light at 427 nm.

22. Consider the results of Experiment 1 at 603 nm. Compared to the concentration of blue food coloring in the solution at an exposure time of 2 min, the concentration of blue food coloring at an exposure time of 12 min was:

F. lower, because the absorbance at 603 nm was lower at 12 min than at 2 min.
G. lower, because the absorbance at 603 nm was higher at 12 min than at 2 min.
H. higher, because the absorbance at 603 nm was higher at 12 min than at 2 min.
J. higher, because the absorbance at 603 nm was lower at 12 min than at 2 min.

23. Light at 427 nm is violet in color and light at 603 nm is orange in color. Which of the following conclusions about solution color, light color, and absorbance is best supported by the results of Experiments 1 and 2 ? Blue solutions tend to absorb violet light:

A. more strongly than orange light, and yellow solutions tend to absorb violet light more strongly than orange light.
B. more strongly than orange light, and yellow solutions tend to absorb violet light less strongly than orange light.
C. less strongly than orange light, and yellow solutions tend to absorb violet light less strongly than orange light.
D. less strongly than orange light, and yellow solutions tend to absorb violet light more strongly than orange light.

Passage V

Students studied electric forces between charged spheres using the apparatus shown in Figure 1.

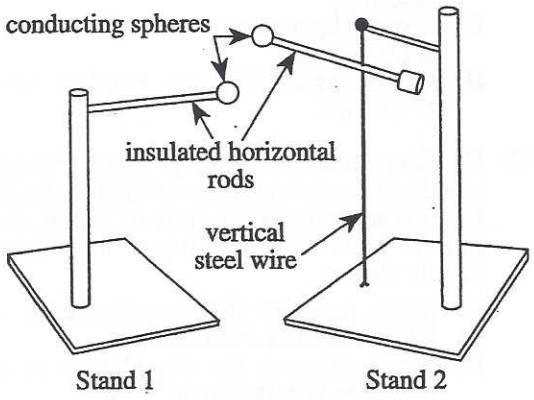
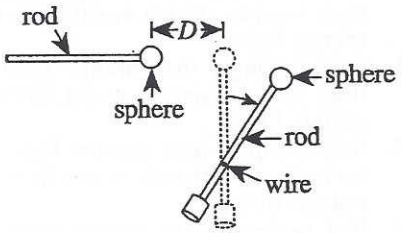


Figure 1

In each trial, the students mounted 2 uncharged conducting spheres D cm apart on the stands. Then they placed a negative charge on each sphere. The electric force between the spheres caused Stand 2's sphere to move away from Stand 1's sphere, thereby twisting the vertical wire clockwise (see Figure 2).



top view of rods and spheres

Figure 2

The students twisted the wire counterclockwise until Stand 2's sphere had moved back to its original position. The angle through which they twisted the wire, θ, in degrees, was proportional to the strength of the electric force with the spheres D cm apart.

Study 1

The students mounted Spheres A and B, each with a radius of 1.9 cm, on Stands 1 and 2, respectively, with $D = 10.0$ cm. Using a charging probe, they placed a charge of -7.5×10^{-9} coulomb (C) on each sphere. Then they found θ.

They repeated this procedure for other values of D (see Table 1).

Table 1		
Trial	D (cm)	θ (°)
1	10.0	50
2	15.0	22
3	20.0	13
4	40.0	3

Study 2

The students mounted Spheres A and B as in Study 1, with $D = 10.0$ cm. Using the probe, they placed a charge of -7.5×10^{-9} C on Sphere A and a charge, Q_B, of -3.8×10^{-9} C on Sphere B. Then they found θ.

They repeated this procedure for other values of Q_B (see Table 2).

Table 2		
Trial	Q_B (10^{-9} C)	θ (°)
5	−3.8	25
6	−1.9	13
7	−0.9	6

Study 3

The students mounted Spheres A and E on Stands 1 and 2, respectively, with $D = 10.0$ cm. Using the probe, they placed a charge of -7.5×10^{-9} C on Sphere A. They charged Sphere E by temporarily connecting it to Sphere A with a thin wire. Then they found θ.

They repeated this procedure, replacing Sphere E with Spheres F and G, in turn. Spheres E, F, and G each had a different radius, R (see Table 3).

Table 3			
Trial	Sphere	R (cm)	θ (°)
8	E	0.95	11
9	F	0.48	8
10	G	0.24	5

Figures and tables adapted from Bruce Lee, "Instruction Manual and Experiment Guide for the PASCO scientific Model ES-9070." ©1989 by PASCO scientific.

24. According to the results of Study 1, as D increased, θ:

F. remained constant.
G. increased only.
H. decreased only.
J. varied, but with no general trend.

25. The amount of charge the students initially placed on Sphere A using the charging probe was the same for all of the trials in which of the studies?

A. Study 1 only
B. Studies 1 and 2 only
C. Studies 2 and 3 only
D. Studies 1, 2, and 3

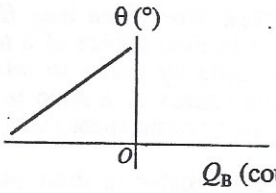
26. Suppose that in Study 3 an additional trial had been performed with Sphere A mounted on Stand 1 and Sphere H, a sphere of radius 0.70 cm, mounted on Stand 2. Based on the results of Study 3, θ for that trial would most likely have been:

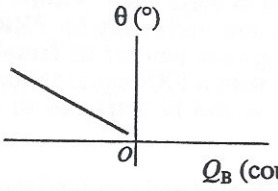
F. less than 5°.
G. between 5° and 8°.
H. between 8° and 11°.
J. greater than 11°.

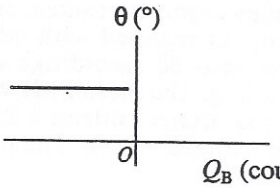
27. Suppose that in any of the trials in Studies 1 and 2, the students had placed a positive charge on Sphere B. How would the direction of motion of Sphere B have been affected? Sphere B would have moved:

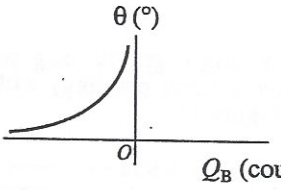
A. away from Sphere A, because like charges attract each other.
B. away from Sphere A, because like charges repel each other.
C. toward Sphere A, because opposite charges attract each other.
D. toward Sphere A, because opposite charges repel each other.

28. The results of Study 2 are best represented by which of the following graphs?

F.


G.


H.


J.


29. During a given trial, while the 2 charged spheres moved apart, the *potential energy* stored in the vertical steel wire most likely:

A. increased, because the wire was becoming more twisted.
B. increased, because the wire was becoming less twisted.
C. decreased, because the wire was becoming more twisted.
D. decreased, because the wire was becoming less twisted.

Passage VI

Females of the New World tree frog *Hyla ebraccata* are strongly influenced in their choice of a mate by *advertisement calls* (calls made by males to attract females). Thus, the reproductive fitness of a male is dependent on the characteristics of his advertisement call.

Advertisement calls differ in their *pulse-repetition rate* (PRR), measured in hertz (Hz). Natural populations of *Hyla ebraccata* show low variability for PRR. A researcher hypothesized that a greater percent of female frogs would be attracted to a call with a PRR equal to the mean PRR of the population than would be attracted to a call with an alternative PRR.

The researcher located and recorded the advertisement call of a male frog, then captured, marked, and released the frog. This procedure was repeated with other frogs from the same population until 60 recordings were obtained, each from a different frog. The mean PRR was found to be 100 Hz. Next, the researcher collected 25 *gravid frogs* (frogs carrying unfertilized eggs). Then the following experiment was conducted.

Experiment

In each trial, a single gravid frog was placed in a small arena (built from foam padding) with 2 speakers at opposite ends (see Figure 1).

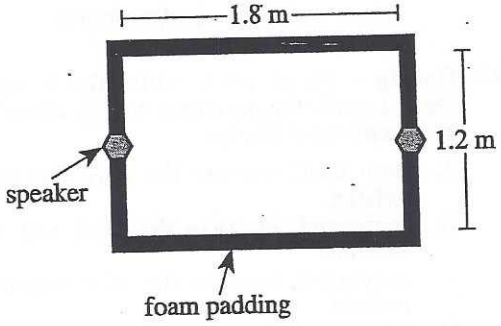


Figure 1

One speaker played a call (at an intensity level of 80 decibels) with a PRR equal to the mean PRR of the population. The other speaker played a call (at 80 decibels) with an alternative PRR. The frog was monitored until it moved to within 2.5 cm of a speaker, and was then removed from the arena.

Every gravid frog participated in 6 trials, each with a different alternative PRR. Figure 2 shows the percent of frogs that moved to within 2.5 cm of the speaker playing an alternative PRR.

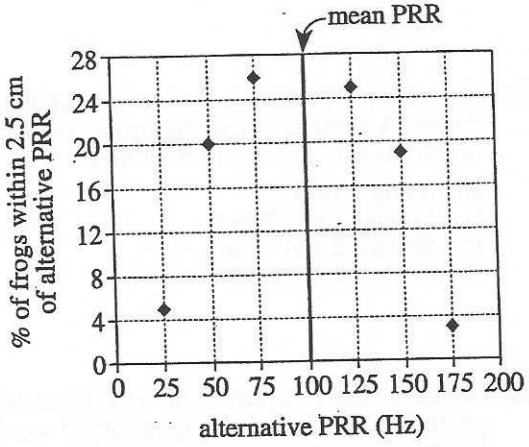


Figure 2

Figure 2 adapted from Lori Wollerman, "Stabilizing and Directional Preferences of Female *Hyla ebraccata* for Calls Differing in Static Properties." ©1998 by the Association for the Study of Animal Behaviour.

30. As the alternative PRR increased from 25 Hz to 175 Hz over the course of the experiment, the percent of frogs that moved to within 2.5 cm of the speaker playing the alternative PRR:

F. increased only.
G. decreased only.
H. increased, then decreased.
J. decreased, then increased.

31. Suppose that, in additional trials, each gravid frog had been exposed to the mean PRR and an alternative PRR of 140 Hz. The percent of frogs that would have moved to within 2.5 cm of the speaker playing the alternative PRR would most likely have been closest to which of the following?

A. 2%
B. 22%
C. 78%
D. 98%

32. By marking the male frogs as part of the procedure for obtaining 60 recordings, which of the following outcomes was the researcher trying to avoid?

F. Recording a particular male frog only once, shifting the mean PRR of the population toward the PRR of that frog's advertisement call
G. Recording a particular male frog only once, shifting the mean PRR of the population away from the PRR of that frog's advertisement call
H. Recording a particular male frog multiple times, shifting the mean PRR of the population toward the PRR of that frog's advertisement call
J. Recording a particular male frog multiple times, shifting the mean PRR of the population away from the PRR of that frog's advertisement call

33. Do the results of the experiment support the researcher's hypothesis?

A. Yes; a greater percent of frogs were attracted to an advertisement call with a PRR of 100 Hz than were attracted to a call with any other PRR.
B. Yes; a lesser percent of frogs were attracted to an advertisement call with a PRR of 100 Hz than were attracted to a call with any other PRR.
C. No; a greater percent of frogs were attracted to an advertisement call with a PRR of 100 Hz than were attracted to a call with any other PRR.
D. No; a lesser percent of frogs were attracted to an advertisement call with a PRR of 100 Hz than were attracted to a call with any other PRR.

34. Which of the following statements best describes the gravid frogs studied in the experiment?

F. They were male frogs carrying unfertilized eggs.
G. They were male frogs making advertisement calls.
H. They were female frogs carrying unfertilized eggs.
J. They were female frogs making advertisement calls.

35. At the start of each trial of the experiment, the gravid frog was most likely placed:

A. 2.5 cm from the speaker playing the mean PRR.
B. 2.5 cm from the speaker playing the alternative PRR.
C. 1.8 m from each speaker.
D. 0.9 m from each speaker.

Passage VII

A *carboxylic acid* (CA) is a compound that contains a –COOH group. When a CA dissolves in H_2O, it can *dissociate*, as shown below.

$$CH_3\text{–}COOH \underset{H_2O}{\rightleftharpoons} CH_3\text{–}COO^- + H^+$$

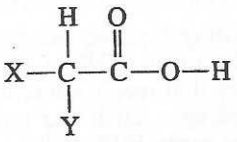
An atom's *electronegativity* (EN) indicates the atom's ability to attract electrons within a molecule (see Table 1). The presence of an electronegative atom in a CA, and the atom's proximity to the –COOH group, can affect the acidity of a CA.

Table 1

Atom	Symbol	EN
Hydrogen	H	2.20
Chlorine	Cl	3.44
Bromine	Br	2.96
Iodine	I	2.66

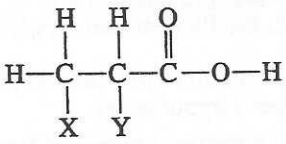
Table 2 gives the pH of aqueous 1.00 M (mole per liter) CA solutions at 25°C. The CA in each solution is either an acetic acid or a propanoic acid (see Figure 1), where X and Y each represent an atom listed in Table 1.

General Structure for Acetic Acids



Example: For X = Br and Y = Br, the formula is $Br_2CHCOOH$.

General Structure for Propanoic Acids



Example: For X = H and Y = Cl, the formula is $CH_3CClHCOOH$.

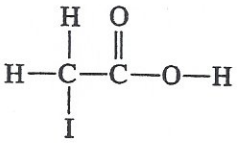
Figure 1

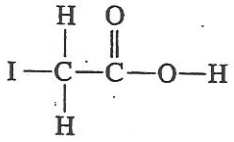
Table 2

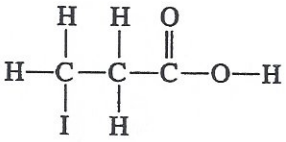
CA	Formula	X	Y	pH
Acetic acid	CH_3COOH	H	H	2.38
Chloroacetic acid	$ClCH_2COOH$	Cl	H	1.44
Bromoacetic acid	$BrCH_2COOH$	Br	H	1.46
Iodoacetic acid	ICH_2COOH	I	H	1.59
Dichloroacetic acid	$Cl_2CHCOOH$	Cl	Cl	0.68
Dibromoacetic acid	$Br_2CHCOOH$	Br	Br	0.74
Propanoic acid	CH_3CH_2COOH	H	H	2.44
2-chloropropanoic acid	$CH_3CClHCOOH$	H	Cl	1.43
3-chloropropanoic acid	$ClCH_2CH_2COOH$	Cl	H	2.00
2-bromopropanoic acid	$CH_3CBrHCOOH$	H	Br	1.49
3-bromopropanoic acid	$BrCH_2CH_2COOH$	Br	H	2.00
2-iodopropanoic acid	$CH_3CIHCOOH$	H	I	1.56
3-iodopropanoic acid	ICH_2CH_2COOH	I	H	2.04

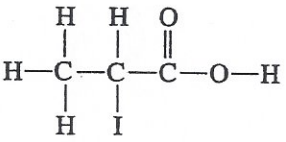
Tables adapted from James G. Speight, *Lange's Handbook of Chemistry*, 16th ed. ©2005 by McGraw-Hill, Inc.

36. Based on Figure 1 and Table 2, which of the following is the structure of 2-iodopropanoic acid?

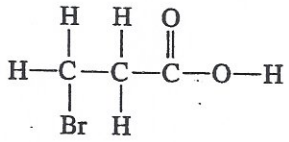
F.


G.


H.


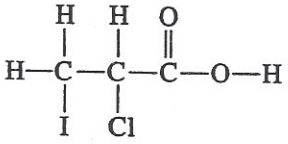
J.


37. Based on Figure 1 and Table 2, the structure shown below has which of the following formulas?



A. $BrCH_2CH_2COOH$
B. $BrCH_3CHCOOH$
C. $CH_3CHBrCOOH$
D. $CH_3CH_2COOBrH$

38. Consider the structure below:



Based on Figure 1, if the CA with this structure were listed in Table 2, the atom represented by X would be:

F. an O atom.
G. a Cl atom.
H. a Br atom.
J. an I atom.

39. According to Table 2, a 1.00 M aqueous solution of which CA, acetic acid or propanoic acid, is more acidic at 25°C ?

A. Acetic acid, because the acetic acid solution has a higher pH.
B. Acetic acid, because the acetic acid solution has a lower pH.
C. Propanoic acid, because the propanoic acid solution has a higher pH.
D. Propanoic acid, because the propanoic acid solution has a lower pH.

40. Fluorine (F) is the most electronegative of all elements. Based on Tables 1 and 2, the pH of a 1.00 M aqueous solution of fluoroacetic acid at 25°C would most likely be:

F. less than 1.44.
G. between 1.44 and 1.59.
H. between 1.59 and 2.38.
J. greater than 2.38.

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

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