Form 69F

(June 2011) (Grant)

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

Therapy on Horseback

[1] Most people have heard of physical therapy, in which trained therapists help rehabilitate patients who have a physical difficulty. [2] But not many have heard of hippotherapy. [3] It's a physical therapy treatment strategy for humans that requires the aid of a horse, and it's used for physical therapy. [4] The name comes from the Greek word for horse, *hippos.* ☐3

Hippotherapy has been used in Europe since the 1960s, and more recently in the United States, as a treatment option for people with developmental disorders and neuromuscular problems. ☐4 Therapists trained in hippotherapy use horses to help patients improve their physical strength and coordination as well as build patients' self-esteem and confidence.

1. **A.** NO CHANGE
   B. whom have
   C. who has
   D. whom has

2. **F.** NO CHANGE
   G. horse.
   H. horse, but it's for humans.
   J. horse—for real.

3. For the sake of the logic and coherence of this paragraph, Sentence 1 should be placed:
   A. where it is now.
   B. after Sentence 2.
   C. after Sentence 3.
   D. after Sentence 4.

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

   Dr. Ingrid Strauss, a leader in hippotherapy, is a neurologist from Germany.

   Should the writer make this addition here?
   F. Yes, because it provides information about the education of a leader in hippotherapy.
   G. Yes, because the writer suggests later in the essay that Dr. Strauss has trained therapists in the United States.
   H. No, because it doesn't make clear how and why Dr. Strauss became interested in hippotherapy.
   J. No, because the writer doesn't sufficiently link the statement to the paragraph or the essay as a whole.

GO ON TO THE NEXT PAGE.

Why a horse? The movement in a persons'
$\underline{}$
5

pelvis when he or she rides a horse is similar to

the movement created by a person walking upright.

This movement is difficult to duplicate using typical

physical therapy tools, such as balls and swings,

since the possible motions, and functions; of
$\underline{}$
6

those tools are relatively fixed. 7 It's easy,

however, a duplication of this pelvic movement
$\underline{}$
8

with the assistance of a walking horse. A

horse-in-motion provides steady sensory input

to the patient, and then the walking speed of
$\underline{}$
9

the horse can be controlled, so can the level

of sensory input. 10

5. **A.** NO CHANGE
   B. persons
   C. person's
   D. persons's

6. **F.** NO CHANGE
   G. motions and functions
   H. motions, and functions
   J. motions and functions,

7. If the writer were to delete the preceding sentence, the essay would primarily lose a statement that explains:
   A. why balls and swings are widely used physical therapy tools.
   B. how balls and swings are typically used in physical therapy.
   C. a limitation of typical physical therapy tools, such as balls and swings.
   D. a way in which typical physical therapy tools can be used in hippotherapy.

8. **F.** NO CHANGE
   G. to duplicate
   H. therapists duplicate
   J. there can be a duplication of

9. **A.** NO CHANGE
   B. this means
   C. and because
   D. DELETE the underlined portion.

10. Which of the following true statements, if added here, would most effectively conclude the paragraph by building on the information in the preceding sentence?
    F. Hippotherapy has evolved over the last forty years.
    G. Some hippotherapy patients are as young as eighteen months.
    H. A therapist will modify the horse's pace in response to the patient's needs.
    J. A horse handler tends to the horse's needs and care during and after hippotherapy sessions.

[1] Hippotherapy is not at all like recreational
11
horseback riding. [2] If you were to visit a hippotherapy

center, you would see patients in different positions. [12]

[3] One purpose of these positions is to allow the patient

to learn how his or her body responds as the horse walks.

[4] In other words, trained spotters ensure the patient's
13
safety. [5] Horses are also used because many people are

drawn to them. [6] Patients often work with the same horse

and grow to love that animal. [7] Most of the patients are

children, and they enjoy brushing the horses and seeing
14
the horse stables. [8] The experience is a lively and

invigorating variation on traditional physical therapy. [15]

11. Which of the following alternatives to the underlined portion would NOT be acceptable?
   A. is a variable from
   B. doesn't resemble
   C. isn't similar to
   D. is very different from

12. In the preceding sentence, the writer is considering revising the clause "you would see patients in different positions" to "you might see someone sitting backward or sideways on a horse or lying prone on a horse's back." Should the writer make this revision?
   F. Yes, because the revision highlights one person's experience with hippotherapy.
   G. Yes, because the revision gives specific details about the ways patients are positioned on horses during therapy sessions.
   H. No, because the revision doesn't add new information to the essay.
   J. No, because the revision detracts from the main focus of the essay.

13. A. NO CHANGE
   B. For example,
   C. Of course,
   D. That is,

14. Which of the following alternatives to the underlined portion would NOT be acceptable?
   F. children. These young patients
   G. children; they
   H. children, and these patients
   J. children they

15. The writer wants to divide this paragraph into two in order to separate the discussion of hippotherapy positions from the discussion of the emotional link between horses and hippotherapy patients. The best place to begin the new paragraph would be at the beginning of Sentence:
   A. 3.
   B. 4.
   C. 5.
   D. 6.

PASSAGE II

The Birth of Broadcasting

In the early 1900s, radio was not the widespread

medium that it is today. Instead, its use was limited to
16
electronics buffs, many of whom built their own *wireless*

sets, as radios were sometimes called in their infancy.

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

On his way to becoming, chairman of the board, of the
17

Radio Corporation of America (RCA), the visionary
18
David Sarnoff who saw a huge audience for radio.
18

To create such an audience, Sarnoff believed would
19
require connecting citizens around the nation via radio

to a dramatic large-scale popular event with built-in mass
20
appeal. Broadcasting this event from receivers set up

in store windows, city parks, and other public spaces to
21
demonstrate that anyone could listen to the wireless, not

just people with special skills and hard-to-build equipment.

The determinedly, ambitious Sarnoff latched onto
22
the perfect event. In 1921, he made elaborate plans to

broadcast a heavyweight boxing match between American

Jack Dempsey with Frenchman Georges Carpentier.
23

24 Sports enthusiasts around the world were anxiously

awaiting the bout between the experienced Dempsey and

the popular underdog, Carpentier. When the time came,

a transmitter was borrowed from the U.S. Navy and hired
25

Major J. Andrew White to describe the action, at RCA's
26
request, store managers, theater owners, and municipal

workers across the country set up loudspeakers.

17. A. NO CHANGE
    B. becoming chairman of the board,
    C. becoming, chairman of the board
    D. becoming chairman of the board

18. F. NO CHANGE
    G. David Sarnoff envisioned a huge audience for radio.
    H. David Sarnoff's vision of a huge audience for radio.
    J. the vision of a huge audience for radio belonged to David Sarnoff.

19. A. NO CHANGE
    B. audience Sarnoff believed,
    C. audience, Sarnoff believed,
    D. audience Sarnoff believed

20. F. NO CHANGE
    G. popular occurrence or
    H. appealing
    J. DELETE the underlined portion.

21. A. NO CHANGE
    B. would
    C. and thereby
    D. DELETE the underlined portion.

22. F. NO CHANGE
    G. determined, ambitiously
    H. determined, ambitious
    J. determined, ambitiousness

23. A. NO CHANGE
    B. against
    C. in a fight with
    D. and

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

    Athletes continue to draw media attention worldwide.

    Should the writer make this addition here?
    F. Yes, because it provides an important context for understanding the significance of the broadcast.
    G. Yes, because it helps explain why radio's popularity diminished when television was invented.
    H. No, because it is not significant that the broadcast focused on an athletic event.
    J. No, because it is only slightly related to the essay's focus on radio's beginnings.

25. A. NO CHANGE
    B. a transmitter had been borrowed by Sarnoff
    C. Sarnoff borrowed a transmitter
    D. Sarnoff would borrow a transmitter

26. F. NO CHANGE
    G. action at
    H. action. At
    J. action then at

5

GO ON TO THE NEXT PAGE.

The match took place in Jersey City on a hot July afternoon. While the athletes battled it out, Major White described the <u>action from ringside.</u> All over the country,
27
people listened in rapt attention. For the first time, they were hearing a distant event as it happened and sharing the experience with millions of others.

During the fourth round, Dempsey defeated Carpentier, just as the Navy's overheated transmitter broke down into a molten mass of wires and tubes. No matter: RCA would soon be <u>offering radios in return for money</u>
28
to a public demanding broadcast music, sports, news, and weather. The era of electronic broadcasting had begun.

27. Given that all the choices are true, which one contributes to the paragraph's point that radio enabled the broadcast of eyewitness accounts of events?
A. NO CHANGE
B. action.
C. action that took place.
D. action with words.

28. F. NO CHANGE
G. selling radios
H. conducting business by sales of radios
J. marketing and selling radios as merchandise

Question 29 asks about the preceding passage as a whole.

---

29. Suppose the writer had intended to write an essay about how a single event had far-reaching consequences in terms of public information. Would this essay fulfill the writer's goal?
A. Yes, because the essay reveals how the radio broadcast of a boxing match transformed the public into an audience seeking unprecedented access to live events.
B. Yes, because the essay reveals that after Sarnoff's radio broadcast of a boxing match, the public's interest in news was replaced with an interest in sports.
C. No, because the essay points out that radios had been providing information to individuals long before Sarnoff broadcast a boxing match to a widespread audience.
D. No, because the essay points out that Sarnoff attracted interest in a broadcast of a boxing match but does not indicate the long-term consequences of that broadcast.

PASSAGE III

At Home in a Language

When I was a child growing up in Delhi, <u>India. My</u>
30
parents and I <u>will have spent</u> our summers in Calcutta,
31
India, visiting my grandparents, aunts, uncles, and cousins.

30. F. NO CHANGE
G. India. So my
H. India; my
J. India, my

31. A. NO CHANGE
B. would spend
C. have spent
D. will be spending

We took the train over eight hundred miles from Delhi to

Calcutta, which I considered a treat as itself. I loved the
                                    ___
                                    32

dining car, the cozy sleeping berth in our cabin, and the
                                                  ___
                                                  33

gentle rocking motion of the train that would lull me
                                              ___
                                              34
to sleep at night. As an adult, I prefer to travel by

car. 35 When we arrived at the Calcutta station

the next morning, we were welcomed announcing

train arrivals and departures over the intercom

by the sound of the Bengali language.
_____
            36
Back in Delhi, the language most people

commonly spoke was Hindi. Though I spoke Hindi

fluently, it wasn't my first language. My parents were

born in Calcutta, where most people spoke Bengali.

They had lived there for years before they got married

and moved to Delhi, where Hindi was widely spoken.
_____
                  37
Because my parents had grown up speaking Bengali,

we spoke Bengali, not Hindi, in our house. It was not

surprising, then, that hearing Bengali on the streets of

Calcutta made me feel right at home.

    Being in Calcutta was a comfort to me because

I could speak almost exclusively in my first language.
_____
    38
Store clerks, cab drivers, bus drivers, schoolchildren,

families picnicking in the parks: it seemed like everybody

in Calcutta spoke Bengali. It only took me a day or

two to adjust to not having to manage two languages.

32. F. NO CHANGE
    G. to
    H. for
    J. in

33. A. NO CHANGE
    B. which
    C. since
    D. whereas

34. F. NO CHANGE
    G. lulled
    H. of lulled
    J. have lulled

35. The writer is considering deleting the preceding sentence. Should the sentence be kept or deleted?
    A. Kept, because it gives the reader further insight into the narrator's personality.
    B. Kept, because it sharpens the essay's focus on favorite modes of transportation.
    C. Deleted, because it disrupts the narration of past events in the paragraph.
    D. Deleted, because it inserts a personal element into an otherwise impersonal essay.

36. The best placement for the underlined portion would be:
    F. where it is now.
    G. after the word *arrived*.
    H. after the word *welcomed*.
    J. after the word *arrivals*.

37. A. NO CHANGE
    B. Delhi, where most people speak Hindi.
    C. Delhi, a city in India.
    D. Delhi.

38. F. NO CHANGE
    G. could communicate and discourse
    H. could shoot the breeze
    J. could, you know, speak

Communicating with such ease was a <u>relief; in Delhi I felt</u>
₃₉

split in half, but in Calcutta I <u>really felt like two people.</u>
₄₀

I also <u>found life in my grandparents' house</u> easy
₄₁

to get used to. Their house was always <u>overflowing with</u>
₄₂
members of my father's family. Being an only child, I

<u>savored</u> this time spent with relatives. My aunts and uncles
₄₃
loved to tease me and tell me jokes and stories. I would

skip through the rooms of my grandparents' sprawling

house with my cousins, <u>thrilled to have all that extra space</u>
₄₄
<u>in which to play games and have fun.</u>
₄₄

39. A. NO CHANGE
   B. relief,
   C. relief
   D. relief and

40. Which choice most logically completes the contrast between the way the narrator felt in Calcutta and in Delhi?
   F. NO CHANGE
   G. remembered how this felt.
   H. felt like I was split in fourths.
   J. felt confident and whole.

41. A. NO CHANGE
   B. found, life in my grandparents' house
   C. found, life in my grandparents' house,
   D. found life in my grandparents' house,

42. Which choice most effectively emphasizes the fact that the narrator's father has a large family?
   F. NO CHANGE
   G. comfortably accommodating
   H. visited by
   J. a familiar haunt of

43. Which of the following alternatives to the underlined portion would NOT be acceptable?
   A. relished
   B. tasted
   C. reveled in
   D. delighted in

44. Given that all the choices are true, which one best concludes the sentence and the essay while reinforcing the essay's main idea?
   F. NO CHANGE
   G. all of us shouting, screaming, and laughing in Bengali.
   H. all of us making memories that will be with us our entire lives.
   J. investigating the many things my grandparents had collected.

PASSAGE IV

The Great Wall of Los Angeles

Judith Francisca Baca believes a mural can tell

a story and that <u>a largeness of it</u> gives its creator an
₄₅

amplified voice. <u>It began in</u> the summer of 1976,
₄₆
Baca led the creation of what is likely the longest

mural in the world, the Great Wall of Los Angeles.

45. A. NO CHANGE
   B. to make large
   C. a large mural
   D. if the mural is large

46. F. NO CHANGE
   G. With a beginning
   H. For it to begin
   J. Beginning

This tourist attraction, painted on the concrete
47
wall of the Tujunga Wash, a flood-control channel in

the San Fernando Valley, is over thirteen feet high and
48
almost a half mile long. The project was commissioned

by Los Angeles city officials, those wanted well-known
49
local muralist Baca to beautify the channel area. She

took this opportunity to bring the people of multiethnic

Los Angeles together to produce a narrative mural

of their stories.

Baca imagined the mural, on the channel wall as a
50
timeline. It would proclaim the historical experiences of

California's people's, focusing mainly on the experiences
51

of women, the poor, and minorities. She wants as many
52
people as possible, especially young people, to help

create the mural.

53 For guidance, they interviewed hundreds of

city residents, historians, and social activists. The subjects

they picked ranged from: Dust Bowl refugees to civil
54

rights activists, Olympic champions to labor organizers,
55
land disputes to the growth of suburbia.

47. The writer would like to describe the mural in a way that strongly emphasizes the mural's visual energy. Which choice best accomplishes this purpose?
   A. NO CHANGE
   B. noticeable piece of art,
   C. vibrant ribbon of colors,
   D. decoration in Los Angeles,

48. F. NO CHANGE
   G. which has a height of over thirteen feet
   H. with a height that's over thirteen feet
   J. over thirteen feet high

49. A. NO CHANGE
   B. whom
   C. they
   D. who

50. F. NO CHANGE
   G. mural, on the channel wall,
   H. mural on the channel wall
   J. mural on the channel wall,

51. A. NO CHANGE
   B. peoples,
   C. peoples',
   D. persons',

52. F. NO CHANGE
   G. wanted
   H. is wanting
   J. has been wanting

53. Which of the following true statements, if added here, would provide the most effective transition into the information that follows in the paragraph?
   A. The Social and Public Art Resource Center (SPARC), which Baca and two other artists founded, is based in Venice, California.
   B. Baca and her team began by choosing subjects for the mural scenes.
   C. Baca's work can be seen all over Los Angeles, as well as at the National Museum of American Art at the Smithsonian Institution.
   D. Baca has taught people of all ages and backgrounds.

54. F. NO CHANGE
   G. picked ranged from
   H. picked, ranged from,
   J. picked, ranged from

55. A. NO CHANGE
   B. activists and also having
   C. activists, being included were
   D. activists, with

Next, area artists drew <u>miniature</u> sketches of the
₅₆

scenes on <u>grids. After that, they</u> created a blueprint of the
₅₇

mural including "bridge images" that wove <u>them</u> together.
₅₈
A huge grid was traced onto a smoothed and sealed section

of the channel wall, and the blueprint sketches were

outlined onto it. The drawings were then painted, over

numerous summers, by Los Angeles teens in groups

recruited with the help of outreach organizations. [59]

In 1983, the mural was finally finished.

Dozens of professional artists, over four hundred

teens, and thousands of other community members

had contributed to the Great Wall of Los Angeles,

<u>a celebration of the many voices of the city.</u>
₆₀

56. Which of the following alternatives to the underlined portion would NOT be acceptable?
   F. scaled-down
   G. reduced-sized
   H. teeny-tiny
   J. small-scale

57. Which of the following alternatives to the underlined portion would NOT be acceptable?
   A. grids. After they did that, the artists
   B. grids, following that, they
   C. grids. The artists then
   D. grids; then they

58. F. NO CHANGE
   G. those
   H. what it is
   J. the scenes

59. If the writer were to delete the phrase "in groups recruited with the help of outreach organizations" from the preceding sentence, the paragraph would primarily lose:
   A. information about how the teen painters were brought together to paint the mural.
   B. an indication that leaders of several outreach organizations helped teens paint the mural.
   C. an explanation of what the teen painters liked about working on the mural.
   D. nothing at all, since the phrase repeats a fact stated earlier in the paragraph.

60. Given that all the choices are true, which one best concludes the essay by clearly linking the essay's conclusion to an image in the essay's opening paragraph?
   F. NO CHANGE
   G. which now, several years later, needs some repair and touching up.
   H. just one work of art in the city.
   J. and each scene was painted in stages, starting with a magenta undercoat.

PASSAGE V

Coloring the Past

[1]

When we were children, my older brother and I
spent many afternoons coloring at the kitchen table. [61]
I would hold up a carnation pink or a lime green crayon,

cover the worn label with my thumb, and asking my
62

brother what color I was holding. I was always surprised
63
time after time, he could not tell the difference between a
pink crayon and a green one. The reason for this was that
he is color-blind.

[2]

[1] This is rarely the case. [2] "Color-blind" is a bit of
a misnomer, as it implies that people with color blindness
cannot see any colors. [3] The human eye contains rod
cells, which allow us to see black and white and perceive
gradations of lightness, and cone cells, which allow us to
see color. [4] Almost all instances of color blindness
involve only the eye's reception of red and green.
64
[5] Most people with color blindness cannot differentiate
between red and green, but others just see these colors
differently than people without color blindness. [65]

61. The writer wishes to add a sentence here that will
clearly lead the reader into the anecdote and informa-
tion to follow in this paragraph. Which of the follow-
ing would best accomplish this purpose?
  A. As we colored, I liked to play a game that he
     didn't always enjoy.
  B. We could spend hours coloring when we were
     young.
  C. I was still learning how to color, but my brother
     was good at it.
  D. We would talk while we colored, and often we
     would draw something together.

62. F. NO CHANGE
  G. covering the worn label with my thumb, and ask
  H. and covering the worn label with my thumb, then
     asking
  J. covering the worn label with my thumb, ask

63. A. NO CHANGE
  B. surprised,
  C. surprised and
  D. surprised when,

64. F. NO CHANGE
  G. eye's recepting
  H. eyes reception
  J. eyes' recepting

65. For the sake of the logic and coherence of this para-
graph, Sentence 1 should be placed:
  A. where it is now.
  B. after Sentence 2.
  C. after Sentence 3.
  D. after Sentence 4.

11

GO ON TO THE NEXT PAGE.

[3]

Seven percent of American males are color-blind,

while only 0.4 percent of American females are. This
66

conversion supports the idea that the gene for color
67

blindness is carried on the X chromosome, men have only
68

one X chromosome (in addition to one Y chromosome).

[A] Women have two X chromosomes, so a deficiency
69

in it can be compensated for by the other.
70

[4]

My brother can easily distinguish pure reds from

pure greens without any difficulty. [B] However, the
71

farther these colors are from "pure" (such as carnation

pink or lime green), the more difficult it is for him to

tell the difference.

66. F. NO CHANGE
   G. have the genetic condition that is commonly known as color blindness.
   H. either cannot differentiate between red and green or see these colors in an unusual way.
   J. DELETE the underlined portion (ending the sentence with a period).

67. A. NO CHANGE
   B. change
   C. conflict
   D. contrast

68. F. NO CHANGE
   G. chromosome since,
   H. chromosome:
   J. chromosome

69. A. NO CHANGE
   B. also
   C. likewise
   D. DELETE the underlined portion.

70. F. NO CHANGE
   G. that
   H. them
   J. one

71. A. NO CHANGE
   B. as long as the colors are pure.
   C. and could almost always tell you whether something is pure red or pure green.
   D. DELETE the underlined portion (ending the sentence with a period).

[5]

It has been years since I bothered my brother with a crayon-color guessing game, but I am still intrigued by how he perceives color. [C] He has became a successful
                                                                                          72

painter specializing in, landscapes of exotic places
                                              73
rendered in vivid colors. [D] He swirls bright color

over canvas, transforming pats of apple red, lemon

yellow, and robin's egg blue paint into dazzling

and vibrant hills, beaches, and mountains,

like visions out of fantastic dreams.
                     74

72. F. NO CHANGE
   G. has become
   H. would became
   J. will have become

73. A. NO CHANGE
   B. painter specializing in landscapes of exotic places
   C. painter, specializing in, landscapes of exotic places
   D. painter specializing in landscapes, of exotic places,

74. The writer wishes to emphasize that as a result of the way the painter sees and uses color, his landscapes have a unique visual quality. Which choice best accomplishes this purpose?
   F. NO CHANGE
   G. since he prefers to paint landscapes.
   H. as if he were creating true works of art.
   J. with brushstrokes that seem to come effortlessly.

> Question 75 asks about the preceding passage as a whole.

75. Upon reviewing the essay and deciding that some information has been left out, the writer composes the following sentence incorporating that information:

> He rarely chooses to use grays, browns, or any other muted tones, opting instead for hues that are closer to pure.

If the writer were to add this sentence to the essay, the sentence would most logically be placed at Point:
   A. A in Paragraph 3.
   B. B in Paragraph 4.
   C. C in Paragraph 5.
   D. D in Paragraph 5.

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.

---

1. What is the perimeter, in centimeters, of a rectangle with length 14 cm and width 9 cm ?
   A. 23
   B. 28
   C. 46
   D. 126
   E. 252

2. The 1st term in the geometric sequence below is −4. If it can be determined, what is the 6th term?

   $$-4, 8, -16, 32, -64, \cdots$$

   F. 128
   G. 96
   H. −96
   J. −128
   K. Cannot be determined from the given information

3. If $r = 8$, $b = 3$, and $g = -5$, what does $(r + b - g)(b + g)$ equal?
   A. −32
   B. −12
   C. 12
   D. 14
   E. 32

4. Every year on Inari's birthday, her uncle gives her $10, plus $2 for each year of her age. How old will Inari be when she receives $34 from her uncle on her birthday?
   F. 7
   G. 12
   H. 14
   J. 22
   K. 29

5. For what value of x is the equation $-2x + 3 = -21$ true?
   A. −22
   B. −12
   C. −9
   D. 9
   E. 12

DO YOUR FIGURING HERE.

6. What is the mean of the list of numbers below?

62, 100, 93, 62, 72, 78, 50, 85, 62, 36

F. 62
G. 64
H. 67
J. 70
K. 75

DO YOUR FIGURING HERE.

7. Adam is baking a cake for his friend's birthday. The cake requires $1\frac{2}{3}$ cups of cocoa, and the frosting requires $\frac{3}{4}$ cup of cocoa. How many cups of cocoa does Adam need?

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

B. $1\frac{1}{2}$

C. $1\frac{6}{7}$

D. $2\frac{2}{9}$

E. $2\frac{5}{12}$

8. In a level field, a vertical pole with a height of 6 feet casts a 10-foot shadow. At the same time, a tree growing in this field casts a 90-foot shadow. What is the height, in feet, of the tree?

F. 9
G. 15
H. 54
J. 60
K. 150

9. The total cost of renting a car is $35.00 for each day the car is rented plus 37.5¢ for each mile the car is driven. What is the total cost of renting the car for 4 days and driving 300 miles?

(Note: No sales tax is involved.)

A. $ 116.50
B. $ 151.25
C. $ 252.50
D. $ 280.00
E. $1,265.00

10. The expression $(7c - 2d)(2c + d)$ is equivalent to:

F. $14c^2 - 2d^2$
G. $14c^2 - 11cd - 2d^2$
H. $14c^2 - 11cd + 2d^2$
J. $14c^2 + 3cd - 2d^2$
K. $14c^2 + 3cd + 2d^2$

GO ON TO THE NEXT PAGE.

11. When solved for y, what is $3x + 5y - 13 = 0$?

   A. $y = \dfrac{-5x + 13}{3}$

   B. $y = \dfrac{-3x + 13}{5}$

   C. $y = \dfrac{3x + 13}{5}$

   D. $y = -3x - 8$

   E. $y = -15x - 65$

12. The speed of one bus exceeds 3 times the speed of another bus by 20 mph. The speed of the slower bus is k mph. Which of the following expressions represents the speed of the faster bus, in miles per hour?

   F. $k + \dfrac{20}{3}$

   G. $k - 20$

   H. $k + 20$

   J. $3k - 20$

   K. $3k + 20$

13. At 2:00 a.m., the temperature is $-15°F$. For the next 3 hours, the temperature decreases 2°F per hour. What is the temperature at 5:00 a.m. ?

   A. $-21°F$
   B. $-17°F$
   C. $-15°F$
   D. $-13°F$
   E. $-9°F$

14. Jing took 6 hours to travel 250 miles by car to Mirror Lake. The graph below shows the distance she traveled versus time. Among the following statements, which one best describes what happened during the interval between 2 hours and 4 hours?
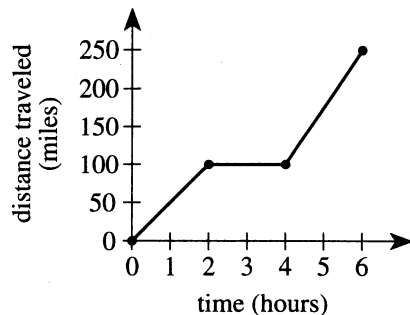
   F. The car traveled at 50 mph.
   G. The car traveled 100 miles.
   H. The car traveled 200 miles.
   J. The car was stopped, and Jing had approximately 150 miles left to travel to Mirror Lake.
   K. The car was stopped, and Jing had approximately 100 miles left to travel to Mirror Lake.

DO YOUR FIGURING HERE.

DO YOUR FIGURING HERE.

15. A children's wading pool, shown below, is in the shape of a right circular cylinder and has a diameter of 6 feet. The pool is filled to a uniform depth of 1.5 feet. Which of the following values is closest to the volume of water in the pool, in cubic feet?

|——— 6 ———|
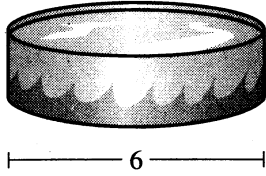
(Note: The volume of a right circular cylinder is $\pi r^2 h$, where r is the radius of the cylinder and h is the height of the cylinder.)

A. 28
B. 42
C. 57
D. 67
E. 133

16. For the function $f(x) = |x|^3 - 1$, what is the value of $f(-1)$?

F. 0
G. 1
H. 2
J. −4
K. −2

17. What is 125% of 332 ?

A. 41.5
B. 265.6
C. 415
D. 4,150
E. 41,500

18. $(6a + 5b + 4c) - (4a + 4b - 2c)$ is equivalent to:

F. $2a + b + 6c$
G. $2a + b + 2c$
H. $2a + 9b + 6c$
J. $2a + 9b - 2c$
K. $10abc$

19. In the standard (x,y) coordinate plane, the coordinates of the endpoints of $\overline{GN}$ are (6,8) and (14,18). What is the x-coordinate of the midpoint of $\overline{GN}$?

A. 7
B. 10
C. 13
D. 16
E. 20

Use the following information to answer questions 20–22.

In the figure shown below, each side of square *ABCD* is 6 inches long. Point *E* lies inside the square, forming the equilateral triangle △*ECD*.
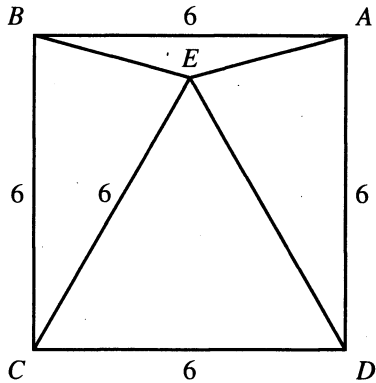
20. What is the area, in square inches, of square *ABCD* ?

F. 9
G. 12
H. 18
J. 24
K. 36

21. What is the measure of ∠*BCE* ?

A. 15°
B. 20°
C. 30°
D. 35°
E. 45°

22. The entire figure is placed in the standard (x,y) coordinate plane such that the vertices of the square are $A(6,6)$, $B(0,6)$, $C(0,0)$, and $D(6,0)$. The x-coordinate of *E* is 3. Which of the following is a line of symmetry for the figure?

F. $y = 0$
G. $x = 3$
H. $y = 3$
J. $x = 6$
K. $y = 6$

---

23. Beverly is using a punch recipe that calls for 2 parts ginger ale to 1 part fruit juice by volume. Beverly is planning to make 12 liters of this punch for a party. How many liters of fruit juice does Beverly need in order to make 12 liters of this punch?

A. 1
B. 3
C. 4
D. 6
E. 8

24. What is the solution to the equation $\frac{4c}{5} - \frac{1}{2} = -\frac{25}{2}$?

F. -15
G. -6
H. -5
J. 6
K. 15

DO YOUR FIGURING HERE.

25. For the line segment below, the ratio of the length of $\overline{AB}$ to the length of $\overline{BC}$ is 1:4. If it can be determined, what is the ratio of the length of $\overline{AB}$ to the length of $\overline{AC}$?

$$A\ B \qquad C$$

A.   1:3
B.   1:5
C.   4:1
D.   5:1
E.   Cannot be determined from the given information

26. The line with equation $8x + 3y = 5$ is graphed in the standard (x,y) coordinate plane. What is the slope of this line?

F. $-\frac{8}{3}$

G. $-\frac{3}{8}$

H. $\frac{8}{3}$

J. $\frac{3}{8}$

K. $\frac{5}{8}$

27. The Kingston High School multimedia room has 108 seats, which are all arranged in rows. The number of seats in each row is 3 less than the number of rows. How many rows of seats are in the multimedia room?

A.   6
B.   9
C.   12
D.   18
E.   36

28. If $90° < \theta < 180°$ and $\sin \theta = \frac{10}{26}$, then $\cos \theta = ?$

F. $\frac{26}{10}$

G. $\frac{10}{24}$

H. $-\frac{24}{26}$

J. $-\frac{26}{24}$

K. $-\frac{26}{10}$

DO YOUR FIGURING HERE.

Use the following information to answer questions 29–32.

The table below gives the length and number of nails per pound for all types of nails available at Schulberg's Hardware. A 2-penny nail, for example, is represented in the "Nail type" column by the notation "2d." Nails bought at Schulberg's can be bought only in 1-pound packages. Each package contains only 1 type of nail.

Nail type	Length (inches)	Number of nails per 1 pound
2d	1.00	876
3d	1.25	568
4d	1.50	316
5d	1.75	271
6d	2.00	181
7d	2.25	161
8d	2.50	106
9d	2.75	96
10d	3.00	69
12d	3.25	64
16d	3.50	49
20d	4.00	31
30d	4.50	24
40d	5.00	18

29. For nails with lengths between 1.00 and 3.00 inches, which of the following expressions gives the length, in inches, of an n-penny nail?

A. $0.30n$
B. $0.50n$
C. $0.25n + 0.50$
D. $n + 0.25$
E. $2n - 3.00$

30. Hadji bought 1 package of 4d nails and 2 packages of 5d nails. These were the only nails he bought. What is the total number of nails that Hadji bought?

F. 587
G. 858
H. 903
J. 2,619
K. 2,664

31. Ty bought an equal number of 12d, 30d, and 40d nails. What is the minimum number of nails of each size that Ty could have bought?

A. 72
B. 120
C. 192
D. 432
E. 576

20

GO ON TO THE NEXT PAGE.

32. A salesperson gave Miki the following advice to determine the size of nail to use: The length of a nail should be 3 times the thickness of the board being fastened to a wall. According to this advice, what nail size should Miki use to fasten a 1.5-inch-thick board to a wall?

F. 4d
G. 8d
H. 10d
J. 12d
K. 30d

DO YOUR FIGURING HERE.

33. In the standard (x,y) coordinate plane, the equation of a circle is $x^2 + y^2 = 100$. At what 2 points does the circle intersect the y-axis?

A. $(0, 10)$ and $(0, -10)$
B. $(0, 20)$ and $(0, -20)$
C. $(0, 50)$ and $(0, -50)$
D. $(0, 100)$ and $(0, -100)$
E. $(0, 200)$ and $(0, -200)$

34. $(-mp)(mp^9)^4$ is equivalent to:

F. $m^4 p^{36}$
G. $-m^4 p^{36}$
H. $-m^5 p^{37}$
J. $-m^8 p^{40}$
K. $-m^{37} p^{37}$

35. The fraction $\frac{578}{999}$ is equivalent to the repeating decimal $0.\overline{578}$. What is the 85th digit to the right of the decimal point?

A. 5
B. 6
C. 7
D. 8
E. 9

36. A jar contains exactly 12 gumballs, each of which is a solid color. There are 5 blue and 7 white gumballs. Chris will draw one gumball at random and then, without replacement, will draw another gumball from the jar at random. Which of the following expressions gives the probability that Chris will draw 2 blue gumballs?

F. $\frac{5}{12} + \frac{5}{12}$

G. $\frac{5}{12} \cdot \frac{5}{12}$

H. $\frac{5}{12} \cdot \frac{4}{12}$

J. $\frac{5}{12} \cdot \frac{5}{11}$

K. $\frac{5}{12} \cdot \frac{4}{11}$

GO ON TO THE NEXT PAGE.

37. Jonah has 72 solid-colored disks that are either red, blue, or green. He lines them up on the floor and finds that there are 15 more red disks than green and 9 more green disks than blue. How many red disks does he have?

A. 13
B. 16
C. 22
D. 32
E. 37

DO YOUR FIGURING HERE.

38. A contractor charges $1.75 per square foot to waterproof the top surface of a wooden deck. What would be the contractor's charge for waterproofing the top surface of the trapezoid-shaped wooden deck shown below?

14 ft

10 ft

24 ft
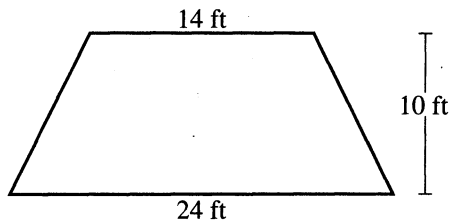
F. $190.00
G. $297.50
H. $332.50
J. $420.00
K. $665.00

39. In △OBC shown in the standard (x,y) coordinate plane below, M is the midpoint of $\overline{OB}$, N is the midpoint of $\overline{BC}$, and Q is the midpoint of $\overline{OC}$. Which of the following statements is *always* true?

y

B(x,y)

M   N

O(0,0)   Q   C(w,0)   x
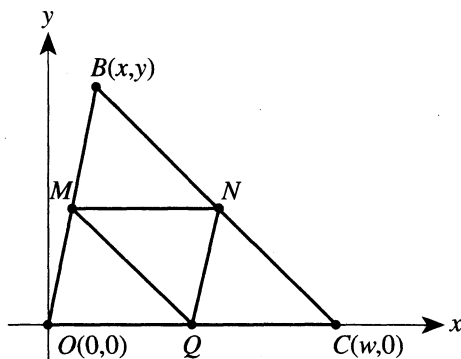
A. The slope of $\overline{MN}$ is equal to the slope of $\overline{OC}$.
B. The product of the slope of $\overline{MN}$ and the slope of $\overline{OC}$ is −1.
C. The product of the slope of $\overline{MN}$ and the slope of $\overline{OB}$ is −1.
D. The product of the slope of $\overline{MN}$ and the slope of $\overline{BC}$ is 1.
E. $\overline{MN} \cong \overline{OC}$

GO ON TO THE NEXT PAGE.

40. The junior class at Silverwood High School sponsored a costume party. Each student wearing a costume paid $2 admission, and each student NOT wearing a costume paid $5 admission. An amount of $489 was collected from the 150 students who paid admission. How much of the amount was collected from students NOT wearing a costume?

F. $245
G. $315
H. $349
J. $375
K. $435

41. Which of the following complex numbers is a sum of $\sqrt{-48}$ and $\sqrt{-27}$?

A. $-5\sqrt{3}$
B. $-7\sqrt{3}$
C. $5i\sqrt{3}$
D. $7i\sqrt{3}$
E. $25i\sqrt{3}$

42. Point P lies on side $\overline{AD}$ of rectangle $ABCD$ as shown below. The measure of $\angle ABP$ is $67°$ and the length of $\overline{AB}$ is 7.5 inches. Which of the following expressions is the length, in inches, of $\overline{AP}$?
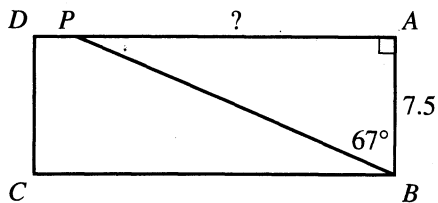
F. $7.5(\sqrt{3})$

G. $2(7.5)$

H. $\dfrac{7.5}{\sin 67°}$

J. $\dfrac{7.5}{\cos 67°}$

K. $7.5 \tan 67°$

43. For any circle with 2 secants drawn from P to the circle, as shown in the figure below, the lengths of the segments of the secants are determined by $a(a + b) = c(c + d)$.
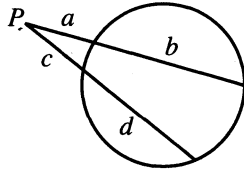
In the figure below, A, B, D, and E are on the circle. Point B is on secant segment $\overline{AC}$, and D is on secant segment $\overline{CE}$. The lengths of $\overline{AB}$, $\overline{BC}$, and $\overline{CD}$ are given in meters. What is the length, in meters, of $\overline{DE}$?
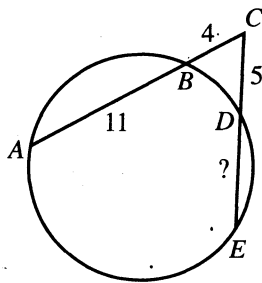
A. 6
B. 7
C. 9
D. 10
E. 12

44. While lifting weights, a person sits on an incline weight bench and pushes the weights straight up, as shown in the figure below on the left. The weight bench is shown below on the right. The angle between the horizontal seat and the backrest is 110°. What is the measure of the angle between the backrest and the vertical path of the weights?
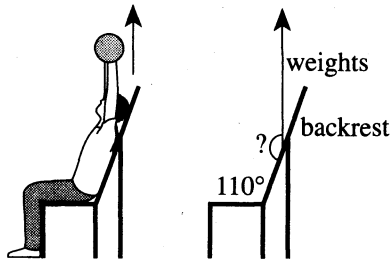
F. 70°
G. 110°
H. 130°
J. 160°
K. 250°

45. In the standard (x,y) coordinate plane, the graph of $y = x^2$ is shifted 5 units down and 4 units right. Which of the following is an equation of the translated graph?

A. $y = (x + 4)^2 + 5$
B. $y = (x + 4)^2 - 5$
C. $y = (x - 4)^2 + 4$
D. $y = (x - 4)^2 - 5$
E. $y = (x + 5)^2 - 4$

DO YOUR FIGURING HERE.

46. When Kaylee kicked the winning soccer goal, she was 10 yards behind the midfield line and 5 yards from the sideline, as shown in the figure below. To the nearest yard, how far was Kaylee from the center of the goal line when she kicked the winning goal?
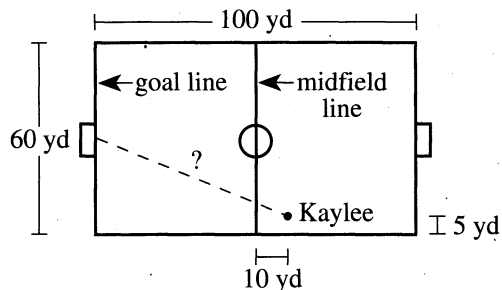
F. 60
G. 65
H. 67
J. 70
K. 72

47. A sector of a circle has an area equal to $\frac{5}{12}$ of the area of the circle. What is the measure of the sector's central angle?

A. 37.5°
B. 75°
C. 105°
D. 150°
E. 210°

48. List B consists of all the integers in List A below and also 3 integers a, b, and c, where $a \le 17$, $b = c$, and $b \ge 42$. What is the median of the integers in List B?

List A: 12, 16, 17, 29, 29, 35, 41, 42, 47, 47, 50

F. 29
G. 32
H. 35
J. 38
K. 41

49. The solution set for the inequality $|2x - a| \le 3$ is $\{x \mid 1 \le x \le 4\}$. What is the value of a?

A. −1

B. $2\frac{1}{2}$

C. $3\frac{1}{2}$

D. 5

E. 11

GO ON TO THE NEXT PAGE.
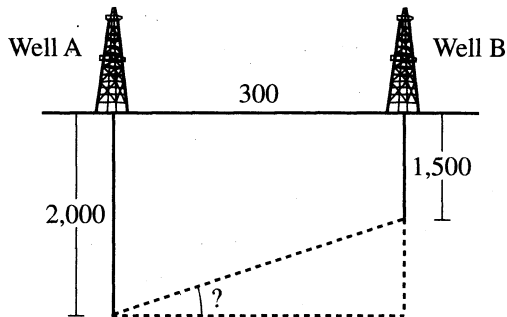
DO YOUR FIGURING HERE.

50. Which of the following is the least common denominator for the expression below?

$$\frac{1}{17 \cdot 23 \cdot 61^2} + \frac{1}{17^2 \cdot 23} + \frac{1}{17 \cdot 23^3}$$

F. $17 \cdot 23$

G. $17 \cdot 23 \cdot 61$

H. $17 \cdot 23 \cdot 61^2$

J. $17^2 \cdot 23^3 \cdot 61^2$

K. $17^4 \cdot 23^5 \cdot 61^2$

51. As shown in the figure below, the drill holes for Well A and Well B are 300 feet apart on level ground. Well A is dug straight down and reaches oil at 2,000 feet. Well B is dug straight down and reaches oil at 1,500 feet. What is the angle of elevation from the point where Well A reaches oil to the point where Well B reaches oil?

(Note: The figure is NOT drawn to scale.)

A. $\sin^{-1}\left(\frac{3}{5}\right)$

B. $\cos^{-1}\left(\frac{3}{5}\right)$

C. $\tan^{-1}\left(\frac{3}{5}\right)$

D. $\cos^{-1}\left(\frac{5}{3}\right)$

E. $\tan^{-1}\left(\frac{5}{3}\right)$

52. Tables of values for the 2 functions f and g are shown below. What is the value of $g(f(5))$?

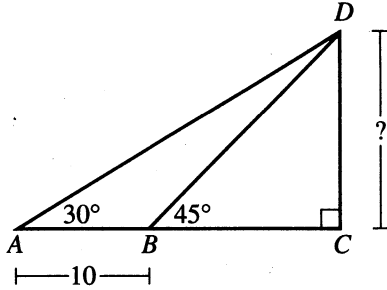| x	$f(x)$		x	$g(x)$
-6	8		-3	5
-3	-6		1	-1
1	5		3	-5
5	3		5	-6

F. -6

G. -5

H. 1

J. 3

K. 8

DO YOUR FIGURING HERE.

53. In the figure below, $\triangle ACD$ is a right triangle, B lies on $\overline{AC}$, and the measures of $\angle DAC$ and $\angle DBC$ are given. The length of $\overline{AB}$ is 10 yards. What is the approximate length, in yards, of $\overline{CD}$?

A. 3.7
B. 4.1
C. 13.7
D. 15.7
E. 24.1

54. For positive integers a and b, an operation Δ can be defined by $a \Delta b = \frac{a}{b} + \frac{b}{a}$. When the sum of a and b is 5 and the product of a and b is 6, what is the value of $a \Delta b$?

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

G. 1

H. $\frac{5}{3}$

J. 2

K. $\frac{13}{6}$

55. Given the matrix equation shown below, what is $\frac{b}{a}$?

$$\begin{bmatrix} 3! \\ 2! \end{bmatrix} + \begin{bmatrix} 2! \\ 4! \end{bmatrix} = \begin{bmatrix} a \\ b \end{bmatrix}$$

(Note: Whenever n is a positive integer, the notation $n!$ represents the product of the integers from n to 1. For example, $3! = 3 \cdot 2 \cdot 1$.)
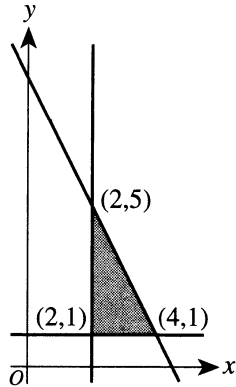
A. $\frac{13}{4}$

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

C. $\frac{4}{7}$

D. 4

E. 6

DO YOUR FIGURING HERE.

56. Graphed in the standard (x,y) coordinate plane below is the solution set for a system of 3 linear inequalities. For values of x and y that satisfy this system, what is the maximum value of $6x - 2y$?


F. 2
G. 10
H. 12
J. 14
K. 22

57. The square base of a regular pyramid has a side length of 4 inches. Each of the other 4 faces of the pyramid is a triangle with a base of 4 inches and a height of 6 inches. The pyramid has a total surface area of 64 square inches. A second regular pyramid has a square base that is 4 inches by 4 inches, but its total surface area is double that of the first pyramid. What is the height, in inches, of each of the triangular faces of the second pyramid?

A. 8
B. 12
C. 14
D. 16
E. 18

58. As shown in the figure below, a triangle has 2 sides each of length 5 feet and a 3rd side of length x feet. The degree measure of the angle between the 2 sides that are 5 feet long is θ. In terms of x, $\cos \theta = ?$

(Note: For any triangle, if a, b, and c are the lengths of the sides opposite $\angle A$, $\angle B$, and $\angle C$, respectively, then $a^2 = b^2 + c^2 - 2bc \cos \angle A$.)
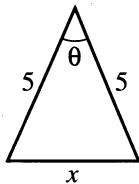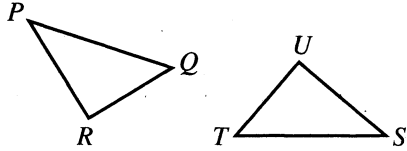

F. $\dfrac{x^2 + 50}{50}$

G. $\dfrac{x^2 - 50}{50}$

H. $\dfrac{x^2 - 10}{50}$

J. $\dfrac{50 - x^2}{50}$

K. $\dfrac{10 - x^2}{50}$

59. Which of the following diagrams provides information that is sufficient to prove that $\triangle PQR$ and $\triangle STU$, shown below, are congruent?

A.

$\angle P \cong \angle S$
$\angle Q \cong \angle T$
$\angle R \cong \angle U$

B.

$\angle P \cong \angle S$
$\angle R \cong \angle T$
$\overline{PQ} \cong \overline{ST}$

C.

$\angle P \cong \angle S$
$\overline{PQ} \cong \overline{ST}$
$\overline{QR} \cong \overline{TU}$

D.

$\angle P \cong \angle S$
$\overline{PQ} \cong \overline{ST}$
$\overline{PR} \cong \overline{SU}$

E.

$\angle P \cong \angle S$
$\overline{PR} \cong \overline{SU}$
$\overline{QR} \cong \overline{TU}$

60. What is the value of c if $x + 2$ is a factor of $2x^3 + 2x^2 - 2cx + 4$?

F. −4
G. −2
H. 0
J. 1
K. 7

END OF TEST 2

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

DO NOT RETURN TO THE PREVIOUS TEST.

ACT-69F

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 novel *Lily Nevada* by Cecelia Holland (©1999 by Cecelia Holland).

By the time Brand got to the train station the Atlantic Mail was long gone. Brand stood staring up the empty tracks. The ordinary city noise of Reno set-tled around him, the wagons on the street, somebody
5 whistling over by the livery stable. Turning, he went back across the platform and into the station house.

The agent was a fuzz-faced kid. Half a dozen locals sat along the benches by the woodstove; when Brand came into the waiting room they stirred, and he
10 heard his name spoken. He leaned against the sill of the ticket window and said, "When's the next west-bound train?"

The agent didn't bother to lift his gaze to Brand. "The next westbound passenger train will leave at five
15 tonight."

"I said when's the next train," Brand said, in a monotone.

The fuzzy face turned toward him, alerted. "There's an express freight through in thirty minutes."

20 Brand said, "I'll take that."

"I can't sell tickets on a freight."

"I'm not buying a ticket," Brand said. He took the billfold from the inner pocket of his coat and hung his badge out in front of the kid's nose.

25 "Yes, sir," the agent said briskly. "Thirty minutes."

Brand turned his head toward the woodstove. The men there were watching him mutely. He said, "Who wants to make a buck?"

30 Immediately one stepped out from the middle of them. This was a pudgy man with thinning hair. "I'll do it, Mr. Brand," he said.

"Go down to the telegraph office, have them wire the SP office in Truckee and hold the Mail for me.
35 Sign it, 'Brand.'"

The pudgy man rushed off. The ticket agent said, "They don't hold the Mail for anything."

Brand did not bother to answer. He went across the waiting room toward the stove. The other men
40 watched him owlishly and he ignored them, pulled off his glove between his left arm and his side, and held out his hand to warm in the heat of the stove. With the stump of his left arm he tucked the glove into his pocket, and the stump after.

45 "Cold, for March," said one of the men tentatively.

Brand said nothing; it was bad enough to be rec-ognized, it made him edgy when people knew him but he didn't know them. The pudgy man came back in,
50 puffing. With a broad and sunny smile he held out the receipt for the telegram, and when Brand went to give him a dollar he shook his head.

"No, thanks," he said. "Glad to have the chance to help."

55 Brand looked him over again. The man wore miner's clothes, denim pants and a flannel shirt and heavy workshoes. His thinning hair made him look old but he was not, younger than Brand, likely, who was thirty-two.

60 "My name's Billy Patch. If there's anything else I can do, I'd take it as a privilege, Mr. Brand."

Brand gave him a sharp sideways look. He could not penetrate the man's eager smiling mask; maybe it wasn't a mask. He said, "I'll remember that."

65 The man crept around to the side, so that he was talking to Brand's face again. "I sort of follow your career, in the papers, you know."

The men on the bench, who were listening with keen ears, rumbled up a burst of muted hilarity. Brand
70 said, "I didn't know I had a career in the papers."

"Well, you know, the police reports." The pudgy man bobbed a little; his eyes shone. "I want to be a peace officer."

Brand gave a laugh and lifted his gaze to the
75 other man's face. "What for?"

"Well, you know—." Bill Patch was rocking on his heels now, as if the inner urge to serve the law would not let him rest.

"Show it to him, Billy boy," one of the men on
80 the bench bawled. "Go on."

The round face before Brand flushed red. With a murmur, the pudgy man took a folded magazine from his hip pocket.

"*Ned Buntline*," Brand said, recognizing the style
85 of the cover even before he could see the title. "What do you read that garbage for? That's not about anything real."

The men by the stove bellowed with laughter. The pudgy man seemed to melt, his hand still
90 stretched out toward Brand with the magazine. The hoots and jeers washed over him; he lowered his gaze toward the floor. Brand watched steadily. It seemed like him standing there, and the other boys jeering, "Stumpy!"

95   "I need a deputy, maybe, on this case I'm on now. Want the job? Just for a day or so."

The pudgy man's gaze snapped back up. The color faded out of his cheeks. The raucous voices of the other men died away. The pudgy man said,
100 "Would I!"

"Just come along. Give me a hand if I need it. This is probably a wild-goose chase anyway."

"Yes, sir!"

Brand turned away a little now, too late, wishing
105 he had kept his mouth shut. He wondered why he had saddled himself with this stranger. "Well," he said. "Come on, then."

1. To develop the characterization of Brand, the author uses all of the following EXCEPT:

A. physical description of Brand.
B. references to Brand's role models.
C. description of how others respond to Brand.
D. dialogue between Brand and others at the station.

2. Which of the following questions is NOT answered by the passage?

F. What does Brand hope to accomplish by stopping the Atlantic Mail?
G. Where do the actions described in the passage take place?
H. How old is Brand?
J. What is the basis for the compassion Brand feels for Patch?

3. Which of the following words from the passage is used figuratively?

A. *Leaned* (line 10)
B. *Turned* (line 18)
C. *Bobbed* (line 72)
D. *Washed* (line 91)

4. Patch is characterized in the passage as:

F. sensitive, earnest, and enthusiastic.
G. funny, conniving, and slow-moving.
H. fidgety, deceitful, and self-centered.
J. overbearing, intellectual, and isolated.

5. The passage most strongly implies that Brand's opinion of the magazine *Ned Buntline* is that it:

A. is useful in his line of work for keeping track of the activities of criminals.
B. inaccurately presents the activities and careers of law enforcement professionals.
C. helps the general public understand and appreciate the hardships of life in the Old West.
D. discourages an appreciation of law enforcement professionals by depicting them as mean and unforgiving.

6. As presented in lines 84–96, Brand's manner toward Patch can best be described as changing from:

F. guarded to openly curious.
G. friendly to stern.
H. critical to reluctantly accepting.
J. polite to impatient.

7. When Brand says, "I'm not buying a ticket" (line 22), he is most likely making the point that:

A. Patch will have to pay his own way on the train.
B. he's entitled to ride the train without paying because of his profession.
C. he's at the station to meet someone, not to catch a train.
D. the ticket agent should give him a free ticket on the five o'clock train.

8. In response to the ticket agent's comment that "they don't hold the Mail for anything" (line 37), Brand:

F. insists that the agent send a telegram anyway in hopes of stopping the Mail.
G. gives the ticket agent a look of disapproval and shows him his badge.
H. explains the importance of stopping the Mail to the men nearby, hoping the ticket agent will overhear.
J. walks away from the ticket agent without bothering to reply.

9. The passage indicates that the fact that some of the men in the station recognized Brand left him with a feeling of:

A. safety.
B. pride.
C. uneasiness.
D. indifference.

10. Which of the following statements best paraphrases the twentieth paragraph (lines 62–64)?

F. Brand can't determine whether Patch is expressing a genuine emotion or trying to manipulate him.
G. Patch tries to please Brand by telling him what he remembers about his accomplishments.
H. Brand's stern expression momentarily discourages Patch from approaching him.
J. Patch and Brand confuse each other with their contradictory statements.

Passage II

SOCIAL SCIENCE: This passage is adapted from the article "Good Gone Wild" by Eric Jaffe (©2006 by Science Service).

The island of Damas is a half-hour boat ride from the Chilean coast. On the island, it's dry and rocky. The Humboldt penguins that live there have no ice slopes to slide down in their black-tie apparel. Instead, these
5 desert penguins seek out caves to shade their eggs from the sun.

To see these penguins, visitors usually begin in La Serena, Chile. They drive 40 miles north on a main highway and then cut toward the coast on a gravel road
10 that leads to the fishing village of Punta de Choros. Local fishermen there charge a fee to guide the tourists to Damas by boat. On the island, people are free to walk into the caves where the penguins live. Anyone can watch a mother brooding an egg and snap a picture.

15 What began in the early 1990s as a place with a few hundred curious visitors has now become a tourism destination that attracts 10,000 penguin peepers a year. Damas provides an example of ecotourism, defined as the practice of visiting sites where exotic landscapes
20 and rare animals are the main attractions. Ideally, ecotourists learn about the habitats that they visit, provide donations to conserve them, and generate income for host communities.

Since this model of tourism emerged some
25 25 years ago, many special-interest sites, like Damas, have experienced hikes in visitation.

But several recent studies show a more complicated picture of the impact of ecotourism, a practice that remains largely unregulated. The increased crowds
30 lead to population changes in some animals, such as the Humboldt penguin and, some 4,000 miles away in the Bahamas, the Allen Cays rock iguana. A mounting garbage problem caused by over-visitation by turtle viewers threatens the beaches of Tortuguero in Costa
35 Rica. People who live near Ghana's Kakum National Park have lost access to the forest's resources and now suffer high rates of unemployment.

"I think there's been a glib . . . championing of ecotourism, that it's a win-win situation," says Martha
40 Honey, executive director of the Center on Ecotourism and Sustainable Development in Washington, D.C. But by studying how animals, environments, and cultures respond to ecotourism, "we can set up systems that aren't having adverse impacts," she says.

45 Ursula Ellenberg, a biologist at the University of Otago in New Zealand, decided to study how human disturbance affects the Humboldt penguins when she was quietly counting their population, but not quietly enough. While she was looking through binoculars
50 from a cliff about 150 meters away, the penguins began racing in all directions. If a cautious researcher can spark such a reaction, she thought, how would the penguins react to a gaggle of shutter-happy tourists?

To study the effects of human-Humboldt interac-
55 tion, Ellenberg and her colleagues measured the breeding success of penguins on the islands of Damas, Choros, and Chanaral, which together make up the Humboldt Penguin National Reserve. The island cluster serves as a good point of comparison: Damas receives
60 10,000 annual visitors, but Choros and Chanaral are much less accessible from the mainland and attract only 1,000 and 100 tourists a year, respectively.

Ellenberg's team was the first to study these penguin populations. The researchers monitored eggs and
65 chicks on each island for 5 months after the penguin mothers laid the eggs. If a nest is abandoned during this period, the chicks usually die. Penguins have many chances to breed during their 20-year life spans, and they would sooner abandon a nest than risk personal
70 harm—say, from an approaching human.

In 2003, the only year that Ellenberg's group studied Chanaral, the penguins there bred an average of 1.34 chicks. On Choros, the average was just below one chick in both 2002 and 2003. But on Damas, female
75 penguins produced, on average, a little less than half a chick in 2002, and the birthrate dipped well below a quarter of a chick in 2003, Ellenberg's team reports.

"It's surprising, when you have islands at such close proximity, that you'd already get a difference,"
80 says Ellenberg. "They should do similarly well."

As scientists study ecotourism's impacts, new understandings "need to be fed back into the industry, to educate what is acceptable behavior," says Honey. "There needs to be a closer alliance between hard sci-
85 ence and the tourism industry."

In the case of the Humboldt penguins, a lack of research led to improper viewing guidelines, says Ellenberg. The Humboldt reserve based its rules for approaching penguins on a related South American
90 species called the Magellanic penguin, which is far less sensitive to human disturbance.

11. According to the passage, one reason the three islands of the Humboldt Penguin National Reserve were attractive for Ellenberg's study of the interaction between humans and Humboldt penguins is that each island:

A. is easily accessible from the mainland.
B. has the same number of penguins living on it.
C. had been studied extensively before ecotourism came to it.
D. receives a different number of visitors annually.

12. As it is used in line 24, the word *model* most nearly means:

F. reproduction.
G. symbol.
H. gauge.
J. form.

13. The main purpose of the fifth paragraph (lines 27–37) is to:

A. describe a recent study of the effects of ecotourism on the Allen Cays rock iguana.
B. present data about Humboldt penguin population changes on Damas.
C. provide several examples of some of the damaging effects of ecotourism.
D. list several popular ecotourism destinations, which are each described later in the passage.

14. According to the passage, which of the following events triggered Ellenberg's interest in studying how human disturbance affects the Humboldt penguins?

F. Discovering a penguin population decline
G. Learning of Honey's concerns about ecotourism
H. Scattering the penguins as she tried to count them
J. Noticing a tourism increase in the Humboldt Penguin National Reserve

15. The passage refers to "a gaggle of shutter-happy tourists" (line 53) mainly to help make the point that:

A. tourists likely bring a great deal of disruption to the Humboldt penguins' habitat.
B. scientists believe tourists should rarely be allowed into the Humboldt penguins' habitat.
C. the Humboldt penguins act playfully in response to tourists' behavior.
D. tourists help protect the Humboldt penguins by increasing other people's awareness of them.

16. It can reasonably be inferred from the passage that human disturbance of the Humboldt penguins' habitat leads to:

F. the penguins fleeing deep into caves with their chicks.
G. the penguins making nests in cactuses.
H. increased aggressiveness in mature penguins.
J. the death of many penguin chicks.

17. According to the passage, which of the following statements about the breeding success of Humboldt penguins is accurate?

A. In 2003, females on Chanaral on average produced more chicks than did the females on Choros.
B. Females on Choros on average produced many more chicks in 2002 than they did in 2003.
C. In 2002, females on Choros and Damas on average produced nearly the same number of chicks.
D. In 2003, females on Damas on average produced twice as many chicks as did the females on Chanaral.

18. The passage states that visitors to Damas have been free to:

F. pick up Humboldt penguin chicks to get a closer look.
G. walk into the caves where the Humboldt penguins live.
H. camp overnight on the island.
J. dock their rented boats on the island.

19. According to the passage, how many teams of researchers had studied the Humboldt penguins on Damas, Choros, and Chanaral before Ellenberg's team did so?

A. Zero
B. One
C. Two
D. Three

20. In the context of the twelfth paragraph (lines 81–85), the statement in lines 84–85 most nearly means that:

F. scientific studies benefit from getting feedback from tourists.
G. the tourism industry must adapt based on findings from scientific studies.
H. scientists must not disturb environments when they study the effects of tourism.
J. the tourism industry and scientists usually agree on wildlife viewing guidelines.

Passage III

HUMANITIES: This passage is adapted from the essay "Ben Webster" by Ira Sadoff (©1992 by Ira Sadoff).

He's almost as wide as he is tall. His forehead is broad as an anvil. He glides onto the stage absent-mindedly, as if he were on the way to somewhere else. He wears a worn-to-shine brown double-breasted suit
5 and a porkpie hat. He doesn't know we're out there, any of the ten of us, in a small Amsterdam café in 1973. He may not know blacks and whites can use the same bathroom everywhere now, that the Vietnam War is winding down, that people may want to hear his music again. He
10 was chased here a decade ago, by racial prejudice, by the lack of work, by television and rock and roll, by free jazz. He's a relic of jazz history.

He snaps his fingers and nods to the rhythm section. They're out of tune, they don't play together, they
15 play figures and chord changes from the fifties, they're a little too loud, and worst of all, they're bored. He's done these same tunes night after night and they want to play something more modern, more dissonant.

He growls at them and keeps snapping his fingers
20 until they pick up the beat. Then he lifts up the saxophone, opens his eyes as if for the first time, and moves to the edge of the stage, where a Dutch girl is drinking coffee and talking with her boyfriend. He moves the sax in her direction; he serenades her. He plays "Pre-
25 lude to a Kiss," a ballad he learned with the Ellington band forty years before. It makes you want to wince, until he's eight notes into the melody. Then you find you're hypnotized by the pure beauty of his instrument, by the remarkable voice, by the wordless story the
30 melody tells. By the unrelenting melancholy, the history of the familiar tune played as if you've never heard it before. This is Ben Webster, two months before he dies on September 9, 1973. He's the musician who can always move you, who's relentless, who knows the
35 secret of melody. Who, like many of our artists, dies alone and impoverished and completely unappreciated.

Jazz is an expression of the history of a people, because every musician must understand its history before being able to play. But rather than exalting the
40 individual imagination, rather than exalting the perverse notion that complexity and eccentricity are themselves virtues, that design and pure intellect prove the greatness of the art, jazz depends upon improvisation and community. A familiar tune is given an interpreta-
45 tion. The individual experience of the artist intersects with the community. Call and response, originated in West Africa, lets artists interact with each other, respond to each other's ideas. They can break in on one another, they can cut each other up, they can alter the
50 whole tone and rhythm of a piece.

When I listen to the music of Ben Webster, though, I forget all the intellectual justifications for jazz; those rules simply don't apply. Webster reduces me to pure feeling, to mood and attitude. I don't care what tune he
55 plays and I don't often care who's playing with him. I can't claim to hear notes I have never heard before; I don't hear configurations, inventions of melody I've never imagined. Instead I hear a voice. A human voice. A timbre, an imagination, a way of playing that com-
60 prehends the nuance, the suggestion of phrase. His tone is thick and reedy, throaty, almost as full of air as note. Our understanding requires patience. He might play a series of quarter notes and then suddenly linger on the penultimate or final note of a phrase as if to say, "Look
65 at what's inside this note." Sometimes the note will bleed onto the next phrase, the next chord change. But always Webster's signature—the raspy sound and the deliberation of phrase—gives a ballad the texture of what jazz musician Rahsaan Roland Kirk would call
70 "the inflated tear."

Webster moves me by the sheer force of personality. I see the torchy ballads in small, dimly lit cafés. I imagine a life that's full of hurtful memories. And I can see a lonely figure holding back his rage. The outsider
75 who knows that love is the only possible salvation, but salvation is only something to long for. You only have to listen to his renditions of "Where Are You?" or "When Your Lover Has Gone," to follow the quest and be consoled by the experience. And though his tone
80 darkens over his forty-year career, though he chooses gruffness over grace, the tunes change only in minor ways. He might cross out a note, a phrase, stretch or compress it, and although the change might represent an improvement, the change is not essential. Webster's
85 greatest gift as an artist is his ability to inhabit the tone of a tune each time he gets up on the stand.

21. The point of view from which the passage is written is best described as that of a:
   A. café patron who was surprised to see one of Webster's last performances.
   B. jazz admirer who is critical of performances by other jazz artists after seeing Webster perform.
   C. Webster admirer who feels deep appreciation for Webster's art and for jazz in general.
   D. music fan who is confused by the complexity of jazz until he sees Webster perform.

22. The author's statement "our understanding requires patience" (line 62) is best supported and illustrated by his:
   F. account of Webster's rendition of "Prelude to a Kiss" (lines 24–32).
   G. views on why jazz music depends upon improvisation and community (lines 44–50).
   H. description of what is represented through "Where Are You?" and "When Your Lover Has Gone" (lines 71–79).
   J. comments on how Webster's music changed during his career (lines 79–84).

23. The main function of the fifth paragraph (lines 51–70) is to:

 A. contrast the playing of jazz artists whose music is uncomplicated with Webster's playing.
 B. offer an explanation for why Webster's powerful tone depends so much on his chord changes.
 C. illustrate how seeing jazz as an expression of history makes understanding Webster's playing easy.
 D. describe the power of Webster's playing using an approach different from the one just used to discuss jazz in general.

24. The author's statements in lines 2–12 primarily serve to suggest that Webster:

 F. seems unprepared for his imminent performance.
 G. is not involved in contemporary political events.
 H. is relaxed because people want to hear his music again.
 J. seems to belong to an earlier time.

25. It can most reasonably be inferred from the passage that Webster's music:

 A. often intrigued musicians who usually appreciated more modern tunes.
 B. evolved as a result of the positive influences of free jazz and rock and roll.
 C. was appreciated for a time, then became less popular.
 D. became more modern through the influence of various supporting musicians.

26. The passage implies that the musicians who play with Webster late in his career:

 F. challenge him to improvise through their careful modifications of the traditional rhythms of familiar tunes.
 G. help him draw ever-increasing crowds to his performances.
 H. hope for his approval but do not jeopardize their individual stylistic preferences.
 J. do not provide an especially memorable or imaginative accompaniment to his playing.

27. In the context of the passage, the author's description of what he does not hear while listening to Webster's music (lines 56–58) primarily emphasizes:

 A. the overwhelming inadequacies of Webster's style of playing.
 B. the importance of intellectual justifications for Webster's jazz.
 C. what actually makes Webster's music alluring to him.
 D. what Webster hopes the audience will hear through his playing.

28. The author seems to attribute Webster's power to move him primarily to Webster's:

 F. playing deliberately in order to encourage the listener to pause and consider each note.
 G. infusing his own memories and life experiences into his music.
 H. disregarding the history of jazz in order to be able to fully express his individual imagination.
 J. playing almost every tune joyfully, no matter who is playing with him.

29. The passage makes it clear that one reason Webster came to Amsterdam was to:

 A. create jazz history.
 B. escape social injustice.
 C. find salvation through love.
 D. observe European musicians.

30. The author states that before being able to play jazz, a musician must:

 F. write new jazz tunes.
 G. understand jazz history.
 H. know the secret of jazz melody.
 J. comprehend the nuance of jazz phrase.

Passage IV

NATURAL SCIENCE: This passage is adapted from the article "The Gas between the Stars" by Ronald J. Reynolds (©2001 by Scientific American, Inc.).

For many years, we have known that an extremely thin atmosphere called the interstellar medium envelops our galaxy, the Milky Way, and threads the space between its billions of stars. Until fairly recently, the
5 medium seemed a cold, static reservoir of gas quietly waiting to condense into stars. Now we recognize the medium as a tempestuous mixture with an extreme diversity of density, temperature and ionization.

In fact, telescopes on the ground and in space are
10 showing the galaxy's atmosphere to be as complex as any planet's. Held by the combined gravitational pull of the stars and other matter, permeated by starlight, energetic particles and a magnetic field, the interstellar medium is continuously stirred, heated, recycled and
15 transformed. Like any atmosphere, it has its highest density and pressure at the "bottom," in this case the plane that defines the middle of the galaxy, where the pressure must balance the weight of the medium from "above." Dense concentrations of gas—clouds—form
20 near the midplane, and from the densest subcondensations, stars precipitate.

When stars exhaust their nuclear fuel and die, those that are at least as massive as the sun expel much of their matter back into the interstellar medium. Thus,
25 as the galaxy ages, each generation of stars pollutes the medium with heavy elements. As in the water cycle on Earth, precipitation is followed by "evaporation," so that material can be recycled over and over again.

Thinking of the interstellar medium as a true
30 atmosphere brings unity to some of the most pressing problems in astrophysics. First and foremost is star formation. Although astronomers have known the basic principles for decades, they still do not grasp exactly what determines when and at what rate stars precipitate
35 from the interstellar medium. Theorists used to explain the creation of stars only in terms of the local conditions within an isolated gas cloud. Now they are considering conditions in the galaxy as a whole.

Not only do these conditions influence star forma-
40 tion, they are influenced by it. What one generation of stars does determines the environment in which subsequent generations are born, live and die. Understanding this feedback is another of the great challenges for researchers. Feedback can be both positive and nega-
45 tive. On the one hand, massive stars can heat and ionize the medium and cause it to bulge out from the midplane. This expansion increases the ambient pressure, compressing the clouds and perhaps triggering their collapse into a new generation of stars. On the other
50 hand, the heating and ionization can also agitate clouds, inhibiting the birth of new stars. When the largest stars blow up, they can even destroy the clouds that gave them birth. In fact, negative feedback could explain

why the gravitational collapse of clouds into stars is so
55 inefficient. Typically only a few percent of a cloud's mass becomes stars.

A third conundrum is that star formation often occurs in sporadic but intense bursts. In the Milky Way the competing feedback effects almost balance out, so
60 that stars form at an unhurried pace—just 10 per year on average. In some galaxies, however, such as the "exploding galaxy" M82, positive feedback has gained the upper hand. Starting 20 million to 50 million years ago, star formation in the central parts of M82 began
65 running out of control, proceeding 10 times faster than before. Our galaxy, too, may have had sporadic bursts. How these starbursts occur and what turns them off must be tied to the complex relation between stars and the tenuous atmosphere from which they precipitate.

70 Finally, astronomers debate how quickly the atmospheric activity is petering out. The majority of stars—those less massive than the sun, which live tens or even hundreds of billions of years—do not contribute to the feedback loops. More and more of the
75 interstellar gas is being locked up into very long lived stars. Eventually all the spare gas in our Milky Way may be exhausted, leaving only stellar dregs behind. How soon this will happen depends on whether the Milky Way is a closed box. Recent observations sug-
80 gest that the galaxy is still an open system, both gaining and losing mass to its cosmic surroundings. High-velocity clouds of relatively unpolluted hydrogen appear to be raining down from intergalactic space, rejuvenating our galaxy. Meanwhile the galaxy may be
85 shedding gas in the form of a high-speed wind from its outer atmosphere, much as the sun slowly sheds mass in the solar wind.

31. The author's main technique in the passage is to:
   A. state a problem and offer several competing solutions.
   B. present a discovery and explore several of its implications.
   C. explain two sides of a debate and argue for one of them.
   D. describe a process and list in order its sequence of steps.

32. As it is used in line 30, the phrase *brings unity to* most nearly means:
   F. enlists the cooperation of.
   G. ends the bitter conflict between.
   H. clarifies and connects.
   J. makes whole and complete.

33. Based on the passage, the claim that the interstellar medium is a "cold, static reservoir of gas" (line 5) is best described as:

A. a fact that the author indicates scientists have known "for many years" (line 1).
B. a fact recently reconfirmed by study of the space between the stars.
C. an opinion once commonly held but that recent research has undermined.
D. an opinion inconsistent with the finding that the medium's gas waits "quietly" (line 5).

34. The author supports his claim that "the galaxy's atmosphere [is] as complex as any planet's" (lines 10–11) mainly by:

F. comparing the galaxy's atmosphere to the atmosphere of a specific planet.
G. listing features of the galaxy's atmosphere that are shared by atmospheres in general.
H. stating that both the galaxy's atmosphere and atmospheres in general are permeated by starlight.
J. describing specific studies comparing the galaxy's atmosphere to planetary atmospheres.

35. It can reasonably be inferred that in the context of the passage, a *positive feedback* is a process that:

A. promotes the birth of new stars.
B. agitates interstellar clouds.
C. destroys large stars.
D. cools the interstellar medium.

36. It can reasonably be inferred from the passage that if the Milky Way were "a closed box" (line 79), then it would:

F. continue to gain mass from and lose mass to its surroundings.
G. expel its stellar dregs into adjoining galaxies.
H. use up all of its spare gas at some point in time.
J. lock up nearly all of its gas in short-lived stars more massive than the Sun.

37. The passage states that new insights about the interstellar medium have arisen as a result of information gathered from:

A. unmanned probes studying the Milky Way's midplane.
B. experiments conducted in Earth's atmosphere.
C. theoretical computer models.
D. ground- and space-based telescopes.

38. The author describes the interstellar medium as all of the following EXCEPT as:

F. being held by the combined gravitational pull of the stars and other matter.
G. having a uniform density, temperature, and ionization.
H. continuously stirred, heated, recycled, and transformed.
J. permeated by starlight, energetic particles, and a magnetic field.

39. In describing the process by which interstellar clouds collapse into stars as "inefficient" (line 55), the author is most directly referring to the fact that:

A. an entire cloud is consumed in the formation of a single star.
B. stars form one at a time from clouds rather than in generations.
C. astronomers cannot readily predict which clouds will produce stars.
D. relatively little of the gas in a cloud condenses into stars.

40. According to the passage, which of the following statements is true about the present state of the Milky Way?

F. Negative feedback has clearly become dominant.
G. It has become an "exploding galaxy."
H. Stars form within it at a slow, steady rate.
J. Between twenty and fifty of its stars die each year.

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

Scientists once thought that on Earth the *methane* (CH_4) from natural sources was produced only by *methanogens* (bacteria that cannot survive in the presence of O_2). It has been recently discovered that some plants emit CH_4 that is generated by an unknown process operating under *aerobic* conditions (O_2 present). Three studies examined CH_4 emission by plants.

Study 1

Beech tree leaves were collected, air-dried, and sterilized. A small quantity (1–6 g) of the air-dried, sterilized leaves was placed in each of 20 identical glass tubes. Each tube was then capped. Using a needle inserted through the cap, the air in each tube was replaced with CH_4-free air. The tubes were then separated into 5 groups of 4 tubes each. Each group of tubes was incubated in the dark for 16 hr at 30°C, 40°C, 50°C, 60°C, or 70°C. The average CH_4 emission rate was determined for each group at the end of the incubation period. This procedure was repeated using ash tree leaves (see Figure 1).
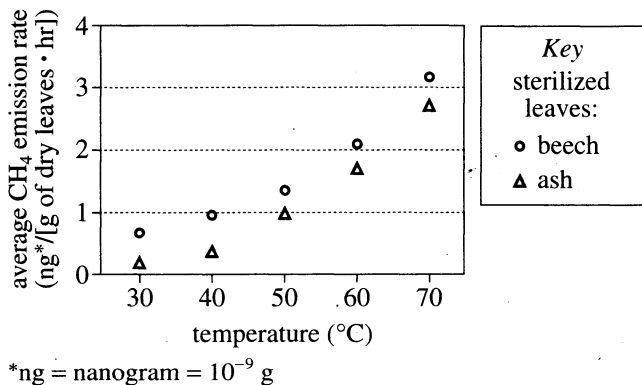

*ng = nanogram = 10^{-9} g

Figure 1

Study 2

The procedure of Study 1 was repeated except that air-dried, *unsterilized* beech and ash leaves were tested (see Figure 2).
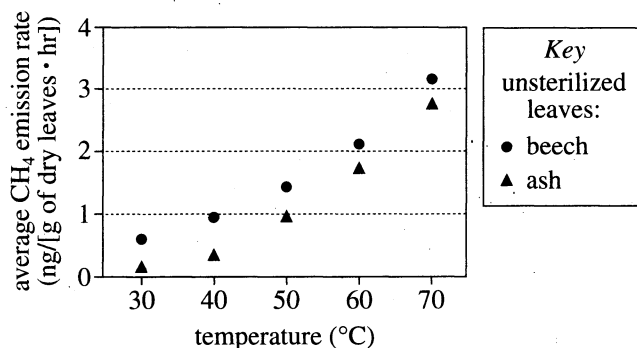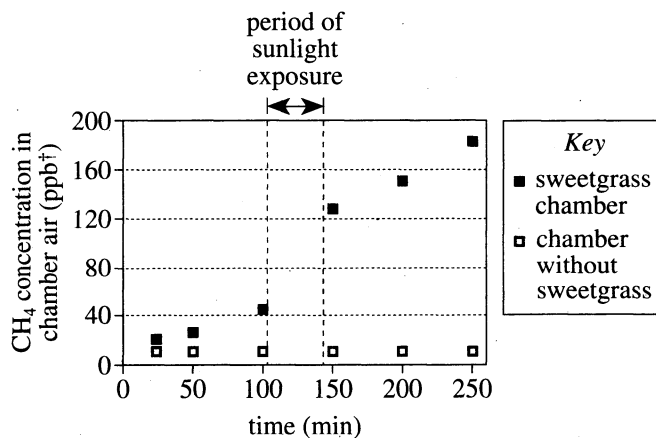

Figure 2

Study 3

Several sweetgrass plants were placed in a large Plexiglas chamber. This chamber and an identical chamber with no sweetgrass inside were then sealed. Using a pump, air in each chamber was replaced with CH_4-free air, after which the chambers were incubated in the dark at 30°C. At 102 min after incubation began, the chambers were placed in direct sunlight for a short period, then returned to the dark to continue incubation at 30°C. Beginning when the chambers were first placed in the dark, the CH_4 concentration in the air inside the chambers was measured every 25 or 50 min for 250 min (see Figure 3).

†ppb = parts per billion

Figure 3

Figures adapted from Frank Keppler et al., "Methane Emissions from Terrestrial Plants under Aerobic Conditions." ©2006 by Nature Publishing Group.

1. According to the results of Study 2, as incubation temperature increased, the average CH_4 emission rate:
   A. increased for beech leaves, but decreased for ash leaves.
   B. increased for both beech leaves and ash leaves.
   C. decreased for beech leaves, but increased for ash leaves.
   D. decreased for both beech leaves and ash leaves.

2. According to the results of Study 1, the average CH_4 emission rate for air-dried, sterilized beech leaves incubated at 60°C was closest to which of the following?
   F. 1.5 ng/[g of dry leaves · hr]
   G. 2.0 ng/[g of dry leaves · hr]
   H. 2.5 ng/[g of dry leaves · hr]
   J. 3.0 ng/[g of dry leaves · hr]

3. A complicating factor in interpreting the results of Study 3 was that exposing the chambers to sunlight probably also:
   A. increased the mass of the plant material inside both chambers.
   B. decreased the mass of the plant material inside both chambers.
   C. increased the temperature inside both chambers.
   D. decreased the temperature inside both chambers.

4. Which of the following served as a control in Study 3 ?
   F. The tubes containing air-dried, unsterilized ash leaves
   G. The tubes containing air-dried, unsterilized beech leaves
   H. The sweetgrass chamber
   J. The chamber without sweetgrass

5. Is the statement "Sterilization had no effect on the CH_4 emission rate for ash leaves" supported by Figures 1 and 2 ?
   A. Yes, because at every incubation temperature, the emission rates for both the sterilized and unsterilized ash leaves were the same.
   B. Yes, because at every incubation temperature, the emission rate for the sterilized ash leaves was less than half that for the unsterilized ash leaves.
   C. No, because at every incubation temperature, the emission rates for both the sterilized and unsterilized ash leaves were the same.
   D. No, because at every incubation temperature, the emission rate for the sterilized ash leaves was less than half that for the unsterilized ash leaves.

6. In Study 1, it was unnecessary to put an identical mass of air-dried, sterilized leaves in each tube because the average CH_4 emission rates were determined:
   F. per g of dry leaves.
   G. at 5 different temperatures.
   H. for 2 different types of leaves.
   J. after incubation in the dark.

Passage II

As fish mature, their diet often changes. Researchers investigated this phenomenon in 2 groups of winter flounder at a location in the Hudson River estuary where there is significant mixing of river water with ocean water. All the flounder were between 2 mo and 5 mo old and at least 20 mm long.

Study 1

Each June of 1996, 1997, and 1998, 100 flounder were captured and placed in cages that were sitting on the bottom of the estuary. Each cage was lined with a mesh bag that had square openings 3 mm in diameter. At the end of 10 days, the fish were removed from the cages and sorted into 4 classes based on length. The stomach contents of the fish in each class were analyzed to determine the percent by mass of each type of prey. The results, averaged over the 3 years, are shown in Figure 1. The percent of fish in each class with empty stomachs is shown in Table 1.
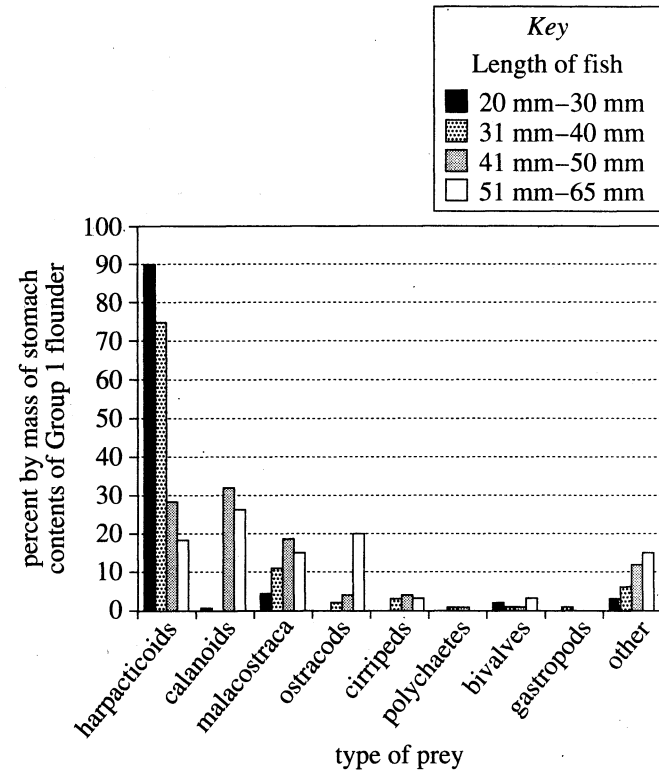
Key

Length of fish
- ■ 20 mm–30 mm
- ▦ 31 mm–40 mm
- ▨ 41 mm–50 mm
- □ 51 mm–65 mm

Figure 1

Table 1		
Group 1 flounder		
Length (mm)	Number of flounder	Percent with empty stomachs
20–30	45	15.5
31–40	87	32.2
41–50	100	35.0
51–65	68	23.5

Study 2

In June of 1998, 30 more flounder were captured, removed from the river, and sorted into 4 classes based on length. Immediately after the fish were sorted, their stomach contents were analyzed to determine the percent by mass of the same types of prey identified in Study 1. The results are shown in Figure 2. The percent of fish in each class with empty stomachs is shown in Table 2.
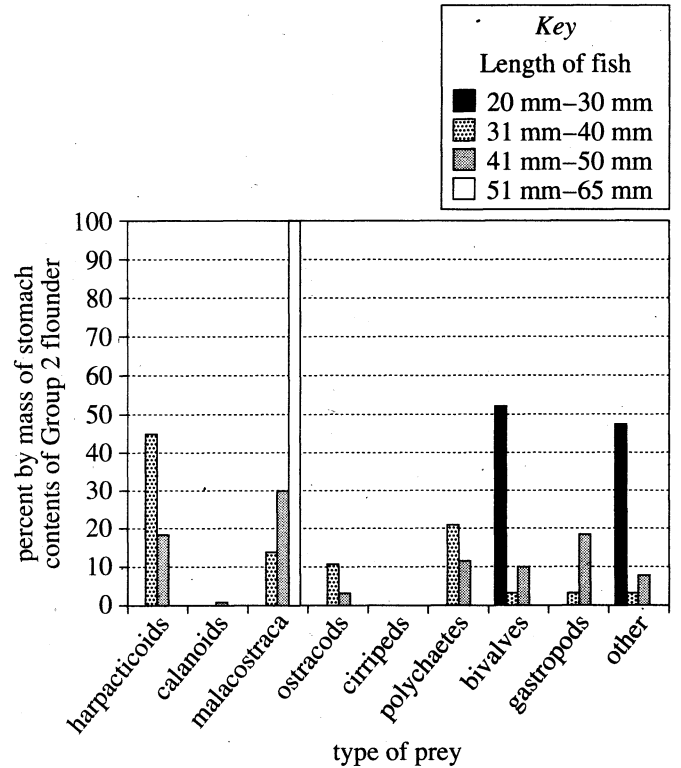
Key

Length of fish
- ■ 20 mm–30 mm
- ▦ 31 mm–40 mm
- ▨ 41 mm–50 mm
- □ 51 mm–65 mm

Figure 2

Table 2		
Group 2 flounder		
Length (mm)	Number of flounder	Percent with empty stomachs
20–30	1	0.0
31–40	8	12.5
41–50	15	26.7
51–65	6	50.0

GO ON TO THE NEXT PAGE.

7. For the class 51 mm–65 mm in length, were the stomach contents of Group 1 flounder and of Group 2 flounder the same?

    A. Yes; both Group 1 flounder and Group 2 flounder in this class ate calanoids only.

    B. Yes; both Group 1 flounder and Group 2 flounder in this class ate ostracods only.

    C. No; the Group 1 flounder in this class ate many types of prey, whereas the Group 2 flounder in this class ate malacostraca only.

    D. No; the Group 1 flounder in this class ate malacostraca only, whereas the Group 2 flounder in this class ate many types of prey.

8. In Study 2, which type(s) of prey was(were) NOT found in the stomachs of any of the 31 mm–40 mm long Group 2 flounder?

    F. Calanoids only

    G. Ostracods only

    H. Calanoids and cirripeds only

    J. Cirripeds and polychaetes only

9. For how many of the 4 classes was the percent of Group 1 flounder with empty stomachs higher than the percent of Group 2 flounder with empty stomachs?

    A. 1

    B. 2

    C. 3

    D. 4

10. In Study 1, what must the researchers have assumed about winter flounder feeding habits when they placed the cages in the estuary? Winter flounder feed in:

    F. fresh water near the surface of an estuary.

    G. fresh water near the bottom of an estuary.

    H. somewhat salty water near the surface of an estuary.

    J. somewhat salty water near the bottom of an estuary.

11. The total mass of the stomach contents of Group 2 flounder 20 mm–30 mm long was 50 mg. Based on Figure 2, the mass of bivalves in those stomach contents was closest to which of the following?

    A. 5 mg

    B. 10 mg

    C. 25 mg

    D. 50 mg

12. A researcher predicted that the diet of Group 1 flounder would change when flounder length exceeded 40 mm. Are the data in Figure 1 consistent with this prediction?

    F. Yes, because the diet of flounder 40 mm or less in length was at least 75% harpacticoids, whereas the diet of flounder greater than 40 mm in length was more varied.

    G. Yes, because the diet of flounder 40 mm or less in length was 100% harpacticoids, whereas the diet of flounder greater than 40 mm in length was more varied.

    H. No, because the diet of flounder 40 mm or less in length was at least 75% harpacticoids, whereas the diet of flounder more than 40 mm in length was more varied.

    J. No, because the diet of flounder 40 mm or less in length was 100% harpacticoids, whereas the diet of flounder more than 40 mm in length was more varied.

Passage III

As calcium oxalate hydrate ($CaC_2O_4 \cdot H_2O$) is heated, it first dehydrates to yield calcium oxalate (CaC_2O_4). Next, the CaC_2O_4 decomposes into calcium carbonate ($CaCO_3$) and carbon monoxide (CO). The $CaCO_3$ then further decomposes into CaO and CO_2 (see equations below).

$$CaC_2O_4 \cdot H_2O(\text{solid, } s) \xrightarrow{\text{heat}} CaC_2O_4(s) + H_2O(\text{gas, } g)$$

$$CaC_2O_4(s) \xrightarrow{\text{heat}} CaCO_3(s) + CO(g)$$

$$CaCO_3(s) \xrightarrow{\text{heat}} CaO(s) + CO_2(g)$$
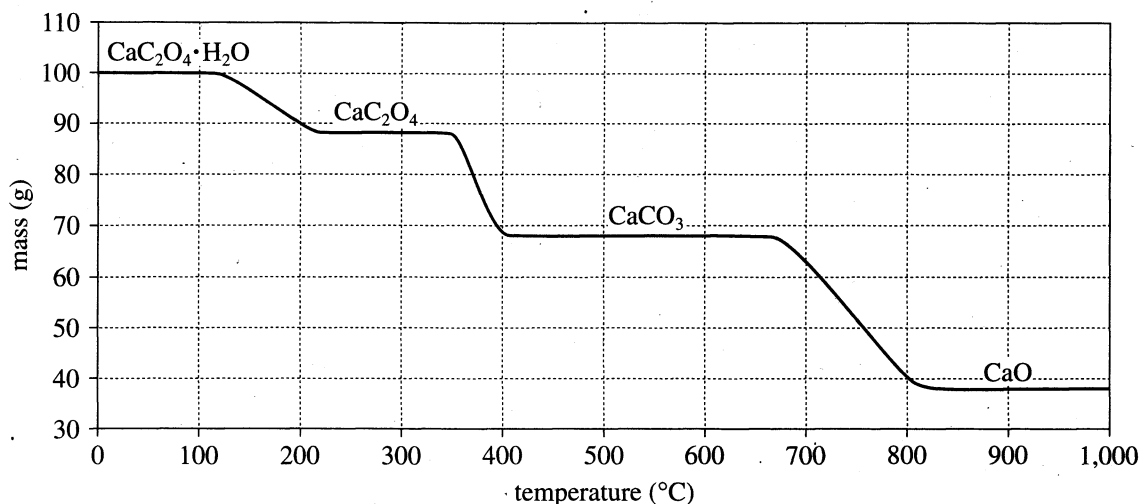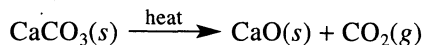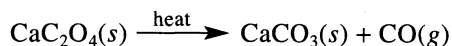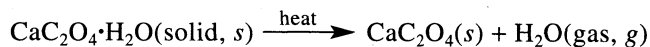
In a *thermogravimetric analysis* (TGA), the mass of a sample is monitored as the sample's temperature is steadily increased. A nonreactive gas is streamed over the sample to carry away any gaseous products. The figure shows the results of a TGA of a 100 g sample of $CaC_2O_4 \cdot H_2O$.

Figure adapted from Mlle. Simonne Peltier and Clément Duval, "Sur la Thermogravimétrie des Précipités Analytiques: II. Dosage Du Calcium." ©1947 by Elsevier Science B.V.

13. If the sample of $CaC_2O_4 \cdot H_2O$ had been 50 g, the mass of the sample at 900°C would have been approximately:

   A. 20 g.
   B. 40 g.
   C. 60 g.
   D. 80 g.

14. During the TGA, the largest change in mass resulted from the decomposition of:

   F. $CaC_2O_4 \cdot H_2O$.
   G. CaC_2O_4.
   H. $CaCO_3$.
   J. CaO.

15. Calcium oxalate started to decompose at approximately what temperature?

   A. 220°C
   B. 350°C
   C. 400°C
   D. 660°C

16. When the TGA began, approximately what percent of the mass of the sample was made up of H_2O ?

   F. 12%
   G. 38%
   H. 62%
   J. 88%

17. The CO_2 that was part of the reactions that occurred during the TGA could best be described as a:

   A. reactant formed directly by the decomposition of CaC_2O_4.
   B. reactant formed directly by the decomposition of $CaCO_3$.
   C. product formed directly by the decomposition of CaC_2O_4.
   D. product formed directly by the decomposition of $CaCO_3$.

Passage IV

The respiratory cycle for resting humans who are breathing normally has been studied by physiologists. The figure shows 4 average measures of the cycle: *lung volume*, *air flow* (the rate at which air flows into or out of the lungs), *pleural pressure* (the pressure in the area between the lungs and the chest wall), and *alveolar pressure* (the pressure in the *alveoli*, small sacs in the lungs where air exchange takes place). Pleural pressure and alveolar pressure are represented as values above or below *atmospheric pressure* (1,033 cm H_2O). The next inspiration begins at the end of the pause.
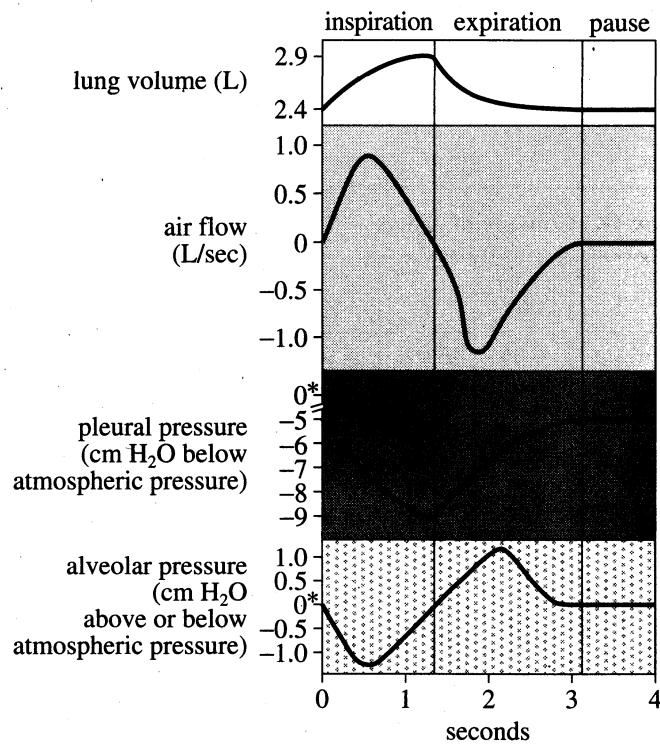
*corresponds to atmospheric pressure (1,033 cm H_2O)

Figure adapted from Robert M. Berne and Matthew N. Levy, eds., *Principles of Physiology.* ©1990 by C. V. Mosby Company.

18. *Functional residual capacity* (FRC) refers to average lung volume during the pause portion of the respiratory cycle. Based on the figure, FRC is closest to which of the following values?
    F. 0.5 L
    G. 2.4 L
    H. 2.9 L
    J. 5.3 L

19. For a resting human who is breathing normally, how does the duration of inspiration compare with the duration of expiration?
    A. The duration of inspiration is longer than the duration of expiration.
    B. The duration of inspiration is shorter than the duration of expiration.
    C. The duration of inspiration and the duration of expiration do not differ.
    D. Cannot be determined from the given information

20. The figure shows that when pleural pressure is lowest, air flow is closest to which of the following?
    F. −0.5 L/sec
    G. 0 L/sec
    H. 0.5 L/sec
    J. 1.0 L/sec

21. When the diaphragm contracts during the first 0.5 sec of inspiration, the chest wall expands away from the lungs, which causes the lungs to expand. Based on the figure, what is the effect of the contraction of the diaphragm on pleural pressure and alveolar pressure?

	pleural pressure	alveolar pressure
A.	increases	increases
B.	increases	decreases
C.	decreases	increases
D.	decreases	decreases

22. According to the information provided, which of the following statements best describes the relationship between alveolar pressure, atmospheric pressure, and the direction of air flow during most of expiration?
    F. Because alveolar pressure is less than atmospheric pressure during most of expiration, air flows into the lungs.
    G. Because alveolar pressure is less than atmospheric pressure during most of expiration, air flows out of the lungs.
    H. Because alveolar pressure exceeds atmospheric pressure during most of expiration, air flows into the lungs.
    J. Because alveolar pressure exceeds atmospheric pressure during most of expiration, air flows out of the lungs.

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Passage V

A material is a *superconductor* (its electrical resistance, R, is zero) if its temperature, T, is lower than its *critical temperature*, T_C.

Key
⊙ Material X
⊡ Material Y

Figure 1

Students measured R and T for both a sample of Material X and a sample of Material Y while each sample was cooled. They used an ohmmeter to measure R (in ohms) and a *thermocouple* to measure T. The thermocouple displayed the result of each measurement of T as a voltage (in millivolts, mV). Accordingly, the students plotted R versus voltage (see Figure 1). To convert voltage in mV to T in kelvins (K), they used Table 1.
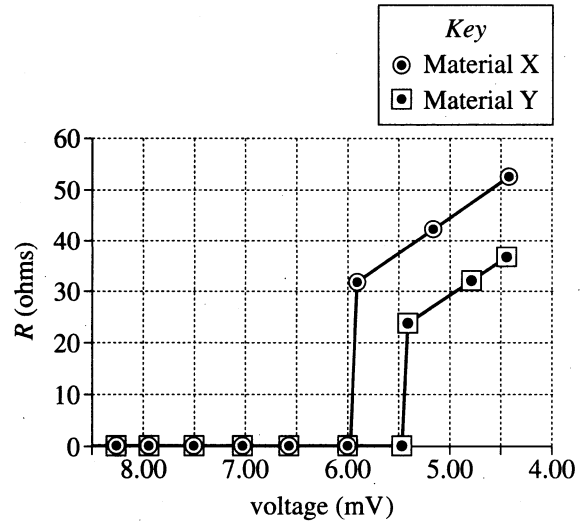
Table 1: Voltage (mV)–Temperature (K) Conversion Chart										
T (K)	0	1	2	3	4	5	6	7	8	9
80	6.29*	6.25†	6.21	6.17	6.13	6.09	6.05	6.01	5.97	5.93
90	5.90	5.86	5.83	5.79	5.75	5.72	5.68	5.64	5.60	5.56
100	5.52	5.48	5.44	5.41	5.37	5.34	5.30	5.27	5.23	5.20
110	5.16	5.13	5.09	5.06	5.02	4.99	4.95	4.91	4.88	4.84
120	4.81	4.77	4.74	4.70	4.67	4.63	4.60	4.56	4.53	4.49
130	4.46	4.42	4.39	4.35	4.32	4.28	4.25	4.21	4.18	4.14
140	4.11	4.07	4.04	4.00	3.97	3.93	3.90	3.86	3.83	3.79

*For example, 6.29 mV converts to 80 K.
†For example, 6.25 mV converts to 81 K.

Figure and table adapted from "Instruction Manual for Superconductor Demonstrations." ©1992 by Colorado Superconductor, Inc.

23. Based on Table 1, if the thermocouple were used to measure the temperature of a sample at 112 K, the voltage displayed would most likely be closest to which of the following?

    A. 4.81 mV
    B. 5.09 mV
    C. 5.44 mV
    D. 6.29 mV

24. In Table 1, as voltage decreases, temperature:

    F. increases only.
    G. decreases only.
    H. varies, but with no general trend.
    J. remains constant.

25. Based on Figure 1 and Table 1, the range of temperatures over which Material X is a superconductor is closest to which of the following?

    A. 2 K
    B. 6 K
    C. 88 K
    D. 176 K

26. Based on Figure 1 and Table 1, T_C for Material Y is most likely closest to which of the following?

    F. 25 K
    G. 50 K
    H. 75 K
    J. 100 K

27. Suppose that the sample of Material Y is included in an electrical circuit, as diagrammed below.
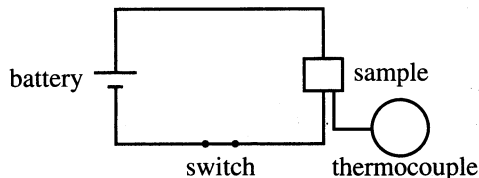
Based on Figure 1 and Table 1, if the sample is kept at 81 K, will the sample generate any heat as a result of the electrical current flowing through the sample?

    A. No, because R of the sample will equal zero.
    B. No, because R of the sample will be greater than zero.
    C. Yes, because R of the sample will equal zero.
    D. Yes, because R of the sample will be greater than zero.

Passage VI

A teacher described the procedure of a study to students in a science class:

A 1 kg sphere, Sphere X, and a 2 kg sphere, Sphere Y, were released from rest, one at a time, from Point P on the right side of a frictionless, U-shaped incline. H_P was the height of Point P above Point L, the lowest point on the incline (see Figure 1).
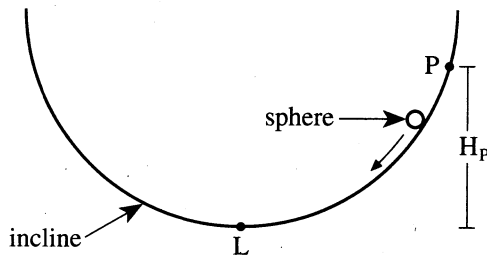

Figure 1

Each sphere was allowed to slide as far up the left side of the incline as it could go.

Next, the teacher gave the students the following definitions:

1. GPE_P, the gravitational potential energy of a sphere at Point P, equaled mgH_P, where m was the sphere's mass and g was the acceleration of the sphere due to Earth's gravity.

2. KE_L, the kinetic energy of a sphere at Point L, equaled $\frac{1}{2}mV_L^2$, where V_L was the sphere's speed at Point L.

3. MO_L, the amount of momentum of a sphere at Point L, equaled mV_L.

Then the teacher asked 3 students to predict (giving their reasons) which sphere, if either, slid farther up the left side of the incline.

Student 1

As a sphere slid down the incline, its GPE_P was converted to kinetic energy. By the time it reached Point L, all of its GPE_P had been converted. Based on Definition 1, because Sphere Y had a greater m than did Sphere X, but the same g and H_P as Sphere X, Sphere Y had a greater GPE_P than did Sphere X. As a result, Sphere Y had a greater KE_L than did Sphere X. Thus, Sphere Y slid farther up the left side of the incline than did Sphere X.

Student 2

Because the 2 spheres had the same g and H_P, they had the same V_L. Based on Definition 3, because Sphere Y had a greater m than did Sphere X, Sphere Y had a greater MO_L than did Sphere X. Thus, Sphere Y slid farther up the left side of the incline than did Sphere X.

Student 3

Because the 2 spheres had the same g and H_P, they had the same V_L. Thus, they slid the same distance up the left side of the incline.

After hearing the students' predictions, the teacher gave them the results of the study (see Table 1).

					Greatest height attained on left side of incline (m)
Sphere	H_P (m)	GPE_P (joules)	V_L (m/sec)	KE_L (joules)	
X	1.0	9.8	4.4	9.8	1.0
Y	1.0	19.6	4.4	19.6	1.0

Table 1

28. Which sphere, X or Y, was subjected to the greater amount of force from Earth's gravitational field?

F. Sphere X, because it had the greater mass.
G. Sphere X, because it had the lesser mass.
H. Sphere Y, because it had the greater mass.
J. Sphere Y, because it had the lesser mass.

29. Suppose 2 other spheres, Sphere S and Sphere T, are released from Point P. The m and V_L for each sphere are given in the table below.

Sphere	m (kg)	V_L (m/sec)
S	5.0	4.4
T	3.5	4.4

Based on Definition 3 and Student 2's statements, which sphere will slide farther up the left side of the incline?

A. Sphere S, because it will have a greater MO_L than will Sphere T.
B. Sphere S, because it will have a lesser MO_L than will Sphere T.
C. Sphere T, because it will have a greater MO_L than will Sphere S.
D. Sphere T, because it will have a lesser MO_L than will Sphere S.

30. Suppose that the study were conducted on the Moon instead of on Earth. Based on Definition 1 and Student 1's statements, compared to the KE_L of Sphere X for the study on Earth, the KE_L of Sphere X for the study on the Moon would be:

F. greater, because the acceleration due to gravity on the Moon is greater than the acceleration due to gravity on Earth.

G. greater, because the acceleration due to gravity on the Moon is less than the acceleration due to gravity on Earth.

H. less, because the acceleration due to gravity on the Moon is greater than the acceleration due to gravity on Earth.

J. less, because the acceleration due to gravity on the Moon is less than the acceleration due to gravity on Earth.

31. Consider the statement "The greatest height attained by a sphere sliding up the left side of the incline does not depend on the sphere's mass." This statement is consistent with the prediction(s) of which of the students?

A. Student 1 only
B. Student 3 only
C. Students 1 and 2 only
D. Students 1, 2, and 3

32. Based on Student 3's statements, how did the *amount of time* for Sphere Y to slide from Point P to Point L compare to the *amount of time* for Sphere X to slide from Point P to Point L ? The amount of time for Sphere Y to slide from Point P to Point L was:

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

G. $\frac{1}{2}$ as great.

H. the same.
J. 2 times as great.

33. Suppose that a sphere is released from a new point on the incline, Point Q, that is between Point P and Point L. At Point Q, the sphere's gravitational potential energy is equal to mgH_Q, where H_Q is the height of Point Q relative to Point L. Based on Student 1's statements about the conversion of gravitational potential energy to kinetic energy, would the sphere's KE_L following the release from Point Q be less than or greater than the sphere's KE_L following the release from Point P ?

A. Greater, because GPE_Q would be greater than GPE_P.
B. Greater, because GPE_Q would be less than GPE_P.
C. Less, because GPE_Q would be greater than GPE_P.
D. Less, because GPE_Q would be less than GPE_P.

34. Consider the 3 students' hypotheses concerning which sphere, if either, slid farther up the left side of the incline. Based on the results of the study, which of the students' predictions, if any, was(were) correct?

F. Student 1's only
G. Student 3's only
H. Student 1's and Student 2's only
J. Neither Student 1's, Student 2's, nor Student 3's

Passage VII

Students were given 12 known compounds and 4 unidentified compounds (Unknowns A–D) to analyze.

Experiment 1

Students placed a solid sample of each known compound in a separate *capillary tube* (a thin glass tube). Samples were then heated, 4 at a time, in a *melting point apparatus* (see Figure 1).
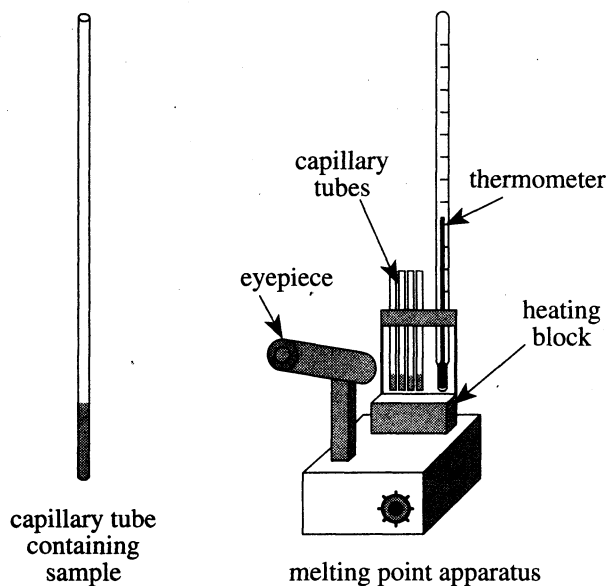

Figure 1

The samples were monitored through the eyepiece. When liquid first appeared in a sample, the temperature was recorded. When no solid remained in the sample, the temperature was again recorded. The compounds were placed in Groups I–IV based on similarity in melting point (MP).

Experiment 2

For each compound in a group, students dissolved a sample and placed a small spot of the solution 2 cm from the bottom of a 13 cm tall and 7 cm wide *thin-layer chromatography* (TLC) plate. Each spot was circled with a pencil and allowed to dry. The plate was placed in a tank containing a small amount of a particular solvent. When the solvent had moved up to 1 cm from the top of the plate, the plate was removed and allowed to dry. Four distances were measured, in cm, under UV light: distance a for each spot and distance b (see Figure 2).
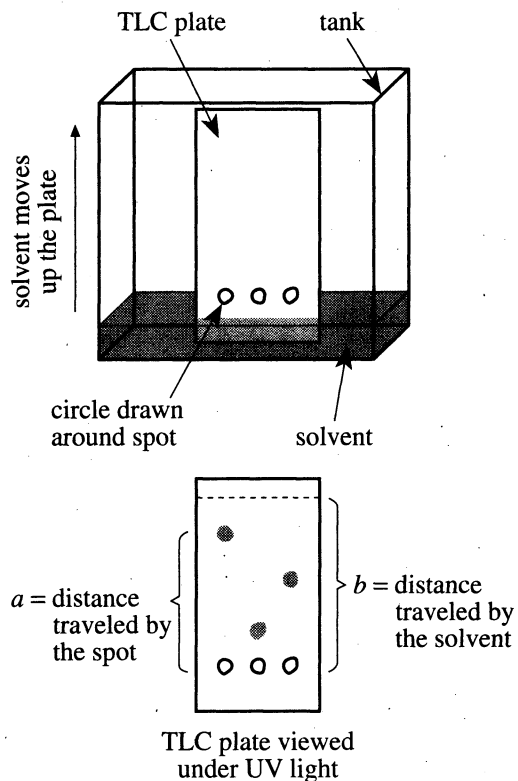

Figure 2

The R_f value of each compound was then calculated by dividing distance a by distance b. The results of Experiments 1 and 2 are shown in Table 1.

Table 1			
Group	Compound	MP range (°C)	R_f value
I	biphenyl	69–72	0.82
	2,5-DMP	68–71	0.24
	4-NBC	70–73	0.40
II	PNCB	83–84	0.67
	naphthalene	80–82	0.85
	vanillin	81–83	0.05
III	acenaphthene	93–95	0.78
	m-toluamide	94–96	0.02
	methyl 4-nitrobenzoate	94–96	0.51
IV	benzoic acid	122–123	0.19
	trans-stilbene	122–123	0.77
	succinimide	122–124	0.00

Experiment 3

The techniques from Experiments 1 and 2 were used to analyze Unknowns A–D (see Table 2).

Table 2		
Unknown	MP range (°C)	R_f value
A	93–95	0.02
B	123–125	0.74
C	68–71	0.85
D	80–82	0.06

Figures adapted from Samuel G. Levine, "Identification of Unknowns by Melting Point and Thin-Layer Chromatography in Combination." ©1990 by Division of Chemical Education, Inc., American Chemical Society.

35. In Experiment 1, liquid first appeared in the biphenyl sample at which of the following temperatures?

A. 69°C
B. 72°C
C. 82°C
D. 100°C

36. The spot for which of the following samples traveled farthest up the TLC plate?

F. 2,5-DMP
G. PNCB
H. acenaphthene
J. benzoic acid

37. One of the students calculated the R_f value for Unknown C as 1.18. There had to be an error in the student's calculation because:

A. distance *a* cannot be longer than distance *b*.
B. distance *b* cannot be longer than distance *a*.
C. distance *a* must be equal to distance *b*.
D. R_f values must be less than or equal to 1.10.

38. A chamber contains samples of each of Unknowns A–D maintained at 150°C. Suppose the temperature in the chamber is slowly cooled to 40°C. Based on the results of Experiment 3, which of the samples would most likely start to solidify first?

F. Unknown A
G. Unknown B
H. Unknown C
J. Unknown D

39. Based on the results of Experiments 1–3, Unknown A is most likely which of the 12 known compounds listed in Table 1 ?

A. biphenyl
B. vanillin
C. acenaphthene
D. *m*-toluamide

40. Which of the following diagrams best represents how the TLC plate appeared under UV light for Group II ?

Key
⊗ PNCB
○ naphthalene
● vanillin

F.

G.

H.

J.
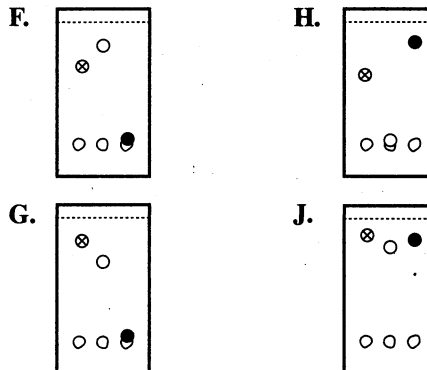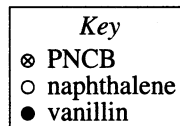
END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

Explanation of Procedures Used to Obtain
Scale Scores from Raw Scores

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

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

ACT Test 69F   **Your Scale Score**

English   _____

Mathematics   _____

Reading   _____

Science   _____

Sum of scores   _____

Composite score (sum ÷ 4)   _____

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

Scale Score	Raw Scores				Scale Score
	Test 1 English	Test 2 Mathematics	Test 3 Reading	Test 4 Science	
36	75	59-60	40	39-40	36
35	73-74	57-58	39	38	35
34	72	55-56	38	—	34
33	71	54	37	37	33
32	70	53	36	36	32
31	69	52	35	35	31
30	68	50-51	34	34	30
29	67	49	33	33	29
28	65-66	47-48	32	32	28
27	64	45-46	31	30-31	27
26	62-63	42-44	30	29	26
25	60-61	40-41	29	27-28	25
24	57-59	37-39	28	25-26	24
23	54-56	35-36	27	23-24	23
22	52-53	33-34	25-26	21-22	22
21	48-51	32	24	20	21
20	45-47	30-31	23	18-19	20
19	43-44	28-29	21-22	16-17	19
18	40-42	25-27	20	15	18
17	38-39	22-24	18-19	14	17
16	36-37	18-21	17	13	16
15	32-35	13-17	15-16	12	15
14	30-31	10-12	14	11	14
13	28-29	8-9	12-13	10	13
12	26-27	6-7	10-11	9	12
11	24-25	5	8-9	8	11
10	21-23	4	7	7	10
9	18-20	—	6	6	9
8	16-17	3	5	5	8
7	13-15	—	4	4	7
6	10-12	2	—	3	6
5	8-9	—	3	2	5
4	6-7	1	2	—	4
3	4-5	—	—	1	3
2	2-3	—	1	—	2
1	0-1	0	0	0	1

69F

ACT ASSESSMENT TEST INFORMATION RELEASE REPORT
TEST DATE = 06/11   TEST FORM = 69F   TEST CENTER = 17860

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ITEM                 1  1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 77777
NUMBER      1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 12345

ENGLISH
CORRECT ANSWER  AGAJCGCGCH AGCJCFDGCJ BHDJCHAGAJ BJAFCHDFAJ AFBGCJCFDH BGBGAHBJAF AGDFBFDHAJ DGBFD
YOUR ANSWER     +++++++++D+ C+BFAG++A+ +++G+GC++F +++++FB+BF D+AF+++G++ +F+++++DG ++A+A++F+F +++++
SUBSCORE        URRRURURUR URRURUUUUR UUURURRRU URRURURRRU URRUURURRR UURURURRR RUURRRURU RUURR

MATHEMATICS
CORRECT ANSWER  CFAGEJEHCJ BKAJBFCFBK CGCFBFCHCG EKAHAKEHAG DKBJDGDJDJ EGCKAKCJDJ
YOUR ANSWER     +++++++++++ +++++++++++ +H+KC++FA+ AF+K++++F A+EG+F+K+K ++DF+++FEH
SUBSCORE        TGAAAAATAA AAAGTGAAGT TGAATGATGA AAGGAAATGG GTTTGTTAGA TGTAGGTTTG

READING
CORRECT ANSWER  BFDFBHBJCF DJCHAJAGAG CFDJCJCGBG BHCGAHDGDH
YOUR ANSWER     CJ++D++F+H C++GC+C+++ ++C+A++J++ +GB+B+A+++
SUBSCORE        LLLLLLLL SSSSSSSS LLLLLLLL SSSSSSSSS

SCIENCE
CORRECT ANSWER  BGCJAFCHCJ CFAHBFDGBG DJBFCJAHAJ BHDGAHAGDF
YOUR ANSWER     ++A++G++++ D+++G+J+H BGC++F++C+ DGAJ+GDJCH
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1st Row: Correct responses to the items on the ACT tests.

2nd Row: Your Responses:
   A plus (+) indicates your response was correct.
   A letter (A through K) is the response you chose,
      if your answer was incorrect.
   A dash (-) indicates you omitted the item.
   An asterisk (*) indicates you gridded more than
      one response.

3rd Row: If the test includes subscores, one of the letters below
   indicates the category to which each item belongs:

   English: U = Usage/Mechanics
             R = Rhetorical Skills
   Math: A = Pre-Algebra/Elementary Algebra
             G = Intermediate Algebra/Coordinate Geometry
             T = Plane Geometry/Trigonometry
   Reading: S = Social Studies/Sciences
             L = Arts/Language

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