Form 66C

(June 2008)

ACT Assessment

2007 – 2008

In response to your recent request for test information release materials, this booklet contains the test questions and conversion tables used in determining your ACT scores. Enclosed with this booklet is a report listing your answers to the ACT Assessment tests and the answer key.

If you wish to order a photocopy of your answer document—including, if you took the Writing Test, a copy of your written essay—please use the order form on the inside back cover of this booklet.

We hope that you will find this information helpful.

P.O. BOX 168
IOWA CITY, IA 52243-0168

ACT

CrackACT.com

Useful Links:

ACT Online Practice Tests: http://www.crackact.com/act/all-tests.html

✓ **ACT English Tests:** http://www.crackact.com/act/english/

✓ **ACT Math Tests:** http://www.crackact.com/act/math/

✓ **ACT Reading Tests:** http://www.crackact.com/act/reading/

✓ **ACT Science Tests:** http://www.crackact.com/act/science/

ACT Test Skills: http://www.crackact.com/act/skills/

ACT Writing Samples: http://www.crackact.com/act/writing/essay-samples.html

ACT Writing Prompts: http://www.crackact.com/act/writing/essay-prompts.html

ACT Downloads:

ACT Downloads: http://www.crackact.com/act-downloads/

Real ACT Tests Download: http://www.crackact.com/act-downloads/real-act-tests.html

---

SAT Online Practice Tests: http://www.cracksat.net

Real ACT Tests Download: http://www.cracksat.net/sat-downloads/

1000+ College Admission Essay Samples:

http://www.cracksat.net/college-admission/essays/

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

Will Rogers, the Cowboy Philosopher

Over the course of the first three and a half decades of the twentieth century, a Cherokee cowboy and trick roper named Will Rogers became one of the most beloved celebrities in the United States. A working cowhand who left the hard life of the range to become a stage comedian, newspaper columnist, radio commentator, author, and movie star, Rogers won the admiration of a public who relished his sarcastic quips, often directed at pretentious people and their hypocrisy. He was a humorist who cloaked his insights in the homely garb of folk wit.
$\frac{}{1}$

To achieve success, Will Rogers had to ride a rough trail. The son of a Cherokee rancher, Will spent his early years working on his father's cattle ranch in what was then Indian Territory (now Oklahoma). He honed his ranching skills, becoming a fine roper and rider, though he would later spoof the cowboy image in some of the films he starred in.
$\frac{}{2}$

1. **A.** NO CHANGE
   B. humorist and
   C. humorist;
   D. humorist,

2. Which of the following alternatives to the underlined portion would be LEAST acceptable?
   F. in which he starred.
   G. that he starred in.
   H. that starred him.
   J. and starred him.

GO ON TO THE NEXT PAGE.
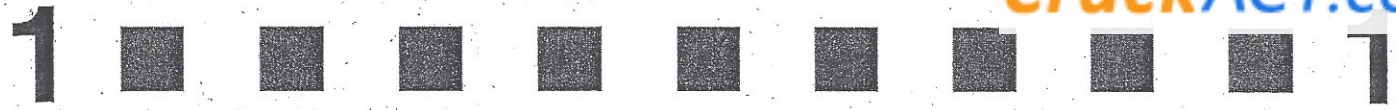
[1] Eventually, Rogers became a success in New York as a lasso-twirling comedian who's

---

droll, folksy monologues had an effect on

---

audiences. [2] Although Will's father wanted

---

his son to stay on the family ranch, Will wanted to experience other ways of life. [3] Joining a Wild West show, he circled the globe and then began a

---

career on the stage, performing rope tricks. [7]

In todays world, Will Rogers

---

would of probably become a talk show

---

host. [10] In his own time, he gained fame

---

3. A. NO CHANGE
   B. comedian whose
   C. comedian, who's
   D. comedian who

4. Given that all the choices are true, which one most clearly communicates that Rogers and his monologues were entertaining?
   F. NO CHANGE
   G. made an impression on
   H. were heard by
   J. amused

5. A. NO CHANGE
   B. Although, Will's
   C. Although, Wills
   D. Although Wills

6. Which of the following alternatives to the underlined portion would be LEAST acceptable?
   F. his son to remain
   G. to stay his son
   H. to keep his son
   J. him to stay

7. Which of the following sequences of sentences makes this paragraph most logical?
   A. NO CHANGE
   B. 1, 3, 2
   C. 2, 3, 1
   D. 3, 1, 2

8. F. NO CHANGE
   G. today's world,
   H. todays' world
   J. todays world

9. A. NO CHANGE
   B. have probably became
   C. have probably become
   D. of probably became

10. At this point, the writer is thinking about adding the following true statement:

    Jay Leno, Oprah Winfrey, and David Letterman are among the most popular talk show hosts today.

    Should the writer make this addition here?
    F. Yes, because it compares Rogers's popularity to that of these celebrities.
    G. Yes, because it helps define exactly what a talk show host does.
    H. No, because it interrupts the flow and development of this paragraph.
    J. No, because it suggests that Rogers was a talk show host.

GO ON TO THE NEXT PAGE.

as a social critic who used his cowboy persona

as a means to reach audiences with his shrewd,
___11___

commonsense remarks on politics and everyday life.

Gradually, he grew into the role of homespun sage

and philosopher, much like that of the kindly old

captain he played in his last film, *Steamboat Round*
___12___

the Bend.

At the heart of Rogers's humor was a

respect for every human being. Nevertheless,

there was a sharp edge to his wit. Proud of his Native

American roots, he ridiculed the snobbery of those
___13___

who bragged about their illustrious forebears:

"Live your life so that whenever you lose, you're ahead."
___14___

11. Which of the following alternatives to the underlined portion would NOT be acceptable?
   A. in order
   B. so that
   C. so as
   D. DELETE the underlined portion.

12. F. NO CHANGE
   G. captain, he played in his last film,
   H. captain, he played in his last film
   J. captain he played in his last film

13. A. NO CHANGE
   B. there was ridicule of the snobbery
   C. the snobbery was ridiculed
   D. ridiculing the snobbery

14. Given that all the choices are quotations attributed to Rogers, which one would most effectively support the preceding statement in this sentence?
   F. NO CHANGE
   G. "I don't make jokes—I just watch the government and report the facts."
   H. "My ancestors didn't come over on the Mayflower —they met the boat."
   J. "I never met a man I didn't like."

Question 15 asks about the preceding passage as a whole.

---

15. After reviewing this essay, the writer is thinking about deleting its opening phrase—"Over the course of the first three and a half decades of the twentieth century,"—and revising the capitalization accordingly. Should this phrase be kept or deleted?

   A. Kept, because it helps explain how Rogers became a nationally known celebrity.
   B. Kept, because it provides a historical time frame for Rogers's life.
   C. Deleted, because it hinders readers from getting to the main subject of the essay.
   D. Deleted, because this information is presented in a more effective way later in the essay.

PASSAGE II

Shell Seeking on Padre Island

Just off the southern coast of Texas, not far from the Mexican border, lies one of my favorite places, Padre Island. However, some of my best childhood memories are of days spent there with my father.

People go to this narrow strip of land on the Gulf of Mexico, there they sunbathe, fish, swim, explore the towns, or pass the time engaged in leisurely pursuits. We went there to look for shells. And we found them on "Little Shell Beach" and "Big Shell Beach."

I became very interested in shells over the years. That was how I learned the names of the beautiful objects in my collection; Scotch bonnets, Atlantic cockles, bay scallops, and sand dollars. I also learned the names of shells that weren't in my collection for which they might be if I kept going back on return trips to Padre Island.

16. F. NO CHANGE
    G. Nevertheless, some
    H. On the other hand, some
    J. Some

17. A. NO CHANGE
    B. Mexico to
    C. Mexico, they
    D. Mexico, tourists

18. Given that all the choices are true, which one best provides new information about Padre Island?
    F. NO CHANGE
    G. simply stroll along the more than eighty miles of beautiful shoreline.
    H. go up and down the beach, not far at all from the coast of Texas.
    J. spend time on the beach gazing out at the waters of the Gulf of Mexico.

19. Given that all the choices are true, which one both introduces the subject of this paragraph and reinforces the essay's presentation of the relationship between the narrator and the father?
    A. NO CHANGE
    B. A book with accurate illustrations helps you learn about your natural surroundings.
    C. Now that I live a long way from Texas, my father and I write to each other.
    D. For my birthday one year, my father gave me a guidebook to shells.

20. F. NO CHANGE
    G. collection
    H. collection,
    J. collection:

21. A. NO CHANGE
    B. but
    C. they
    D. but when they

22. F. NO CHANGE
    G. returning
    H. making trips or excursions
    J. making the effort to visit on trips

I arrived early one morning. Late in the afternoon,
<u>a cluster of seaweed on the beach caught my attention.</u>
[23]

<u>An examination of the tangled heap, I saw a lightning</u>
[24]

whelk, the state seashell of Texas: [25] Then I saw another.

<u>Overcome with excitement, I carefully extracted them</u>
[26]
<u>from the seaweed</u> before dashing down the beach to show
[26]

my father. We put <u>my treasure's</u> on the sand to admire
[27]

them. They were as long as my <u>father's feet. Amazingly,</u>
[28]
they had survived the storm without any chips or cracks.
Perhaps the dense seaweed had protected them. We
wrapped the shells in a towel, put them in my father's
backpack, and headed for town.

On the way, I watched the shorebirds
<u>as the sun set over the water.</u> The black skimmers
[29]
were flying low, their open beaks gliding through
the water. A laughing gull hopped from post to post on
a rickety pier. A pair of roseate spoonbills stood in the
surf, waiting for dinner to swim by.

23. Given that all the choices are true, which one best introduces the subject of this paragraph?
   A. NO CHANGE
   B. I have found that having one hobby sometimes leads to having another hobby.
   C. Together, my father and I built a wooden display case with glass doors for my shells.
   D. One day after a big storm, I made my most thrilling discovery.

24. F. NO CHANGE
   G. Examining
   H. A close look at
   J. In order to examine

25. The writer is considering deleting the phrase "the state seashell of Texas" from the preceding sentence (replacing the comma after the word *whelk* with a period). Should the phrase be kept or deleted?
   A. Kept, because it helps explain the term *lightning whelk*, which might otherwise confuse readers.
   B. Kept, because it emphasizes for readers that the narrator was looking for lightning whelks for years before finding one.
   C. Deleted, because the narrator learned the names of seashells later in life.
   D. Deleted, because the information is provided elsewhere in the essay.

26. F. NO CHANGE
   G. I carefully extracted them from the seaweed overcome with excitement
   H. Extracting them from the seaweed, I was carefully overcome with excitement,
   J. Overcome with excitement, the seaweed was carefully removed

27. A. NO CHANGE
   B. treasures'
   C. treasures
   D. treasures,

28. Which of the following alternatives to the underlined portion would NOT be acceptable?
   F. feet. We were amazed that
   G. feet; amazingly,
   H. feet, amazingly,
   J. feet. To our amazement,

29. Given that all the choices are true, which one best makes a connection between the narrator's shell seeking and the shorebirds' behavior?
   A. NO CHANGE
   B. without the help of binoculars.
   C. with great interest.
   D. as they hunted for their own treasures.

Providing a festive conclusion to a perfect day,
———
30

a troupe of flamenco dancers was performing in the

amphitheater at the edge of town. The swirling of taffeta

skirts and the drumming of shoes on the polished floor

seemed to celebrate our best day ever on Padre Island.

30. Which of the following alternatives to the underlined portion would be LEAST acceptable?
   F. close
   G. ending
   H. destiny.
   J. end

A Typical Football Fan

My seventy-year-old grandmother immigrated

to the United States from South Korea forty years

ago. She is now a U.S. citizen, though she still

speaks and reads Korean better than she does English.
                                    ———
                                     31

31. Which of the following alternatives to the underlined portion would NOT be acceptable?
   A. English.
   B. she speaks and reads English.
   C. English is.
   D. she can speak and read English.

Before retiring recently and not being employed, she
         ——————————————————————
                     32

32. F. NO CHANGE
   G. recently, so that she doesn't have to go to work anymore,
   H. recently and resigning from her position,
   J. recently,

has worked for many years as a waitress. She
———
33

33. A. NO CHANGE
   B. has been working
   C. would have worked
   D. worked

considers herself to be a devoted wife and a doting
——————————————
         34

mother and grandmother. She certainly doesn't fit the

34. Which of the following alternatives to the underlined portion would NOT be acceptable?
   F. believes that she is
   G. thinks of herself as
   H. considers herself
   J. thinks herself being

image associated with that of a typical fan of American
     ——————————————
              35

35. A. NO CHANGE
   B. that is often seen to be closely connected with that of
   C. that is linked up with that for
   D. of

football. In contrast, for the past thirty years, she's been
        ——————————
             36
in love with this physical, male-dominated sport.

36. F. NO CHANGE
   G. Although
   H. Yet
   J. Thus,

As summer ends, my grandmother's ongoing

preparation for the new professional football season

begins. She eagerly studies the weekly listing of upcoming

televised games that comes out every week. On Saturdays,
                         ——————————————
                              37

she shops for groceries, prepares reheatable meals for

herself and my grandfather (who, by the way, dislikes

football), and finishes every household chore that might

disrupt her game day. On Sundays, she settles on the

sofa for the pregame show, but she doesn't sit still or
                       ——————————
                          38

stay quiet for long. As the game unfolds, she jumps to

her feet, waving the remote control and yelling, "That
———————
   39

was clipping!" or "Touchdown!"

My grandmother can talk

football as fluently and confidently as any
           ——————————————————
                   40

sportscaster. However, she'll proclaim that
            ——————————
                41

in her Korean accent a veteran, thirty-five-year-
—————————————————
       42

old quarterback should "retire already—too old"

and that a "Heisman-winning rookie tailback" will

easily gain a thousand yards this season. [43] She'll

predict that one team will make the playoffs due to

"smart draft picks" and "good game plans," while

another will end up "in the division cellar" because

of "salary caps" and "too many injuries."

37. A. NO CHANGE
    B. that appears on a regular basis.
    C. which is published regularly.
    D. DELETE the underlined portion and end the sentence with a period.

38. Which of the following alternatives to the underlined portion would NOT be acceptable?
    F. show; she
    G. show. She
    H. show she
    J. show; however, she

39. A. NO CHANGE
    B. feet! Waving
    C. feet waving,
    D. feet; waving

40. F. NO CHANGE
    G. fluent and confidently
    H. fluently and confident
    J. fluent and confident

41. A. NO CHANGE
    B. On the other hand, she'll
    C. Otherwise, she'll
    D. She'll

42. The best placement for the underlined phrase would be:
    F. where it is now.
    G. before the word *proclaim.*
    H. after the word *proclaim.*
    J. after the word *should.*

43. The writer is considering deleting the compound word *thirty-five-year-old* (and the comma in front of it) from the preceding sentence. Should this word be kept or deleted?
    A. Kept, because it indicates the typical age of a good quarterback.
    B. Kept, because it adds a detail that is relevant to the grandmother's comment in this sentence.
    C. Deleted, because it shifts the focus of the paragraph away from the grandmother.
    D. Deleted, because whether a player is too old or not is a matter of opinion.

8
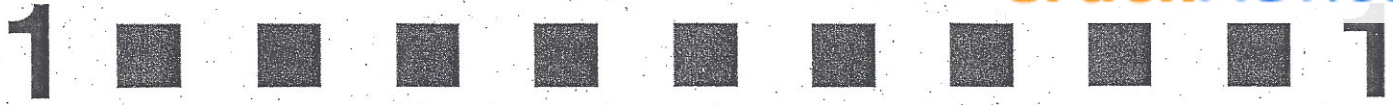
Perhaps because of the depth of her understanding of football, my grandmother is not impressed by pampered superstars and overpaid quarterbacks. Instead, her loyalties lie with dedicated, hardworking athletes—team players whom, of course, play to win. In that sense, she certainly
<u>44</u>

fits the mold of the typical football fan.
<u>45</u>

44. F.   NO CHANGE
    G.   which,
    H.   who,
    J.   DELETE the underlined portion.

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

    A.   finds the place for
    B.   exhibits the characteristics of
    C.   fits the stereotype of
    D.   follows the pattern of

PASSAGE IV

Elusive Lunar Rainbows

People have always been fascinated by rainbows. In fact, nearly every culture has legends about them. The first person <u>initially</u> to offer a scientific explanation
<u>46</u>
of rainbows was René Descartes. In 1637 he correctly

<u>hypothesized that</u> rainbows occur when suspended water
<u>47</u>
droplets refract light, separating it into an arc-shaped spectrum of colors. Typically you look for rainbows when the sun shines through rain, but under the right circumstances, a bright full moon can supply enough light to create a lunar rainbow.

Lunar <u>rainbows, or "moonbows,"</u>
<u>48</u>

are little <u>known and, in that way, are like</u>
<u>49</u>
some other aspects of the natural world.
<u>49</u>

46. F.   NO CHANGE
    G.   in an initial attempt
    H.   with an initial idea
    J.   DELETE the underlined portion.

47. A.   NO CHANGE
    B.   hypothesized, that
    C.   hypothesized; that
    D.   hypothesized that,

48. F.   NO CHANGE
    G.   rainbows, or "moonbows"
    H.   rainbows or "moonbows,"
    J.   rainbows or, "moonbows"

49. Given that all the choices are true, which one best indicates the focus of this paragraph?

    A.   NO CHANGE
    B.   in the same way that some constellations are more familiar than others.
    C.   because they are difficult to see and because the conditions required to create them rarely occur.
    D.   even though, given the chance, most people would like to see one.

GO ON TO THE NEXT PAGE.

The moon must be full and low in the sky, and rain
__
50
must be falling. Also, because moonlight is less powerful

then sunlight, lunar rainbows are faint and easily
__
51

obscured by surrounding lights and air pollution. [52]

Just as the sun is behind you when you see a solar

rainbow, the moon is behind you when you see a lunar
__
53

rainbow. When a moonbow appears in front of you, its
__
54
center lies in the direction exactly opposite that of the

moon. Although moonlight strikes the falling rain and

separates its light into the same spectrum of color

present in a solar rainbow, a lunar rainbow is likely to be

perceived as a delicate white arc against the dark night

sky, and which poorly illuminated objects appear colorless
__
55

at night. In fact, the human eye loses its sensitivity to color
__
56
at low levels of illumination, a camera with a very long

exposure setting can capture a lunar rainbows' colors.
__
57

Like solar rainbows, the observers of lunar rainbows
__
58
are easier to find near waterfalls. Tourist bureaus in places

such as Victoria Falls in Zimbabwe list lunar rainbows as

local attractions. Moonbows were reportedly once a

common sight at both the New York and Canadian parts

50. F. NO CHANGE
    G. at the same time,
    H. it's important that
    J. notice that

51. A. NO CHANGE
    B. than sunlight,
    C. as sunlight,
    D. then sunlight is,

52. The writer is considering deleting the phrase "and air
    pollution" from the preceding sentence (placing a
    period after the word *lights*). Should the phrase be kept
    or deleted?
    F. Kept, because it is necessary to understanding
       what follows in the next paragraph.
    G. Kept, because it provides a detail that is relevant
       to the main point of this sentence.
    H. Deleted, because it contains information that has
       already been provided in the essay.
    J. Deleted, because it deprives the essay of its posi-
       tive tone.

53. A. NO CHANGE
    B. it when it is
    C. us if they see
    D. you if they are

54. F. NO CHANGE
    G. it's
    H. its'
    J. at it's

55. A. NO CHANGE
    B. which
    C. because
    D. DELETE the underlined portion.

56. F. NO CHANGE
    G. Though the
    H. The
    J. Consider that the

57. A. NO CHANGE
    B. rainbow's colors.
    C. rainbow's color's.
    D. rainbows colors.

58. F. NO CHANGE
    G. lunar rainbows
    H. those watching lunar rainbows
    J. lunar rainbow observers

of Niagara Falls before bright surrounding lights made

them impossible to see. You can still witness them at
                                      59

Yosemite Falls in California and at Cumberland Falls

in Kentucky.

59. Which of the following alternatives to the underlined word would be LEAST acceptable?

A. come across
B. catch a glimpse of
C. keep watch over
D. behold

Question 60 asks about the preceding passage as a whole.

---

60. Suppose the writer's goal had been to write a brief essay focusing on an unusual phenomenon of nature. Would this essay accomplish that goal?

F. Yes, because it is devoted to an overview of the factors that limit the likelihood of rainbows occurring near moonbows.
G. Yes, because it describes moonbows and explains why they occur infrequently.
H. No, because it compares moonbows to rainbows, which are familiar to most people.
J. No, because it establishes that moonbows have been understood since 1637.

PASSAGE V

Time Dollars: Earning Help by Giving Help

Across the United States, individuals and community

groups are turning their personal time into opportunities to
                   61

both give and receive volunteer services. By donating their
    61

time and talents to others through nonprofit Time Dollar

Exchange programs are contributing to their communities
         62

and promoting interaction.
    63

Though the practice of bartering have ancient
              64

origins, Time Dollars began in 1980 as a means of

encouraging and rewarding community involvement.

61. Which choice most effectively introduces the basic idea of Time Dollar Exchange programs, as described elsewhere in the essay?

A. NO CHANGE
B. sacrificing their time for others to promote their organizations.
C. searching for ways to inspire community members to buy their products and services.
D. acquiring belongings with their new purchasing power.

62. F. NO CHANGE
G. programs now
H. programs, participants
J. programs, and

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

A. fostering
B. upgrading
C. improving
D. stimulating

64. F. NO CHANGE
G. practice of bartering have had
H. practices of bartering has
J. practice of bartering has

Time Dollar Exchange programs recognize that each

person is valuable and has something meaningfully
_____
                                                    65

to contribute. One hour spent helping another
                              ____
                               66

person earns one Time Dollar. The Time Dollar can
_____
      67

then be exchanged for services from another participant.

For instance, a person might wash someone's windows for

an hour and receive an hour's worth of babysitting from

someone else. [68] The Time Dollar is not a conventional

unit of currency, such as a dollar or quarter. It is recorded

at a clearinghouse that connects volunteers with people

needing their services.

Furthermore, a program in Brooklyn, New York,
_____
     69

that focuses on services for senior citizens is one of

the longest-running projects, since 1987, more than
                      _____
                            70

5,000 participants have tallied up 115,000 Time

Dollars. Service opportunities range between home
                                 _____
                                    71

repair and meal preparation; to ride sharing and reading
_____
          72

aloud. The beauty of the program is that, because those

who receive help provide assistance to others in return,

65. A. NO CHANGE
    B. more meaningfully
    C. more meaningful
    D. meaningful

66. F. NO CHANGE
    G. exhausted
    H. consumed
    J. used up

67. A. NO CHANGE
    B. person, earns
    C. person earns,
    D. person; earns

68. The writer is concerned about the level of emphasis on
    explaining how Time Dollar services are exchanged
    and is therefore considering deleting the preceding
    sentence. Should this sentence be kept or deleted?
    F. Kept, because it reveals which services have been
        exchanged most frequently since Time Dollars
        began in 1980.
    G. Kept, because it provides a specific example that
        helps make clear how services are exchanged in
        the Time Dollar programs.
    H. Deleted, because it provides an explanation of the
        exchange of services that is inconsistent with
        information given earlier in this paragraph.
    J. Deleted, because the essay is about the Time
        Dollar programs as a whole, not just the exchange
        of services.

69. A. NO CHANGE
    B. Meanwhile, a
    C. Therefore, a
    D. A

70. F. NO CHANGE
    G. projects. Since
    H. projects and since
    J. projects since

71. A. NO CHANGE
    B. among
    C. from
    D. across

72. F. NO CHANGE
    G. repair, and meal preparation
    H. repair and meal preparation
    J. repair, and meal preparation,

the program fosters mutual relationships. Many

participants claim that the Brooklyn program has

created a network for otherwise-isolated seniors. 73

Participating in this increasingly popular system of

fair exchange has its rewards. Today there are more than

sixty Time Dollar programs operating in twenty-five states.

Participants gain a strengthened sense of neighborhood and

community. First, neighbors are getting to know neighbors,
$\overline{\quad 74 \quad}$

and teenagers have gotten involved. Through Time
$\overline{\quad 75 \quad}$

Dollars, those with specific needs are meeting them

with the cooperation of others.

73. The writer is considering deleting the phrase "for otherwise-isolated seniors" from the preceding sentence (placing a period after the word *network*). Should that phrase be kept or deleted?

A. Kept, because it suggests the social value of the network created by the Brooklyn program.
B. Kept, because it makes clear the participants' hope for more community support of the Brooklyn program.
C. Deleted, because it detracts from the sentence's focus on the participants' claim.
D. Deleted, because it doesn't contribute to the reader's understanding of the value of the Brooklyn program.

74. F. NO CHANGE
G. (Do NOT begin new paragraph) Neighbors
H. (Begin new paragraph) Neighbors
J. (Begin new paragraph) First, neighbors

75. Given that all the choices are true, which one most clearly shows how Time Dollar programs are promoting communication between community members?

A. NO CHANGE
B. senior citizens are getting out more often.
C. teenagers are enjoying new experiences.
D. senior citizens are connecting with teenagers.

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. The second term of an arithmetic sequence is 12, and the third term is 6. What is the first term?

   (Note: In an arithmetic sequence, consecutive terms differ by the same amount.)

   A. −12

   B. −6

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

   D. 6

   E. 18

2. Let a function of 2 variables be defined by $f(x,y) = xy - (x - y)$. What is the value of $f(10,3)$?
   F. 13
   G. 17
   H. 23
   J. 37
   K. 43

3. Kele works at the high school concession stand to help raise money for the math team. Kele only uses 1¢, 5¢, 10¢, and 25¢ coins when making change. What is the least number of these coins needed to make change totaling 44¢ ?
   A. 5
   B. 6
   C. 7
   D. 8
   E. 9

4. What is the perimeter, in centimeters, of a rectangle with length 10 cm and width 5 cm ?
   F. 15
   G. 20
   H. 30
   J. 50
   K. 100

DO YOUR FIGURING HERE.

5. If $x = -4$, what is the value of $\frac{x^2 - 1}{x + 1}$?

A. -5

B. -3

C. 3

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

E. 11

DO YOUR FIGURING HERE.

6. Which of the following is NOT a factor of 1,001 ?

F. 1
G. 7
H. 11
J. 13
K. 17

7. The 16-member drama club needs to choose a student government representative. They decide that the representative, who will be chosen at random, CANNOT be any of the 3 officers of the club. What is the probability that Adrian, who is a member of the club but NOT an officer, will be chosen?

A. 0

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

C. $\frac{1}{13}$

D. $\frac{3}{16}$

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

8. For what value of x is the equation $3(x - 6) + x = 30$ true?

F. 24
G. 12
H. 9
J. 6
K. 3

9. Chenoa is working as a summer intern for a state senator running for reelection. She is in charge of ordering election signs. The cost of printing election signs includes a one-time fee of $15.00, plus $0.33 for each sign printed. Which of the following is the cost, in dollars, to print x signs?

A. $15.33x$
B. $15.00x + 0.33$
C. $4.95x$
D. $0.33x + 15.00$
E. $0.33x - 15.00$

10. Juanita purchased an automobile for a total of $14,000. She financed all of the $14,000 and started loan payments of $315 a month for 5 years. At the end of the 5-year period, how much more than the purchase price will Juanita have paid for her automobile?

   F. $ 980
   G. $1,575
   H. $2,205
   J. $3,780
   K. $4,900

11. $8x^5 \cdot 12x^5$ is equivalent to:

   A. $20x^{10}$
   B. $20x^{25}$
   C. $96x^5$
   D. $96x^{10}$
   E. $96x^{25}$

12. The expression $\dfrac{6+\frac{1}{3}}{1+\frac{1}{6}}$ is equal to:

   F. 3

   G. 4

   H. 8

   J. $\dfrac{38}{7}$

   K. $\dfrac{133}{3}$

13. On a real number line, point A is at -5.5 and is 7.5 units from point B. What are the possible locations of B on the real number line?

   A. -13 and -2
   B. -13 and 2
   C. -13 and 13
   D. 13 and -2
   E. 13 and 2

14. A data set contains 5 elements and has a mean of 6. Four of the elements are 1, 3, 7, and 8. Which of the following is the fifth element?

   F. 5
   G. 6
   H. 11
   J. 13
   K. 17

DO YOUR FIGURING HERE.

15. The yearly net profit earned by the Atlas Baby Food Company for 1999 was $2,379,000, and the yearly net profit earned for 2001 was $2,426,000. If the yearly net profits increased linearly from 1999 through 2001, what was the yearly net profit earned for 2000 ?

   A. $2,105,050
   B. $2,350,000
   C. $2,400,000
   D. $2,402,500
   E. $2,425,000

16. On a map, the lengths of the sides of a triangular parcel of land are 3, 5, and 7 centimeters. The shortest side has an actual length of 410 meters. Which of the following is closest to the actual length, in meters, of the longest side?

   F. 176
   G. 586
   H. 656
   J. 683
   K. 957

17. What is the slope-intercept form of $4x - y - 3 = 0$?

   A. $y = -4x - 3$
   B. $y = -4x + 3$
   C. $y = 3x - 4$
   D. $y = 4x - 3$
   E. $y = 4x + 3$

18. What is the value of $|-8| - |7 - 43|$?

   F. -44
   G. -28
   H. 28
   J. 44
   K. 58

19. In $\triangle ABC$, $\angle A$ measures greater than 22° and $\angle B$ measures exactly 58°. Which of the following phrases best describes the measure of $\angle C$?

   A. Greater than 100°
   B. Less than 100°
   C. Equal to 60°
   D. Equal to 80°
   E. Equal to 100°

20. What is the greatest integer w that satisfies the inequality $9 > \frac{w}{3} + 1$?

    F. 23
    G. 24
    H. 25
    J. 26
    K. 28

DO YOUR FIGURING HERE.

21. You are designing a play mat for toy cars. An existing railroad track meets a straight road at an angle of 94° to the road, as shown in the figure below. You are adding a new railroad track beyond and parallel to the existing track. What is the degree measure of the angle between the road and the new track, as indicated below?
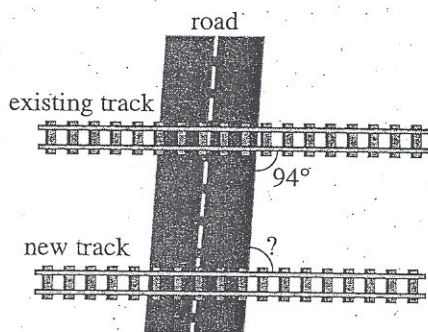
    A. 86°
    B. 88°
    C. 90°
    D. 92°
    E. 94°

22. In right triangle $\triangle ABC$ shown below, D is the midpoint of $\overline{AC}$. To the nearest 0.1 foot, what is the length of $\overline{AD}$?
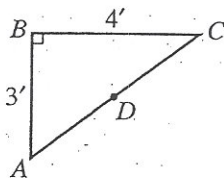
    F. 2.5
    G. 3.5
    H. 5.0
    J. 12.5
    K. 25.0

DO YOUR FIGURING HERE.

> Use the following information to answer questions 23–24.

When Michelle defrosts frozen hamburger in her family's microwave, she enters the hamburger's weight, to the nearest 0.1 pound, and the microwave automatically sets the defrost time. Michelle defrosts 3 different amounts of frozen hamburger in her family's microwave and wonders if there is a relationship between the weights and corresponding microwave defrost times. She graphs the 3 weights and corresponding microwave defrost times in the standard (x,y) coordinate plane, as shown below, and notices a linear relationship between these 3 points. She finds that an equation of the line through these 3 points is $y = 420x + 10$.
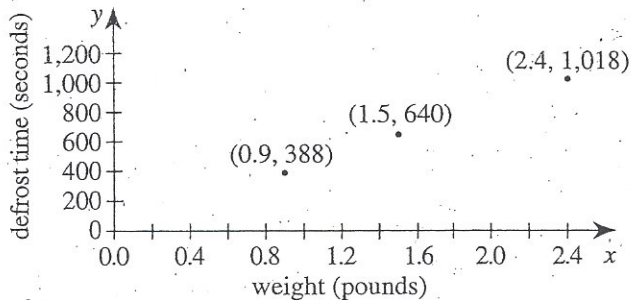
23. How many seconds longer is the microwave's defrost time for 2.4 pounds of frozen hamburger than for 0.9 pounds of frozen hamburger?

    A. 252
    B. 378
    C. 630
    D. 640
    E. 1,018

24. According to Michelle's equation, about how many seconds would it take to defrost 8 ounces of frozen hamburger in her family's microwave?

    (Note: 1 pound = 16 ounces)

    F. 194
    G. 210
    H. 220
    J. 336
    K. 346

25. In the polygon below, all pairs of the 8 line segments that meet do so at right angles, and all the dimensions given are in inches. What is the area, in square inches, of the polygon?
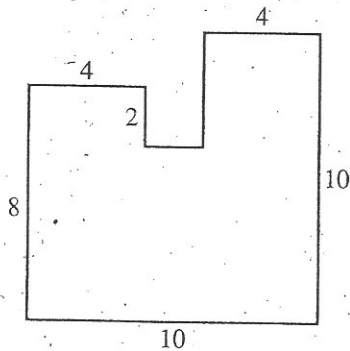
A. 80
B. 82
C. 84
D. 88
E. 92

26. Maria's 7-hour drive to college was 355 miles long. She averaged 45 miles per hour for the first 2 hours. Which of the following is closest to her average speed, in miles per hour, for the remainder of her drive?

F. 38
G. 51
H. 53
J. 55
K. 56

27. For all x, $(x^2 + 2x + 1)(x - 1) = ?$

A. $x^3 + x^2 - x - 1$
B. $x^3 + x^2 + 3x + 1$
C. $x^3 + 2x^2 + x - 1$
D. $x^3 + 2x^2 + x + 1$
E. $x^3 + 2x - 1$

28. For $\angle A$ in $\triangle ABC$ below, which of the following trigonometric expressions has value $\frac{12}{13}$?

F. $\cos A$
G. $\csc A$
H. $\sec A$
J. $\sin A$
K. $\tan A$
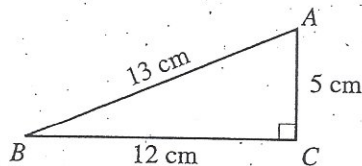
29. Mark was responsible for buying yo-yos and tops to use as prizes for the school carnival. His receipt showed that he spent a total of $32.20 and that he bought 60 items. Yo-yos cost $0.65 each, and tops cost $0.25 each. How many yo-yos did Mark buy to use as prizes for the school carnival?

(Note: There was no tax charged on the items because they were bought for a school.)

A. 19
B. 21
C. 30
D. 39
E. 43
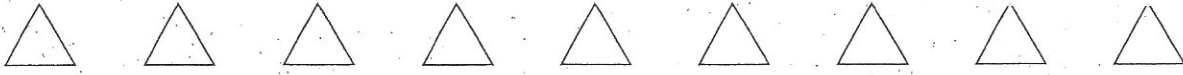
DO YOUR FIGURING HERE.

30. The operation @ is defined as follows: $a @ b = \frac{a^2 + b^2}{a - b}$, where a and b are real numbers and $a \neq b$. What is the value of $(-2) @ (-6)$?

    F. -10
    G. -8
    H. 4
    J. 5
    K. 10

31. Nam is planning to make a cake using a recipe that calls for $2\frac{1}{2}$ cups of pecans. He has $1\frac{1}{4}$ cups of pecans in a canister. The amount of pecans in the canister is what fraction of the amount of pecans he needs for the recipe?

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

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

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

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

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

32. As shown below, O is the center of a circle, $\overline{AB}$ is a diameter of the circle, C lies on the circle, $AC = CB$, and $OB = 7$ cm. What is the area, in square centimeters, of $\triangle ABC$?
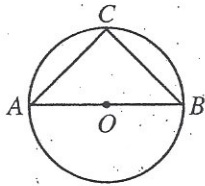
    F. 14
    G. 28
    H. 49
    J. 98
    K. 196

33. Which of the following values of x is in the solution set of the equation $x^2 + 5x - 14 = 10$?

    A. -24
    B. -8
    C. -7
    D. -3
    E. 2

DO YOUR FIGURING HERE.

34. As shown in the figure below, a silo consists of a right circular cylinder with a hemisphere on top. The radius of the cylinder and of the hemisphere is 10 feet, and the height of the cylinder is 25 feet. Which of the following is closest to the volume, in cubic feet, of the silo?

(Note: The volume of a right circular cylinder is given by $\pi r^2 h$, where r is the radius and h is the height. The volume of a hemisphere is given by $\frac{2}{3}\pi r^3$, where r is the radius.)
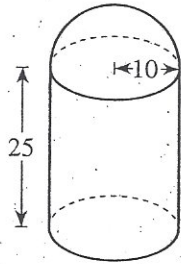
F. 2,200
G. 8,900
H. 9,900
J. 21,700
K. 52,400

35. An isosceles trapezoid has an area of 35 square feet, a height of 5 feet, and one base that is 8 feet long. The other base must be how many feet long?

A. 1.75
B. 4.5
C. 6
D. 15
E. 30

36. What is the slope of the line through the points $(-4,1)$ and $(-6,-3)$ in the standard (x,y) coordinate plane?

F. -7

G. $-\frac{1}{7}$

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

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

K. 2

37. Points A, B, and C are vertices of an equilateral triangle. Points A, B, and D are collinear points, with B between A and D. What is the measure of $\angle CBD$?

A. 30°
B. 40°
C. 60°
D. 90°
E. 120°
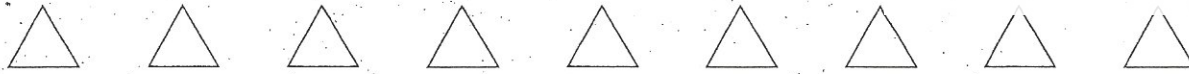
DO YOUR FIGURING HERE.

38. The decimal representation of $\frac{6}{7}$ repeats and can be written as $0.857142857142\cdots$. What is the 100th digit to the right of the decimal point in this decimal representation?

    F. 1
    G. 2
    H. 4
    J. 5
    K. 8

39. Points $A(-3,0)$, $B(0,3)$, and $C(3,0)$ lie in the standard (x,y) coordinate plane. If $ABCD$ is a square, then what is the length, in coordinate units, of $\overline{CD}$?

    A. 3
    B. 9
    C. $\sqrt{3}$
    D. $3\sqrt{2}$
    E. $6\sqrt{2}$

40. The graph of the equation $xy = 8$ is reflected across the x-axis in the standard (x,y) coordinate plane. Which of the following is an equation of the reflection?

    F. $xy = -8$
    G. $xy = 8$
    H. $x|y| = 8$
    J. $|xy| = 8$
    K. $|x|y = -8$

41. The figure below shows an example in which $\overline{AB}$ and $\overline{DE}$ are perpendicular to $\overline{BD}$, and $\overline{AE}$ and $\overline{BD}$ intersect at C. Which of the following statements is true about any such figure?
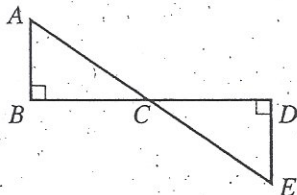
    A. $\overline{AB} \cong \overline{DE}$
    B. $\overline{BC} \cong \overline{CD}$
    C. $\overline{BD}$ bisects $\overline{AE}$
    D. $\triangle ABC \cong \triangle EDC$
    E. $\triangle ABC$ and $\triangle EDC$ are similar triangles.

Use the following information to answer questions 42–44.

The senior class at Figg High School is sponsoring a fund-raiser to raise $1,250.00 for a graduation celebration. They can choose 1 of the 2 fund-raising options listed below.

Candy Bar option: After paying a start-up fee of $15.00, the senior class can purchase candy bars for $0.38 each and sell them for $1.00 each.

Photo Prints option: After paying a start-up fee of $25.00, the senior class can sell photo prints at prom. The film and flash for the camera cost $1.00 per print. The senior class will sell each print for $3.00.

42. For the Photo Prints option, at least how many prints must be sold to cover the start-up fee for the fund-raiser?

F. 8
G. 9
H. 12
J. 13
K. 25

43. There are 510 students in the senior class at Figg High School. Abram suggests that instead of selling something, each senior donate $3.00 toward the goal. If 80% of the senior class donates $3.00, by what percent, to the nearest whole percent of the goal, would the class fall short of the goal?

A. 1%
B. 2%
C. 3%
D. 4%
E. 5%

44. The senior class chose the Candy Bar option and met their fund-raising goal. They must have sold a minimum of how many candy bars?

F. 1,978
G. 2,041
H. 2,259
J. 3,250
K. 3,329
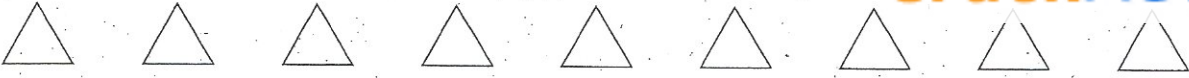
45. The graph in the standard (x,y) coordinate plane below shows $y = \frac{2}{9}(x - 3)^2 - 1$ for values of x such that $0 \le x \le 6$. The x-coordinates of points A, B, and C are 0, 3, and 6, respectively. What is the area of $\triangle ABC$, in square coordinate units?
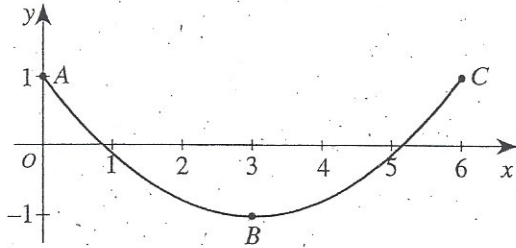
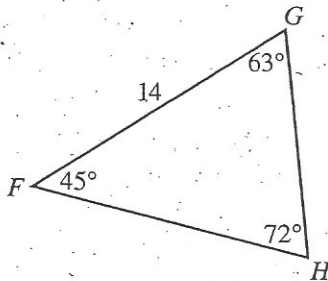A. $\dfrac{3}{2}$

B. 3

C. 4

D. 6

E. 12

46. In $\triangle FGH$ below, $\overline{FG}$ is 14 feet long. To the nearest tenth of a foot, how many feet long is $\overline{GH}$?

(Note: The law of sines states that for a triangle with sides of length a, b, and c opposite $\angle A$, $\angle B$, and $\angle C$, respectively, $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$.)

(Note: sin 45° ≈ 0.707, sin 63° ≈ 0.891, sin 72° ≈ 0.951)


F. 9.9
G. 10.4
H. 12.5
J. 13.1
K. 13.3

47. When using the quadratic formula, Monali found that an equation had solutions $x = 5 \pm \sqrt{-9a^2}$, where a is a positive real number. Which of the following expressions gives Monali's solutions as complex numbers?

A. $5 \pm 1ai$
B. $5 \pm 3ai$
C. $5 \pm 6ai$
D. $5 \pm 9ai$
E. $5 \pm 12ai$

48. In the figure below, the circle with center O has a radius of 7 inches and the measure of $\overset{\frown}{AB}$ is 80°. What is the measure of $\angle BAO$?
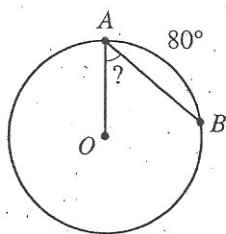

F. 30°
G. 40°
H. 50°
J. 60°
K. 80°

49. Tamas is 35 feet away from the base of a vertical flagpole, on level ground. He sees the top of the flagpole at an angle of inclination of 40°. About how many feet higher than Tamas's eye level is the top of the flagpole?

A. $\dfrac{\cos 40°}{35}$

B. $\dfrac{\sin 40°}{35}$

C. $35 \cos 40°$

D. $35 \sin 40°$

E. $35 \tan 40°$

50. In the standard (x,y) coordinate plane, what are the coordinates of the center of the circle whose equation is $x^2 - 6x + y^2 + 4y + 12 = 0$?

F. $(-3,\ 2)$
G. $(-2,-3)$
H. $(-2,\ 3)$
J. $(\ 3,-2)$
K. $(\ 3,\ 2)$

DO YOUR FIGURING HERE.
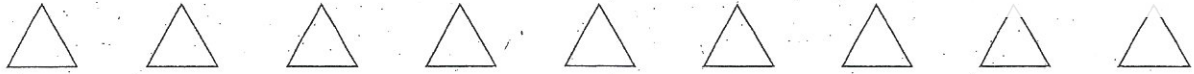
DO YOUR FIGURING HERE.

51. Stephanie has a rectangular graph 10 inches wide and 8 inches high that she needs to paste into a lab report for her science class. Stephanie will use a photocopy machine repeatedly to reduce the size of her graph. With each reduction, the width and height will each be reduced to 80% of what they each were. What is the minimum number of reductions using the photocopy machine that will allow the graph to fit in a space 3.5 inches high?

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

52. If $\det \begin{bmatrix} a & b \\ c & d \end{bmatrix} = ad - bc$, then $\det \begin{bmatrix} -b & -c \\ -d & a \end{bmatrix} = ?$

F. $ad - bc$
G. $-ad + bc$
H. $ab - dc$
J. $-ab + bc$
K. $-ab - dc$

53. In the figure below, all 9 circles are congruent and each circle is tangent to each circle adjacent to it. Each circle, except the middle circle, is tangent to at least 1 side of the square. The circumference of each circle is 16π centimeters. What is the length, in centimeters, of each side of the square?


A. 48
B. 24
C. 12
D. 48π
E. 24π
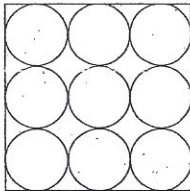
54. Nolan has 20 collectible stamps. He paid $43.75 for each stamp 3 years ago. The stamps are currently valued at $51.85 each. How much *more* must the average value per stamp rise for the combined value of these 20 stamps to be exactly $300.00 more than Nolan paid for them?

F. $15.41
G. $14.60
H. $10.22
J. $ 8.10
K. $ 6.90

55. In the figure below, the circles centered at P and Q intersect at A and B, and points P, X, Y, and Q are collinear. The lengths of $\overline{PB}$, $\overline{QB}$, and $\overline{XY}$ are 9, 12, and 2 units, respectively. What is the length, in units, of $\overline{PQ}$?
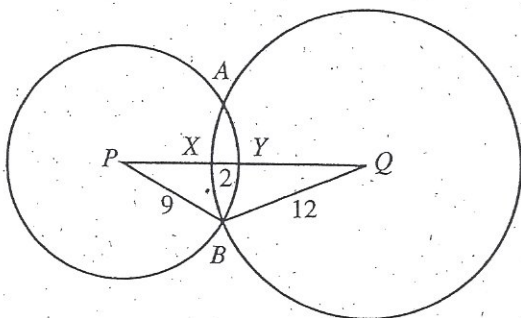
A. 15
B. 16
C. 17
D. 19
E. 21

56. A parabola with vertex (3,7) and axis of symmetry $x = 3$ crosses the x-axis at $(3 + \sqrt{21}, 0)$. At what other point, if any, does the parabola cross the x-axis?

F. $(3 - \sqrt{21}, 0)$
G. $(-3 - \sqrt{21}, 0)$
H. $(-3 + \sqrt{21}, 0)$
J. No other point
K. Cannot be determined from the given information

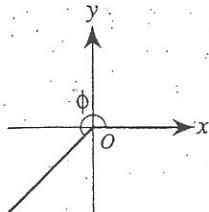57. When $x \neq 5$ and $x \neq -5$, $\dfrac{2x}{x^2 - 25} + \dfrac{2x}{5 - x}$ is equivalent to:

A. $\dfrac{-2x^2}{x^2 - 25}$

B. $\dfrac{-2x^2 - 8x}{x^2 - 25}$

C. $\dfrac{4x^2 - 10x}{x^2 - 25}$

D. $\dfrac{-10x}{x^2 - 25}$

E. $\dfrac{2x + 12x}{x^2 - 25}$

58. An angle with measure ϕ is shown in the standard (x,y) coordinate plane below. The angle with measure ϕ has the positive x-axis as one side and has the portion of the line $y = x$ shown as its other side. What is the value of $\sin \phi$?

F. $-\dfrac{\sqrt{3}}{2}$

G. $-\dfrac{\sqrt{2}}{2}$

H. $-\dfrac{\sqrt{3}}{3}$

J. $\dfrac{\sqrt{2}}{2}$

K. $\dfrac{\sqrt{3}}{2}$

59. The amount of money, A dollars, in a savings account after t years is given by $A = P + Prt$, where P dollars is the amount of money in the account originally and r is the rate of simple interest. Which of the following expressions gives P in terms of A, r, and t ?

A. $\dfrac{A}{1 + rt}$

B. $\dfrac{1 + rt}{A}$

C. $\dfrac{A - P}{rt}$

D. $\dfrac{A}{2rt}$

E. $A - rt$

60. Consider the equation $\sqrt{b} - \sqrt{a} = 3\sqrt{a}$, where a and b are positive real numbers. What is b in terms of a ?

F. $16a$
G. $9a$
H. $4a$
J. $3a$
K. $2a$

END OF TEST 2

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

DO NOT RETURN TO THE PREVIOUS TEST.

READING TEST

35 Minutes—40 Questions

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

Passage I

PROSE FICTION: This passage is adapted from the novel *Against the Flood* by Ma Van Khang (©2000 by Ma Van Khang).

Khiem stretched himself out on the beach.

The waves rolled onto the shore in a measure as regular as the breathing of a giant. The water slowly inundated the edge of the sand, licked at his ribs like a
5 puppy. His eyes half-closed, he let his muscles relax, let himself become part of the dream of the beach. First light was opening the sky like a door. A long purple cloud shaped like a sword lay low over the horizon. It elongated, and the sunlight glinting beneath it clarified
10 its shape and reflected down onto the sea and then onto the shore where it lay like a moment at the creation of the world: a strange, vaguely dewy light that trembled between the new day and the slow melt of the darkness.

Dawn as an opening book. The faint, bass voices
15 of breezes. The sound of waves swelling, falling, slowly withdrawing, their frothing foam leaving white, crooked traces. The soft shuffling footfalls of the all-night fishermen as they moved backwards up the beach, drawing their dripping nets towards their chests. The
20 fierce flapping of the desperate fish caught inside.

Under these sounds, a worshipful silence. A temple, well and cleanly kept. The salt taste of the sea, permeating his senses, smoothing the chaos of his life. Silence as the melting of all noises and troubles eroding
25 him and the vague sense, somewhere in it, of the true form of his life, fastened to the shapes of sky and sea in the early dawn.

The sun, like a red egg yolk, like hot iron, rose above the horizon. Khiem squinted at the huge form
30 that carried in it the memories of millennia. Here on the smooth sand, he felt suddenly that he was lying in a false calmness. He stirred, as if half caught by an idea that had just come to him, or a desire just out of his reach.

35 The cadence of the waves until now had sounded like hesitant footsteps, reluctant to destroy the dawn's silence, gently rattling the shells left like night gifts on the shore. The footsteps suddenly grew louder now,
rushing, the stampede of a horde released from cages,
40 dashing into one another, pouring out. Some inner force seemed to be building in the waves; they threatened now, roared, threw themselves onto the beach, overran the dry zones, boiled up like water thrown onto a metal stove. Waves smacked into Khiem's flesh. He felt the
45 sand washing out and collapsing under his back in stages, his body being pushed and drawn, and suddenly he was sliding out of the place where he'd been lying. He closed his eyes, enjoying the sensation of lightness, of slipping away from the complications and troubles of
50 his days in a haze of longing, floating towards her, the woman who had asked him to come here.

After a while, he opened his eyes. The landscape around him had changed. The sun was higher. The ceiling of cloud was high now too, hanging over an
55 immense expanse of blue sky. The curve of the beach separated itself from the sea and the empty sky; behind the rows of sea pines, the shore was crowded with guest houses, hotels, and hostels of all styles, each competing with the other to push close to the water. Nearby, the
60 squares of the salt-production fields sparkled like segmented glass, and down the coast he could see villages here and there behind the sea dikes, their houses white as crumbs of rice powder cake.

A faint worry rose in him, here in front of this
65 immensity which seemed a symbol of absolute power. Yet at the same time he felt a sense of joy, a lingering of the sincerity he had just touched.

He had seen the sea for the first time when he was twenty years old. That brief, long-ago meeting had left
70 impressions that had never gone away, and he sensed in those memories, that feeling, a piece of the Creator within himself. Humankind came from the sea; its salt still traceable in their blood. He had read that somewhere; he remembered it forever, and he'd inherited the
75 elements of the ocean in his own body. His ancestors were the children of the Lady of the Nation, Au Co, Mother of the Hundred Eggs that became the Hundred Children; fifty who went to the forests, fifty who went to live by the sea. His forebears were tattooed fisher-
80 men, pearl divers, strugglers against the fierce creatures of the ocean, its waves and its wind. Their lives and legends had burned like stars in the firmament of his childhood imagination. He'd loved those stories in which people had to put aside their own safety when

GO ON TO THE NEXT PAGE.

85 they were forced to dive for pearls under the terrible Chinese Ming dynasty.

The sea. In that first meeting with it, Khiem had come face to face with something invisible and magnificent that stood outside of time.

1. The passage can best be described as a fictional account of one man's experiences with the sea that:
   A. presents several episodes from the man's life, each one revealing a reason why he has ultimately chosen to avoid the sea.
   B. relies on description and personification to illustrate that the man can control the forces of the sea, just as his ancestors could.
   C. provides an impressionistic portrayal of the sea as a powerful force that is closely connected to the human spirit.
   D. offers concrete and specific details about the elements of the sea to demonstrate that the sea is not as mysterious as it may sometimes seem.

2. The point of view from which the passage is told can best be described as that of a narrator who:
   F. mistrusts Khiem's reason for coming to the beach.
   G. defines his or her relationship to Khiem.
   H. reveals his or her reactions to Khiem's actions.
   J. understands Khiem's inner thoughts.

3. The narrator's statement in lines 66–67 most directly refers back to Khiem's:
   A. thoughts about the sun related in the fifth paragraph (lines 28–34).
   B. encounter with the sea described in the sixth paragraph (lines 35–51).
   C. observation of the guest houses, hotels, and hostels on the shore (lines 55–59).
   D. view of the salt-production fields and the villages down the coast (lines 59–63).

4. Which of the following statements best expresses how Khiem feels during his experience at the sea as described in lines 1–67?
   F. Overwhelmed by the surrounding gloom
   G. Peaceful and inspired but slightly uneasy
   H. Uncomfortable and unable to relax
   J. Carefree and satisfied but tired

5. One of the main purposes of the last two paragraphs (lines 68–89) is for the narrator to describe Khiem's first meeting with the sea in a way that:
   A. deepens the reader's understanding of the significance of the sea to Khiem.
   B. specifically identifies the desire, alluded to earlier in the passage, that is just out of Khiem's reach.
   C. develops the reader's understanding of Khiem as someone who had made sacrifices during the Ming dynasty.
   D. reveals the significance of the woman who is mentioned earlier in the passage.

6. In the first three paragraphs (lines 1–20), the narrator describes all of the following elements of Khiem's surroundings EXCEPT the:
   F. color of the sand on the beach.
   G. appearance of the traces of sea foam on the shore.
   H. shape of a particular cloud.
   J. movements of the all-night fishermen.

7. The word *it* in line 25 most directly refers to:
   A. "the salt taste of the sea" (line 22).
   B. "the chaos of his life" (line 23).
   C. "silence" (line 24).
   D. "all noises and troubles" (line 24).

8. As it is used in line 48, the word *lightness* most nearly means:
   F. luminousness.
   G. dimness.
   H. liveliness.
   J. weightlessness.

9. When Khiem finds that "the landscape around him had changed" (lines 52–53), his initial response is to:
   A. observe the new sights.
   B. consider where he would go next.
   C. speculate about how he had reached the new surroundings.
   D. wonder who lived in the villages he could see.

10. The main purpose of the information in lines 75–86 is to further illustrate that Khiem believes the elements of the sea are a part of:
    F. his forebears, who struggled against the forces of the sea, but not a part of him.
    G. the Lady of the Nation, who passed the elements on to her children, but not a part of present-day humans.
    H. him, inherited from ancestors whom he feels connected to through his spiritual beliefs and memories of legends heard in childhood.
    J. the waves, wind, and the creatures of the ocean, each element posing a threat to humankind.

Passage II

Neanderthals, traditionally designated *Homo sapiens neanderthalensis,* were not only "human" but also, it turns out, more "modern" than scientists previously allowed. "In the minds of the European anthropologists
5 who first studied them, Neanderthals were the embodiment of primitive humans, subhumans if you will," says Fred H. Smith, a physical anthropologist at Loyola University in Chicago who has been studying Neanderthal DNA. "They were believed to be scavengers who made
10 primitive tools and were incapable of language or symbolic thought." Now, he says, researchers believe that Neanderthals "were highly intelligent, able to adapt to a wide variety of ecological zones, and capable of developing highly functional tools to help them do so. They
15 were quite accomplished."

Contrary to the view that Neanderthals were evolutionary failures—they died out about 28,000 years ago—they actually had quite a run. "If you take success to mean the ability to survive in hostile, changing envi-
20 ronments, then Neanderthals were a great success," says archaeologist John Shea of the State University of New York at Stony Brook. "They lived 250,000 years or more in the harshest climates experienced by primates, not just humans." In contrast, we modern
25 humans have only been around for 100,000 years or so and moved into colder, temperate regions only in the past 40,000 years.

Though the fossil evidence is not definitive, Neanderthals appear to have descended from an earlier
30 human species, *Homo erectus,* between 500,000 to 300,000 years ago. Neanderthals shared many features with their ancestors—a prominent brow, weak chin, sloping skull and large nose—but were as big-brained as the anatomically modern humans that later colonized
35 Europe, *Homo sapiens.* At the same time, Neanderthals were stocky, a build that would have conserved heat efficiently. From musculature marks on Neanderthal fossils and the heft of arm and leg bones, researchers conclude they were also incredibly strong. Yet their
40 hands were remarkably like those of modern humans; a study published in March 2003 shows that Neanderthals, contrary to previous thinking, could touch index finger and thumb, which would have given them considerable dexterity.

45 Neanderthal fossils suggest that they must have endured a lot of pain. "When you look at adult Neanderthal fossils, particularly the bones of the arms and skull, you see [evidence of] fractures," says Erik Trinkaus, an anthropologist at Washington University
50 in St. Louis. "I've yet to see an adult Neanderthal skeleton that doesn't have at least one fracture, and in adults in their 30s, it's common to see multiple healed fractures." (That they suffered so many broken bones suggests they hunted large animals up close, probably
55 stabbing prey with heavy spears—a risky tactic.) In addition, fossil evidence indicates that Neanderthals suffered from a wide range of ailments, including pneumonia and malnourishment. Still, they persevered, in some cases living to the ripe old age of 45 or so.

60 Perhaps surprisingly, Neanderthals must also have been caring: to survive disabling injury or illness requires the help of fellow clan members, paleoanthropologists say. A telling example came from an Iraqi cave known as Shanidar, 250 miles north of Baghdad,
65 near the border with Turkey and Iran. There, archaeologist Ralph Solecki discovered nine nearly complete Neanderthal skeletons in the late 1950s. One Neanderthal's injuries were so severe that researchers believe that he could not have survived long without a
70 hand from his fellow clan members.

"This was really the first demonstration that Neanderthals behaved in what we think of as a fundamentally human way," says Trinkaus, who in the 1970s helped reconstruct and catalog the Shanidar fossil col-
75 lection in Baghdad. (One of the skeletons is held by the Smithsonian Institution's National Museum of Natural History.) "The result was that those of us studying Neanderthals started thinking about these people in terms of their behavior and not just their anatomy."

80 As Neanderthals retreated into present-day southern Spain and parts of Croatia toward the end of their time, modern human beings were right on their heels. Some researchers believe that Neanderthals and Cro-Magnon humans probably mated, if only in limited
85 numbers. The question of whether Neanderthals and modern humans bred might be resolved in the near future by scientists studying DNA samples from Neanderthal and Cro-Magnon fossils.

11. The passage indicates that contrary to the European anthropologists who first studied Neanderthals, scientists today believe Neanderthals were:

A. subhumans who evolved into modern humans.
B. *Homo sapiens* who were virtually indistinguishable from modern humans.
C. intelligent and adaptable descendants of an earlier human species.
D. scavengers who shared few of the traits of the *Homo sapiens* that would later colonize Europe.

12. The main purpose of the second paragraph (lines 16–27) is to:

F. argue that Neanderthals were an evolutionary success, in terms of longevity and climates endured.
G. demonstrate that Neanderthals and other primates lived 100,000 years in harsh climates.
H. pinpoint when, in the timeline of human development, Neanderthals became extinct.
J. give details of how Neanderthals successfully survived in various climates.

GO ON TO THE NEXT PAGE.

13. The passage identifies the closest similarities between Neanderthals and modern humans in which two anatomical features?

A. Skull shape and brain size
B. Bone thickness and skull shape
C. Muscle strength and hand structure
D. Hand structure and brain size

14. In the passage, which of the following scientists most directly argues that, in one way, the accomplishments of Neanderthals surpassed those of modern humans?

F. Smith
G. Shea
H. Trinkaus
J. Solecki

15. It can reasonably be inferred from the fifth paragraph (lines 60–70) that Neanderthal survival of disabling injury or illness was dependent on:

A. changes in the global climate.
B. the development of highly functional tools.
C. strong social relationships.
D. sophisticated skeletal structures.

16. It can reasonably be inferred from the sixth paragraph (lines 71–79) that before the discoveries highlighted in the passage, scientists tended to study Neanderthals mainly in terms of their:

F. anatomy.
G. behavior.
H. culture.
J. intelligence.

17. As it is used in line 15, the word *accomplished* most nearly means:

A. undisputed.
B. recognized.
C. finished.
D. skilled.

18. According to the passage, modern humans at the beginning of their existence did NOT:

F. use language or symbolic thought.
G. develop highly functional tools.
H. live in colder, temperate climates.
J. survive disabling injury or illness.

19. The passage most directly credits which of the following traits with Neanderthals' ability to maintain suitable body temperatures in cold climates?

A. The stockiness of their build
B. The heft of their arm and leg bones
C. The anatomy of their hands
D. The slope of their skulls

20. The passage states that reliable evidence that modern humans bred with Neanderthals could come from comparing:

F. musculature marks found on fossils.
G. skeletal structures of each group.
H. tools made and used by both groups.
J. DNA samples taken from fossils.

Passage III

HUMANITIES: This passage is adapted from the article "General Tubman" by Drew Gilpin Faust (©2004 by The New York Times Company).

Harriet Tubman is far better known in American popular culture and among schoolchildren than she is in the serious historical literature. There has been no adult biography since 1943. Now three scholars have pub-
5 lished studies almost simultaneously. Who is Harriet Tubman and why should we care about her? What can we know of her life, how can we know it and how should it shape our understanding of American history?

Tubman was born a slave on Maryland's Eastern
10 Shore sometime in the early 1820's. In 1849, fearing she would be sold, Tubman fled north, connecting with antislavery activists through what came to be known as the Underground Railroad. She returned to the South more than a dozen times to lead her brother, parents
15 and, ultimately, about 70 individuals to freedom. By the late 1850's, Tubman was appearing on the antislavery lecture circuit and was widely hailed as a heroine across the North. During the Civil War, Tubman served as teacher, laundress, cook, spy and scout for the Union
20 forces, helping to connect Northern troops with networks of slave information. In June 1863, she played a crucial role in a Union raid in South Carolina that liberated more than 700 slaves.

After the war, Tubman settled in Auburn, N.Y.,
25 where she struggled economically the rest of her life, undertaking domestic work and public speaking to support herself and dedicating much of her energy to philanthropic efforts on behalf of the freed people. She also became a regular speaker at woman suffrage gather-
30 ings, demanding to know if women's wartime deeds "do not place woman as man's equal, what do?"

Tubman remained illiterate her entire life. She left not a single document in her own hand. To find, as Jean M. Humez seeks to do in *Harriet Tubman: The Life and*
35 *the Life Stories*, "the private woman whose life has virtually disappeared behind the heroic public icon," is no small challenge. Humez cites the "advantage of a much larger number of primary sources" than earlier students of Tubman. Indeed, she and Kate Clifford Larson, in
40 her first book, *Bound for the Promised Land*, have both done extensive and imaginative research in local historical sources that tell us almost more than we want to know about the Eastern Shore in the mid-19th century; in the papers of antislavery activists who interacted
45 with Tubman; in the correspondence of an earlier Tubman biographer who in the 1940's interviewed individuals who had been alive long enough to remember her.

Catherine Clinton's *Harriet Tubman: The Road to*
50 *Freedom* is much less richly researched and less detailed, but draws on the extensive historical writing of recent years about slavery and the Civil War to place Tubman's life within its times. Clinton frequently spec-
ulates about what she cannot know, with such interjec-
55 tions as "one can imagine" or "there is every reason to believe." Larson and Humez tend to conjecture less and instead to supply the reader with the considerable information they have collected—sometimes, it seems, more because they have found it than because it adds signifi-
60 cantly to our understanding of Tubman's life.

Tubman—or at least the "private woman" Humez seeks—largely eludes us still. But Humez spends less than half her book on a biographical treatment of Tubman. The final 200 pages consider the contempo-
65 rary stories and texts through which we know Tubman, with most of this space devoted to excerpts from the documents themselves. Humez has compiled what she calls Tubman's "core stories," accounts of her life Tubman told regularly in her public appearances, and
70 descriptions written by those who interacted with her. Presented as a chronology of her life, these materials paint a far more vivid portrait than any biographer's account. The reader gains not just glimpses of Tubman, but sees how she confounded even those admirers who
75 still could not comprehend a black woman who behaved like the bravest of men. Unable to deal with her complexity, her inherent challenge to every expectation of race and sex, history in the early 20th century all but forgot her. An era of growing racial equality
80 rediscovered her only to reduce her to myth.

These three biographies leave us still searching for Harriet Tubman, still unsure how this particular slave woman was able to transcend the constraints her era and her society placed upon her. But we now have help
85 in our pursuit. If read with the care Humez's introduction to the documentary section of her book prescribes, the collection of Tubman sources she has assembled provides the basis for a far fuller and more complex portrait than has hitherto been available.

21. The passage indicates that to try to overcome the problem Tubman's illiteracy poses for a biographer, Humez:

A. interviewed several other biographers who had carefully researched Tubman in the 1940s.
B. utilized a large number of previously unused primary sources related to Tubman and her times.
C. tried to imagine what kinds of materials Tubman would have read had she been literate.
D. relied on speculation to fill in the gaps in the record of Tubman's life.

22. The passage indicates that Tubman's activities before the Civil War included all of the following EXCEPT:

F. appearing on the lecture circuit.
G. working as a teacher and spy.
H. leading family members to freedom.
J. living in Maryland.

GO ON TO THE NEXT PAGE.

23. The passage best supports the conclusion that after the Civil War, Tubman:

   A. remained committed to helping others despite her own difficult circumstances.
   B. became greatly disillusioned with philanthropic efforts to aid the freed people.
   C. felt that plans to implement woman suffrage were proceeding too quickly.
   D. cut back on her public speaking because of her need to earn money.

24. It can most reasonably be inferred that the passage's author considers the frequent use in a biography of phrases such as "one can imagine" or "there is every reason to believe" (lines 55–56) to be:

   F. insightful.
   G. inspiring.
   H. unavoidable.
   J. undesirable.

25. The passage's author would most likely agree with which of the following statements about the present state of Tubman scholarship?

   A. Tubman is still a mystery, and the recent biographies do little to help us appreciate her.
   B. Tubman's life was already well understood, and the recent biographies merely add minor details.
   C. Thanks to the recent biographies, the complexity of Tubman's life has been significantly reduced.
   D. Though Tubman remains elusive, the recent biographies aid our understanding of her.

26. The passage indicates that uncertainty exists about what year Tubman:

   F. was born.
   G. fled north.
   H. assisted a Union raid.
   J. died.

27. The information in lines 18–23 deals primarily with:

   A. Tubman's important, wide-ranging contribution to the Northern war effort.
   B. the crucial role Tubman played in a raid in South Carolina.
   C. some of the responsibilities Northern women had during the Civil War.
   D. the assistance that networks of slave information provided to Union troops.

28. It can reasonably be inferred that by the question quoted in lines 28–31, Tubman meant to express her:

   F. doubt about the ultimate value of women's wartime deeds.
   G. belief that women had proved their equality to men and deserved the vote.
   H. hope that women would be allowed to speak at suffrage gatherings.
   J. worry that women hadn't yet had a chance to demonstrate their talents.

29. Humez's statement about "the private woman" and "the heroic public icon" (lines 33–37) most nearly means that in Humez's view:

   A. Tubman has remained unknown for too long and deserves to be seen as the hero she was.
   B. Tubman was an intensely private person who had trouble adjusting to public recognition.
   C. women and men can admire Tubman as a symbol of noble service to one's country.
   D. fame has almost completely obscured the real person Tubman was.

30. According to the passage, which of the following is true about *Bound for the Promised Land*?

   F. It is Larson's first book.
   G. It is Larson's third book on Tubman.
   H. It was coauthored by Larson and Humez.
   J. It was criticized by Clinton and Humez.

Passage IV

American traffic engineering has been a practical, level-headed field. Its mathematical and computer models indicate that when traffic jams occur, they are the result of bottlenecks (merging lanes, bad curves, 5 accidents), which constrict flow. Find a way to eliminate the bottlenecks and flow will be restored.

Then, a few years ago, several German theoretical physicists began publishing papers on traffic flow in publications not normally read by civil engineers. The 10 physicists had noticed that if one simulated the movement of cars and trucks on a highway using the well-established equations that describe how the molecules of a gas move, some distinctly eerie results emerged. Cars do not behave exactly like gas molecules, to be 15 sure: for example, drivers try to avoid collisions by slowing down when they get too near another car, whereas gas molecules have no such aversion. But the physicists added some terms to the equations to take the differences into account, and the overall description of 20 traffic as a flowing gas has proved to be a very good one. The moving-gas model of traffic reproduces many phenomena seen in real-world traffic. When a flowing gas encounters a bottleneck, for example, it becomes compressed as the molecules suddenly crowd 25 together—and that compression travels back through the stream of oncoming gas as a shock wave. That is precisely analogous to the well-known slowing and queuing of cars behind a traffic bottleneck: as cars slow at the obstruction, cars behind them slow too, which 30 causes a wave of stop-and-go movement to be transmitted "upstream" along the highway.

The eeriest thing that came out of these equations, however, was the implication that traffic congestion can arise completely spontaneously under certain circum-35 stances. No bottlenecks or other external causes are necessary. Traffic can be flowing freely along, at a density still well below what the road can handle, and then suddenly gel into a slow-moving ooze. Under the right conditions a small, brief, and local fluctuation in the 40 speed or spacing of cars—the sort of fluctuation that happens all the time just by chance on a busy highway—is all it takes to trigger a system-wide breakdown that persists for hours after the blip that triggered it is gone. In fact, the physicists' analysis suggested, such 45 spontaneous breakdowns in traffic flow probably occur quite frequently on highways.

Though a decidedly unnerving discovery, this was very much of a piece with the results of mathematical models of many physical and biological systems that 50 exhibit the phenomena popularized under the heading "chaos theory." In any complex interacting system with many parts, each of which affects the others, tiny fluctuations can grow in huge but unpredictable ways. Scientists refer to these as nonlinear phenomena—phe-55 nomena in which seemingly negligible changes in one variable have disproportionately great consequences. Nonlinear properties have been discovered in the mathematical equations that describe weather, chemical reactions, and populations of biological organisms. 60 Some combinations of variables for these equations give rise to sudden "phase shifts," in which the solution to the equation jumps abruptly from one value to another; others set off truly chaotic situations in which for a time the solution to the equation fluctuates wildly 65 and without any seeming pattern, and then suddenly calms down.

In the case of traffic, the physicists found that given a certain combination of vehicle density and vehicle flow rate along a highway, the solution to their 70 equations undergoes a sudden phase shift from freely moving traffic to what they call "synchronized traffic." Cars in all lanes abruptly slow down and start moving at the same speed as the cars in adjacent lanes, which makes passing impossible and can cause the whole 75 system to jam up for hours.

Such a leap from one state to another is like what happens when a chemical substance changes phase from vapor to liquid. It often happens that water in a cloud remains in the gas phase even after temperature 80 and density have reached the point where it could condense into water droplets. Only when a speck of dust happens along, providing a surface on which condensation can take place, does the transition finally occur. The physicists basically found that free flow and syn-85 chronized flow can occur under the same conditions, and that under such "metastable" conditions a small fluctuation in traffic density can act as the speck of dust causing the shift from one to the other.

31. The author characterizes the comparison between the movement of gas molecules and the movement of highway traffic as:

A. intriguing but ultimately fruitless.
B. imperfect but generally sound.
C. promising but annoyingly abstract.
D. flawed but nonetheless entertaining.

32. The main point of the third paragraph (lines 32–46) is that:

F. traffic can gel into a slow-moving ooze when bottlenecks appear on the highway.
G. small, brief, localized changes in traffic flow can create long-lasting, widespread traffic problems.
H. spontaneous breakdowns in traffic flow are rare on highways, according to the physicists.
J. recent research has identified several predictable, external causes of traffic congestion on highways.

33. In terms of where and how frequently they appear, nonlinear phenomena are described by the author as:

A. common in physical systems but rare in biological ones.
B. found mainly in chemical reactions and weather systems.
C. possible in all kinds of complex interacting systems.
D. present in human populations but absent from traffic systems.

34. Lines 60–66 mainly emphasize what quality?

F. Unpredictability
G. Dangerousness
H. Moderateness
J. Simplicity

35. According to the passage, "synchronized traffic" is a situation in which:

A. safety improves due to the slowed movement of all traffic.
B. passing increases due to a sudden, simultaneous slowdown in a few lanes.
C. traffic slows abruptly in one lane and at the same time speeds up in another.
D. traffic in all lanes suddenly starts moving at the same slowed speed.

36. The author claims that a speck of dust is like a small fluctuation in traffic density in that both are:

F. too tiny to be considered important.
G. capable of causing a phase shift.
H. able to promote the free flow of objects.
J. affected by the presence of water vapor.

37. The passage states that in response to difficulties in applying equations describing the movement of gas molecules to the movement of highway traffic, the physicists:

A. realized how poorly they understood gas molecule movement.
B. developed entirely new models to describe traffic flow.
C. added some terms to the equations.
D. deleted a variable from the equations.

38. Based on the passage, what relationship does the discovery described in the third paragraph (lines 32–46) have to chaos theory?

F. It led to new doubts about chaos theory's basic assumptions.
G. It was the main inspiration for the development of chaos theory.
H. It is unaccounted for by chaos theory.
J. It is consistent with chaos theory.

39. Lines 36–38 are best summarized as describing a problem that:

A. quickly resolves itself after it had just as quickly appeared.
B. slowly develops as a cluster of factors comes into play.
C. steadily worsens into a major crisis as a result of neglect.
D. suddenly emerges when everything had seemed fine.

40. The author defines nonlinear phenomena as phenomena in which:

F. seemingly insignificant changes in one variable have disproportionately large effects.
G. seemingly important changes in one variable have surprisingly small effects.
H. small changes in one variable produce equally small effects.
J. large changes in one variable produce equally large effects.

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

The *mitotic index* (*MI*) for a group of cells is calculated as follows:

$$MI = \frac{\text{number of cells in mitosis}}{\text{number of cells}}$$

Figure 1 shows the average *MI* for onion root tip cells as a function of their distance from the root cap.
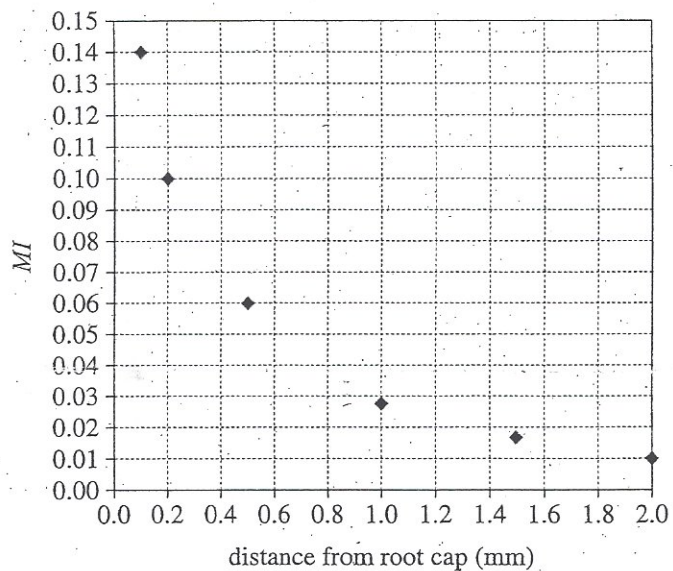
Five hundred mitotic onion root tip cells were examined. Figure 2 shows the number of cells in each of the 4 mitotic phases.
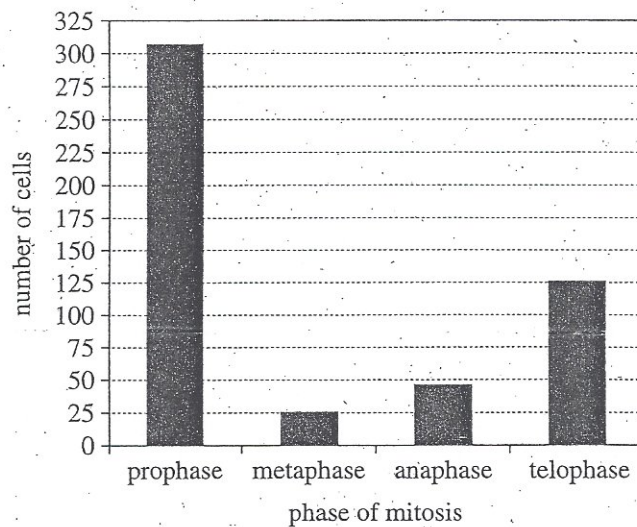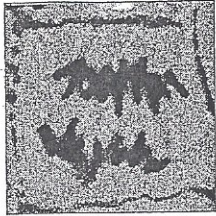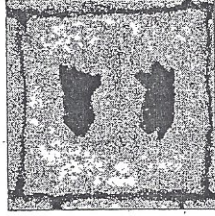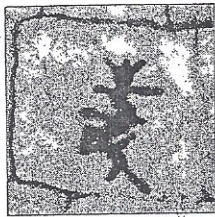

Figure 1

Figure 2

Figure 3 shows 4 onion root tip cells (Cells 1–4), each of which is in 1 of the 4 mitotic phases. In Figure 3, each phase is shown once. However, the cells are *not* arranged in order of the phases of mitosis.
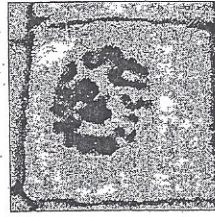

Figure 3

Figure 3 adapted from Peter H. Raven, Ray F. Evert, and Susan E. Eichhorn, *Biology of Plants*, 4th ed. ©1986 by Worth Publishers, Inc.

1. According to Figure 2, how did the number of onion root tip cells in telophase compare with the number of onion root tip cells in metaphase? The number in telophase was about:

   A. $\frac{1}{5}$ as great as the number in metaphase.

   B. $\frac{1}{2}$ as great as the number in metaphase.

   C. 2 times as great as the number in metaphase.

   D. 5 times as great as the number in metaphase.

2. Based on Figure 1, of the onion root tip cells that are 2.2 mm from the root cap, the percent that are in mitosis most likely falls within which of the following ranges?

   F. Less than or equal to 1.0%
   G. Greater than 1.0% and less than 2.5%
   H. Greater than 2.5% and less than 5.5%
   J. Greater than 5.5%

3. Based on Figure 2, of the onion root tip cells that were in mitosis, the proportion that were in prophase is closest to which of the following?

   A. $\frac{100}{305}$

   B. $\frac{500}{305}$

   C. $\frac{305}{100}$

   D. $\frac{305}{500}$

4. Which cell in Figure 3 is in the first phase of mitosis?

   F. Cell 1
   G. Cell 2
   H. Cell 3
   J. Cell 4

5. Which cell in Figure 3 is in the phase of mitosis during which the chromosomes initially align along the metaphase plate?

   A. Cell 1
   B. Cell 2
   C. Cell 3
   D. Cell 4

Passage II

A *restriction enzyme* is a protein that cuts DNA at a specific sequence of base pairs. Because almost all humans have small differences in DNA sequence, a restriction enzyme tends to cut in different places in each person's DNA. This creates a distinctive pattern of DNA fragments or bands, sometimes called a *DNA fingerprint*, that is generally unique for each person. A DNA fingerprint can be analyzed using *gel electrophoresis* (a technique that uses an electric field to separate DNA fragments into bands based on size) along with various DNA visualization methods.

A painting was stolen from a museum. No fingerprints were located; however, a sample of skin cells and blood was found on a window broken by the thief. Investigators decided to use blood typing and DNA fingerprinting to determine which of 4 suspects (Suspects 1–4) matched the skin and blood from the museum.
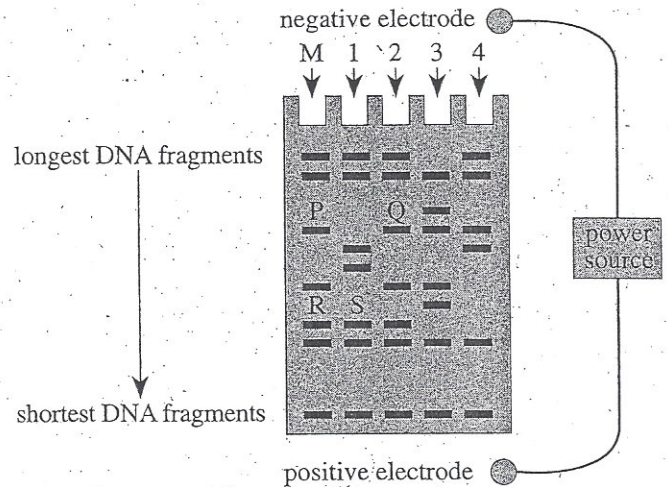
Note: Each band (━) is made up of DNA fragments. P, Q, R, and S are 4 specific bands.

Figure 1

Investigation

Table 1 shows the blood type of the museum sample (Sample M) and of Suspects 1–4 (Samples 1–4, respectively).

Table 1	
Sample	Blood type
M	O
1	B
2	O
3	AB
4	O

DNA from Sample M and from Samples 1–4 was placed in separate tubes so that each tube contained DNA from 1 of the suspects or the museum sample. Restriction Enzyme X was added to each tube, and the samples were incubated for 1 hr at 37°C. Investigators used gel electrophoresis to separate the DNA fragments in each sample into bands. The fragments in a band were similar in length. Figure 1 shows the DNA fingerprints that resulted when the samples were cut by Restriction Enzyme X and visualized with an appropriate method.

6. According to Figure 1, the pattern of DNA bands produced by Sample M most closely matches the pattern produced by the DNA sample from:

F. Suspect 1.
G. Suspect 2.
H. Suspect 3.
J. Suspect 4.

7. Are the data in Table 1 consistent with the hypothesis that Suspect 4 stole the painting?

A. No; Suspect 4 has the same blood type as Sample M.
B. No; Suspect 4 has a different blood type than Sample M.
C. Yes; Suspect 4 has the same blood type as Sample M.
D. Yes; Suspect 4 has a different blood type than Sample M.

8. Based on Figure 1, the DNA fragments in which of the following 2 bands were most likely closest in length?

F. P and Q
G. P and R
H. Q and R
J. Q and S

9. During the gel electrophoresis, the DNA fragments moved toward the electrode shown at the bottom of Figure 1. Therefore, the charge of the DNA fragments must have been:

A. positive, because opposite charges attract.
B. positive, because like charges attract.
C. negative, because opposite charges attract.
D. negative, because like charges attract.

10. What is the most likely reason that the DNA samples were incubated at a temperature of 37°C ?

F. Restriction Enzyme X does not function at that temperature.
G. Restriction Enzyme X functions best at that temperature.
H. Blood cells break down at that temperature.
J. All contaminants are eliminated at that temperature.

11. Blood type is determined by the products of 3 different alleles of the same gene. The I^A allele is responsible for the A antigen, the I^B allele is responsible for the B antigen, and the i allele does not result in either antigen. Based on Table 1, the genotype of Suspect 1 could be which of the following?

I. $I^B I^B$
II. $I^A i$
III. $I^B i$

A. I only
B. I or II only
C. I or III only
D. I, II, or III

Passage III

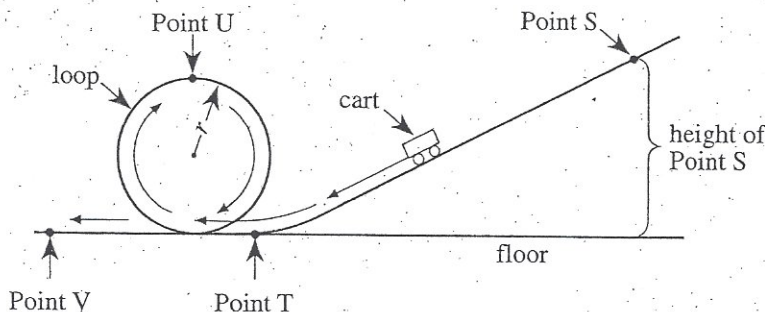In 5 trials, a toy cart rolled on a track after being released from rest at Point S (see Figure 1).

Figure 1

For each combination of cart mass, M, and loop radius, r, Point S was at the minimum height, h, required for the cart to roll completely through the loop. The cart was stopped at Point V.

The cart's gravitational potential energy, PE, at Points S and U and the cart's kinetic energy, KE, at Point U are shown in Table 1. When the cart was on the floor, PE was zero. The cart's total mechanical energy, TME, at a given point equaled $PE + KE$ at that point. TME at Point S minus TME at a second point equaled the amount of TME converted to heat by friction between Point S and the second point.

				PE (J*) at Point:		KE at Point U
Trial	M (kg)	r (m)	h (m)	S	U	(J*)
1	0.030	0.080	0.250	0.073	0.047	0.012
2	0.030	0.090	0.281	0.083	0.053	0.013
3	0.030	0.100	0.312	0.092	0.059	0.015
4	0.040	0.100	0.312	0.122	0.078	0.020
5	0.050	0.100	0.312	0.153	0.098	0.025

Table 1

*J = joule

12. Based on the results of Trials 3–5, if an additional trial is performed with $M = 0.060$ kg and $r = 0.100$ m, KE at Point U will most likely be:

F. less than 0.015 J.
G. between 0.015 J and 0.020 J.
H. between 0.020 J and 0.025 J.
J. greater than 0.025 J.

13. The results of Trials 1–3 indicate that as the radius of the loop increased, the minimum height of Point S required for the cart to roll completely through the loop:

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

14. The total mechanical energy of an object is said to be *conserved* if the total mechanical energy of the object has the same value everywhere along the path of the object. In which of the trials, if any, was TME conserved while the cart rolled from Point S to Point U ?

F. Trial 1 only
G. Trial 3 only
H. All of the trials
J. None of the trials

15. In Trial 3, at the time of the cart's release, TME was closest to which of the following?

A. 0.000 J
B. 0.015 J
C. 0.059 J
D. 0.092 J

16. Which of the following ranks Points S, T, and U in order, from the point at which the speed of the cart was slowest to the point at which the speed of the cart was fastest during any given trial?

F. Point S, Point T, Point U
G. Point S, Point U, Point T
H. Point U, Point S, Point T
J. Point U, Point T, Point S

Passage IV

Alcohols are carbon compounds that contain a *hydroxyl* (–OH) group bonded to a C atom. If the hydroxyl-bonded C atom is bonded to only one other C atom, or to no other C atoms, the alcohol is a *primary alcohol*. Table 1 lists the chemical formula, melting point, and boiling point for several primary alcohols.

Table 1			
Primary alcohol	Chemical formula	Melting point (°C)	Boiling point (°C)
Methanol	CH_3OH	−98	65
Ethanol	CH_3CH_2OH	−114	78
1-propanol	$CH_3(CH_2)_2OH$	−126	97
1-butanol	$CH_3(CH_2)_3OH$	−90	118
1-pentanol	$CH_3(CH_2)_4OH$	−79	138

Figure 1 shows how the viscosity (in centipoise, cp) of 3 primary alcohols varies with temperature.
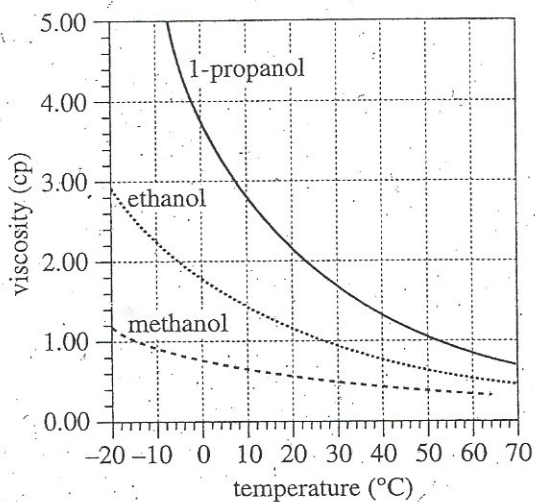

Figure 1

Figure 2 shows how the viscosity of aqueous solutions of the same 3 alcohols varies with alcohol concentration at 20°C.
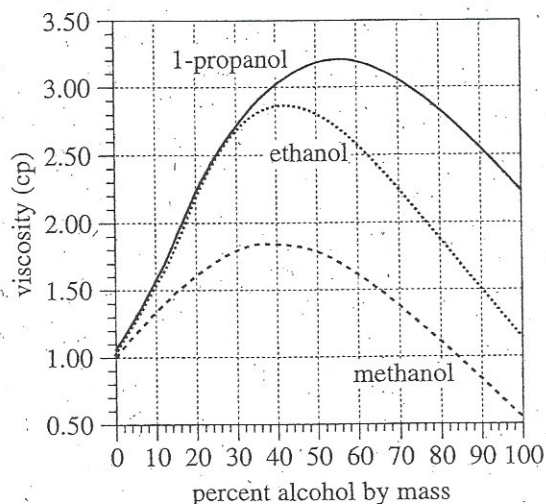

Figure 2

17. According to Figure 2, as the percent H_2O by mass in an ethanol/H_2O solution increases from 0% to 100%, the viscosity:

   A. decreases only.
   B. increases only.
   C. decreases, then increases.
   D. increases, then decreases.

18. The primary alcohol 1-hexanol has the chemical formula $CH_3(CH_2)_5OH$. Based on Table 1, the boiling point of 1-hexanol is most likely:

   F. less than 115°C.
   G. between 115°C and 145°C.
   H. between 145°C and 175°C.
   J. greater than 175°C.

19. Which of the alcohols listed in Table 1 has the *lowest* freezing point?

   A. Ethanol
   B. 1-propanol
   C. 1-butanol
   D. 1-pentanol

20. According to Figure 2, at 20°C, the viscosity of a methanol/H_2O solution that is 10% methanol by mass is closest to the viscosity of which of the following methanol/H_2O solutions?

   F. 30% methanol by mass
   G. 50% methanol by mass
   H. 70% methanol by mass
   J. 90% methanol by mass

21. According to Figure 1, does ethanol or 1-propanol flow more easily at 25°C?

   A. Ethanol, because ethanol has the higher viscosity.
   B. Ethanol, because ethanol has the lower viscosity.
   C. 1-propanol, because 1-propanol has the higher viscosity.
   D. 1-propanol, because 1-propanol has the lower viscosity.

Passage V

The current in an electric circuit produces a magnetic field that will exert a measurable force on a nearby magnet.

Students performed experiments using the apparatus shown in Figure 1.
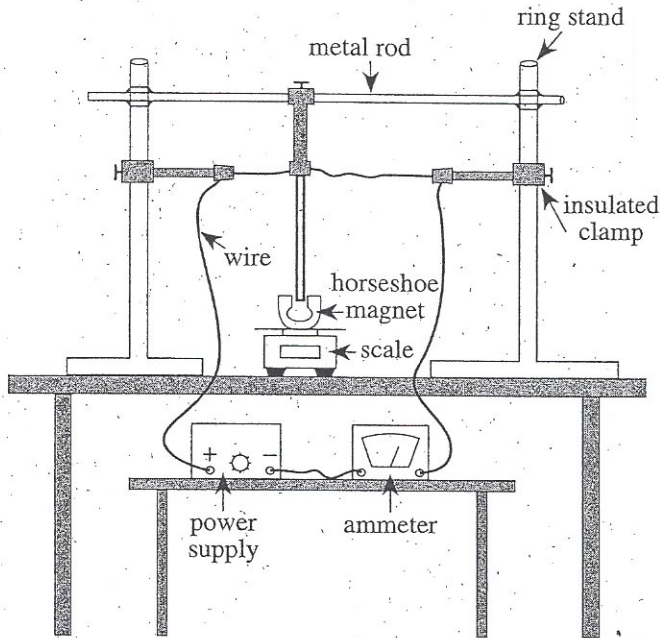

Figure 1

The apparatus included an electric circuit. A horizontal segment of the circuit, Segment AB, lay between the poles of a horseshoe magnet, as shown in Figure 2.
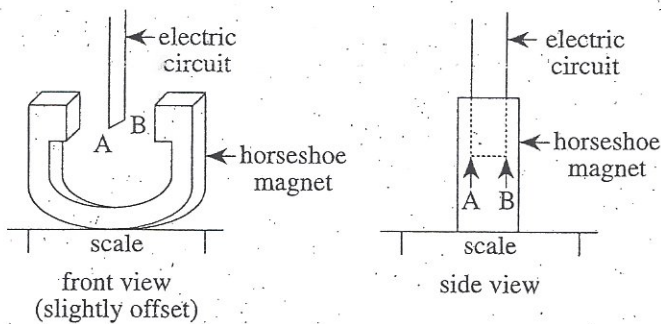

Figure 2

When current flowed through the circuit, only the magnetic field associated with Segment AB exerted a measurable force on the horseshoe magnet.

The horseshoe magnet, which weighed approximately 1.5 newtons (N), rested on a scale. Before the first experiment and after each of the following scale readings, the scale was adjusted with the horseshoe magnet in place so that when no current was flowing through the circuit the scale reading was 2.00000 N.

Experiment 1

The students passed various amounts of current through the circuit and recorded the scale reading for each amount, as shown in Table 1.

Table 1	
Amount of current (amp)	Scale reading (N)
1.50	2.00118
2.50	2.00196
3.50	2.00275

Experiment 2

The students reversed the connections to the power supply so that the current flowed in the direction opposite to that in Experiment 1. They repeated the procedure used in Experiment 1. Their results are shown in Table 2.

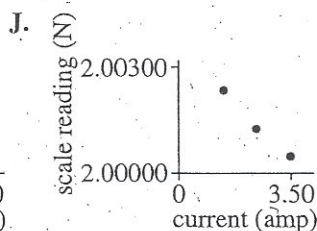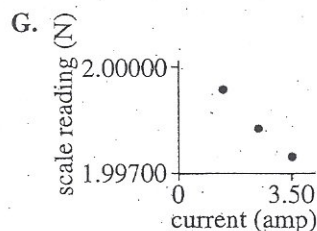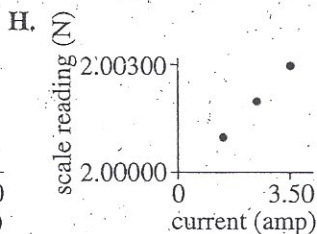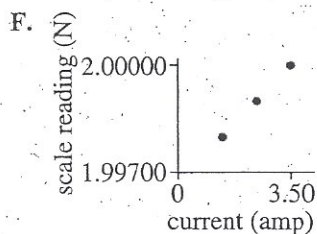| Table 2	
Amount of current (amp)	Scale reading (N)
1.50	1.99882
2.50	1.99804
3.50	1.99725

Experiment 3

Using a current of 2.50 amp flowing in the same direction as in Experiment 1, the students varied the length of Segment AB. Their results are shown in Table 3.

Table 3	
Length of Segment AB (cm)	Scale reading (N)
2.0	2.00342
3.0	2.00514
4.0	2.00685

ACT-66C

44

GO ON TO THE NEXT PAGE.

22. The results of Experiment 2 are best represented by which of the following graphs?

F.

scale reading (N) vs current (amp); 2.00000, 1.99700; 0, 3.50

H.

scale reading (N) vs current (amp); 2.00300, 2.00000; 0, 3.50

G.

scale reading (N) vs current (amp); 2.00000, 1.99700; 0, 3.50

J.

scale reading (N) vs current (amp); 2.00300, 2.00000; 0, 3.50

23. Which of the following statements best explains the results of Experiment 3 ? The magnetic force exerted on the horseshoe magnet by the magnetic field of Segment AB:

A. increased as the length of Segment AB was increased.

B. decreased as the length of Segment AB was increased.

C. increased as the current flowing through the circuit was increased.

D. decreased as the current flowing through the circuit was increased.

24. Based on the results of Experiments 1 and 3, it can most reasonably be inferred that in Experiment 1 the length of Segment AB was:

F. less than 2.0 cm.

G. between 2.0 cm and 3.0 cm.

H. between 3.0 cm and 4.0 cm.

J. greater than 4.0 cm.

25. In Experiments 1 and 2, the direction in which the current flowed through the circuit determined which of the following?

A. Length of Segment AB

B. Strength of the magnetic field produced by the horseshoe magnet

C. Direction of the force exerted on the horseshoe magnet by the magnetic field of Segment AB

D. Mass of the horseshoe magnet

26. Suppose the current had flowed in the same direction in Experiment 3 as in Experiment 2. Based on the results of Experiments 1 and 2, with the length of Segment AB equal to 2.0 cm, the scale reading most likely would have been:

F. 1.99315 N.

G. 1.99658 N.

H. 2.00342 N.

J. 2.00685 N.

27. Before the horseshoe magnet was placed on the scale prior to Experiment 1, the scale read 0.00000 N. After the students placed the horseshoe magnet on the scale, with no current flowing through the circuit, the students made which of the following adjustments to the scale?

A. They added approximately 0.5 N to the scale reading.

B. They subtracted approximately 0.5 N from the scale reading.

C. They added approximately 1.5 N to the scale reading.

D. They subtracted approximately 1.5 N from the scale reading.

Passage VI

CO$_2$ is put into Earth's atmosphere by human activities and by natural processes such as diffusion from the oceans.

Atmospheric CO$_2$ affects Earth's climate. In general, as the atmospheric CO$_2$ concentration increases, more infrared radiation from Earth's surface is absorbed by CO$_2$, and the average global temperature rises. The atmospheric CO$_2$ concentration that existed at any given time over the past 160,000 years can be determined from air trapped in bubbles in Antarctic ice formed at that time. Figure 1 shows the atmospheric CO$_2$ concentration over the past 1,000 years.
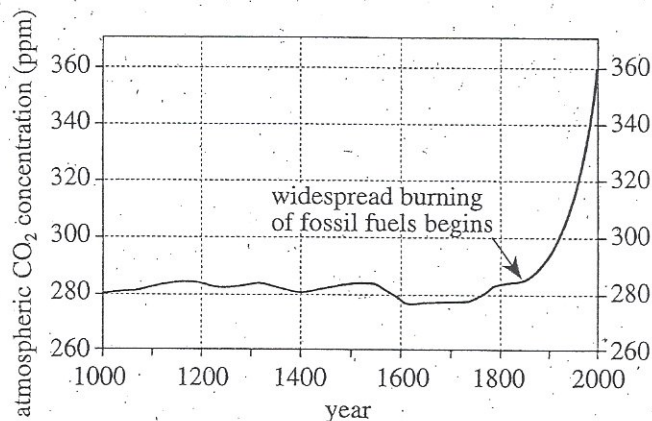

Figure 1

Figure 1 adapted from International Panel on Climate Change, "Climate Change 2001: The Scientific Basis." ©2001 by Cambridge University Press.

Figure 2 shows the atmospheric CO$_2$ concentration and the *global temperature deviation* over the past 160,000 years. Global temperature deviation equals:

(average global temperature at a given time) –

(present-day average global temperature)
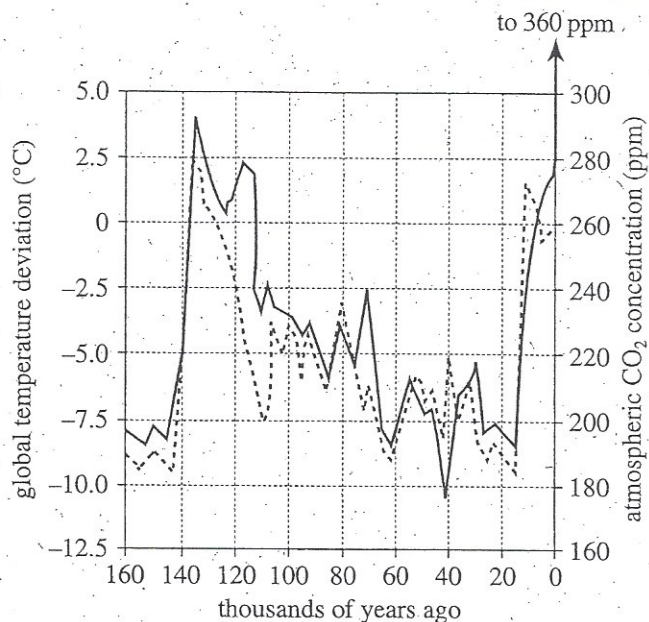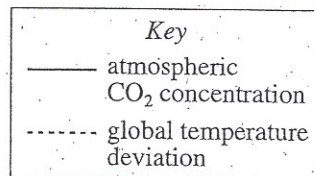
Figure 2

Figure 2 adapted from Stephen Schneider, "The Changing Climate." ©1989 by Scientific American.

Two scientists discuss why the average global temperature has risen over the past 150 years.

Scientist 1

Global warming is a direct result of the CO$_2$ put into the air by the widespread burning of fossil fuels. Figure 1 shows that for hundreds of years prior to 1850, the atmospheric CO$_2$ concentration was relatively constant at around 280 parts per million (ppm). Since 1850, a steady increase in the amount of fossil fuels burned has caused the atmospheric CO$_2$ concentration to increase, reaching 360 ppm by the year 2000, higher than at any time in the past 160,000 years. Over the same 150 years, average global temperature has risen by almost 1°C. Since the year 2000, the atmospheric CO$_2$ concentration has been increasing at a constant rate of 1.5% per year.

Scientist 2

Global warming is a natural process that has occurred a number of times during the past 160,000 years, even before the widespread burning of fossil fuels. In general, increases and decreases in average global temperature result from increases and decreases, respectively, in the atmospheric CO_2 concentration (see Figure 2). The CO_2 put into the atmosphere by human activities is less than 5% of the CO_2 put into the atmosphere by all sources. Therefore, the CO_2 put into the atmosphere by human activities, by itself, has no measurable effect on average global temperature.

28. According to Scientist 1, the atmospheric CO_2 concentration has been increasing at a constant rate since the year 2000. Given the atmospheric CO_2 concentration for the year 2000 in Figure 1, Scientist 1 would most likely conclude that the atmospheric CO_2 concentration for the year 2002 was closest to which of the following?

    F.   330 ppm
    G. 350 ppm
    H. 370 ppm
    J.   390 ppm

29. Suppose Scientist 2 asserted that there have been times over the past 160,000 years at which the average global temperature has been higher than it is today. To support this assertion, Scientist 2 would most likely cite the temperature data in Figure 2 for which of the following times?

    A. 160,000 years ago
    B. 135,000 years ago
    C. 110,000 years ago
    D.   85,000 years ago

30. Scientist 1 states that today's atmospheric CO_2 concentration is higher than that at any time in the past 160,000 years. Does Figure 1 give sufficient basis for that statement?

    F.   Yes; Figure 1 shows the atmospheric CO_2 concentration for the past 160,000 years.
    G. Yes; Figure 1 shows the atmospheric CO_2 concentration for the past 1,000 years only.
    H. No; Figure 1 shows the atmospheric CO_2 concentration for the past 160,000 years.
    J.   No; Figure 1 shows the atmospheric CO_2 concentration for the past 1,000 years only.

31. According to Figure 2, over which of the following time intervals did the average global temperature increase more than 5 times as much as Scientist 1 claims it has increased over the past 150 years?

    A. 80,000 years ago to 70,000 years ago
    B. 60,000 years ago to 50,000 years ago
    C. 40,000 years ago to 30,000 years ago
    D. 20,000 years ago to 10,000 years ago

32. Which of the following statements about the atmospheric CO_2 concentration would most likely be supported by Scientist 2 ?

    F.   As the atmospheric CO_2 concentration increases, average global temperature generally decreases.
    G. As the atmospheric CO_2 concentration increases, average global temperature generally increases.
    H. The atmospheric CO_2 concentration is changed only by widespread burning of fossil fuels.
    J.   The atmospheric CO_2 concentration has remained constant for 160,000 years.

33. Given Figure 1, Scientist 1 would most likely claim that from the year 1000 to the year 1600, the average global temperature:

    A. increased by more than 2°C.
    B. decreased by more than 2°C.
    C. changed by 2°C.
    D. changed by less than 2°C, if at all.

34. Assume that the present-day average global temperature is 22°C. Given Figure 2, the two scientists would most likely claim that the average global temperature 140,000 years ago was closest to which of the following?

    F.   18°C
    G. 21°C
    H. 24°C
    J.   27°C

Passage VII

The net movement of H_2O molecules across a semipermeable membrane from a region of higher H_2O concentration to a region of lower H_2O concentration is called *osmosis*. A *semipermeable membrane*, such as dialysis tubing, is a barrier with tiny pores that allow only molecules under a certain size, such as H_2O molecules, to pass through. Other small molecules can also migrate from higher concentration regions to lower concentration regions.

A dilute starch solution and a dilute iodine (I_2) solution were each prepared in H_2O. The I_2 solution had a higher concentration of dissolved particles than did the starch solution. Therefore, the starch solution had a higher concentration of H_2O than did the I_2 solution. Molecules of I_2 are larger than H_2O molecules, but are much smaller than starch molecules. A starch solution is milky-white. An I_2 solution is reddish-brown. Mixing starch and I_2 solutions will result in a blue solution.

Experiment 1

A sealed bag made of dialysis tubing (a dialysis bag) containing the I_2 solution was submerged in a beaker containing the starch solution. After 1 hr, the bag had swollen from its original size. The solution around the outside of the bag was blue, but no blue coloration was evident within the bag.

Experiment 2

A dialysis bag containing the starch solution was submerged in a beaker containing the I_2 solution. After 1 hr, the bag had shrunk. The solution inside the bag was blue, while the appearance of the solution outside the bag did not change.

Experiment 3

A dialysis bag containing the I_2 solution was submerged in a beaker containing distilled H_2O. After 1 hr, the bag was swollen, and the solutions both inside the bag and outside the bag were reddish-brown.

35. How, if at all, would the results have been different if a dialysis bag with pores large enough to allow H_2O, I_2, and starch molecules to pass through had been used in Experiment 2 ?

   A. The dialysis bag would have swollen and burst.
   B. A reddish-brown color would have appeared in both the dialysis bag and the beaker.
   C. A blue color would have appeared in both the dialysis bag and the beaker.
   D. The results would not have been different.

36. In Experiments 1 and 2, what did the beaker contain before submersion of the dialysis bag?

	Experiment 1	Experiment 2
F.	starch solution	I_2 solution
G.	I_2 solution	starch solution
H.	starch solution	distilled water
J.	I_2 solution	distilled water

37. In Experiment 1, before the dialysis bag was placed in the beaker, the solution in the bag was:

   A. blue.
   B. milky-white.
   C. reddish-brown.
   D. colorless.

38. A chemist claimed that since the solutions both inside and outside the bag ended up reddish-brown in color in Experiment 3, I_2 molecules must be bigger than H_2O molecules. Is this claim valid?

   F. Yes; the results show that both I_2 and H_2O molecules can pass through the dialysis bag.
   G. Yes; the results show that H_2O molecules can pass through the dialysis bag, but I_2 molecules cannot.
   H. No; the results only show that I_2 and H_2O molecules are smaller than the pores in the dialysis bag.
   J. No; the results only show that I_2 and H_2O molecules are larger than the pores in the dialysis bag.

39. Sugar molecules do not pass through the dialysis bags used in Experiments 1–3 and are colorless when dissolved in H_2O. If Experiment 3 were repeated, but the bag was instead filled with a sugar solution, the bag would:

   A. swell, and the solutions both inside and outside the bag would be colorless.
   B. shrink, and the solutions both inside and outside the bag would be colorless.
   C. swell, and the solutions both inside and outside the bag would be reddish-brown.
   D. shrink, and the solution inside the bag would be reddish-brown while the solution outside the bag would be colorless.

GO ON TO THE NEXT PAGE.

40. In Experiments 1 and 2, starch molecules were able to move:

F. only into the dialysis bag.
G. only out of the dialysis bag.
H. both into the dialysis bag and out of the dialysis bag.
J. neither into nor out of the dialysis bag.

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

52C|54D|55C|56B|57B|59C|59F|60E|61B|61C|61D|61F|62D|63C|63D|63E|63F|64F|65C|66B|66C|66F|67B|
67C|67F|68A|68C|68G|69A|69F|70C|70G|71G|Sample Test 1|Sample Test 2|Practice Test 1|Practice Test 2|

OPEN ACT, the ONLY way to 30+ ACT Test for free

OPEN **ACT** provides you the answers for ACT Form 66C:

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

07/08/08

ACT ASSESSMENT TEST INFORMATION RELEASE REPORT
TEST DATE = 06/08   TEST FORM = 66C   TEST CENTER = 21774

ZAZZARO MICHAEL N
XXXXX3581
092590

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

ENGLISH
CORRECT ANSWER       AJBJAGCGCH BFAHBJBGDJ BGDGAFCHDH CJDJDHDHAF DHBHAJAFCF BGAFCGBGCG AHBJDFAGDG CHAGD
YOUR ANSWER          +++++J++++ ++++++++++ +++++B+++ +++++++++++J ++++++++++ ++++++++++ ++++++++ +J++
SUBSCORE             UURURRUUR UUURRRURRU UURURUURR URURURRUU RURURRRUUU URUUUURRR RURURURRU UURRR

MATHEMATICS
CORRECT ANSWER       EHCHAKCGDK DJBHDKDGBF AFCHCHAJEK DHBHCKEFDF EJBGDGBHEJ DKAKDFBGAF
YOUR ANSWER          ++++++++++ ++++++++++ ++++++++++ +++++++D+++ +++++E+++++ +++++C+EJ
SUBSCORE             GGATAAAAA AAGAGTGATG TTAATAATGA ATATTGTAGG TAAAGTGTTG GGTATGGTAG

READING
CORRECT ANSWER       CJBGAFCJAH CFDGCFDHAJ BGAJDFAGDF BGCFDGCJDF
YOUR ANSWER          ++++++B+++ +++++++++F++ ++++++++++ C+++++B+++
SUBSCORE             LLLLLLLL SSSSSSSSS LLLLLLLLL SSSSSSSSSS

SCIENCE
CORRECT ANSWER       DFDJBGCFCG CJAJDGDHBH BGAFCGAHBJ DGDFCFCHAJ
YOUR ANSWER          ++++++++++ ++D+++++D+ A+C+BH++++ +++BG+F++
```

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

PLUS WRITING TEST FORM: 13R
1st RATER: 04   2nd RATER: 04

0018392

ZAZZARO MICHAEL N
55 EASTFIELD RD
WATERBURY, CT 06708-3201