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Sample Test 2

ACT Assessment®

Directions

This booklet contains tests in English, Mathematics, Reading, and Science. These tests measure skills and abilities highly related to high school course work and success in college. *CALCULATORS MAY BE USED ON THE MATHEMATICS TEST ONLY.*

The questions in each test are numbered, and the suggested answers for each question are lettered. On the answer document, the rows of ovals are numbered to match the questions, and the ovals in each row are lettered to correspond to the suggested answers.

For each question, first decide which answer is best. Next, locate on the answer document the row of ovals numbered the same as the question. Then, locate the oval in that row lettered the same as your answer. Finally, fill in the oval completely. Use a soft lead pencil and make your marks heavy and black. *DO NOT USE A BALLPOINT PEN.*

Mark only one answer to each question. If you change your mind about an answer, erase your first mark thoroughly before marking your new answer. For each question, make certain that you mark in the row of ovals with the same number as the question.

Only responses marked on your answer document will be scored. Your score on each test will be based only on the number of questions you answer correctly during the time allowed for that test. You will NOT be penalized for guessing. *IT IS TO YOUR ADVANTAGE TO ANSWER EVERY QUESTION EVEN IF YOU MUST GUESS.*

You may work on each test ONLY when your test supervisor tells you to do so. If you finish a test before time is called for that test, you should use the time remaining to reconsider questions you are uncertain about in that test. You may NOT look back to a test on which time has already been called, and you may NOT go ahead to another test. To do so will disqualify you from the examination.

Lay your pencil down immediately when time is called at the end of each test. You may NOT for any reason fill in or alter ovals for a test after time is called for that test. To do so will disqualify you from the examination.

Do not fold or tear the pages of your test booklet.

DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.

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ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for each underlined part. 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."

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. You cannot determine most answers without reading several sentences beyond the question. Be sure that you have read far enough ahead each time you choose an alternative.

PASSAGE I

A Natural Wonder

You sit in the bright silver moonlight on a beach where its[1] 10,000 miles from home. You are on the east coast of Malaysia. You hear the soft, steady sound of the surf and feel the gentle touch of the warm breeze against your skin. Barefoot, you wiggle your toes into the damp sand. You cross your arms and lean forward against your upraised knees. You are waiting.

Then they come out of the sea, and are[2] three massive turtles. They are giant leatherback turtles, seven feet long and weighing 1,000 to 1,500 pounds. They can live to be more than a hundred years old. [3] Each year they return here to lay their eggs, in the place where they themselves were hatched.

You watch as each of them slowly dig a hole and fill[4]

1. **A.** NO CHANGE
   B. and its
   C. it's
   D. OMIT the underlined portion.

2. **F.** NO CHANGE
   G. they are
   H. you see
   J. OMIT the underlined portion.

3. Given that all are true, which of the following sentences, if added here, would most vividly describe the turtles' appearance and their movement from the water to the beach?
   A. They are the largest living turtle in the world and are covered with a tough outer shell that looks like leather.
   B. Eventually there appear three enormous turtles on the beach in front of you.
   C. They look like huge living rocks creeping almost imperceptibly onto the sand in front of you.
   D. There in front of you are three of the largest turtles you've ever seen.

4. **F.** NO CHANGE
   G. they each slowly dig a hole and fill
   H. they each slowly digs a hole and fills
   J. they slowly dig a hole and fills

GO ON TO THE NEXT PAGE.

it, one egg at a time, in which there are over a hundred eggs. The eggs are bright white and about two inches in diameter. You were watching as each turtle then slowly, laboriously, buries the eggs, turning in circle after circle, pushing sand back into the holes with surprisingly efficient flippers.

[1] You notice that the turtles' eyes are covered with a shiny liquid. [2] You know that this liquid has a scientific explanation: they keep they're eyes moist and clear of particles. [3] It looks as if they've been crying. [4] Nevertheless, you may prefer to think of them as emotional teary-eyed, over creating new life. [11]

The process takes hours, but you remain quiet and still. It is all being watched by you. You are looking at the sight of these odd, slow, determined beings and their prehistoric ritual. And one realizes that there is nothing quite as astounding as witnessing one of life's more subtle and elusive natural wonders.

5. **A.** NO CHANGE
B. there are
C. with
D. OMIT the underlined portion.

6. **F.** NO CHANGE
G. watch
H. had watched
J. watched

7. **A.** NO CHANGE
B. until the eggs are buried with surprisingly efficient flippers, pushing sand back into the holes, turning in circle after circle.
C. turning in circle after circle with surprisingly efficient flippers until the eggs are buried pushing sand back into the holes.
D. turns in circle after circle, back into the holes pushing sand until they are buried with surprisingly efficient flippers.

8. **F.** NO CHANGE
G. turtle's eyes
H. turtles eyes
J. turtles' eye's

9. **A.** NO CHANGE
B. it keeps its
C. it keeps their
D. they keep its

10. **F.** NO CHANGE
G. them as emotional, teary-eyed over
H. them, as emotional, teary-eyed over
J. them as, emotional teary-eyed over,

11. Which of the following sequences of sentences makes this paragraph most logical?
A. NO CHANGE
B. 1, 3, 2, 4
C. 2, 1, 4, 3
D. 3, 2, 1, 4

12. **F.** NO CHANGE
G. All of it is watched by you.
H. You watch it all.
J. Watching all of it is you.

13. Which of the choices best emphasizes the writer's intense involvement in witnessing this process?
A. NO CHANGE
B. watching
C. immersed in
D. curious in

14. Which of the choices is most consistent with the style established in the essay?
F. NO CHANGE
G. it is then apparent
H. one can see
J. you realize

GO ON TO THE NEXT PAGE.

Question 15 asks about the essay as a whole.

15. Suppose the writer had been assigned to write an essay explaining the reproductive methods of different species of turtles. Would this essay successfully fulfill the assignment?

A. Yes, because the essay focuses on the turtles and their egg-laying process.
B. Yes, because the essay describes the reproductive methods of giant leatherback turtles.
C. No, because the essay restricts its focus to the writer's experience of witnessing the egg-laying process of giant leatherback turtles.
D. No, because the essay omits mention of any turtle behavior connected with their means of reproduction.

PASSAGE II

Prepared for Anything

My mother is a justice of the peace; that means she has the power to perform weddings.[16] She has to be prepared for anything, because weddings these days can range from formal evening gown affairs to barefoot frolics during which the bride's dog might play the part of the ring bearer. She loves them all.[17]

Mom keeps a crazy conglomeration of wedding gear; rubber boots; a swanky, black formal; blue jeans;[18] dignified dresses, in three pastel colors; sneakers; beach[18] sandals, and a ski hat. Every item—except that ski hat—has come in handy at least once.

The rubber-boot wedding until now[19] was one of the most exciting and, despite the boots, romantic ceremonies so far. It took place on a wide pond. When Mom arrived, the guests had already been ferried

16. **F.** NO CHANGE
G. put on the ball and chain.
H. join couples up in matrimonial wedlock.
J. do the nuptial thing.

17. Which of the choices best introduces a central theme of the essay and provides an appropriate transition between the first and second paragraphs?

A. NO CHANGE
B. Or, a younger brother could be ring bearer.
C. The bride usually has a maid or matron of honor.
D. But it is usually the father who gives the bride away.

18. **F.** NO CHANGE
G. gear; rubber boots, a swanky, black formal, blue jeans, dignified dresses in three pastel colors, sneakers,
H. gear: rubber boots; a swanky black formal; blue jeans; dignified dresses, in three pastel colors; sneakers;
J. gear: rubber boots, a swanky black formal, blue jeans, dignified dresses in three pastel colors, sneakers,

19. **A.** NO CHANGE
B. (Place after *was*)
C. (Place after *ceremonies*)
D. OMIT the underlined portion.

GO ON TO THE NEXT PAGE.

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out to a leaky, flat-bottomed boat made
20

festive with flowers and pink balloons. [21]

They may be more expensive, but helium balloons do
22
look festive. My mother and the bridesmaids, all suitably
22
booted, paddled out in a canoe. Finally, dramatically, the bride and her parents arrived under sail. [23]

[24] Except for the beach setting, the bride had informed her, everything was to be traditional. The bride wore a long, queenly gown and veil, but she had not considered on the wind, which would have lifted her veil clean off if my mother hadn't had the good sense to hold it on. In the wedding photograph Mom appears to be blessing the bride, of whom a slightly harried expression
25
is disclosed by the wind.

Thus Mom's favorite weddings was a wonderful
26
blending of cultures and traditions: the bride and groom were Hungarian immigrants dressed in American denim; the ceremony of two-minute duration which was in
27
English was followed by hours of Hungarian celebrations.

20. **F.** NO CHANGE
G. boat for it has been made
H. boat, which it was made
J. boat. Making it

21. Given that all are true, which of the following sentences, if added here, would best enhance the narration of events in this paragraph?

A. Festivity is a good thing at weddings.
B. The groom and best man rowed up in a dinghy.
C. The bride and parents came later.
D. The bride didn't come in a flat-bottomed boat.

22. **F.** NO CHANGE
G. Flowers are also expensive, but they do look festive.
H. Helium balloons come in many colors.
J. OMIT the underlined portion.

23. Which of the following sentences, if added here, would best conclude the paragraph and support the main idea of the paragraph as expressed in its first sentence?

A. By the time the wedding was over, everyone was damp.
B. The crows cawed across the pond, the water sloshed, and the mosquitoes bit remorselessly.
C. My mother said not even all those wet galoshes undermined the romance of the starlit evening.
D. A flute duet performed by friends of the bride was nearly drowned out by the hiss of the wind in their dresses.

24. Which of the following sentences best continues to develop and support the theme of the essay while providing a smooth transition between the preceding paragraph and this one?

F. One of my mother's favorite weddings was held in the desert and another at the seashore.
G. My mother's second maritime wedding demanded the swanky formal and the sandals.
H. My mother sported a swanky formal and sandals.
J. My mother likes strange weddings.

25. **A.** NO CHANGE
B. which a slightly harried expression
C. a slightly harried expression of whom
D. whose slightly harried expression

26. **F.** NO CHANGE
G. Therefore,
H. Nevertheless,
J. Another of

27. **A.** NO CHANGE
B. two-minute ceremony
C. two-minute ceremony that took only a minute and was
D. ceremony that took two minutes and that was

GO ON TO THE NEXT PAGE.

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Yet the wedding Mom dreams of performing; she (28) hopes will take place at the foot of a ski run. She imagines my brother and his bride skiing down the mountain to join she and their guests. (29) Mom, however, (30) will be wearing a ski hat.

28. **F.** NO CHANGE
G. performing she
H. performing, and she
J. performing

29. **A.** NO CHANGE
B. her and their guests.
C. their guests and she.
D. there guests and herself.

30. **F.** NO CHANGE
G. nevertheless,
H. of course,
J. whoever,

PASSAGE III

Marian Anderson in Concert

It has been said that Marian Anderson's concerts were much like (31) communal celebrations than singing events. Her voice had extraordinary range and power, but equally moving was her presence on stage. Sincerely, gracious, (32) always in full command of her art, she seemed completely absorbed in every song she sang.

There is perhaps no superior (33) example of her ability to reach out to an audience than the concert she gave on Easter Sunday in 1939. It was, therefore, (34) originally scheduled to be given at Constitution Hall in Washington, D.C. But several weeks before the engagement, the organization that owned the hall canceled the contract (35) because members objected to an African American singing there.

The decision created controversy that spread throughout the country. When word of what happened reached the president's wife, Eleanor Roosevelt, her first response was to resign from the organization. The second thing she did was (36) to arrange for Anderson to sing before

31. **A.** NO CHANGE
B. more as
C. more like
D. OMIT the underlined portion.

32. **F.** NO CHANGE
G. Sincere, gracious,
H. Sincere graciously,
J. Sincere, gracious

33. **A.** NO CHANGE
B. better of an
C. better
D. good

34. **F.** NO CHANGE
G. was, however,
H. was, in fact,
J. was

35. **A.** NO CHANGE
B. canceled, the contract;
C. canceled the contract;
D. canceled, the contract,

36. **F.** NO CHANGE
G. did: was
H. did was,
J. did, was

GO ON TO THE NEXT PAGE.

the nation, her listening audience, from the steps of the Lincoln Memorial. (37)

Anderson wrote that she was in her autobiography so nervous she barely remembered that day. Before her a sea of faces stretched all the way to the Washington Monument, and behind her towered the statue of Abraham Lincoln. (38) (39) She was introduced to Supreme Court justices members, of the House, and Senate, executive department heads, and other dignitaries. (40) Then she walked over to the bank of microphones.

Anderson began by singing the national anthem, after which she sang several opera pieces and spirituals. (41) (41) Her splendid voice was broadcast into homes all across the country. With her mastery of various musical styles and the richness and control of her renditions, she made that Easter Sunday one of the nicest days of the year. (42)

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Whether performing Verdi at the Metropolitan Opera or singing folk spirituals on one of many concert tours, Anderson embraced her audiences with the same (43)

37. Which choice most effectively explains how Anderson was able to sing "before the nation"?

A. NO CHANGE
B. in front of the radio,
C. via radio,
D. across the dial,

38. **F.** NO CHANGE
G. (Place after *wrote*)
H. (Place after *nervous*)
J. (Place after *day* and end sentence with a period)

39. **A.** NO CHANGE
B. Abraham Lincoln towered as a statue.
C. was towering the statue of Abraham Lincoln.
D. the statue of Abraham Lincoln was towered.

40. **F.** NO CHANGE
G. justices members of the House
H. justices, members of the House,
J. justices, members of the House

41. **A.** NO CHANGE
B. After she sang several opera pieces and spirituals, Anderson began by singing the national anthem.
C. Anderson began by singing the national anthem, after she sang several opera pieces and spirituals.
D. By singing the national anthem, Anderson began and then sang several opera pieces and spirituals.

42. Which choice would most effectively summarize the event's impact as it has been described here?

F. NO CHANGE
G. a very important religious holiday.
H. a nationwide celebration of song.
J. the dream of a musical connoisseur.

43. **A.** NO CHANGE
B. many of one's
C. one out of her
D. any one of those

GO ON TO THE NEXT PAGE.

largeness of spirit. When she retired in 1965, [44] she

44. The writer is considering adding the following phrase at this point in the essay:

> decades after making one of her several concert tours on the European continent,

Would this phrase be a relevant and appropriate addition to the essay, and why?

F. Yes, because it informs the reader that she continued to perform long after that European tour.
G. Yes, because it helps the reader to form a historical reference for her European concert tours.
H. Yes, because it draws the link between the extreme pressures of those tours and her eventual retirement.
J. No, because it is vague and implies a significance to those tours unsupported by the rest of the essay.

had won over not only their acclaim but their enduring affection.
(45)

45. **A.** NO CHANGE
B. earned the winnings of
C. been the winner in
D. won

PASSAGE IV

> The following paragraphs may or may not be in the most logical order. Each paragraph is numbered in brackets, and item 60 will ask you to choose the most logical placement for Paragraph 4.

Clouds and Their Silver Linings

[1]

History is not merely remembering the good that came before. What's nostalgia. Small doses of nostalgia
(46)

46. **F.** NO CHANGE
G. Its
H. That's
J. Thats

may be harmless but enough, anything beyond that can
(47)

47. **A.** NO CHANGE
B. enough harmless, but
C. harmless enough, however,
D. harmless enough, but

get awfully dangerous awfully fast. [48]

48. Which of the following, if added here, would most effectively serve to summarize one of the main ideas of the essay?

F. People who accept mere nostalgia as history often deny or ignore long-term problems that need attention.
G. Those who don't believe in history are nostalgic—they realize that life is made up of both good and bad.
H. The number of people who have accepted mere nostalgia as history has begun to decrease in recent years.
J. In this essay, we will attempt to examine the intricate relationship between nostalgia and history.

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[2]

A culture willing to confront its flaws, can begin
49

to find remedies for it. The American Revolution
50

involving the original thirteen colonies was the outgrowth
51
of a focused attack on an unjust system. The same goes for

the abolition, women's rights, and civil rights movements.
52

In contrast, every constructive social movement in United
53
States history has resulted less from preening over successes than from examining failures.

[3]

More recently, American culture during the 1980s,
54

typified by the popular song "Don't Worry, Be Happy,"
55
fostered a host of domestic problems. Many health experts will tell you that if our leaders had initially taken the AIDS epidemic seriously, the disease would not be the problem that it is today. And many economists will tell you that the savings-and-loan scandal, which will cost United States taxpayers more than the entire Vietnam War, could only have occurred during a time of irresponsible confidence, when too many people wanted to ignore any negative information.

49. **A.** NO CHANGE
B. it's flaws
C. it's flaws,
D. its flaws

50. **F.** NO CHANGE
G. for them.
H. of them.
J. for themselves.

51. **A.** NO CHANGE
B. that occurred in what was to become the United States
C. that took place in what was then the thirteen colonies
D. OMIT the underlined portion.

52. **F.** NO CHANGE
G. abolition, womens' rights
H. abolition women's rights,
J. abolition, womens rights

53. **A.** NO CHANGE
B. In fact,
C. Besides,
D. For example,

54. **F.** NO CHANGE
G. culture, derived from the same Latin root as the word *cultivate* is,
H. culture, by which we do not mean "aesthetic taste or refinement,"
J. social patterns, traits, and products that are the sum of American culture

55. The writer intends here to provide an example of 1980s American culture superficially celebrating the positive. Given that all of the statements are true, which choice would best accomplish the writer's goal?
A. NO CHANGE
B. when the baby boomers became the "thirty-something" crowd,
C. which was certainly not an easy time for everybody,
D. despite a worldwide trend toward greater democratic freedom,

GO ON TO THE NEXT PAGE.

[4]

Sadly, the converse is equally true: a culture that blinds itself to flaws and dwells on the positive can create serious trouble for itself. Many historians believe that the self-indulgence and nationalism of the 1920s, for example, led directly to the Great Depression, which entertained breadlines and dust bowls. (56)

56. F. NO CHANGE
G. Depression, when they suffered breadlines and dust bowls.
H. Depression, a time of breadlines and dust bowls.
J. breadlines and dust bowls of the Depression.

[5]

As the philosopher George Santayana said (57) "Those who cannot remember the past are condemned to repeat it." In their effort to dwell on only the upbeat aspects of history, the people peddling like in nostalgia (58) are distorting the past, and (59) remembering it. The more distorted our past becomes, the more doomed we are to repeat it. Or, to put it another way, the more we look at the silver lining and ignore the clouds, the more likely we are to be caught in the rain with no umbrella.

57. A. NO CHANGE
B. philosopher, George Santayana said
C. philosopher, George Santayana, said
D. philosopher George Santayana said,

58. F. NO CHANGE
G. peddling nostalgia
H. peddling nostalgia like a bicycle
J. nostalgia peddling

59. A. NO CHANGE
B. nor
C. as their
D. not

Question 60 asks about the essay as a whole.

60. For the sake of the unity and coherence of this essay, Paragraph 4 should be placed:
F. where it is now.
G. after Paragraph 1.
H. after Paragraph 2.
J. after Paragraph 5.

PASSAGE V

A Schedule for Success

[1]

Japanese students observe a rigorous annually (61) schedule. Beginning in the second week of April and extending (62) through the following March. The

61. A. NO CHANGE
B. an annual rigorously
C. an annual rigorous
D. a rigorous annual

62. F. NO CHANGE
G. April, which extends the school year
H. April, their school year extends
J. April and extends

GO ON TO THE NEXT PAGE.

students have no long breaks or full summer vacations. [63]

[2]

[1] Japanese students finish their first term at the end of July and go on vacation until the beginning of September. [2] Then students return for their third term. [3] The second term ends on December 25 for the upcoming New Year's holiday. [64]

[3]

The Japanese school system consists of six years of elementary, three years of middle, and three years of high school. Although high school is not compulsory, (65)

attendees have become virtually universal. Acceptance (66)

into the best Japanese high schools however, are highly (67) competitive.

[4]

Japanese students have mixed attitudes toward school. Attending school six days a week, (68) (68)

taking as many as nine courses during a term. (69)

Typical, a ninth-grader takes Japanese, social studies, (70) mathematics, science, music, fine arts, physical education,

63. The writer wishes to open Paragraph 1 with a sentence that will define the topic and begin to sharpen the focus on the particular subject of this essay. Given that all are true, which of the following would most effectively accomplish this?

A. Japan is a populous island nation located along what is commonly known as the Pacific Rim.
B. The economic "miracle" that has taken place on the island nation of Japan has its roots in a strong educational system.
C. The economic growth that began in Japan in the 1960s has resulted in the third-highest gross national product in the world.
D. Every presidential candidate that comes before the public points out the importance to the nation of a healthy educational system.

64. Which of the following provides the most logical ordering of the sentences in Paragraph 2?

F. NO CHANGE
G. 1, 3, 2
H. 2, 1, 3
J. 3, 1, 2

65. **A.** NO CHANGE
B. school, although,
C. school, although
D. school and although

66. **F.** NO CHANGE
G. the number of attendants has
H. attendants have
J. attendance has

67. **A.** NO CHANGE
B. schools, however, is
C. schools, however, are
D. schools however, is

68. Which choice most effectively and appropriately introduces the subject of Paragraph 4?

F. NO CHANGE
G. Students in Japan have been given the option to learn beyond the classroom.
H. Japanese students generally have a heavy course load.
J. After all, Japanese students are just like you and me.

69. **A.** NO CHANGE
B. as many as nine courses may be taken
C. they take as many as nine courses
D. nine courses are taken by as many as possible

70. **F.** NO CHANGE
G. Typically, a
H. A typically
J. A typical,

GO ON TO THE NEXT PAGE.

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English, and homemaking or workshop are taken. The (71) greatest emphasis, however, is on the basic skills of writing, reading, and mathematical abilities and aptitudes. (72)

[5]

Because each major Japanese corporation recruits (73) new employees by arrangement from particular universities year after year, getting into the right university is important for students. Therefore, most parents encourage their children to attend *jukus,* or private preparatory schools, on weeknights and Sundays. The extra work helps the students to score well on entrance exams, which determine what universities they may attend. Once accepted into college, students are almost guaranteed graduation and a good job afterward.

[6]

With this emphasis on education, Japan has attained one of the highest literacy rates in the world; about (74) 99 percent. Meanwhile, Japan's educational system and its (75) business community have joined forces to ensure that a steady supply of well-prepared youth continue to enter the work force.

71. **A.** NO CHANGE
B. workshop is also taken.
C. workshop can be taken.
D. workshop.

72. **F.** NO CHANGE
G. the subject where math skills are practiced.
H. basic mathematical computations.
J. mathematics.

73. **A.** NO CHANGE
B. recruits, on an annual basis,
C. annually recruits
D. each year recruits

74. **F.** NO CHANGE
G. world about,
H. world: about
J. world about

75. **A.** NO CHANGE
B. it's
C. their
D. its'

END OF TEST 1

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

NO TEST MATERIAL ON THIS PAGE

MATHEMATICS TEST

60 Minutes—60 Questions

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

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

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

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

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

DO YOUR FIGURING HERE.

1. A *stone* is a unit of weight equivalent to 14 pounds. If a person weighs 177 pounds, how many stone, to the nearest tenth, does this person weigh?

   A. 247.8
   B. 126.4
   C. 79.1
   D. 12.6
   E. 7.9

2. To keep up with rising expenses, a motel manager needs to raise the $30.00 room rate by 18%. What will be the new rate?

   F. $30.18
   G. $31.80
   H. $33.00
   J. $35.40
   K. $48.00

3. Contributions to a charity are made by each of 5 companies as indicated in the table below.

Company	A	B	C	D	E
Contribution in dollars	0	300	300	180	270

   What is the average of the contributions made by the 5 companies?

   A. $187.50
   B. $210.00
   C. $250.00
   D. $262.50
   E. $350.00

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

4. Car A travels 60 miles per hour for $1\frac{1}{2}$ hours; Car B travels 40 miles per hour for 2 hours. What is the *difference* between the number of miles traveled by Car A and the number of miles traveled by Car B ?

F. 0
G. 10
H. 80
J. 90
K. 170

5. Which of the following is a value of t for which $(t-3)(t+2)=0$?

A. 2
B. 3
C. 5
D. 6
E. 7

6. In the parallelogram $ABCD$ shown below, $\overline{AD}$ is 6 inches long. If the parallelogram's perimeter is 34 inches, how many inches long is $\overline{AB}$?

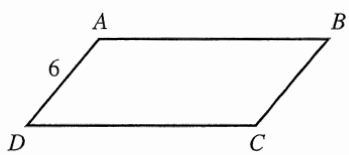
F. 28

G. 22

H. 17

J. 11

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



7. If the measure of each interior angle in a regular polygon is 90°, how many sides does the polygon have?

A. 3
B. 4
C. 6
D. 8
E. 12

8. For all nonzero r, t, and z values, $\frac{16r^3tz^5}{-4rt^3z^2} = ?$

F. $-\frac{4z^3}{r^2t^2}$

G. $-\frac{4r^2z^3}{t^2}$

H. $-\frac{4rz}{t}$

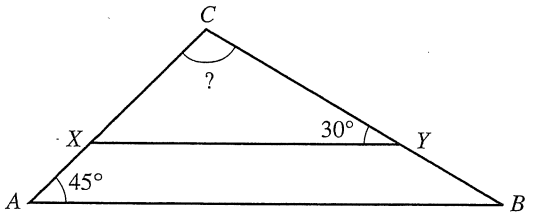
J. $-4r^4t^4z^7$

K. $-4r^2t^2z^3$

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

9. In the figure below, X and Y lie on the sides of $\triangle ABC$, and $\overline{XY}$ is parallel to $\overline{AB}$. What is the measure of $\angle C$?



A. 105°
B. 115°
C. 125°
D. 135°
E. 150°

10. $|-3| \cdot |2| = ?$

F. −6
G. −5
H. −1
J. 5
K. 6

11. A TV station conducted a telephone poll seeking viewers' reactions to a new show. Of the 750 people who answered, 500 liked the new show, 100 disliked it, and the rest were undecided. What percent of those who answered were undecided about the new show?

A. 20%

B. 25%

C. $66\frac{2}{3}\%$

D. 80%

E. 150%

12. Two whole numbers have a greatest common factor of 6 and a least common multiple of 36. Which of the following pairs of whole numbers will satisfy the given conditions?

F. 4 and 9
G. 9 and 12
H. 12 and 15
J. 12 and 18
K. 18 and 24

13. If $x = -2$ and $y = 3$, then $x^3y + xy^3 = ?$

A. −30
B. −36
C. −48
D. −78
E. −108

GO ON TO THE NEXT PAGE.

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DO YOUR FIGURING HERE.

14. How many units long is 1 side of a square with perimeter $20c - 12$ units?

F. $20c - 12$
G. $20c - 3$
H. $8c$
J. $5c - 12$
K. $5c - 3$

15. If $(x + k)^2 = x^2 + 22x + k^2$ for all real numbers x, then $k = ?$

A. 11
B. 22
C. 44
D. 88
E. 176

16. Before his interview, Ben bought 1 suit and 2 shirts, all on sale. The suit, regularly \$260, was 20% off, and the shirts, regularly \$30 each, were 30% off. What was the total price of the 3 items Ben bought?

(Note: Assume there is no sales tax.)

F. \$220
G. \$229
H. \$240
J. \$250
K. \$270

17. Which of the following expressions gives the slope of the line connecting the points (6,8) and (–4,–10) in the standard (x,y) coordinate plane?

A. $\frac{8 + (-10)}{-6 - (-4)}$

B. $\frac{8 + (-10)}{-4 + 6}$

C. $\frac{8 - (-10)}{6 - (-4)}$

D. $\frac{8 - (-10)}{-4 - 6}$

E. $\frac{8 - (-10)}{-6 + 4}$

18. In the standard (x,y) coordinate plane, how many times does the graph of $y = (x + 1)(x - 2)(x + 3)(x + 4)$ intersect the x-axis?

F. 10
G. 6
H. 4
J. 3
K. 1

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

19. Which of the following is a simplified version equivalent to $\frac{3+6x}{9x}$?

A. $\frac{2x+1}{3x}$

B. $\frac{1+6x}{3x}$

C. 1

D. 2

E. $\frac{7}{3}$

20. Four students about to purchase concert tickets for \$18.50 for each ticket discover that they may purchase a block of 5 tickets for \$80.00. How much would each of the 4 save if they can get a fifth person to join them and the 5 people equally divide the price of the 5-ticket block?

F. \$ 1.50
G. \$ 2.50
H. \$ 3.13
J. \$10.00
K. \$12.50

21. What is the sum of the polynomials $3a^2b + 2a^2b^2$ and $-ab^2 + a^2b^2$?

A. $3a^2b - ab^2 + 3a^2b^2$
B. $3a^2b - ab^2 + 2a^2b^2$
C. $2a^2b + 3a^2b^2$
D. $2a^2b^3 + 2a^4b^4$
E. $-3a^3b^3 + 2a^4b^4$

22. An object 4 feet tall casts a 3-foot shadow when the angle of elevation of the sun is θ (see figure below). What is tan(θ) ?

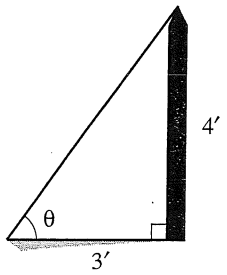
F. $\frac{3}{4}$

G. 1

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

J. 7

K. 12



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DO YOUR FIGURING HERE.

23. Mary was x years old 10 years ago. How old will she be 6 years from now?

A. $x + 6$
B. $(x - 10) + 6$
C. $(x + 10) - 6$
D. $(x - 10) - 6$
E. $(x + 10) + 6$

24. Which of the following is a factor of $x^2 - 5x - 6$?

F. $(x - 1)$
G. $(x + 2)$
H. $(x - 2)$
J. $(x - 3)$
K. $(x - 6)$

25. What is the length, in centimeters (cm), of the hypotenuse of a right triangle with legs measuring 5 cm and 12 cm ?

A. 7
B. 13
C. 17
D. $\sqrt{17}$
E. $\sqrt{119}$

26. Which of the following expressions is a simplified form of $(-2a^5)^2$?

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F. $-4a^{10}$
G. $-4a^7$
H. $-2a^{10}$
J. $4a^7$
K. $4a^{10}$

27. The *specific gravity* of a substance is the ratio of the weight of the substance to the weight of an equal volume of water. If 1 cubic foot of water weighs 62.5 pounds, what is the specific gravity of a liquid that weighs 125 pounds per cubic foot?

A. 1
B. 1.25
C. 2
D. 6.25
E. 125

28. If $2x + 1 = -3$, what is the value of $x^2 - 3x$?

F. -10
G. -2
H. 2
J. 5
K. 10

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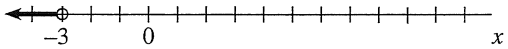
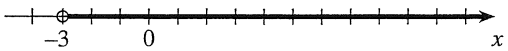
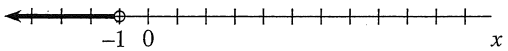
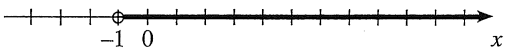
DO YOUR FIGURING HERE.

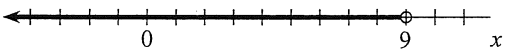
29. Which of the following is the graph of the solution set for $3(2 + x) < 3$?

A. 

B. 

C. 

D. 

E. 

30. Which of the following equations has y varying directly as the square of w and inversely as the cube of t ?

F. $\frac{y^2}{t^3} = w$

G. $\frac{w^2}{t^3} = y$

H. $\frac{t^2}{w^3} = y$

J. $\frac{\sqrt{w}}{\sqrt[3]{t}} = y$

K. $\frac{w^2}{y^3} = t$

31. Points $A(-3,-4)$ and $B(7,-2)$ determine line segment $\overline{AB}$ in the standard (x,y) coordinate plane. If the midpoint of $\overline{AB}$ is $(a,-3)$, what is the value of a ?

A. 2
B. –4
C. 4
D. –5
E. 5

32. If the graphs of $y = 2x$ and $y = mx + 1$ are parallel in the standard (x,y) coordinate plane, then $m =$?

F. –1

G. 0

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

J. 1

K. 2

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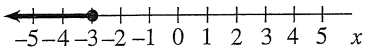
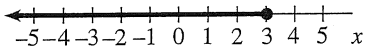
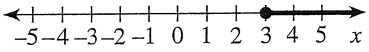
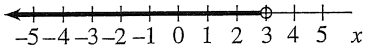
DO YOUR FIGURING HERE.

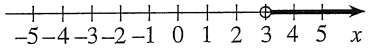
33. When 4 times x is increased by 7, the result is less than 19. Which of the following is a graph of the real numbers x that satisfy this relationship?

A. 

B. 

C. 

D. 

E. 

34. It costs 90 cents to purchase x apples and 68 cents to purchase y oranges. Which of the following is an expression for the cost, in cents, of 5 apples and 7 oranges?

F. $\frac{90}{5+x} + \frac{68}{7+y}$

G. $7\left(\frac{90}{x}\right) + 5\left(\frac{68}{y}\right)$

H. $5\left(\frac{x}{90}\right) + 7\left(\frac{y}{68}\right)$

J. $5\left(\frac{90}{x}\right) + 7\left(\frac{68}{y}\right)$

K. $5\left(\frac{68}{x}\right) + 7\left(\frac{90}{x}\right)$

35. When graphed in the standard (x,y) coordinate plane, 3 points from among (–12,3), (–8,2), (–3,2), (1,2), and (5,1) lie on the same side of the line $y + x = 0$. Which 3 points are they?

A. (–12,3), (–8,2), (–3,2)
B. (–12,3), (–8,2), (1,2)
C. (–12,3), (–3,2), (5,1)
D. (–12,3), (1,2), (5,1)
E. (–3,2), (1,2), (5,1)

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DO YOUR FIGURING HERE.

36. What is the cosine of angle A in right triangle $\triangle ABC$ below?

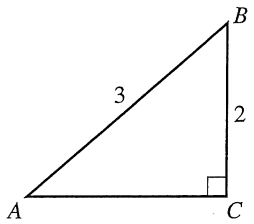
F. $\frac{2}{\sqrt{5}}$

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

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

J. $\frac{\sqrt{5}}{2}$

K. $\frac{3}{\sqrt{5}}$



37. The graph of the solution set for the system of linear equations below is a single line in the standard (x,y) coordinate plane.

$$18x - 30y = 54$$
$$6x + ky = 18$$

What must be the value of k ?

A. -10

B. -6

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

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

E. 3

38. Doctors use the term *maximum heart rate* (*MHR*) when referring to the quantity found by starting with 220 beats per minute and subtracting 1 beat per minute for each year of a person's age. Doctors recommend exercising 3 or 4 times each week for at least 20 minutes with your heart rate increased from its *resting heart rate* (*RHR*) to its *training heart rate* (*THR*), where

$$THR = RHR + .65(MHR - RHR)$$

Which of the following is closest to the *THR* of a 43-year-old person whose *RHR* is 54 beats per minute?

F. 197
G. 169
H. 162
J. 134
K. 80

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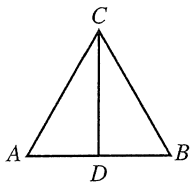
39. Martina's teacher told her to be sure NOT to calculate $(a + b)^2$ as $a^2 + b^2$. But Martina thinks that sometimes that calculation works. After working for a while, she shows that $(a + b)^2$ equals $a^2 + b^2$ if and only if:

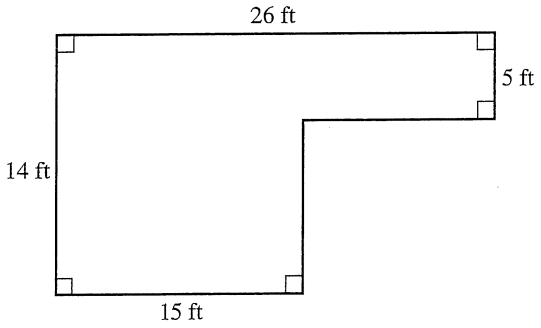
A. $a = 0$
B. $b = 0$
C. $a = 0$ and $b = 0$
D. $a = 0$ or $b = 0$
E. a and b have the same sign

40. In the figure below, $\overline{CD}$ is an altitude of equilateral triangle $\triangle ABC$. If $\overline{CD}$ is $6\sqrt{3}$ units long, how many units long is $\overline{AC}$?



F. $3\sqrt{3}$
G. 6
H. 12
J. $12\sqrt{3}$
K. 36

41. What is the perimeter, in feet (ft), of the figure below?



A. 60
B. 75
C. 80
D. 130
E. 364

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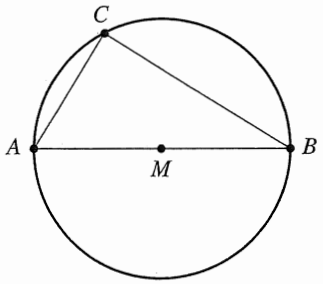
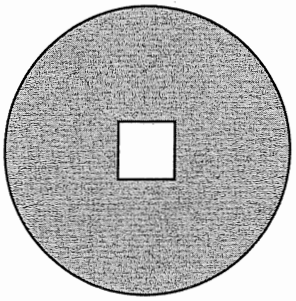
DO YOUR FIGURING HERE.

42. Right triangle $\triangle ABC$ is inscribed in a circle with center M, shown below, and C can be any point on the circle other than A or B. Which of the following is the most direct explanation of why $\triangle MCA$ is isosceles?



F. 2 sides are radii of the circle
G. Side-angle-side congruence
H. Angle-side-angle congruence
J. Angle-angle-angle similarity
K. The Pythagorean theorem

43. A square 2 feet on a side is cut out of a circle with radius 10 feet as shown in the figure below. Which of the following expressions gives the area of the shaded region, in square feet?



A. $\pi(10 - 2^2)$
B. $\pi(10 - 2)^2$
C. $\pi(10 - 1)^2$
D. $\pi 10^2 - 1^2$
E. $\pi 10^2 - 2^2$

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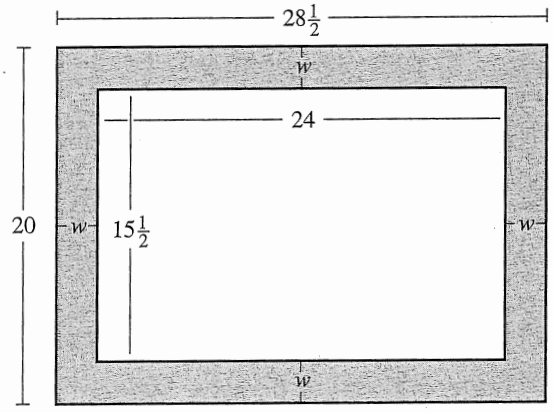
DO YOUR FIGURING HERE.

44. The inside dimensions of a rectangular picture frame are $15\frac{1}{2}$ inches by 24 inches and the outside dimensions are 20 inches by $28\frac{1}{2}$ inches, as shown below.



What is the width (w), in inches, of the picture frame?

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

G. 2

H. $2\frac{1}{4}$

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

K. $4\frac{1}{2}$

45. The area of a rectangular floor is 170 square feet. The length of the floor is 3 feet less than twice the width. How many feet wide is the floor?

A. 8.5
B. 10
C. 14
D. 15
E. 17

46. For the area of a square to double, the new side lengths must be the old side lengths multiplied by:

F. $\sqrt{2}$

G. 2

H. 4

J. $\sqrt{8}$

K. 8

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47. If $\log_x 81 = 4$, then $x = ?$

A. 3

B. 9

C. $\frac{81}{4}$

D. $\frac{81}{\log 4}$

E. 81^4

48. If $A = \begin{bmatrix} 2 & -4 \\ 6 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 4 \\ -6 & 0 \end{bmatrix}$, then $A - B = ?$

F. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

G. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

H. $\begin{bmatrix} 0 & -8 \\ 0 & 0 \end{bmatrix}$

J. $\begin{bmatrix} -4 & 0 \\ -12 & 0 \end{bmatrix}$

K. $\begin{bmatrix} 4 & -8 \\ 12 & 0 \end{bmatrix}$

49. If a and b are real numbers, and $a > b$ and $b < 0$, then which of the following inequalities must be true?

A. $a > 0$

B. $a < 0$

C. $a^2 > b^2$

D. $a^2 < b^2$

E. $b^2 > 0$

50. The ratio of the lengths of the sides of a right triangle is $1:\sqrt{3}:2$. What is the sine of the triangle's smallest angle?

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

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

H. $\frac{\sqrt{3}}{2}$

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

K. 1

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DO YOUR FIGURING HERE.

51. What is the amplitude of the graph of the equation $y + 2 = 3\sin(4\theta)$?

(Note: The amplitude is $\frac{1}{2}$ the difference between the maximum and the minimum values of y.)

A. 2
B. 3
C. 4
D. 5
E. 6

52. Each of the following determines a unique plane in 3-dimensional Euclidean space EXCEPT:

F. 1 line and 1 point NOT on the line.
G. 2 distinct parallel lines.
H. 2 intersecting perpendicular lines.
J. 2 lines intersecting in more than 1 point.
K. 3 distinct points NOT on the same line.

53. The measure of the vertex angle of an isosceles triangle is $(x - 20)°$. The base angles each measure $(2x + 30)°$. What is the measure in degrees of one of the base angles?

A. 8°

B. 28°

C. $42\frac{1}{2}°$

D. $47\frac{1}{2}°$

E. 86°

54. In decorating baskets for a retirement party, Rudy needs the following amounts of ribbon for each basket:

number of ribbons	length (inches)
5	8
3	16
2	10

If the ribbon costs \$0.98 per yard, which of the following would be the approximate cost of ribbon for 10 baskets?

(Note: 1 yard = 36 inches)

F. \$ 3
G. \$ 9
H. \$30
J. \$35
K. \$90

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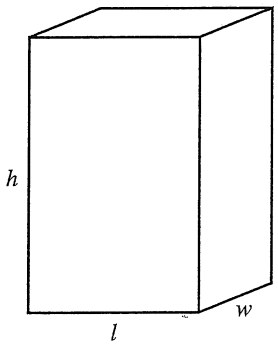
55. The formula for the surface area (S) of a rectangular solid (shown below) is $S = 2lw + 2lh + 2wh$, where l represents the length, w the width, and h the height of the solid. Doubling each of the dimensions (l, w, and h) will increase the surface area to how many times its original size?



A. 2
B. 4
C. 6
D. 8
E. 24

56. The average of a set of five integers is 16. When a sixth number is included in the set, the average of the set increases to 18. What is the sixth number?

F. 18
G. 20
H. 21
J. 24
K. 28

57. Which of the following is an equation of the largest circle that can be inscribed in the ellipse with equation $\frac{(x-1)^2}{9} + \frac{(y+3)^2}{16} = 1$?

A. $(x-1)^2 + (y+3)^2 = 144$
B. $(x-1)^2 + (y+3)^2 = 16$
C. $(x-1)^2 + (y+3)^2 = 9$
D. $x^2 + y^2 = 16$
E. $x^2 + y^2 = 9$

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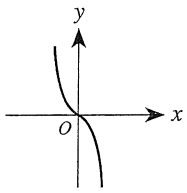
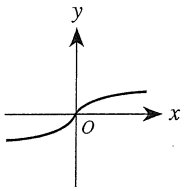
DO YOUR FIGURING HERE.

58. One of the graphs below is that of $y = Ax^3$, where A is a constant. Which one?

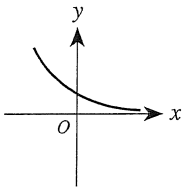
F.



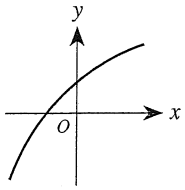
J.



G.



K.



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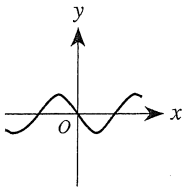

59. How many points do the graphs of all 3 of the following equations have in common?

$$\begin{aligned} -x &= y - 3 \\ -x &= -y - 3 \\ 3x &= -3y + 2 \end{aligned}$$

A. 0
B. 1
C. 2
D. 3
E. Infinitely many

60. In 3 fair coin tosses, what is the probability of obtaining exactly 2 tails?

(Note: In a fair coin toss the 2 outcomes, heads and tails, are equally likely.)

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

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

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

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

K. $\frac{7}{8}$

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 Virginia Woolf's *To The Lighthouse* (©1955 by Leonard Woolf).

It could not last, she knew, but at the moment her eyes were so clear that they seemed to go round the table unveiling each of these people, and their thoughts and their feelings, without effort like a light stealing under water so that its ripples and the reeds in it and the minnows balancing themselves, and the sudden silent trout are all lit up hanging, trembling. So she saw them; she heard them; but whatever they said had also this quality, as if what they said was like the movement of a trout when, at the same time, one can see the ripple and the gravel, something to the right, something to the left; and the whole is held together; for whereas in active life she would be netting and separating one thing from another; she would be saying she liked the Waverley novels or had not read them; she would be urging herself forward; now she said nothing. For the moment, she hung suspended.

"Ah, but how long do you think it'll last?" said somebody. It was as if she had antennae trembling out from her, which, intercepting certain sentences, forced them upon her attention. This was one of them. She scented danger for her husband. A question like that would lead, almost certainly, to something being said which reminded him of his own failure. How long would he be read—he would think at once. William Bankes (who was entirely free from all such vanity) laughed, and said he attached no importance to changes in fashion. Who could tell what was going to last—in literature or indeed in anything else?

"Let us enjoy what we do enjoy," he said. His integrity seemed to Mrs. Ramsay quite admirable. He never seemed for a moment to think, But how does this affect me? But then if you had the other temperament, which must have praise, which must have encouragement, naturally you began (and she knew that Mr. Ramsay was beginning) to be uneasy; to want somebody to say, Oh, but your work will last, Mr. Ramsay, or something like that. He showed his uneasiness quite clearly now by saying, with some irritation, that, anyhow, Scott (or was it Shakespeare?) would last him his lifetime. He said it irritably. Everybody, she thought, felt a little uncomfortable, without knowing why. Then Minta Doyle, whose instinct was fine, said bluffly, absurdly, that she did not believe that any one really enjoyed reading Shakespeare. Mr. Ramsay said grimly that very few people liked it as much as they said they did. But, he added, there is considerable merit in some of the plays nevertheless, and Mrs. Ramsay saw that it would be all right for the moment anyhow; he would laugh at Minta, and she, Mrs. Ramsay saw, realising his extreme anxiety about himself, would, in her own way, see that he was taken care of, and praise him, somehow or other. But she wished it was not necessary. Anyhow, she was free now to listen to what Paul Rayley was trying to say about books one had read as a boy. They lasted, he said. He had read some of Tolstoi at school. There was one he always remembered, but he had forgotten the name. Russian names were impossible, said Mrs. Ramsay. "Vronsky," said Paul. He remembered that because he always thought it such a good name for a villain. "Vronsky," said Mrs. Ramsay; "Oh, *Anna Karenina,*" but that did not take them very far; books were not in their line. No, Charles Tansley would put them both right in a second about books, but it was all so mixed up with, Am I saying the right thing? Am I making a good impression? that, after all, one knew more about him than about Tolstoi, whereas, what Paul said was about the thing, simply, not himself, nothing else. Like all stupid people, he had a kind of modesty too, a consideration for what you were feeling, which, once in a way at least, she found attractive. Now he was thinking, not about himself or about Tolstoi, but whether she was cold, whether she would like a pear.

No, she said, she did not want a pear. Indeed she had been keeping guard over the dish of fruit (without realising it) jealously, hoping that nobody would touch it. Her eyes had been going in and out among the curves and shadows of the fruit, among the rich purples of the lowland grapes, then over the horny ridge of the shell, putting a yellow against a purple, a curved shape against a round shape, without knowing why she did it, or why, every time she did it, she felt more and more serene; until, oh, what a pity that they should do it—a hand reached out, took a pear, and spoilt the whole thing.

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1. Which author is described as less enjoyable to read than people are willing to admit?
   A. Scott
   B. Ramsay
   C. Shakespeare
   D. Tolstoi

2. What danger does Mrs. Ramsay sense at one point in the conversation?
   F. That she will be forced to pay attention to what is being said
   G. That her husband will miss an important change in literature
   H. That she will be seen as vain
   J. That something will be said to make her husband feel a failure

3. It is most reasonable to infer that Mrs. Ramsay hopes no one will touch the dish of fruit primarily because:
   A. it is beautiful and calming.
   B. she knows her children want it.
   C. she is afraid her husband will get angry.
   D. she wants the pear for herself.

4. Given the way he is presented in the passage, William Bankes can best be described as:
   F. amiable and self-confident.
   G. vain and insecure.
   H. kind but vain.
   J. self-confident and selfish.

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5. The first paragraph suggests that the "she" who is looking around the dinner table feels unusually:
   A. awkward and unsure of what's happening.
   B. aware of what others are thinking and feeling.
   C. on display like a fish in an aquarium.
   D. like a character in the Waverley novels.

6. Which of the following conclusions about the relationship between Mr. and Mrs. Ramsay is best supported by the details in the passage?
   F. She admires his integrity and he respects her modesty.
   G. They are bored and uncomfortable with each other and only stay together for their children.
   H. She is jealous and selfish and he is unhappy.
   J. He is insecure and requires a lot of attention, which she usually gives.

7. What does the narrator suggest is a central characteristic of Charles Tansley?
   A. Stupidity
   B. Modesty
   C. Self-absorption
   D. Forgetfulness

8. Which person does Mrs. Ramsay admire for having integrity?
   F. Mr. Ramsay
   G. Mr. Rayley
   H. Minta Doyle
   J. Mr. Bankes

9. Mrs. Ramsay would most likely agree with which of the following characterizations of Paul Rayley?
   A. He is stupid but considerate.
   B. He is a vain intellectual.
   C. He is modest and smart.
   D. He is vain and worried about making a good impression.

10. One can reasonably infer from the passage that on the occasion of this dinner Mrs. Ramsay is feeling:
   F. detached and analytical.
   G. frightened and uneasy.
   H. giddy and happy.
   J. irritated and insecure.

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Passage II

SOCIAL SCIENCE: This passage is adapted from *Loose Canons,* a collection of essays by Henry Louis Gates, Jr. (©1992 by Henry Louis Gates, Jr.).

What is multiculturalism, and why are they saying such terrible things about it? We've been told it threatens to fragment American culture into a warren of ethnic enclaves, each separate and inviolate. We've been told that it menaces the Western tradition of literature and the arts. We've been told it aims to politicize the school curriculum, replacing honest historical scholarship with a "feel good" syllabus designed solely to bolster the self-esteem of minorities. The alarm has been sounded, and many scholars and educators—liberals as well as conservatives—have responded to it. After all, if multiculturalism is just a pretty name for ethnic chauvinism, who needs it?

There is, of course, a liberal rejoinder to these concerns, which says that this isn't what multiculturalism is—or at least not what it ought to be. The liberal pluralist insists that the debate has been miscast from the beginning and that it is worth setting the main issues straight.

There's no denying that the multicultural initiative arose, in part, because of the fragmentation of American society by ethnicity, class, and gender. To make it the culprit for this fragmentation is to mistake effect for cause. Mayor Dinkins's metaphor about New York as a "gorgeous mosaic" is catchy but unhelpful, if it means that each culture is fixed in place and separated by grout. Perhaps we should try to think of American culture as a conversation among different voices—even if it's a conversation that some of us weren't able to join until recently. Perhaps we should think about education, as the conservative philosopher Michael Oakeshott proposed, as "an invitation into the art of this conversation in which we learn to recognize the voices," each conditioned, as he says, by a different perception of the world. Common sense says that you don't bracket 90 percent of the world's cultural heritage if you really want to learn about the world.

To insist that we "master our own culture" before learning others only defers the vexed question: What gets to count as "our" culture? What makes knowledge worth knowing? Unfortunately, as history has taught us, an Anglo-American regional culture has too often masked itself as universal, passing itself off as our "common culture," and depicting different cultural traditions as "tribal" or "parochial." So it's only when we're free to explore the complexities of our hyphenated American culture that we can discover what a genuinely common American culture might actually look like. Common sense reminds us that we're *all* ethnics, and the challenge of transcending ethnic chauvinism is one we all face.

Granted, multiculturalism is no magic panacea for our social ills. We're worried when Johnny can't read. We're worried when Johnny can't add. But shouldn't we be worried, too, when Johnny tramples gravestones in a Jewish cemetery or scrawls racial epithets on a dormitory wall? It's a fact about this country that we've entrusted our schools with the fashioning and refashioning of a democratic polity; that's why the schooling of America has always been a matter of political judgment. But in America, a nation that has theorized itself as plural from its inception, our schools have a very special task.

The society we have made simply won't survive without the values of tolerance. And cultural tolerance comes to nothing without cultural understanding. In short, the challenge facing America in the next century will be the shaping, at long last, of a truly common public culture, one responsive to the long-silenced cultures of color. If we relinquish the ideal of America as a plural nation, we've abandoned the very experiment that America represents.

11. The main point of the last paragraph is that the values upon which America is based demand that its citizens need to be:

A. more scholarly.
B. more tolerant.
C. less idealistic.
D. more experimental.

12. The author of the passage finds Mayor Dinkins's metaphor (line 25) unhelpful because that metaphor suggests that each culture in America:

F. should probably be blended together.
G. exists separately from one another.
H. seems to embody cultural pluralism.
J. attacks the concept of ethnic chauvinism.

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13. The author of the passage appears to feel that the answer to the question "What gets to count as 'our' culture?" should be provided by:

A. most Anglo-Americans.
B. a few liberal pluralists.
C. a range of cultural perspectives.
D. concerned scholars and educators.

14. As it is used in line 62, the word *inception* most nearly means:

F. politics.
G. beginnings.
H. idealism.
J. multiculturalism.

15. One of the main points made in the third paragraph (lines 20–37) is that education demands that people:

A. learn to master their own culture.
B. learn to see the world from new perspectives.
C. find a way to define American regional culture.
D. bracket 90 percent of the world's cultures.

16. The author implies that it is not unusual for the dominant culture in our country to look at different cultural traditions as:

F. parochial.
G. typical.
H. universal.
J. multicultural.

17. According to the passage, only by hearing the many different voices in American culture can we know what:

A. panacea will make American culture fully multicultural.
B. is so appealing about Dinkins's "gorgeous mosaic" metaphor.
C. distinguishes tribal from parochial in American culture.
D. a genuinely common American culture might look like.

18. The author states that because we have entrusted the task of "fashioning and refashioning a democratic polity" to our schools, education has become:

F. democratic.
G. irrelevant.
H. multicultural.
J. political.

19. The author states that America was founded upon the notion of being:

I. a truly plural nation.
II. a "gorgeous mosaic."
III. responsive to the cultures of color.

A. I only
B. II only
C. I and II only
D. II and III only

20. The author's comment about cultures that are "long-silenced" refers to groups that:

F. have little interest in contributing to American cultural growth.
G. deliberately avoided discussing the subject of multiculturalism.
H. the dominant group has tried to exclude from shaping American culture.
J. rarely felt it necessary to comment on the course of American culture.

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Passage III

HUMANITIES: This passage is adapted from Lindsay Heinsen's "The Southern Artist: Kreg Kallenberger" (©1991 by Southern Accents, Inc.).

As the Ozarks reach west from Missouri and Arkansas, they give their final gasps north of Tulsa and then collapse onto the Great Plains. The gasps are the Osage Hills. It's a hard, undomesticated landscape of low, bald elevations, red clay, and scrub oak. The Osage Hills have cast no spell over Tulsa's real-estate developers who, in boom times, have pushed the city relentlessly southward onto the plains. "This is forgotten country," says a man who grew up in its shadow. "Most Tulsa residents don't know it's here." Yet the Osage Hills have found at least one contemporary poet in sculptor Kreg Kallenberger. A soft-spoken man of forty, Kallenberger moved to Tulsa at the age of one and has seldom left since. From the foothills, it's a short drive down Apache Street to his home and studio on Reservoir Hill. There, he reworks the burnt hills and blasted sky in the cool medium of glass.

Kallenberger's Osage sculptures would look at home on the shelves of a Rocky Mountain minerals shop, surrounded by geodes. Most are long wedges of cast optical crystal, glacial melon slices weighing as much as fifty pounds. On the tops and sides, they are all precision—sliced, notched, and polished. Yet this refinement has a raw edge. The rugged bottoms are peaks and valleys, stained with the colors and vistas of the nearby hills. As Kallenberger readies them for a February show at Boca Raton's Habatat Galleries, Osage works are strewn about the studio. They seem to have been sliced from the foothills with sky intact, as if God were gathering landscape samples for the next world.

These are works of time-consuming craftsmanship: when Kallenberger says, "I rarely leave the house," one believes him. His intensity and background in engineering may be prerequisites for sculptors working with glass. The days are spent lugging crystal ingots, tinkering with the furnace, sketching, fabricating molds, monitoring the slow processes of heating, cooling, grinding, and polishing. His chosen wedge shape is particularly vulnerable to the cooling process, which lasts up to three weeks; if the power fails or the equipment settings are inaccurate, the result is fracture. "This is not a predictable industry," he says. "You base this success on the last failure." He completed just twelve Osage pieces last year.

The sculptor's reputation has taken off in the past six or seven years. He now has regular one-man shows at the two Habatat Galleries, located at Farmington Hills near Detroit and in Boca Raton. Through Habatat, he has attended the influential New Art Forms show at Chicago's Navy Pier each autumn. And in 1984, on the strength of his Interlock and Cuneiform series, he received a National Endowment for the Arts Fellowship Grant. He is represented in Tulsa by M. A. Doran Gallery, and his works are in the Detroit Institute of Arts, Atlanta's High Museum of Art, and the Museum of Fine Arts, Boston.

In April of [1990], Kallenberger was featured in the Detroit Habatat's Eighteenth Annual International Invitational exhibition. Ferdinand Hampson, who cofounded the gallery with Tom and Linda Boone, says, "These are theoretically the greatest artists in glass today, and Kreg dominated the show in sales and critical opinion."

Kallenberger's current themes emerged with the Titanic series in the mid-eighties. The wedges of his earlier Cuneiform series reappeared, elongated and deeper. Key details—a scoop or notch, a pair of black circles—appeared on the thin top edge, in contrast with the deep and massive whole. Along came the rough edges, controlled fractures, eventually stained by hand.

The optical effects of the Osage sculptures are dazzling. As one walks around each piece, its transparent volume suddenly fills up with the refracted landscape of the bottom edge—a sculpture filled with an image. "The glass just does that," he says. The power of basic shapes is his focus, as are contrasts of texture and color.

Oddly, the charisma of glass exerts a special fascination for men. "It seems to be made through mysterious processes," Kallenberger says. Among his audience are "CEOs [Chief Executive Officers of corporations] who've never bought sculpture or any art before." Presented with identical shapes in bronze and glass, this hypothetical male CEO will prefer the latter. Why? "Because he *thinks* he knows how the bronze shape is made. It's made sort of like his car is made. It's metal—you can hammer on it, weld it. He looks at the same form in glass and has no idea how it was made. Men look at a piece and say, 'How did you *do* that?'"

21. The passage indicates Kallenberger's sculptures are most vulnerable to damage during which part of their production?

A. Mold fabrication
B. Heating process
C. Cooling period
D. Grinding procedure

22. Kallenberger says that by his observation male CEOs frequently like what kind of art pieces best?

F. Brass sculpture
G. Geodes
H. Paintings
J. Glass sculpture

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23. The phrase "reworks the burnt hills and blasted sky in the cool medium of glass" (lines 16–17) implies that:

A. Kallenberger is doing some landscaping around his house with his sculptures to make his home cooler and nicer.
B. there is an interesting contrast between the stark, hot, rough landscape that Kallenberger captures in his sculpture and the cool, smooth texture of glass.
C. Kallenberger is using glass windows and skylights in his house and studio to cool them off.
D. there are more fires in the hills around Kallenberger's studios than in the mountains where he gets his glass.

24. It is reasonable to infer that Kallenberger calls his Osage sculptures Osage because:

F. the process comes from an artist named Osage.
G. the crystal comes from the Osage Hills.
H. Osage is the place he was born.
J. the Osage Hills inspire his work.

25. When was Kallenberger's Titanic series of works produced?

A. After the Cuneiform series
B. Before the Cuneiform series
C. In April of 1990
D. After the Detroit Habatat Eighteenth Annual International Invitational

26. Which of the following is NOT characteristic of the Osage sculptures?

F. They are modern geometric designs.
G. They would be at home in a minerals shop.
H. They look like reworkings of the burnt hills.
J. They are often colored to resemble the Osage Hills.

27. As it is used in line 2, the word *gasps* most nearly means:

A. deep sighs.
B. small mountains.
C. wide valleys.
D. profound fatigue.

28. The passage suggests that Kallenberger's early training for another profession has proven to be:

F. a hindrance to his work as an artist.
G. not significant in his work as an artist.
H. useful in the technical part of his work as an artist.
J. helpful in developing his artistic sensibility.

29. The passage suggests that much of the visual power of Kallenberger's sculptures comes from the:

A. perfect smoothness of all the sides of the sculptures.
B. pure white transparency of the sculptures.
C. way the rough bottom edge is refracted in the sculptures.
D. contrast between the glass and bronze parts of the sculpture.

30. The passage suggests that Kallenberger's sculptures come from:

I. pieces of natural mineral in the Ozarks.
II. geodes in a Rocky Mountain minerals shop.
III. cast glass that is heated, cooled, and polished.

F. I only
G. III only
H. I and II only
J. I, II, and III

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Passage IV

NATURAL SCIENCE: This passage is adapted from the article "Butterflies and Bad Taste: Rethinking a Classic Tale of Mimicry" by Tim Walker (©1991 by Science Service, Inc.).

Picture a bird searching for a midafternoon snack—perhaps a butterfly.

Suddenly, the bird spies a bright orange butterfly. But instead of attacking, the bird ignores it. Why? Because the bird remembers what happened the last time it ate a bright orange butterfly: It vomited.

So the butterfly survives and continues on its way, courtesy of the bright orange warning that nature painted on its wings.

But was this a false warning? Did the butterfly's color trick the bird into passing up what would have actually made a tasty hors d'oeuvre? If the orange butterfly was a viceroy, *Limenitis archippus,* most biologists would have answered yes. For more than a century, the conventional wisdom has held that this winged insect cloaks a very appetizing body behind the colors of a toxic monarch butterfly, *Danaus plexippus.*

New research indicates, however, that the viceroy has successfully deceived scientists, not birds. Entomologists have long labored under the assumption that the viceroy's orange warning colors were just a bluff. Now, two zoologists have demonstrated that to discerning birds, the viceroy can taste just as foul as the noxious monarch.

Nineteenth-century English naturalist Henry Walter Bates first put forth the idea that a species of tasty butterfly could protect itself by evolving to mimic a toxic species. One species' exploitation of another's protection system has been called Batesian mimicry ever since.

And for most of this century, biology textbooks have touted the viceroy-monarch relationship as the classic example of Batesian mimicry—a truism that must now be reconsidered.

David B. Ritland and Lincoln P. Brower have conducted an avian taste test. The test aimed to determine which butterfly species, if any, were noxious to the birds. Because these snacks lacked wings, the birds had to base their selections on the taste of the butterflies' bodies alone.

The birds found the viceroy just as unappetizing as the monarch.

Why had no one challenged the viceroy's avian palatability before?

One reason, says entomologist Austin P. Platt, is that the viceroy evolved from a group of tasty admiral butterflies. "So it was just widely held that the viceroy itself was also palatable," he explains.

During the last several years, however, a few experiments began to cast doubt on the viceroy's supposed tastiness. But those experiments used whole butterflies, Ritland says, which meant that the taste-testing birds could have rejected the viceroys because of their orange wings and not because of any noxious taste.

Moreover, many biologists believed butterflies couldn't manufacture their own toxic chemicals to defend themselves from predators; instead, the insects had to absorb the toxins of poisonous plants during their caterpillar stage. And viceroy larvae don't feed on toxic plants.

The adult monarch's chemical defense, however, does depend on toxins in the milkweed plants on which its caterpillars feed, Brower notes. Because monarch caterpillars incorporate the heart toxins, called cardiac glycosides, that milkweeds rely on for their own defense against herbivores, eating a monarch can "really set a bird's heart jumping," he observes.

But the toxicity of an individual monarch depends on the variety of milkweed it ate as a caterpillar, Brower says. A bird that eats a monarch butterfly that dined as a caterpillar on a mildly toxic variety of milkweed will not be poisoned. But a monarch caterpillar feeding on a strongly toxic milkweed variety will become a truly toxic butterfly, potentially deadly to any bird that eats one and doesn't vomit it back up.

Viceroy caterpillars, in contrast, feed on nontoxic willows, and this suggests that viceroy butterflies somehow manufacture their own chemical defense. The observation supports a new view that not all butterflies depend on plant poisons for their defenses.

For example, Ritland and Brower's results suggest that the viceroy may actually be a "Mullerian" mimic of the monarch. This kind of mutually advantageous mimicry is named for the 19th-century German-born Brazilian zoologist, Fritz Muller, who first described how two or more equally distasteful butterfly species gain greater protection from predators by evolving the same general appearance.

Brower explains the advantage: If each of two chemically protected species has a different wing-color pattern, then a bird will have to eat many individuals of each species before it learns to avoid both. But if both species evolve the same color pattern, then only half as many of each species need succumb.

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31. The reason that Ritland and Brower's work is forcing reconsideration of a long-standing theory of the relationship between viceroy and monarch butterflies is that their experiment demonstrated that the birds:

A. were not made ill by either viceroy or monarch bodies.
B. would only eat butterflies whose wings were still attached.
C. found viceroy bodies to be no tastier than those of monarchs.
D. preferred the monarch bodies, contrary to the theory.

32. According to the passage, viceroy caterpillars feed on:

I. milkweed.
II. nontoxic willows.
III. mildly toxic willows.

F. I only
G. II only
H. I and II only
J. I and III only

33. According to David Ritland, recent experiments testing the palatability of viceroy butterflies (lines 49–55) were flawed primarily because the experimenters:

A. didn't remove the butterflies' wings.
B. doubted the tastiness of viceroys from the outset.
C. didn't include monarch butterflies in the experiments for comparison.
D. followed the widely held belief that viceroys taste like admiral butterflies.

34. The passage suggests that the toxicity of the monarch butterfly is primarily a result of the:

F. amount of milkweed that the monarch butterfly eats.
G. ability of the monarch butterfly to manufacture its own poison.
H. variety of milkweed that the monarch caterpillar ate.
J. color of the monarch butterfly's wings.

35. Which of the following best describes the question that remains unanswered from Ritland and Brower's research, as it is presented in the passage?

A. Why had no scientists discovered the toxicity of viceroy butterflies before?
B. How do viceroy butterflies manufacture the toxic chemicals in their system?
C. Why are some adult monarchs more poisonous than others?
D. How are birds affected by the poison contained in monarch butterflies?

36. It can be inferred from the passage that after a bird eats a monarch butterfly, all of the following could reasonably happen EXCEPT that the bird:

F. dies within a short period of time.
G. experiences a drastically increased heart rate.
H. immediately vomits the butterfly and dies.
J. vomits the butterfly and then survives.

37. According to the passage, the main difference between Batesian and Mullerian mimicry is that:

A. Mullerian mimicry offers greater protection for two inedible species through their resemblance, while Batesian mimicry protects an edible species because it looks like a poisonous one.
B. Batesian mimicry offers mutual protection for two unappetizing species, while Mullerian mimicry serves to protect an edible species simply because it resembles a poisonous species.
C. Batesian mimicry involves a predator species exploiting a prey species, while Mullerian mimicry involves cooperation between two species.
D. Batesian mimicry requires that the bad-tasting species be actually tasted by the predator, while Mullerian mimicry does not.

38. If scientists conclude that Mullerian mimicry does provide an adequate explanation for the coloring of viceroy butterflies, which of the following would the mimicry be serving to protect?

I. Admiral butterflies
II. Monarch butterflies
III. Viceroy butterflies

F. II only
G. III only
H. I and II only
J. II and III only

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39. According to the passage, biologists were convinced until recently that viceroy butterflies could NOT be toxic because the biologists believed that:

A. butterflies could only become toxic if their larvae ate toxic plants.
B. butterflies had to manufacture their own poisons.
C. viceroy butterflies defended themselves by means of mimicry.
D. viceroy caterpillars fed on only milkweed plants.

40. According to evidence presented in the passage, the fact that Batesian mimicry was the readily accepted explanation for the similarity of the viceroy's appearance to that of the monarch is likely due to the mistaken belief that:

F. the two species of butterflies were considered to be closely related.
G. butterfly coloring was a function of the food that the caterpillars eat.
H. Mullerian mimicry always involved one tasty and one distasteful species.
J. viceroys must taste good because they were evolved from another palatable species.

END OF TEST 3

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

DO NOT RETURN TO A PREVIOUS TEST.

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SCIENCE REASONING 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

Two artificial marshes were built to help reduce the amounts of iron and manganese in, and the acidity of, water seeping into a stream from a coal mine site (see Figure 1). Table 1 shows precipitation, in centimeters (cm); flow rate, in liters per minute (L/min); pH (acidity); and iron and manganese content, in milligrams per liter (mg/L), of inlet and outlet water over 5 days.

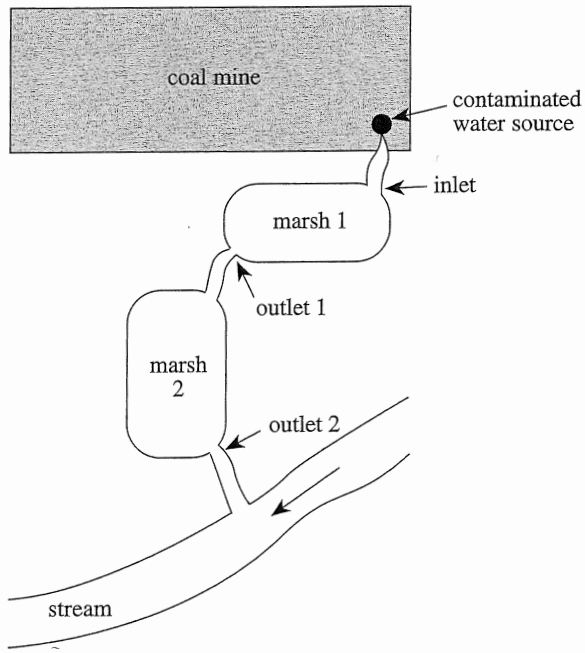

Figure 1

Table 1

Day	Precipitation (cm)	Flow rate (L/min)			pH			Iron (mg/L)			Manganese (mg/L)		
		Inlet	Outlet 1	Outlet 2	Inlet	Outlet 1	Outlet 2	Inlet	Outlet 1	Outlet 2	Inlet	Outlet 1	Outlet 2
1	0	110	105	100	5.5	5.8	6.5	100	50	5.2	6.4	6.4	6.3
2	0	100	95	90	5.4	6.0	6.4	110	56	5.0	6.5	6.5	6.4
3	4.5	110	295	420	5.5	6.6	7.4	100	65	22.7	6.4	4.3	2.2
4	trace	130	190	250	5.4	6.4	6.8	90	47	10.2	6.3	5.5	4.7
5	0	150	145	140	5.5	6.1	6.5	80	42	7.1	6.0	6.0	5.9

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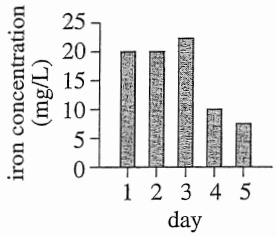
Water having a higher level of iron or manganese or a lower pH than the values given in Table 2 is said to be contaminated.

Table 2		
Allowed contaminant levels		
pH	Iron (mg/L)	Manganese (mg/L)
6.0	3.5	2.0

1. Which of the following figures best represents the iron concentrations at Outlet 2 for the 5-day period?

A.


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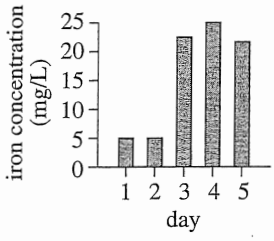

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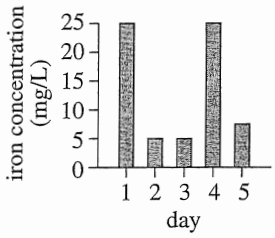

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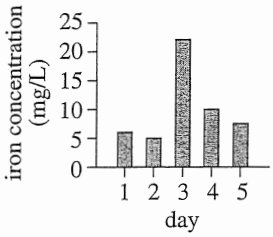

2. Which of the following statements best explains why the manganese level was at its lowest on Day 3 at Outlet 2 ?

F. Manganese is used as a nutrient by the plants in the marshes.
G. Manganese levels are lowered through dilution with rainwater.
H. Manganese cannot be dissolved in water.
J. Manganese is no longer seeping from the coal mine site.

3. Which of the following statements about Outlet 1 and Outlet 2 flow rates is supported by the data in Table 1 ?

A. Outlet 1 and 2 flow rates both increased during heavy rain.
B. Outlet 1 and 2 flow rates both decreased during heavy rain.
C. Outlet 1 and 2 flow rates did not change during heavy rain.
D. Outlet 1 and 2 flow rates returned to their Day 2 levels the day after the heavy rain.

4. According to the information provided in Tables 1 and 2, on any given day, the water leaving the marshes at Outlet 2 is contaminated with respect to:

F. iron only.
G. manganese only.
H. iron and manganese only.
J. manganese and pH only.

5. According to the data, which of the following actions would be most useful in reducing the iron levels in water released to the stream to a level below the allowed contaminant level given in Table 2 ?

A. Building a third marsh
B. Removing the second marsh
C. Removing the marshes entirely
D. Rerouting the stream

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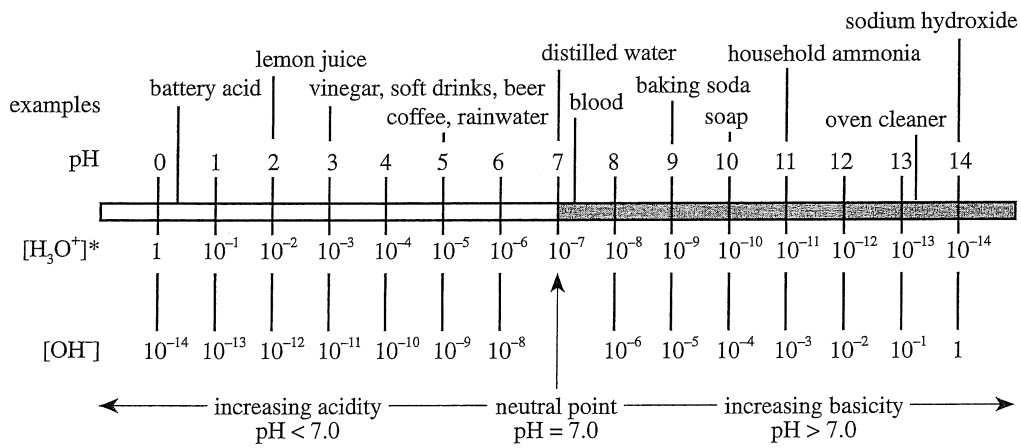
Passage II

An acid-base titration involves slowly adding a measured amount of acid to a solution containing a base and an indicator. The indicator, a dye, signals the *endpoint* (exact point where the acid has consumed all of the base) by changing colors as the solution goes from basic to acidic. The pH scale is a relative measure of the strength of acids and bases (see Figure 1). Table 1 shows the amount of acid required to reach the endpoint of different basic solutions containing various natural indicators.



*Note: [] = concentration of ion in units of mol/L

Figure 1

Table 1

Natural indicator	Initial color	Initial pH	Volume of acid added (mL)			Final color	Final pH
			Trial 1	Trial 2	Trial 3		
Apple	red	8.5	17.1	17.2	17.0	yellow	5.5
Beets	red	10.0	12.2	11.9	12.4	purple	6.0
Blueberry	purple	8.0	18.6	18.5	18.1	green	6.0
Grape juice	red	9.5	10.4	10.3	10.9	green	6.5
Onion	colorless	8.5	11.2	11.8	11.4	yellow	5.5
Red cabbage	red	8.0	26.2	26.8	25.9	pink	4.0
Spinach	green	9.0	21.3	20.8	21.1	yellow	6.0
Tea	orange	11.0	19.4	20.2	19.8	yellow	5.0

Figure adapted from J. Dudley Herron et al., *Heath Chemistry.*
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6. Based on the information in Table 1, which of the following indicators experienced the greatest change in pH during the titration?

   F. Spinach
   G. Tea
   H. Beets
   J. Apple

7. According to Figure 1, which of the following solutions is the most acidic?

   A. Oven cleaner
   B. Baking soda
   C. Lemon juice
   D. Rainwater

8. Which of the following statements about the pH of the basic solutions before and after the titration is consistent with the data in Table 1 ?

   F. The pH of a solution is lower after the titration because of the addition of a base.
   G. The pH of a solution is lower after the titration because of the addition of an acid.
   H. The pH of a solution is higher before the titration because of the addition of an acid.
   J. The pH of a solution is higher before the titration because of the addition of the indicator.

9. If the solutions were reversed and the base was added to an acid solution in the presence of an indicator, based on the information in Table 1, one would predict which of the following results?

   A. The pH changes in the opposite direction, but the same color change occurs.
   B. The pH changes in the opposite direction and the colors would be reversed.
   C. The pH changes in the same direction, but the colors would be reversed.
   D. The pH changes in the same direction and the same color change occurs.

10. Strongly acidic or basic solutions have pH values near either end of the pH scale. According to the data in Table 1, which of the following indicators changes at the most acidic pH ?

   F. Grape juice
   G. Onion
   H. Red cabbage
   J. Tea

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Passage III

Many individuals past the age of 45 develop *osteoporosis,* which makes the bones less dense and is characterized by a net loss of calcium in the bones. Although osteoporosis occurs in men, it is more common in women. Several hypotheses have been proposed to explain the onset of osteoporosis.

Dietary Hypothesis

Calcium from food is absorbed into the bloodstream by the small intestine. Vitamin D is necessary for this process. Most Americans ingest too little calcium and vitamin D in their diet. In a study of individuals 18–25 years old, it was shown that the majority had significantly low levels of calcium in their blood. When these individuals received daily supplements of 1,500 mg of calcium and 400 units of vitamin D, their blood calcium levels increased to normal levels. If insufficient levels of calcium and vitamin D are supplied by the diet, dietary supplements should be taken to avoid osteoporosis.

Estrogen Hypothesis

Estrogens, hormones produced primarily in the ovaries in women and, to a much lesser degree, in the adrenal glands in both sexes, and *androgens,* produced in the testes in men, are required for the deposition of calcium into bone. Androgen levels in men remain relatively constant throughout life; estrogen levels in women slowly decline after the onset of *menopause* (the time when a woman's ability to reproduce ends), which usually occurs between the ages of 45 and 55. As a result, the bones of postmenopausal women lose calcium.

Scientists compared the bone density of 4 groups of postmenopausal women. Each group took a dietary supplement. The results are shown in the table.

Group	Supplements	Change in bone density
A	estrogen	+2.3%
B	500 mg calcium	–1.0%
C	estrogen + 500 mg calcium	+2.3%
D	sugar	–1.0%

Exercise Hypothesis

Lack of exercise results in calcium loss from bones, whereas regular weight-bearing exercise can increase bone density. One study showed that 8 weeks of weight training added calcium and hardened bones in both postmenopausal women and men over the age of 45. Since body weight is supported by water, 8 weeks of swimming had no effect on bone density. Both groups followed the same high-calcium diet. Vitamin D intake was not measured.

11. To accept the evidence presented in the Dietary Hypothesis, one must assume that low blood levels of calcium are indicative of:

A. low bone levels of calcium.
B. low bone levels of estrogen.
C. high intestinal levels of vitamin D.
D. high blood levels of vitamin D.

12. One advantage of the Estrogen Hypothesis is that, of the three hypotheses, it *best* explains why osteoporosis is more common in which of the following groups?

F. Men over the age of 45 rather than in women over the age of 45
G. Men over the age of 45 rather than in men under the age of 45
H. Women over the age of 45 rather than in men over the age of 45
J. Women under the age of 45 rather than in women over the age of 45

13. According to the Estrogen Hypothesis, premenopausal women who have had their ovaries surgically removed should exhibit:

A. increased calcium levels in their bones.
B. increased estrogen levels in their blood.
C. gradual loss of calcium from their bones.
D. gradual reduction in vitamin D levels in their blood.

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14. Which of the following is a criticism that supporters of the Dietary Hypothesis would make of the experimental results cited in the Exercise Hypothesis?

F. Too much calcium was added to the diets of the test subjects in both groups.
G. Blood vitamin D levels in the two groups were not monitored.
H. Estrogen supplements should have been given to each group of individuals.
J. Osteoporosis is more common in premenopausal women than in postmenopausal women.

15. Assume that increased blood calcium levels result in increased bone density. How would supporters of the Estrogen Hypothesis explain the experimental results presented in the Dietary Hypothesis?

A. The test subjects probably had below-normal blood calcium levels.
B. The test subjects did not perform any weight-bearing exercise.
C. The test subjects probably had normal estrogen and androgen levels.
D. The test subjects were given too low a dosage of vitamin D.

16. How would supporters of the Dietary Hypothesis explain the results for Group B in the experiment cited in the Estrogen Hypothesis?

F. Vitamin D supplements should not have been taken by this group.
G. Insufficient calcium was added to the diet to increase bone density.
H. Estrogen supplements should have been taken to increase bone density.
J. Too much estrogen was added to the diet of this group to affect bone density.

17. The experiments cited in the Estrogen Hypothesis and in the Exercise Hypothesis are similar in that each:

A. test subject was given an estrogen supplement.
B. test subject was given a calcium supplement.
C. test subject was given a vitamin D supplement.
D. woman tested was postmenopausal.

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Passage IV

Three studies were conducted to examine the relationship between ants and the acacia trees they inhabit.

Study 1

Table 1 shows the results of a comparison between a species of acacia tree that is inhabited by ants (ant trees) and a species that is not inhabited by ants (non-ant trees).

Table 1

	Ant trees	Non-ant trees
Leaves	bitter-tasting chemicals absent protein-bodies present	bitter-tasting chemicals present protein-bodies absent
Thorns	specialized hollow thorns on stems	no specialized thorns
Ants	specific ant species living in thorns	no ants living on trees
Extrafloral nectaries*	present	absent
Trunk	surrounded by bare ground	surrounded by many other plants

*Nectar-producing (sugar-producing) structures located outside the flowers

Study 2

Table 2 shows the results of a comparison between acacia ants and a closely related ant species that does not inhabit acacia trees.

Table 2

	Acacia ants	Non-acacia ants
Aggressiveness	very aggressive	very aggressive
Active periods	active day and night	active during daylight only
Diet	protein-bodies nectar	do not eat living plants
Nest site	only in the thorns of ant trees	in the ground

Study 3

Acacia trees were divided into three groups. Acacia ants were removed from the trees in Group A, but were left on the trees in Group B. Group C consisted of a species of non-ant acacia tree. All the trees were initially healthy and of similar size. The number of trees still alive in each group 300 days after the start of the study is shown in Table 3.

Table 3

	Group A		Group B		Group C	
Day	alive	dead	alive	dead	alive	dead
1	38	0	39	0	40	0
300	10	28	28	11	30	10

Trees in Group A were killed by plant-eating insects and large mammals that ate the leaves on lower branches. There was no evidence that trees in Groups B and C were killed by grazing animals.

18. How is the design of Study 1 different from the design of Study 2 ?

F. In Study 1, acacia ants were removed from acacia trees, but not in Study 2.
G. In Study 1, plant characteristics were examined, while in Study 2, ant characteristics were examined.
H. In Study 1, acacia ants were examined, while in Study 2, non-acacia ants were examined.
J. In Study 1, ant characteristics were examined, while in Study 2, plant characteristics were examined.

19. On the basis of the experimental results, one can generalize that which of the following characteristics protects non-ant acacias from being eaten by insects or grazing animals?

A. Bitter-tasting chemicals
B. Protein bodies
C. Extrafloral nectaries
D. Specialized hollow thorns

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20. From the results of Study 2 the researchers would hypothesize that the ground surrounding the ant acacia trees was bare of vegetation because the:

F. acacia ants killed the plants growing near the ant acacia trees.
G. acacia ants killed the plants growing near the non-ant acacia trees.
H. non-acacia ants killed the plants growing near the non-ant acacia trees.
J. non-acacia ants killed the ant acacia trees.

21. Can any conclusions about the relationship between plants and insects be drawn from the observations made on acacias and ants?

A. Yes; the behavior of different insect species toward plants seems to be the same.
B. Yes; some plants apparently provide shelter for the insects that protect them.
C. No; plants apparently have the same species of insects living on them.
D. No; insects are rarely associated with plants.

22. Researchers removed all the insects from a tree that is different from the acacia. A comparison showed that few leaves were eaten both before and after removal of the insects. Which of the following conclusions about the insects and the tree best explains these results?

F. The leaves were protected from grazing by some factor other than the insects.
G. Numerous vines grew over the tree and covered the leaves and stems.
H. The tree was unable to defend its leaves from attacks by grazing animals.
J. Aggressive insects attacked any potential grazers on the leaves of this tree.

23. Which of the following conclusions about the function of protein bodies and extrafloral nectaries would be consistent with the results of the studies?

A. Protein bodies are used to deter grazing animals, while extrafloral nectaries are used as a food source by acacia ants.
B. Extrafloral nectaries are used to deter grazing animals, while protein bodies are used as a food source by acacia ants.
C. Both protein bodies and extrafloral nectaries are used to deter grazing animals.
D. Both protein bodies and extrafloral nectaries are used as food sources by acacia ants.

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Passage V

A *solution* is a mixture of at least two substances. The *solvent* does the dissolving and the *solute* is dissolved by the solvent.

Some solutions containing solutes, called *electrolytes,* can conduct electricity because they can carry an electric charge when in solution; whereas *nonelectrolytes* cannot carry an electric charge. An *ammeter* is a device used to measure the current carried by a solution (see Figure 1).

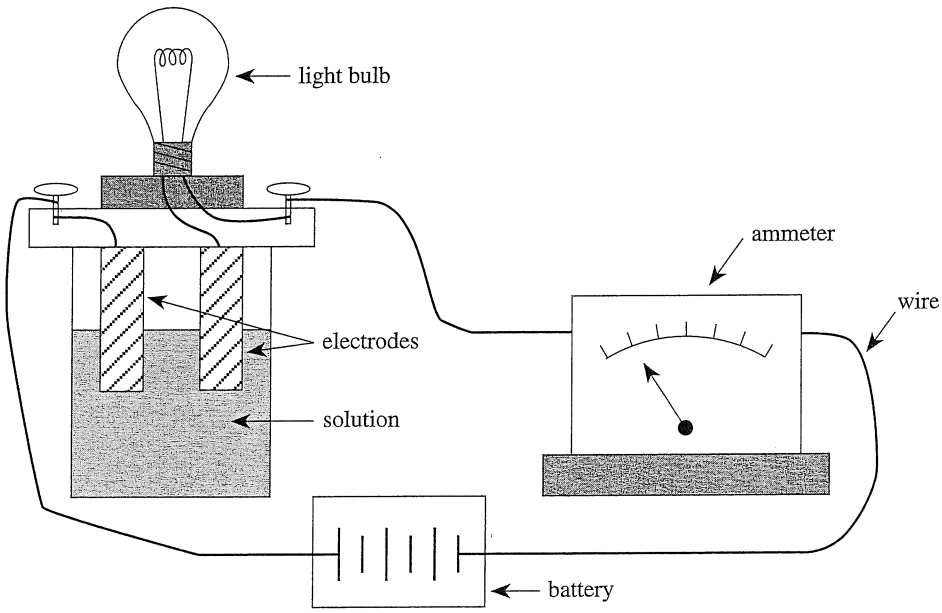

Figure 1

The following experiments were performed to test the hypothesis that either increasing the amount of solute or the temperature of the solution will increase the solution's conductivity.

Experiment 1

The solutions consisted of 5.0 grams (g) of each solute dissolved in 100 milliliters (mL) of water at 20°C. The water was also tested without any solute. The results are shown in Table 1.

Table 1

Solute	Ammeter reading (milliamps)
Water (H_2O)	0.0
Hydrogen chloride (HCl)	5.9
Sugar ($C_{12}H_{22}O_{11}$)	0.0
Potassium chloride (KCl)	2.9
Sodium fluoride (NaF)	5.0
Magnesium acetate ($Mg(C_2H_3O_2)_2$)	2.1

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Experiment 2

Experiment 1 was repeated, except the amount of solute of each solution was increased to 10.0 g in 100 mL of water at 20°C. The results are shown in Table 2.

Table 2

Solute	Ammeter reading (milliamps)
Water (H_2O)	0.0
Hydrogen chloride (HCl)	11.4
Sugar ($C_{12}H_{22}O_{11}$)	0.0
Potassium chloride (KCl)	5.5
Sodium fluoride (NaF)	8.5
Magnesium acetate ($Mg(C_2H_3O_2)_2$)	3.4

Experiment 3

Experiment 2 was repeated at 50°C. The results are shown in Table 3.

Table 3

Solute	Ammeter reading (milliamps)
Water (H_2O)	0.0
Hydrogen chloride (HCl)	1.7
Sugar ($C_{12}H_{22}O_{11}$)	0.0
Potassium chloride (KCl)	7.4
Sodium fluoride (NaF)	12.0
Magnesium acetate ($Mg(C_2H_3O_2)_2$)	4.7

24. The experimental results for each of the following solutes supports the scientist's hypothesis that increasing the amount of solute increases the conductivity of a solution EXCEPT the results for:

F. HCl.
G. $C_{12}H_{22}O_{11}$.
H. KCl.
J. $Mg(C_2H_3O_2)_2$.

25. According to the results of all 3 experiments, which of the following solutions of $Mg(C_2H_3O_2)_2$ would be expected to conduct the most electricity?

A. 2 g in 200 mL of 5°C H_2O
B. 10 g in 100 mL of 5°C H_2O
C. 10 g in 100 mL of 15°C H_2O
D. 20 g in 1,000 mL of 2°C H_2O

26. If a scientist dissolved both 10 g of $C_{12}H_{22}O_{11}$ and 10 g of KCl in 100 mL of H_2O at 50°C, the ammeter would read approximately:

F. 0.0 milliamps.
G. 1.7 milliamps.
H. 7.4 milliamps.
J. 8.9 milliamps.

27. If Experiment 3 was repeated and the temperature of the H_2O was increased to 80°C, the conductivity of the solutions with electrolytes would most likely:

A. decrease with the exception of HCl.
B. remain constant.
C. increase only.
D. increase with the exception of HCl.

28. Which of the following best explains why H_2O was tested in all three experiments?

F. To determine if H_2O is the solute or the solvent
G. To determine the amount of conductivity contributed by the solvent
H. To determine if H_2O will dissolve all of the salts equally
J. To prove that H_2O is a good conductor of electricity

29. On the basis of the experimental results, which of the following effects would be most appropriate to test next to gain additional information about conductivity?

A. The effect of temperature on conductivity
B. The effect of solute color on conductivity
C. The effect of water on conductivity
D. The effect of different solvents on conductivity

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Passage VI

Various chains were released from rest with their lower end touching a scale that measured the force, in newtons (N), of the chain on the scale pan (see Figure 1). A *newton* is the force required to accelerate a 1-kilogram mass at a rate of 1.0 m/sec^2. The mass of the chain, its total length (L), the momentary length of chain on the pan (x), as well as the momentary weight of the portion of the chain on the pan, were also measured. The results are shown in Table 1.

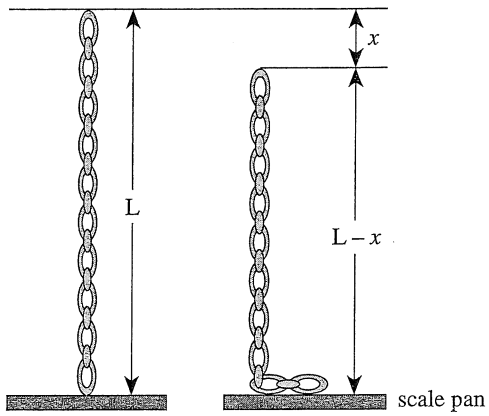

Figure 1

Table 1

Trial	Mass of chain (g)	Total length of chain (m)	Momentary length on scale pan (m)	Momentary weight on scale pan (N)	Force on scale pan (N)
1	250	0.5	0.1	0.49	1.47
2	250	0.5	0.2	0.98	2.94
3	250	0.5	0.3	1.47	4.41
4	250	0.5	0.4	1.96	5.88
5	500	0.5	0.1	0.98	2.94
6	500	0.5	0.2	1.96	5.88
7	500	0.5	0.3	2.94	8.82
8	500	0.5	0.4	3.92	11.76
9	750	0.5	0.3	4.41	13.23
10	750	1.0	0.5	3.67	11.01
11	1,000	0.5	0.3	5.88	17.64
12	1,000	1.0	0.5	4.90	14.70
13	1,000	1.5	1.0	6.53	19.60
14	1,000	2.0	1.5	7.35	22.05

Figure 1 and Table 1 adapted from John R. Gordon and Raymond A. Serway, *Physics for Scientists and Engineers with Modern Physics,* 3rd edition. ©1990 by Saunders College Publishing.

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30. In Trials 5–8, as the momentary length of chain on the pan increases, the momentary weight of the chain on the pan:

F. increases.
G. decreases.
H. remains constant.
J. increases and then decreases.

31. Which of the following trials best supports the hypothesis that doubling the mass of a chain while keeping the length of chain on the pan constant doubles the force on the pan?

A. Trials 1 and 4
B. Trials 2 and 9
C. Trials 2 and 14
D. Trials 3 and 7

32. Based on the data in Table 1, if a chain with a mass of 1,250 g and a total length of 2.0 m were used, in which of the following ranges would the force on the pan be if $x = 1.5$ m ?

F. 5.88 N to 14.72 N
G. 14.73 N to 19.58 N
H. 19.59 N to 22.04 N
J. Greater than 22.05 N

33. Which of the following trials uses the chain with the largest mass per unit length?

A. Trials 5–8
B. Trial 9
C. Trial 11
D. Trial 14

34. If, in Trials 1–4, the entire length of chain (0.5 m) would have been allowed to drop on the scale pan, the momentary weight on the pan for this new trial would have been approximately:

F. 1.0 N.
G. 1.5 N.
H. 2.0 N.
J. 2.5 N.

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Passage VII

Early on May 18, 1980, Mount St. Helens violently erupted, expelling a huge cloud of volcanic ash. Most of the ash fell to Earth on May 18, as the cloud moved rapidly away from the volcano. The following studies examined the ashfall.

Study 1

Researchers measured the depth of uncompacted ash, in millimeters (mm), at hundreds of stations in Washington, Idaho, and Montana. Only ash that had fallen on manufactured objects such as roofs and cars was measured. The results are shown in Figure 1.

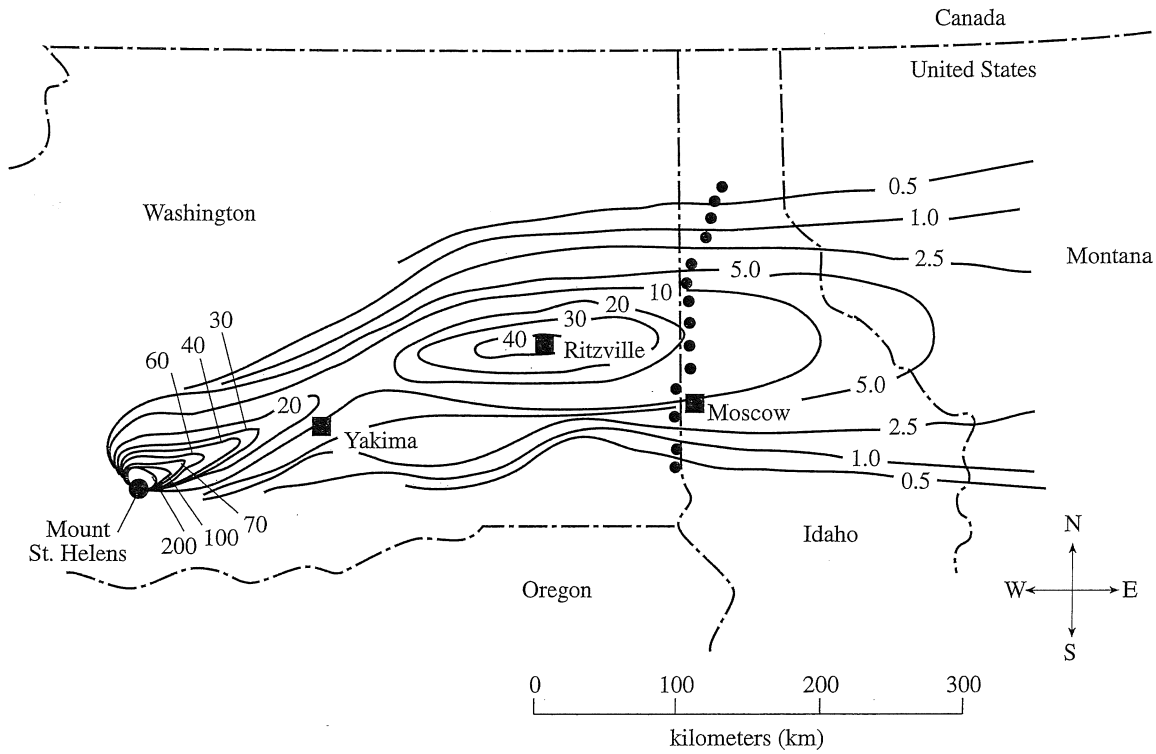

Figure 1

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Study 2

The thickness of the ash layer on manufactured objects was measured at 14 stations along a north-south line passing near Moscow, Idaho (see Figure 1).

Researchers found that ash deposits east of Yakima, Washington, were composed of two different layers. The thin lower layer (1–2 mm) was made of dark gray ash composed of sand-sized particles of fragmented volcanic rock, and, above that, a thicker layer of lighter-colored ash was composed of smaller (silt-sized) particles (see Figure 2).

It was believed that the dark ash formed during the initial eruption, when rock from the mountain was pulverized, whereas the lighter-colored ash formed later in the eruption as molten rock (magma) inside the volcano was violently expelled.

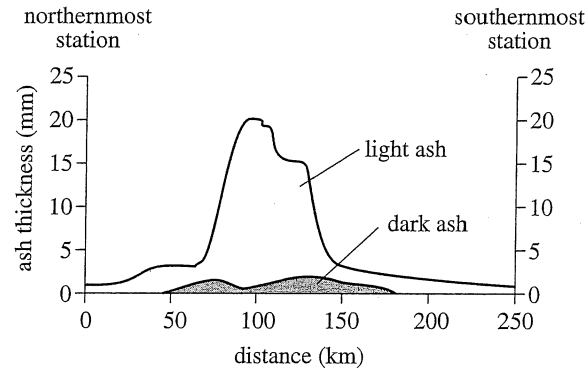

Figure 2

Study 3

Samples of volcanic ash were collected along a line of stations stretching from the volcano to western Montana. Figure 3 shows the calculated average particle size of the samples at each station.

(Note: The average grain size in Figure 3 includes particles of both dark and light ash.)

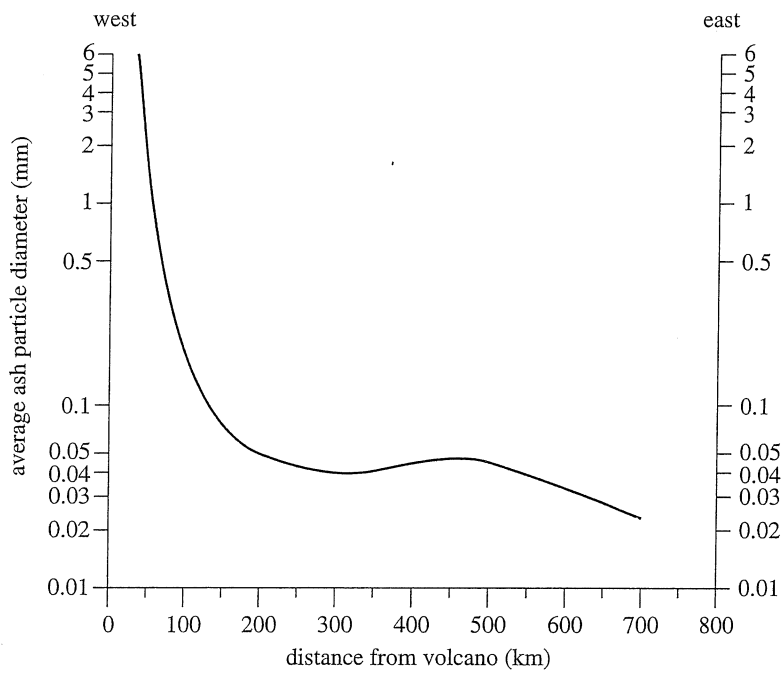

Figure 3

Figures adapted from A. M. Sarna-Wojcicki et al., "Areal Distribution, Thickness, Mass, Volume, and Grain Size of Air-fall Ash from the Six Major Eruptions of 1980." ©1982 by the U. S. Geological Survey.

GO ON TO THE NEXT PAGE.

35. The researchers in Study 2 hypothesized that the dark ash was ejected before the light gray ash. An alternative hypothesis is that both ash types were expelled simultaneously, but that the darker particles were more dense ("heavier") and fell to the ground more rapidly. Which of the following findings would *disprove* the alternative hypothesis?

A. A light ash layer under a dark ash layer
B. A dark ash layer under a light ash layer
C. Light ash ejected higher into the air than dark ash
D. Light ash deposits found farther from the volcano than dark ash deposits

36. Which of the following was varied in Study 3 ?

F. Size of the sample taken
G. Location of sites from which ash samples were taken
H. Method of determining the average ash particle diameter
J. Mass of ash particles per cubic millimeter of ash

37. Do the results of Study 1 support the hypothesis that volcanic ash rises into the atmosphere and settles out evenly in a fairly circular region around the erupting volcano?

A. No; the ash layer varied in thickness and was deposited mainly east of the peak.
B. No; the ash layer was of a constant thickness throughout the area of deposition and was deposited along a relatively narrow path east of the peak.
C. Yes; the ash layer varied in thickness and was deposited in a circular pattern around the peak.
D. Yes; the ash layer was of constant thickness and was deposited in a circular pattern around the peak.

38. Based on Study 3, what can one conclude about how average ash particle diameter changed with distance from Mount St. Helens?

I. It decreased between 50 and 200 km.
II. It increased between 325 and 450 km.
III. It decreased between 500 and 700 km.

F. I only
G. II only
H. III only
J. I, II, and III

39. If Study 2 were repeated along a north-south line passing through Ritzville, Washington (shown in Figure 1), compared to the results from the line passing through Moscow, those from Ritzville would show:

A. a maximum thickness of ash greater than 25 mm.
B. no dark ash at any of the measurement sites.
C. no light ash at any of the measurement sites.
D. a thinner ash layer in the center part of the line than at the ends of it.

40. Investigators believed that most of the deposited ash resulted from fragmentation of new rock formed during the eruption rather than fragmentation of much older, preexisting rock. Which of the following studies support(s) this interpretation?

F. Study 2 only
G. Study 3 only
H. Studies 1 and 2 only
J. Studies 2 and 3 only

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

NO TEST MATERIAL ON THIS PAGE

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

ACT Resource Links

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

※ **ACT English Practice Tests:**

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

※ **ACT Math Practice Tests:**

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

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

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https://www.apstudy.net

ACT Form Test 2
Scale Score Conversion Table

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