Form Code: ACTC63

Form 63C

(December 2005)

ACT Assessment®

2005–2006

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ENGLISH TEST

45 Minutes—75 Questions

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

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

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

PASSAGE I

The Joys of Walking

While some people are exhilarated by vigorous exercise, I am not. I love feeling fit, but I hate working out. I've tried dozens of different fitness activities, but all of them leave me bored, sore, or frustrated by my inability to do them well and how boring they were. [1]

Finally, I made a deal with myself. Each day I would try to find time for a half-hour walk. [2] Fitting it into my schedule whenever I could. Running errands and [3] visiting

1. The writer is considering deleting the phrase "and how boring they were" from the preceding sentence (placing a period after the word *well*). Should the writer make this deletion?
   - A. Yes, because the phrase unnecessarily repeats a point made earlier in the sentence.
   - B. Yes, because the sentence is more detailed without the phrase.
   - C. No, because the phrase describes one of the challenges of exercise.
   - D. No, because the phrase provides new and relevant information about exercise.

2. F. NO CHANGE
   - G. walk. Which fit
   - H. walk; with fitting
   - J. walk, fitting

3. A. NO CHANGE
   - B. errands, and
   - C. errands, and,
   - D. errands and,

friends if I walked (4) would take longer to my destination, but I consoled myself with virtuous thoughts of how my body could benefit from the effort.

A funny thing happened on my way to fitness. [5] While I usually felt physically invigorated by my walks, even more satisfying were the psychological rewards. Walking cleared my head and brightened my spirits in a way no other exercise routine ever had.

[1] Walking slowed my often frenetic pace. [2] I was trying to go too fast. (6) [3] In spring, I'd rejoice in the first crocuses emerging out (7) the snow, the faint misting of green on tree branches just beginning to bud, the colorful explosion of tulips and daffodils. [4] I anticipated crisp fall days and the crackle of leaves in my path. (8) [5] As the lushness of summer gradually unfolded, I noticed for what seemed like the first time the homey smell of freshly mown grass and the warmth of sunlight on my face. [6] Even in bitter winter, I treasured my walking time, and after a stressful day a stroll to (9) decompress myself was often craved, I found. [10] (9)

4. The best placement for the underlined portion would be:
   - F. where it is now.
   - G. after the word *longer*.
   - H. after the word *myself*.
   - J. after the word *body*.

5. The writer is considering deleting the preceding sentence. If the writer were to make this deletion, the paragraph would primarily lose:
   - A. a shift in the subject from exercise to humor.
   - B. the writer's summary of the benefits of walking.
   - C. a signal that something new and unexpected will follow.
   - D. a principal illustration of the relationship between the writer and exercise.

6. Which choice most effectively introduces the description that follows in this paragraph?
   - F. NO CHANGE
   - G. had time to savor the changes in seasons.
   - H. tried to walk at the same time every day.
   - J. fit a walk into my schedule.

7. A. NO CHANGE
   - B. from out
   - C. outside
   - D. from

8. Given that all the choices are true, which one best illustrates the narrator's appreciation of nature?
   - F. NO CHANGE
   - G. when noisy birds would be gone from the gardens.
   - H. with woolen sweaters and warm gloves.
   - J. and the chance to imagine next summer's activities.

9. A. NO CHANGE
   - B. I found myself craving a stroll to decompress often.
   - C. I often found myself craving a stroll to decompress.
   - D. to decompress myself often I found I craved a stroll.

10. For the sake of the logic and coherence of this paragraph, Sentence 5 should be placed:
    - F. where it is now.
    - G. after Sentence 2.
    - H. after Sentence 3.
    - J. after Sentence 6.

I've thought many times of the instinctive (11) way our bodies respond to the beat of music by wanting to get up and dance, or how (12) a parent quiets a crying baby by walking back and forth. I think that at some deep level we humans need steady rhythmic, (13) movement to feel centered and content.

So now when I want to escape the busyness of my life, I take a walk. No matter how far I go, I know that I will return refreshed in (14) both body and mind.

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

- **A.** spontaneous
- **B.** unconscious
- **C.** involuntary
- **D.** automatically

12. **F.** NO CHANGE
- **G.** for example,
- **H.** meanwhile
- **J.** then

13. **A.** NO CHANGE
- **B.** steady, rhythmic
- **C.** steady, rhythmic,
- **D.** steady; rhythmic

14. **F.** NO CHANGE
- **G.** refreshing in
- **H.** a refreshment of
- **J.** refreshed with

Question 15 asks about the preceding passage as a whole.

15. Suppose the writer's goal had been to write a brief essay illustrating some of the benefits that walking can provide. Would this essay successfully fulfill the writer's goal?

- **A.** Yes, because the essay offers some of the positive effects of walking.
- **B.** Yes, because the essay encourages readers to get out and walk.
- **C.** No, because the essay presents reasons for walking, rather than the rewards.
- **D.** No, because the essay is limited to the physical benefits of walking.

PASSAGE II

A Family Craft

The printshops where my father worked, whether in a publishing house in Vermont or in a small-town newspaper office in Idaho, always presented the same vivid experience. The tap dance of Linotype keys (16) the pungent scents of printing ink and cleaning chemicals, and the slapping sound of the rollers dripping with ink—

16. **F.** NO CHANGE
- **G.** keys;
- **H.** keys,
- **J.** keys—

every job has its hazards.
17

It was a special occasion for which I could
18

visit my father at work. However, he was a Linotype
19

operator and, the Linotype machine seemed formidable.
20

My father's hands flew across an enormous keyboard that was unlike any I saw in other places.
21

As he typed, the machine melted chunks of metal and then formed the molten mass into lines of metal type, bright
22

and burning hot, these lines of type—headlines, sentences, phrases—slid out of the machine. Once cooled, these slugs (as the lines of type are called) were taken to a table where the typesetter fit them together by hand into a wooden frame the size of a newspaper page. The frame was set into the printing press, inked, and used to print pages. Afterward, the type was cleaned in various chemicals and were put
23

back into the Linotype to be re-created
24

as tomorrow's headlines and stories.

In the early seventies, the Linotype process was phased out, and my father went to work in the business office. His company had switched to offset printing, a method that relies on photographic images rather than metal type. Since then, computers have further

17. Given that all the choices are true, which one best helps establish this essay as a nostalgic tribute?
    - A. NO CHANGE
    - B. these machines are very expensive.
    - C. ink stains are hard to remove.
    - D. many such details remain with me.

18. F. NO CHANGE
    - G. which
    - H. when
    - J. where

19. A. NO CHANGE
    - B. He, on the other hand,
    - C. Gradually, he
    - D. He

20. F. NO CHANGE
    - G. operator and the Linotype machine,
    - H. operator, and the Linotype machine,
    - J. operator, and the Linotype machine

21. Given that all the choices are true, which one provides details that best help the reader visualize the keyboard?
    - A. NO CHANGE
    - B. something amazing to behold.
    - C. like several typewriter keyboards spliced together.
    - D. like the alphabet right there just waiting to be turned into words.

22. F. NO CHANGE
    - G. type, then bright
    - H. type, they were bright
    - J. type. Bright

23. A. NO CHANGE
    - B. put
    - C. they were put
    - D. OMIT the underlined portion.

24. F. NO CHANGE
    - G. Linotype. To be re-created
    - H. Linotype. Then re-created
    - J. Linotype. His job to re-create

revolutionized the printing industry. When I process text at my computer, in my job, I remember my father at his
25

Linotype machine. When comparing his workplace to
26
mine, it is quiet and clean. The air smells of coffee,
26

not tea. Instead of stained and scuffed wooden tables, I'm
27

surrounded by sleek vinyl office furniture. But in essence,
28

my father's work and mine are the most alike. From him,
29
I inherited faithfulness to the written word and care in sending it out into the world.

25. Given that all the choices are true, which one provides information that is most relevant to the contrast being established between the father's profession and the narrator's?

- **A.** NO CHANGE
- **B.** as the editor of an Internet magazine,
- **C.** now that I have a career of my own,
- **D.** in my professional capacity,

26. **F.** NO CHANGE
- **G.** Making a comparison between his workplace and mine, it is quiet and clean.
- **H.** Compared to his workplace, my office is quiet and clean.
- **J.** Quiet and clean compared to his workplace, which isn't.

27. Which choice is most consistent with the subject of the essay?

- **A.** NO CHANGE
- **B.** an aroma that I like.
- **C.** not ink.
- **D.** all day.

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

- **F.** essentially,
- **G.** in essentially,
- **H.** fundamentally,
- **J.** for the most part,

29. **A.** NO CHANGE
- **B.** the same.
- **C.** more of the same.
- **D.** like the same.

Question 30 asks about the preceding passage as a whole.

30. Suppose one of the writer's goals had been to write an essay that reveals a connection between her profession and her father's. Would this essay fulfill that goal?

- **F.** Yes, because the essay indicates that the narrator sees a similarity between her work with the written word and her father's.
- **G.** Yes, because the essay shows how the narrator learned to operate a Linotype machine as a child and later went into a job at a printing press.
- **H.** No, because the essay indicates that the narrator chose a different career from that of her father, even though she admired his Linotype skills.
- **J.** No, because the essay focuses on how a Linotype machine operates, not on how the narrator chose her line of work.

GO ON TO THE NEXT PAGE.

PASSAGE III

Coretta Scott King: An Unexpected Turn

As a child, Coretta Scott loved to sing and play the piano. Born in 1927 in Marion, Alabama, the daughter of a successful truck farmer, she became (31) a top student in grade school and was often asked to lead the class in song. Her parents encouraged her to study diligently and responded to her special interests with piano and voice lessons.

[1] After finishing high school, Coretta Scott attended Antioch College (32) in Ohio. [2] After college, she enrolled in Boston's New England Conservatory of Music, where her studies, she hoped, would lead to a degree in voice and a celebrated (33) concert singer. [3] It was there that her life took an unexpected turn when she met a doctoral student at Boston University's School of Theology, Martin Luther King, Jr. [4] She graduated from Antioch in 1951 with a degree upon finishing a program of study (34) in music and elementary education. [35]

Soon after their marriage in 1953, the Kings moved to Montgomery, Alabama, where the Reverend Dr. King began his first church assignment. Their first child was born in 1955, just three weeks before Dr. King has led (36) the historic Montgomery bus boycott. During these years, Coretta Scott King became a calm, forceful presence, (37) in the civil rights movement.

31. A. NO CHANGE
    B. who became
    C. and
    D. OMIT the underlined portion.

32. Which of the following alternatives to the underlined portion would NOT be acceptable?
    F. College where its location is
    G. College, which is located
    H. College, which is
    J. College, located

33. A. NO CHANGE
    B. career as a
    C. professional
    D. OMIT the underlined portion.

34. F. NO CHANGE
    G. by receiving both a diploma and an academic degree
    H. with a degree, having received a diploma
    J. with a degree

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

36. F. NO CHANGE
    G. leads
    H. lead
    J. led

37. A. NO CHANGE
    B. calm, forceful presence
    C. calm, forceful, presence
    D. calm forceful presence,

Even as she fulfilled the duties of pastor's wife, she was
38
steady and unwavering. In 1956, after their home was

bombed, supporters were told how much his wife's
39

strength had helped him through that incident. [40]

In the mid-sixties, Coretta Scott King began to take on a more active role in the movement, which after her
41
husband's assassination in 1968, she helped carry on the cause of racial and economic justice. [42] As founder of the Martin Luther King, Jr. Center for Nonviolent Social

Change, the work continues to fulfill the goals of
43
peace and justice.

One of the great stories of the civil rights movement have been that
44

38. The writer wants to provide a statement here that will contrast with, and thus highlight, the statement that follows in this sentence. Given that all the choices are true, which one would best accomplish this?
   - F. NO CHANGE
   - G. While she traveled to Europe, Africa, and India with her husband,
   - H. Although danger always threatened their lives,
   - J. Organizing a series of Freedom Concerts,

39. A. NO CHANGE
   - B. supporters were being told
   - C. Dr. King told supporters
   - D. it was told

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

    In 1957, Dr. and Mrs. King celebrated their belated honeymoon in Mexico.

    Should the writer add this sentence here?
   - F. Yes, because it describes an important event in the life of Coretta Scott King.
   - G. Yes, because it shows how busy Dr. and Mrs. King were at that time.
   - H. No, because it doesn't follow the chronological order of this narrative.
   - J. No, because it distracts readers from the main focus of this paragraph.

41. A. NO CHANGE
   - B. movement, and
   - C. movement,
   - D. movement

42. Given that all the following statements are true, which one, if added here, would provide the most relevant addition to this paragraph?
   - F. In 1964, he had been awarded the Nobel Peace Prize for his civil rights work.
   - G. She also worked as a voice instructor in the music department of Morris Brown College.
   - H. She led the campaign to establish a national holiday to honor her late husband and his work.
   - J. He had influenced the passage of the 1964 Civil Rights Act and the 1965 Voting Rights Bill.

43. A. NO CHANGE
   - B. she continues to work
   - C. the work is continuing
   - D. the ongoing work

44. F. NO CHANGE
   - G. were
   - H. are
   - J. is

Coretta Scott King might have become a
45
great concert singer if things were different.
45

45. Which choice would best complete this sentence by providing an accurate and effective summary of the essay?
A. NO CHANGE
B. the work and leadership of Dr. King continue to have an effect on the world.
C. the perseverance of many extraordinary people led to change in the United States.
D. this musically gifted young woman developed into a leader of national stature.

PASSAGE IV

Voice of the People

[1]

Harriett Woods did not plan to be a politician, but in 1984 she was elected lieutenant governor of Missouri. Her first job had been as a newspaper reporter she had moved to St. Louis to write for the
46

Globe-Democrat, which shut down years ago. In 1953
47

she was to marry a fellow reporter and left the newspaper
48
to raise their children.

[2]

Interestingly, her children's needs prompted Woods's first political action. Each afternoon, Woods put her babies in bed for their naps, a time she cherished for her own reading and personal literary scholarship. Each afternoon,
49
trucks drove over a loose utility-hole cover, and the

clanking and clamorous noisemaking awoke the boys.
50

46. F. NO CHANGE
G. reporter; she had moved
H. reporter, she had moved;
J. reporter, she had moved

47. A. NO CHANGE
B. *Globe-Democrat,* one of the many newspapers in this bustling city.
C. *Globe-Democrat,* which is not in operation anymore.
D. *Globe-Democrat.*

48. F. NO CHANGE
G. would marry
H. married
J. would be married to

49. A. NO CHANGE
B. and investigation of written texts.
C. and relaxation with books.
D. OMIT the underlined portion and end the sentence with a period.

50. F. NO CHANGE
G. clanking noise
H. noisy sound of loud clanking
J. racket of the clanking sound

Woods appealed on her city council to close the street to trucks, but the council stalled. She sought her neighbors' support by going door-to-door and gathering their signatures on a petition.

[3]

When Woods called a local television station to seek a writing job, she was asked to moderate a panel discussion on local politics. She became a regular moderator, a job that led to her becoming head of public affairs at another television station. She continued her grassroots politics, focusing on the fight for fair housing. [53]

As a result of her success

to bring community members into the legislative process, Woods was asked to fill a vacant seat on the city council. This was the start of her political career and led to her election as a state senator in 1976. Then she became the first woman in Missouri history, to hold a statewide office when she was elected lieutenant governor.

[4]

Although she narrowly lost bids for the U.S. Senate in 1982 and 1986, Woods's campaigns earned their national recognition. Because of Woods's history of public outreach

51. **A.** NO CHANGE
B. by
C. for
D. to

52. **F.** NO CHANGE
G. and a job
H. as a job
J. OMIT the underlined portion.

53. If the writer were to delete the phrase "focusing on the fight for fair housing" from the preceding sentence, the paragraph would primarily lose:

A. an indication of the political support for Woods in her community.
B. an explanation of the nature of Woods's job at the television station.
C. an elaboration on the statement in the first part of the sentence.
D. an example of Woods's success as a politician.

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

F. In response to
G. Because of
H. Despite
J. Due to

55. **A.** NO CHANGE
B. and bringing
C. of bringing
D. in bringing

56. **F.** NO CHANGE
G. woman in Missouri's history,
H. woman, in Missouri's history
J. woman in Missouri history

57. **A.** NO CHANGE
B. herself
C. them
D. her

and community partnership, she was named president of the National Women's Political Caucus, an organization that seeks to bring women into the political process. After she retired, Woods wrote *Stepping Up to Power,* a book about her political life, which all began when she asked her neighbors how they wanted to be governed.

58. F. NO CHANGE
G. wrote:
H. wrote,
J. wrote;

59. A. NO CHANGE
B. neighbor's
C. neighbors'
D. neighbors,

Question 60 asks about the preceding passage as a whole.

60. Upon reviewing the essay and finding that some important information has been left out, the writer composes the following sentence:

Her campaign worked: the council closed the street to trucks.

The new sentence would most logically be placed at the end of Paragraph:

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

PASSAGE V

How Bilingual Speakers Choose Which Language to Use

You walk into a clothing store and ask for a dress shirt—a simple enough thing to do. But what if you are a bilingual speaker in a bilingual city such as Miami? How would they decide which language to use? Several subtle, but significant cues, may come into play, suggesting the choice (in this case) of either Spanish or English.

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

A. store in order to ask
B. store that asks
C. store, asking
D. store to ask

62. F. NO CHANGE
G. he or she
H. one
J. you

63. A. NO CHANGE
B. subtle, but significant cues
C. subtle but significant cues,
D. subtle but significant cues

These cues may operate independently, or several may act together. So that they signal (64) language choice.

Such cues may be found in the speaker's immediate surroundings. Hearing a Venezuelan singer's latest recording being played on its (65) sound system might prompt a bilingual speaker to use Spanish. Besides, (66) the language of the speaker's most recent conversation can be the determining factor. (67) For example, if the speaker had been talking (68) in English with a friend before entering the store, he or she might continue to use English to address the store clerk.

[1] Many bilingual teenagers in Miami feel more comfortably (69) speaking English than Spanish; (70) the reverse is often true of their parents. [2] Age can also be an important factor in language choice. [3] Consequently, teenagers may use English if the salesperson is their own age but Spanish (as a sign of respect) if the salesperson belongs to their parents (71) generation. [72]

64. F. NO CHANGE
    G. together. In order to signal
    H. together. Signaling
    J. together, to signal

65. A. NO CHANGE
    B. a store's,
    C. their
    D. it's

66. F. NO CHANGE
    G. For this reason,
    H. Sometimes,
    J. Instead,

67. A. NO CHANGE
    B. factor that decides the determination of the language choice.
    C. factor responsible for determining the language choice decision.
    D. factor that determines it.

68. Which of the following alternatives to the underlined portion would be LEAST acceptable?
    F. speaking together
    G. communicating
    H. conversing
    J. chatting

69. A. NO CHANGE
    B. most comfortable
    C. more comfortable
    D. most comfortably

70. Which of the following alternatives to the underlined portion would be LEAST acceptable?
    F. Spanish, unless
    G. Spanish, while
    H. Spanish; however,
    J. Spanish, but

71. A. NO CHANGE
    B. their parents'
    C. their parent's
    D. there parent's

72. Which of the following sequences of sentences makes this paragraph most logical?
    F. NO CHANGE
    G. 1, 3, 2
    H. 2, 1, 3
    J. 3, 2, 1

A speaker fluent in two languages has distinct advantages over a monolingual speaker. It is common to hear Spanish spoken in Miami's Little Havana, where many Cuban immigrants have settled in recent decades. However, the farther one gets from this area in the city, the more common it is to hear English instead of Spanish. If the clothing store is located relatively far from Little Havana, a bilingual speaker might decide to request the dress shirt in English. Nevertheless, the combination of any of the cues mentioned above could influence the choice, which means that the acquisition of a second language is valuable for anyone wanting to be successful in business.

73. Which choice would most effectively introduce the main topic of this paragraph?
   - A. NO CHANGE
   - B. Generally, bilingual speakers conduct their business in many parts of the city.
   - C. Finally, a speaker's location in the city may influence language choice.
   - D. A bilingual speaker will eventually choose one language for primary use.

74.
   - F. NO CHANGE
   - G. Spanish, spoken
   - H. Spanish, spoke
   - J. Spanish spoke

75. Which choice would most effectively end this sentence by summarizing one of the key points of the essay?
   - A. NO CHANGE
   - B. making the decision of which language to use a complex and subtle process requiring keen social and linguistic awareness.
   - C. and the various languages used in the United States enrich and invigorate the most widely used language, English.
   - D. so being at least somewhat familiar with Spanish can be helpful if an English speaker intends to live in Miami.

END OF TEST 1

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

MATHEMATICS TEST

60 Minutes—60 Questions

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

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

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

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

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

DO YOUR FIGURING HERE.

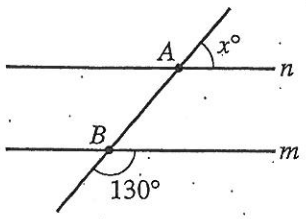
1. A formula that gives m, the recommended maximum heart rate, in beats per minute, while exercising, for a person a years old is $m = 0.8(220 - a)$. What is the recommended maximum heart rate, in beats per minute, while exercising for a person 20 years old?

   A. 156
   B. 160
   C. 176
   D. 192
   E. 196

2. The cost of renting a video game is \$4.10 for the first day plus \$1.50 for each day after the first day. Which of the following is a description of the relationship between c, the cost, in dollars, of renting a video game, and d, the number of days after the first day the video game is rented?

   F. $c = 1.50d + 4.10$
   G. $d = 1.50c + 4.10$
   H. $c = (1.50 + 4.10)d$
   J. $c = 4.10d + 1.50$
   K. $d = 4.10c + 1.50$

3. As shown in the diagram below, parallel lines n and m are intersected by $\overleftrightarrow{AB}$. What is the value of x ?



   A. 130
   B. 70
   C. 60
   D. 50
   E. 40

4. What is the solution for x of the equation $3x + 6 = 7x - 9$?

DO YOUR FIGURING HERE.

F. $-\frac{15}{4}$

G. $-\frac{3}{4}$

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

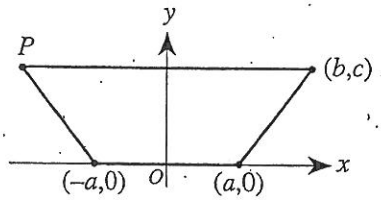
J. $\frac{3}{4}$

K. $\frac{15}{4}$

5. The function h of the 2 variables a and b is defined by $h(a,b) = 5a + 4b - 3ab$. What is $h(2,-3)$?

A. -25
B. -6
C. 4
D. 11
E. 16

6. An isosceles trapezoid is graphed in the standard (x,y) coordinate plane below. Which of the following are the coordinates of vertex P ?



F. $(-b,\ c)$
G. $(-b,-a)$
H. $(\ b,-a)$
J. $(\ b,-c)$
K. $(\ c,\ b)$

7. Each edge of a cube measures 3 inches. What is the volume, in cubic inches, of the cube?

A. 9
B. 27
C. 36
D. 54
E. 162

8. Today's newspaper reported that the price of a gallon of milk 10 years ago was 70% of today's price for a gallon of milk. Today's price for a gallon of milk is \$2.50. Which of the following is closest to the price of a gallon of milk 10 years ago?

F. \$0.70
G. \$0.75
H. \$1.75
J. \$1.80
K. \$2.43

DO YOUR FIGURING HERE.

9. A certain forklift can carry a maximum weight of 3,000 pounds. This forklift will be used to carry boxes that weigh 65 pounds each. Which of the following inequalities is true if and only if the forklift does not exceed its maximum weight limit when it carries b boxes, where b is a whole number?

   A. $65b \leq 3{,}000$
   B. $65b > 3{,}000$
   C. $65 - b \leq 3{,}000$
   D. $65 - b > 3{,}000$
   E. $\frac{b}{65} > 3{,}000$

10. A rectangle has an area of 48 square meters and a width of 6 meters. What is the perimeter, in meters, of the rectangle?

   F. 8
   G. 14
   H. 24
   J. 28
   K. 32

11. When $(x - 6)(x - 5)(x - 4)(x - 3)(x - 2)$ is multiplied out and all like terms are combined, the resulting expression is written so that powers of x are ordered from greatest to least. What are the first term and the last term of the expression?

	first term	last term
A.	$5x$	-720
B.	$5x$	20
C.	x^5	-720
D.	x^5	-20
E.	x^5	720

12. Juan needed 2 cables of different lengths for his home audio speakers. He purchased a total of 39 feet of cable. The longer piece of cable is 9 feet longer than the shorter piece. What is the length, in feet, of the longer piece of cable?

   F. 6
   G. 13
   H. 15
   J. 24
   K. 26

13. Mark is paid $20 per hour for typing manuscripts. If he types a 15,000-word manuscript at the rate of 50 words per minute, how much will he be paid?

   A. $ 15
   B. $ 100
   C. $ 150
   D. $ 300
   E. $6,000

DO YOUR FIGURING HERE.

14. To the nearest foot, what is the length of a diagonal of the top of a rectangular cement slab 12 feet wide and 14 feet long?

F. 13
G. 18
H. 19
J. 20
K. 26

15. A plumber's total charge includes a fixed service charge plus an hourly rate for the job. If the total charge is \$140 for a 3-hour job and \$200 for a 5-hour job, what is the total charge for an 8-hour job?

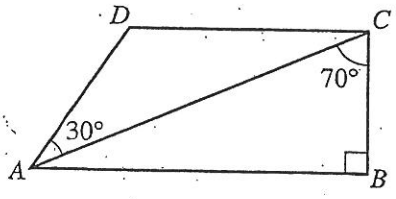
A. \$430
B. \$290
C. \$260
D. \$250
E. \$240

16. If $\frac{(n+2)(9-3)}{8(2)} = 2$, then $n = ?$

F. $-1\frac{1}{3}$
G. $1\frac{1}{3}$
H. $3\frac{1}{3}$
J. $5\frac{1}{3}$
K. $7\frac{1}{3}$

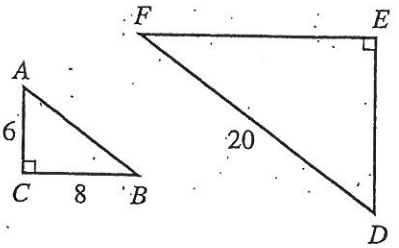
17. In quadrilateral $ABCD$ shown below, $\overline{AB}$ is parallel to $\overline{CD}$, and $\overline{CB}$ is perpendicular to $\overline{AB}$. What is the measure of $\angle D$?

A. 80°
B. 90°
C. 100°
D. 120°
E. 130°



18. The figure below shows 2 similar right triangles such that A corresponds to D. The given dimensions are in feet. What is the length, in feet, of $\overline{EF}$?

F. 8
G. 12
H. 15
J. 16
K. 18



DO YOUR FIGURING HERE.

Use the following information to answer questions 19–21.

In the baseball World Series, the American League champions play the National League champions. The first team to win 4 games wins the Series. The table below gives the year of the Series, the winning team's league (A for American and N for National), and the number of games that Series lasted. For example, the 1980 World Series was won by the National League team and lasted 6 games. The table includes the World Series from 1980 through 2000, except for 1994. In 1994, the World Series was not played due to a players' strike.

Year	Winner	Number of games	Year	Winner	Number of games
1980	N	6	1990	N	6
1981	N	6	1991	A	7
1982	N	7	1992	A	6
1983	A	5	1993	A	6
1984	A	5	1995	N	6
1985	A	7	1996	A	6
1986	N	7	1997	N	6
1987	A	7	1998	A	7
1988	N	5	1999	A	4
1989	A	6	2000	A	5

19. The National League won about what percent of the 20 World Series listed in the table?

A. 8%
B. 25%
C. 40%
D. 45%
E. 67%

20. The table includes data for 6 World Series that were played after the 1994 strike. In these Series, a total of 34 games were played. How many of these games did the American League team win?

F. 16
G. 20
H. 22
J. 26
K. 28

21. The first 10 World Series listed in the table (1980 through 1989) had a median length of how many games?

A. 5
B. $5\frac{1}{2}$
C. 6
D. $6\frac{1}{2}$
E. 7

DO YOUR FIGURING HERE.

22. For all nonzero values of a, b, and c, which of the following is the solution for x of the equation $ax + b = c$?

F. $\frac{c}{ab}$

G. $\frac{c}{a} - b$

H. $\frac{b-c}{a}$

J. $\frac{b+c}{a}$

K. $\frac{c-b}{a}$

23. What is the midpoint of the line segment with endpoints (3,5) and (−1,3) in the standard (x,y) coordinate plane?

A. (0,6)
B. (1,4)
C. (2,1)
D. (2,8)
E. (4,2)

24. For all x, $\frac{4x^2+2}{2} = ?$

F. $2x^2$

G. $2x^2 + 1$

H. $2x^2 + 2$

J. $4x^2$

K. $4x^2 + 1$

25. As a fund-raiser, a local youth group sold boxes of regular popcorn for $5 each and boxes of caramel popcorn for $8 each. Altogether, they sold 160 boxes for $1,100. How many boxes of caramel popcorn did they sell?

A. 20
B. 32
C. 60
D. 80
E. 100

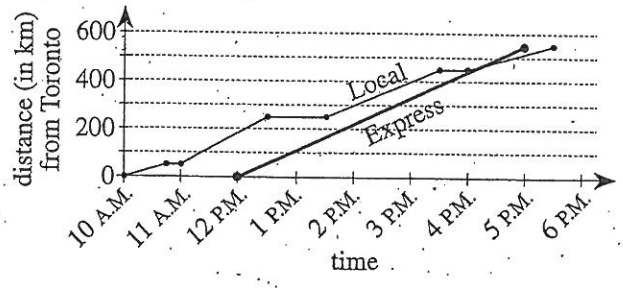
GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

Use the following information to answer questions 26–28.

Two trains travel the same route from Toronto to Montreal, a distance of 550 km. The Local leaves Toronto earlier than the Express, makes 3 stops at stations along the way, and arrives in Montreal later than the Express. Assume that the Local travels at a constant speed on each of the 4 parts of the route, but not necessarily at the same speed for all 4 parts, and that the Express travels at a constant speed. The schedule for the Local and a graph for the Local and the Express are shown below.

Schedule for the Local		
City	Scheduled arrival time	Distance (to the nearest kilometer) from Toronto
Toronto		0
Oshawa	10:45 A.M.	51
Kingston	12:30 P.M.	252
Lancaster	3:30 P.M.	451
Montreal	5:30 P.M.	550



26. At about how many kilometers from the Toronto station does the Express pass the Local?

F. 0
G. 50
H. 250
J. 450
K. 550

27. Over which of the following time intervals is the Local going faster than the Express?

I. 12:00 P.M.–12:30 P.M.
II. 1:30 P.M.– 3:30 P.M.
III. 4:00 P.M.– 5:00 P.M.

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

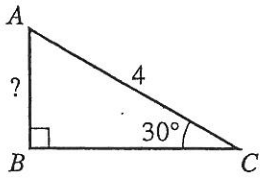
DO YOUR FIGURING HERE.

28. One of the following gives the total amount of time that the Local spends at stops along the way. Which one is it?

F. 1 hour 45 minutes
G. 2 hours 30 minutes
H. 2 hours 45 minutes
J. 3 hours
K. 3 hours 15 minutes

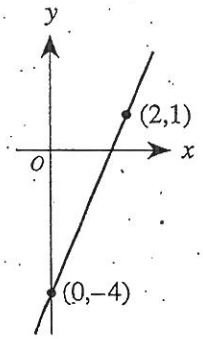
29. In $\triangle ABC$ below, $\angle B$ is a right angle, the measure of $\angle C$ is 30°, and $\overline{AC}$ is 4 inches long. What is the length, in inches, of $\overline{AB}$?

A. $\frac{2}{\sqrt{3}}$
B. $\sqrt{3}$
C. 2
D. $\frac{4}{\sqrt{3}}$
E. $2\sqrt{3}$



30. What is the slope of a line that is parallel to the line graphed below in the standard (x,y) coordinate plane?

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



31. The operation ⊗ is defined as "cube the number that is to the left of ⊗ and add the result to the number that is to the right of ⊗." What is the value of $2 \otimes (4 \otimes 5)$?

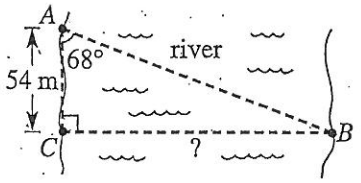
A. 40
B. 77
C. 160
D. 640
E. 1,733

32. For which of the following values of a will $\left(-\frac{1}{2}\right)^a$ represent a real number between −1 and 0 ?

F. −2
G. −1
H. 0
J. 1
K. 2

DO YOUR FIGURING HERE.

33. A surveyor wants to approximate a river's width. As shown in the figure below, points A and C are located on the west bank of a river and point B is located on the east bank of the river such that $\angle ACB$ is a right angle. She measures and finds that the length of $\overline{AC}$ is 54 meters and the measure of $\angle BAC$ is 68°.



Given the trigonometric approximations in the tables below, which of the following is closest to the river's width, in meters, represented by the length of $\overline{BC}$?

cos 22°	0.927
sin 22°	0.375
tan 22°	0.404

cos 68°	0.375
sin 68°	0.927
tan 68°	2.475

A. 58
B. 108
C. 134
D. 136
E. 144

34. The first term of an arithmetic sequence is 1. The common difference of the sequence is 2. What is the sum of the first 15 terms of this sequence?

F. 29
G. 64
H. 210
J. 225
K. 450

35. A cookbook recommends cooking a certain type of roast at 325°F for 50 minutes per pound of the roast's weight. According to this recommendation, how long should a 5-pound roast of this type be cooked at 325°F ?

A. 2 hours 30 minutes
B. 2 hours 50 minutes
C. 4 hours 10 minutes
D. 4 hours 17 minutes
E. 6 hours 0 minutes

36. The integer a is 4 more than the positive integer b. The integer c is 4 less than b. The product of a and c is 84. What is the value of b ?

F. 6
G. 8
H. 10
J. 14
K. 42

DO YOUR FIGURING HERE.

37. For what values of x is it true that $x - 2 > \frac{x}{2}$?

A. No values
B. Only values between 0 and 2
C. Only values between 2 and 4
D. Only values greater than 4
E. All values

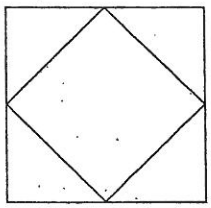
38. For all $a \geq 0$, $|-a|^3 - (-|3|^2) = ?$

F. $a^3 + 9$
G. $a^3 + 6$
H. $a^3 - 9$
J. $-a^3 + 6$
K. $-a^3 + 9$

39. If x and y are positive integers and $x - y = 5$, what is the least possible value of $x + y$?

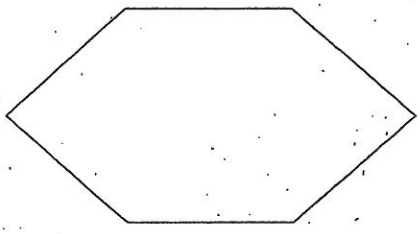
A. 10
B. 9
C. 8
D. 7
E. 6

40. The midpoints of the sides of the outer square shown below are the vertices of the inner square. Thus, the outer square is divided into 5 regions (the inner square and 4 right triangles). What is the ratio of the area of the inner square to the total area of the 4 right triangles?



F. 1:1
G. 1:2
H. 2:1
J. 3:2
K. 4:1

41. The hexagon shown below has 6 sides of equal length. What is the sum of the measures of the interior angles in this hexagon?



A. 900°
B. 720°
C. 540°
D. 360°
E. 120°

DO YOUR FIGURING HERE.

42. What is the least common multiple of 4, 6, and 8 ?

F. 2
G. 8
H. 24
J. 48
K. 192

43. What is the distance, in coordinate units, from (3,4) to (6,9) in the standard (x,y) coordinate plane?

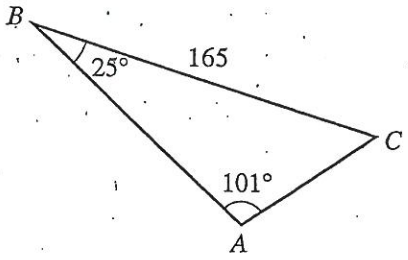
A. $\sqrt{4}$
B. $\sqrt{8}$
C. $\sqrt{10}$
D. $\sqrt{34}$
E. $\sqrt{40}$

44. Jim makes the statement "If you have visited the White House, then you have been to Washington, D.C." Which of the following statements is logically equivalent to Jim's statement?

F. You have visited the White House, or you have been to Washington, D.C.
G. You have visited the White House, and you have been to Washington, D.C.
H. If you have been to Washington, D.C., then you have visited the White House.
J. If you have not visited the White House, then you have not been to Washington, D.C.
K. If you have not been to Washington, D.C., then you have not visited the White House.

45. In $\triangle ABC$ below, $\angle A$ measures 101°, $\angle B$ measures 25°, and the length of $\overline{BC}$ is 165 meters. To the nearest meter, what is the length of $\overline{AC}$?

(Note: The law of sines states that the lengths of the sides of a triangle are proportional to the sines of the opposite angles. Note also that $\sin 101° \approx 0.982$ and $\sin 25° \approx 0.423$.)



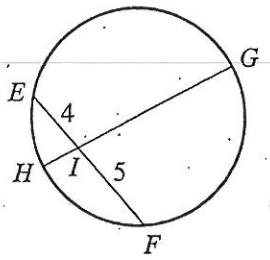
A. 41
B. 54
C. 64
D. 71
E. 81

46. Which of the following expressions is equivalent to $6x^2 - 14x - 12$?

F. $(2x - 3)(3x + 4)$
G. $(2x + 3)(3x - 4)$
H. $(6x - 1)(x + 12)$
J. $2(3x - 2)(x + 3)$
K. $2(3x + 2)(x - 3)$

DO YOUR FIGURING HERE.

47. When 2 chords of a circle intersect inside the circle, the product of the lengths of the 2 segments of one chord is equal to the product of the lengths of the 2 segments of the other chord. In the figure below, chords $\overline{EF}$ and $\overline{GH}$ intersect at I. The length of $\overline{GH}$ is 12 inches. The length of $\overline{FI}$ is 5 inches. The length of $\overline{EI}$ is 4 inches. The length of $\overline{HI}$ is less than the length of $\overline{GI}$. What is the length, in inches, of $\overline{GI}$?



A. 3
B. 5
C. 7
D. 8
E. 10

48. Which of the following gives the range of numbers that are within 1.5 of the number $\frac{2}{3}$?

F. $-\frac{13}{6}$ to $\frac{5}{6}$
G. $-\frac{13}{6}$ to $\frac{13}{6}$
H. $-\frac{5}{6}$ to $\frac{5}{6}$
J. $-\frac{5}{6}$ to $\frac{13}{6}$
K. -1 to 1

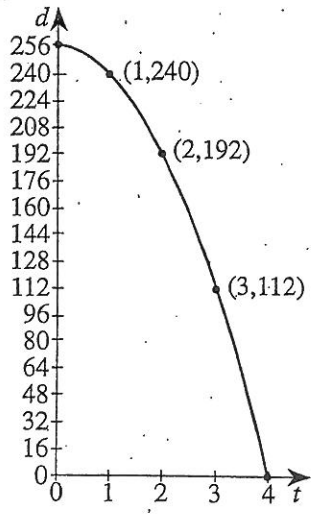
49. In the standard (x,y) coordinate plane, $\triangle ABC$ is isosceles with $\overline{AB}$ congruent to $\overline{AC}$. Vertex B has coordinates $(-3,0)$ and vertex C has coordinates $(0,0)$. What is the x-coordinate of vertex A?

A. -3
B. $-\frac{3}{2}$
C. 0
D. $\frac{3}{2}$
E. 3

DO YOUR FIGURING HERE.

50. A flowerpot fell from a windowsill. The graph below shows the distance, d feet, the flowerpot was above the ground t seconds after it fell. The graph shows that the flowerpot fell 16 feet (from $d = 256$ to $d = 240$) during the 1st second of its fall and 48 feet (from $d = 240$ to $d = 192$) during the 2nd second of its fall. During which second of its fall, if any, was the average speed of the flowerpot, in feet per second, the greatest?

(Note: The average speed of an object over a given interval of time is the distance it traveled during the interval divided by the length of the interval.)



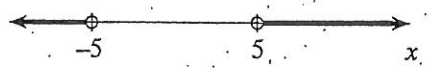
F. 4th
G. 3rd
H. 2nd
J. 1st
K. None; the speed of the flowerpot was constant during its fall.

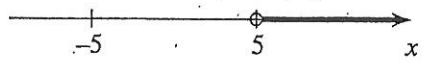
51. Each of 6 historical events occurred in a different year. You are asked to arrange the 6 events in ascending order by the years they occurred. You know the earliest and the latest. You randomly order the other events. What is the probability that you order the 6 events correctly?

A. $\frac{1}{720}$
B. $\frac{1}{120}$
C. $\frac{1}{24}$
D. $\frac{1}{6}$
E. $\frac{1}{4}$

52. Which of the following number line graphs shows the solution set for x of $x^2 > 25$?

DO YOUR FIGURING HERE.

F.


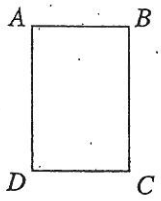
G.


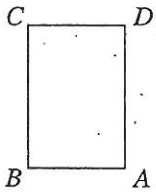
H.

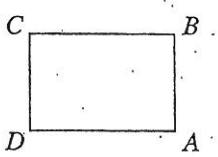

J.

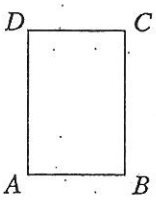

K.

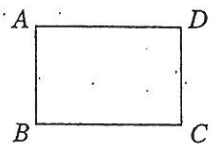

53. Rectangle $ABCD$, shown below, is reflected over $\overline{DC}$ and then rotated 180° clockwise around C. Which of the following shows the final orientation of $ABCD$?

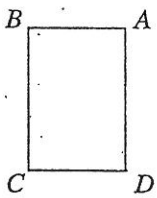


A.


D.


B.


E.


C.


DO YOUR FIGURING HERE.

54. The table below shows data from the 1990 U.S. Census.

Highest level of education attained	Percent of adults 25 or older
8th grade or less	10.4
Some high school	14.4
High school diploma	30.0
Some college, no degree	18.7
Associate degree	6.2
Bachelor's degree	13.1
Graduate or professional degree	7.2

If this information were presented as a circle graph, what would be the measure of the central angle of the sector representing those for whom the highest level of education attained is a high school diploma?

F. 120°
G. 108°
H. 60°
J. 54°
K. 30°

55. How many (x,y) pairs of real numbers satisfy $xy = 3$ and $(x + y)^2 = 10$?

A. 0
B. 1
C. 2
D. 4
E. Infinitely many

56. In the standard (x,y) coordinate plane, what is the range of the function defined by the equation $y = 3 \sin(2x)$?

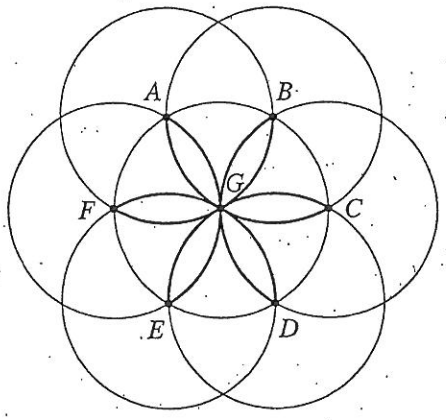
F. $-\pi \leq y \leq \pi$
G. $-2\pi \leq y \leq 2\pi$
H. $-2 \leq y \leq 2$
J. $-3 \leq y \leq 3$
K. $-6 \leq y \leq 6$

57. The Leaning Tower of Proville creates an 85° angle between itself and the level ground around the tower. The tower's shadow is 100 feet long. If it can be determined, which of the following expressions gives the distance, in feet, from the top of the tower to the ground?

A. 100 cos 85°
B. 100 sin 85°
C. 100 tan 85°
D. 100 cot 85°
E. Cannot be determined from the given information

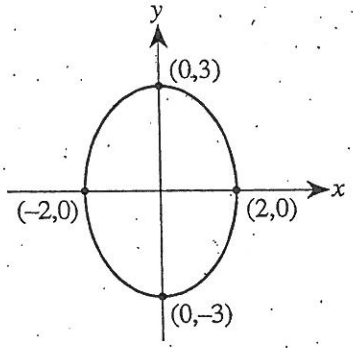
DO YOUR FIGURING HERE.

58. The 7 congruent circles shown in the figure below are centered at points A through G, and each circle has a circumference of 24π cm. Points A through F are equally spaced on the circumference of the circle centered at G. What is the sum of the lengths, in centimeters, of the 6 thicker arcs ($\overset{\frown}{AGC}$, $\overset{\frown}{BGD}$, $\overset{\frown}{CGE}$, $\overset{\frown}{DGF}$, $\overset{\frown}{EGA}$, and $\overset{\frown}{FGB}$)?



F. 48π
G. 72π
H. 96π
J. 144π
K. 288π

59. Which of the following is an equation of the ellipse graphed below?



A. $x^2 + y^2 = -6$
B. $\frac{x^2}{2} + \frac{y^2}{3} = 0$
C. $\frac{x^2}{2} + \frac{y^2}{3} = 1$
D. $\frac{x^2}{4} + \frac{y^2}{9} = 0$
E. $\frac{x^2}{4} + \frac{y^2}{9} = 1$

60. If x and y are real numbers such that $4 \leq x \leq 12$ and $2 \leq y \leq 4$, then the minimum value for $\frac{x}{y}$ is:

F. 0
G. 1
H. 2
J. 3
K. 6

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 David Leavitt's novel *Equal Affections* (©1989 by David Leavitt).

Nine mysterious and crucial years separated April's birth from Danny's. This meant that when Danny was nine, his sister was eighteen and had lived twice as long in the world as he had. The difference never seemed so vast, so insurmountable, as it did that magical year, for as they got older, nine years became less of a gulf and more of a bridge. Danny met and befriended people older than April all the time now, as peers, a fact the nine-year-old baby brother in him still couldn't help but marvel at; when he was a child, she and her friends had seemed so immutably older than he was. Now people April's age worked under him.

April and his parents had been a family long before he came along; they shared with each other elaborate and entrenched rituals, masses of common history, so much that in his early childhood he was always having to ask questions: What is the house in this picture? Our old house, where we lived in Boston, when April was born. Who are these women holding babies? That is your grandmother, who you never knew, holding your cousin Joanne. And that is your aunt Eleanor, holding your cousin Markie. And that is your mommy, holding your sister. He studied the photographs, memorizing the faces he would never see in real life, because the people they belonged to were dead or had aged beyond the point of recognition. It was like homework, like memorizing the parts of the body or the capitals. But the pictures he paid closest attention to were the ones his parents had taken when April was a baby. There were hundreds of them—ten or twenty taken on a single day, sometimes, marked and dated and captioned, as if Louise and Nat had been under some sort of picture-taking enchantment, brought on by the miracle of first birth. "11/22/52: Mommy giving April her bottle." "11/23/52: Daddy puts April in her bath." Danny didn't know this energetic young couple, busily engaged in the rituals of baby care, and yet there were his father's ringed eyes and sharp nose on the face of that skinny boy; there was his mother's slightly upturned lip, her blazing dark eyes. What surprised him most was a sequence of pictures taken on the beach. The color in these pictures had faded, and so the beach had a bleached, white aspect, the bright flowers on Louise's bathing suit fading, as if at the end of their season.

As April grew, as her unspecified baby face took on the familiar features of his sister, the gaps between when the pictures were taken grew as well, until instead of every day, it was every six months, and then every year, at her birthday party. Then there were no dates. Then there were no more binders, just an old shoebox filled with snapshots. Very few pictures existed of Danny's own babyhood, and when he once asked his mother why, she looked at him strangely and put her hand on her forehead. "Oh, Danny," she said, laughing a little. "I'm sorry." He hadn't, until that moment, thought of it as anything to apologize for.

When Danny was growing up, he had a red rubber ball he liked to bounce. After school, in the afternoon, he'd walk for hours, bouncing this ball, spinning out in his head the plots of imaginary movies and television shows, and later, when April started singing, making up songs. She had told him that if he wrote a song good enough, she would sing it. But somehow it was always someone else's tune he came up with during those predusk hours he spent outdoors, bouncing, bouncing. When he started college, that familiar, thunking beat was what Louise said she missed most; she couldn't stand the silence, she told Danny, and joked about paying a neighborhood child to play handball against her garage. And later, when he was living in the East and went home for visits, he'd find the red ball waiting for him on his bed, and sometimes, when he had something to think through, he'd take it up and bounce it, though it was soft where once it had been tight, and riddled with tiny, unsealable holes. Louise, doing the dishes or ironing, felt a rare peacefulness come over her as she listened to that familiar thumping of her son and his ball outside.

Danny remembered those hours bouncing the ball as ones of supreme contentment and security. He had a vision, sometimes, of Wall Street at rush hour, men in business suits, women in pastel-colored tennis shoes, but not hurrying as usual toward the subway; instead, they are just shuffling along, bouncing, and in the world there is a sound like thunder as a thousand balls hit the pavement at once, fly again into the air, at once.

1. The mood of this passage can best be described as:
   - A. jubilant.
   - B. mournful.
   - C. contemplative.
   - D. apprehensive.

2. Which of the following statements is NOT supported by the passage?
   - F. Danny experienced a lonely childhood until he reached the age of nine.
   - G. Danny was born too late to know his grandmother and some other extended-family members.
   - H. Danny's participation in some family rituals was limited primarily to looking at old photographs.
   - J. Danny's visits home when he was living in the East could provide him time for reflection.

3. In the second paragraph (lines 13–45), the narrator primarily emphasizes Danny's sense of:
   - A. estrangement from his mother.
   - B. rivalry with his older sister April.
   - C. anxiety about the cousins and grandparents that he has never met.
   - D. curiosity about what his extended family was like before he was born.

4. In the passage, the red rubber ball represents all of the following EXCEPT:
   - F. a young boy's only friend while growing up.
   - G. an object that stimulates the imagination.
   - H. the link between a young man's past and present.
   - J. a welcome distraction from silence.

5. The passage suggests that as Danny grew older, April became more:
   - A. comprehensible to him.
   - B. emotionally distant.
   - C. dependent on her family.
   - D. vital to his success.

6. The narrator points out that studying the pictures "was like homework" (line 26) for Danny primarily to emphasize his:
   - F. lack of interest in sitting down with his mother every night to look at old family pictures.
   - G. intense desire to know where he fit in this larger extended family.
   - H. unpleasant experiences in school doing homework.
   - J. commitment to getting to know his extended-family members as fully as possible before he met them at the next reunion.

7. According to the passage, which of the following ultimately enables Danny to recognize the young couple pictured in some old pictures as Louise and Nat?
   - A. The presence of his grandmother and Aunt Eleanor in many of the same pictures
   - B. The couple's animated gestures captured in the pictures
   - C. The names *Markie* and *Joanne* written on several of the old pictures
   - D. Some of his parents' distinguishing physical characteristics

8. When Louise jokes with Danny "about paying a neighborhood child to play handball against her garage" (lines 69–71), she is most likely trying to tell Danny that she:
   - F. remembers the marks he made when he used to throw the handball against the garage.
   - G. thinks of him often as being more special than April when he was younger.
   - H. values the memory of that activity he engaged in while growing up and still at home.
   - J. longs for him to attend college closer to home so she can see him more often.

9. "Those hours bouncing the ball" (line 80) are said in the passage to take place during all of the following activities EXCEPT Danny's:
   - A. after-school walks when he was growing up.
   - B. visits home when he lived in the East.
   - C. predusk efforts to make up songs for April to sing.
   - D. long walks while at college recalling the past.

10. According to the passage, while looking at his family's old pictures, Danny's moment of greatest surprise occurs when:
    - F. his attention is drawn to a series of beach pictures that are faded in color.
    - G. he recognizes April's slightly upturned lip and blazing dark eyes.
    - H. he discovers a picture with the caption "Daddy puts April in her bath."
    - J. Louise responds to one of his questions by saying, "That is your mommy holding you."

Passage II

SOCIAL SCIENCE: This passage is adapted from the revised second edition of *Demystifying Economics* by Allen W. Smith (©2000 by Allen W. Smith). *Gross Domestic Product* (GDP) is the total dollar value of all goods and services produced in a year's time within a country's borders.

Economists usually define *fiscal policy* as the deliberate use of government's spending and taxing powers to influence economic activity. When the government raises or lowers taxes, or changes its spending levels, in order to bring about a desired change in the level of total spending, and thus the performance of the economy, it is practicing fiscal policy. Fiscal policy can also be defined more generally as simply the government's taxing and spending policies regardless of whether or not it is trying to bring about changes in the level of total spending in the economy.

The origin of fiscal policy as a tool to bring about deliberate changes in the performance of the economy dates back to 1936 when a British economist, John Maynard Keynes, published a monumental book, *The General Theory of Employment, Interest, and Money.* Keynesian economics soon became the predominant body of economic theory in the Western world. Although his theories have undergone substantial refinement and revision, much of modern Keynesian economics is still rooted in the ideas set forth by Keynes. Keynes argued that government should play an active role in maintaining the proper level of total spending in the economy in order to minimize both unemployment and inflation. He believed that, with the proper use of the government's spending and taxing powers, the extremes of the business cycle could be avoided.

The extremes of the business cycle, which result in high unemployment or high inflation, can be very costly. During a severe recession, millions of workers become unemployed, and billions of dollars worth of potential production are permanently lost. In addition, prolonged periods of high inflation can have a devastating effect on both the economy and the people.

The objectives of deliberate fiscal policy are to minimize unemployment and inflation by using the government's taxing and spending powers to assure the correct level of total spending, and thus the proper level of Gross Domestic Product. The principal determinant of the level of the Gross Domestic Product (GDP) is the level of total spending in the economy. If the GDP is too high, the economy will experience inflation, and if it is too low, the economy will suffer from unemployment. Therefore, in order to have a healthy economy, it is important to have the proper amount of total spending so the GDP will be neither too high nor too low.

Fiscal policy can be used to regulate the level of total spending. If total spending is too high, the government can lower its own spending and/or increase taxes so consumers will have less after-tax money to spend. If total spending is too low, the government can increase its own spending and/or reduce taxes, so consumers will have more after-tax money to spend. At least in theory, fiscal policy can be used to regulate the level of total spending, and thus the level of production. If GDP could be maintained at the appropriate level, it would be possible to avoid both high inflation and serious unemployment.

One example of successful use of fiscal policy is the long period of economic expansion during the 1960s. When President John F. Kennedy took office in 1961, the economy was suffering from a recession that had begun in 1958. Kennedy brought into his administration economic advisers who were determined to use fiscal policy to bring the economy out of the recession. The first fiscal-policy measures included increased federal spending on highways, and legislation that allowed businesses to subtract from their taxes a part of the cost of new investment in factories and machines.

When these measures proved insufficient, the President proposed a major tax cut. Although President Kennedy was assassinated before the tax cut was enacted, his successor, Lyndon Johnson, signed an $11 billion tax cut into law in February 1964. This large tax cut, along with substantial increases in spending for the Vietnam War, fueled an economic expansion that lasted 106 consecutive months.

Fiscal policy does not have such a good track record in combating inflation, however. The problem is not that proper fiscal policies cannot successfully control inflation. The problem is the political feasibility of getting the President and Congress to support the proper fiscal policies during periods of inflation. Higher taxes and cuts in government programs are never popular with the public, and many politicians do not have the guts to do what is right for the economy because such unpopular actions might cost them votes in the next election.

11. The passage's main idea is that:

- **A.** fiscal policy theory first recommended by Keynes ought to be the foundation of fiscal policy in the entire Western world.
- **B.** the diligent application of fiscal policy that is based on the ideas of Keynes can be effective at regulating the economy.
- **C.** the unwillingness of many politicians to recognize sound fiscal policy is the main reason Keynesian economics has become increasingly unpopular.
- **D.** government should play as little role as possible in manipulating the economy with fiscal policy.

12. It can reasonably be inferred from the passage that the advisors President Kennedy brought into his administration were:
    - F. skeptical of using tax cuts to spur the economy.
    - G. focused on successfully controlling inflation.
    - H. committed to Keynesian economics.
    - J. not at first popular with the public.

13. The main purpose of the first paragraph is to:
    - A. define fiscal policy in both specific and general terms.
    - B. portray fiscal policy as a vague concept.
    - C. argue for the adoption of an unconventional definition of fiscal policy.
    - D. present two contradictory definitions of fiscal policy.

14. The main idea of the fourth paragraph (lines 36–47) is that:
    - F. the total amount of spending in an economy is determined entirely by its GDP.
    - G. deliberate fiscal policy ought to focus more on unemployment than on inflation.
    - H. inflation and unemployment are both caused by a GDP that is too high.
    - J. the GDP of a healthy economy results from a proper amount of total spending.

15. The passage indicates that which of the following is true of the fiscal-policy measures introduced by President Kennedy after 1961?
    - A. They were the first instances of the deliberate use of fiscal policy by a U.S. president.
    - B. They were designed to decrease the nation's total spending.
    - C. The inflation preceding them was the result of flawed fiscal policy.
    - D. The first of them were not effective at bringing the nation out of recession.

16. The last paragraph contains which of the following?
    - F. A conclusion that Keynesian economics is ineffective at controlling inflation
    - G. An example of a successful implementation of fiscal policy
    - H. A complaint concerning the implementation of fiscal policy
    - J. A fact that undermines the feasibility of fiscal policy to affect unemployment

17. The passage's author would most likely agree with which of the following statements about fiscal policy?
    - A. The extremes of the business cycle are inevitable, regardless of what fiscal policy is used.
    - B. Politicians should endorse good fiscal policy even at the risk of alienating voters.
    - C. Fiscal policy is a sound theory even while there are no examples of it being successfully implemented.
    - D. Fiscal policy is most effective when it is designed to bring about only small changes in the economy.

18. As it is used in line 7, the word *practicing* most nearly means:
    - F. training.
    - G. preparing.
    - H. unleashing.
    - J. implementing.

19. It can reasonably be inferred from the passage that a main contribution of Keynes to economic theory was the idea that:
    - A. the extremes of the business cycle are inevitable.
    - B. high inflation is not always bad for the economy.
    - C. fiscal policy can be used to change the economy's performance.
    - D. good fiscal policy is often hindered by politicians' personal motives.

20. The passage states that if a nation's total spending is too high, the government can act to regulate this by:
    - F. lowering its own spending.
    - G. lowering taxes on individuals.
    - H. encouraging businesses to invest in new factories and machines.
    - J. encouraging businesses to hire unemployed workers.

Passage III

HUMANITIES: This passage is adapted from "An Emissary of the Between-World," an interview by Katie Bacon with author Louise Erdrich (©2001 by The Atlantic Monthly Group). Erdrich, of French, German, and Ojibwe ancestry, is the author of several novels, two children's books, and a memoir.

Bacon: Could you talk about the role humor plays in Ojibwemowin, the language spoken by your mother's tribe? And what about the role it plays in your fiction?

Erdrich: Ojibwemowin is a marvel; the more I know the less I know I know. Words are constantly in a state of flux and invention, and a fluent speaker can inject humor into any subject or situation. For instance, a friend of mine in describing a baby's frustration over not being nursed combined *nishka* (angry) and *dodosh* (milk) to make a word that translates as "milk rage"—*nishkadodosh*. I'll always be a beginner in this language, as it is surely one of the most complex on earth. As for humor in my fiction, I hope it's there. It's impossible to write about Native life without humor—that's how people maintain sanity.

Bacon: How has learning Ojibwemowin changed the way you think about English?

Erdrich: For one thing, I've noticed English is extremely gender-based. There is no his or her in Ojibwe. English doesn't have the flexibility of true spoken Ojibwe. Because it has been written and scrutinized and coded a person can't (or people usually don't) make up words right on the spot, as can happen easily in a language based on oral tradition. But English is also a big, gobbling, greedy, thorny language, and a gift to writers because it absorbs all comers and yet retains its most ancient self.

Bacon: Do you feel any pressure to write about certain themes because people think of you as a Native American writer? As more Native Americans have begun publishing books, do you feel freed in any way?

Erdrich: Anything I write about comes from inside and not outside pressure. Nothing works on paper unless I feel absolutely compelled to write it, and some of what I write as a consequence may work politically and emotionally, or it simply may not.

I do feel pleased that many other Native people are writing books, extending the view of what a Native person is, and introducing the idea of tribal literature. Not "Native" literature, but literature based in one tribal vision. For instance, Ojibwe literature is very different from Lakota, or Zuni, or Santa Clara Pueblo, or Ho-Chunk, or Mesquakie literature. Each is based in an extremely specific tradition, history, religion, worldview.

Bacon: You return to the same characters over and over again, looking at their lives from different perspectives, telling their stories in different ways. Do your characters ever surprise you?

Erdrich: Yes, I am often surprised. I have no explanation for why my characters continue on with me beyond the fact of my own consciousness. It must contain these people—at all ages, in situations that become accessible to me over time. Fifteen years isn't long for a writer to continue with her characters. I'm working on one big continuous novel anyway. All of the books are part of it.

Bacon: In your books you have written about love of God, of music, of land, of children, of culture, among many other kinds. If one thing could be said to tie your work together, would it be the myriad forms of love?

Erdrich: I wouldn't mind that being said, although one could also point out that the work is also tied together by the unity of place, or by the failure of love to solve people's lives, or by the desperate wish to be back in our parents' arms, or to be home, or by the dreadful and persistent longing to know why we are on earth.

Bacon: Do you see yourself as a "re-storier" for the Ojibwe—a reclaimer of narratives that were never written down or were drowned out?

Erdrich: The Ojibwe have been telling stories through and in spite of immense hardship. In fact, Ojibwe narrative has grown rich and subtle on the ironies of conflict. But these are the narratives Ojibwe people tell among themselves, and in Ojibwemowin. I wouldn't even begin to think of myself as a "re-storier" in that sense. I write in English, and so I suppose I function as an emissary of the between-world, that increasingly common margin where cultures mix and collide. That is in fact where many of my stories occur.

Primarily, though, I am just a storyteller, and I take them where I find them. I love stories whether they function to reclaim old narratives or occur spontaneously. Often, to my surprise, they do both. I'll follow an inner thread of a plot and find that I am actually retelling a very old story, often in a contemporary setting. I usually can't recall whether it is something I remember hearing, or something I dreamed, or read, or imagined on the spot. It all becomes confused and then the characters take over, anyway, and make the piece their own.

21. In her questions, Bacon presents herself as being most interested in:

A. Erdrich's connections to her Ojibwe heritage and the reoccurring elements in her work.
B. the characteristics of Ojibwemowin and what Erdrich has learned from studying it.
C. the role of humor in modern fiction and Erdrich's evaluation of several prominent Native writers.
D. Erdrich's tips for aspiring authors and the many challenges of being a Native writer.

22. With which of the following statements about her writing would Erdrich most likely agree?
    - F. It contains more references to gender than writing in English generally does.
    - G. It often develops in ways that she did not originally foresee.
    - H. It remains tightly under her conscious control as it unfolds.
    - J. It has been profoundly reshaped by the work of younger Native writers.

23. Erdrich refers to "milk rage" (line 10) primarily to suggest that:
    - A. young children are particularly inventive with language.
    - B. concepts in Ojibwemowin can be hard to translate into English.
    - C. the nature of Ojibwemowin increases its ability to express humor.
    - D. humor is an important part of her fiction.

24. Based on the passage, Erdrich most nearly regards the concept of "Native literature" as:
    - F. inappropriate, because it suggests that all Native writers share a common perspective.
    - G. exciting, because it has helped unite writers from many different tribes.
    - H. helpful, because it has encouraged many other Native people to write books.
    - J. problematic, because it implies that such literature is not part of American literature.

25. When Bacon suggests that what ties Erdrich's work together is "the myriad forms of love" (line 61), how does Erdrich respond?
    - A. She disagrees, since to her a sense of place and home are more important unifying elements.
    - B. She disagrees, since love fails more often than it endures in her writings.
    - C. She agrees that this theme is present but suggests that other themes are equally important.
    - D. She agrees but argues that love as a theme has declined in importance in her later works.

26. By describing herself as "an emissary of the between-world" (lines 77–78), Erdrich is most likely implying that she:
    - F. is shifting from writing in English to writing in Ojibwemowin.
    - G. wants to translate traditional Ojibwe narratives into English.
    - H. hopes her writing will settle the cultural conflicts she sees around her.
    - J. writes about the intersecting of cultures, which she herself embodies.

27. The passage indicates that which of the following statements is true about Erdrich's relationship with Ojibwemowin?
    - A. She has become a fluent speaker of it.
    - B. She considers herself a perpetual beginner in it.
    - C. She is gaining confidence in her ability to use it.
    - D. She yearns to understand the humor of it.

28. Erdrich states that humor is essential for which of the following?
    - F. Raising babies
    - G. Maintaining sanity
    - H. Learning a language
    - J. Uniting a people

29. Based on the passage, Erdrich would most likely characterize her works of fiction as:
    - A. significantly interconnected.
    - B. intentionally controversial.
    - C. steadfastly modern.
    - D. wholly original.

30. Erdrich states that conflict has had which of the following effects on Ojibwe narrative?
    - F. Made it rich and subtle
    - G. Ironically diminished it
    - H. Drowned out some of it
    - J. Promoted its "re-storying"

Passage IV

NATURAL SCIENCE: This passage is adapted from *Ancient Trees: Trees That Live for a Thousand Years* by Anna Lewington and Edward Parker (©1999 by Anna Lewington and Edward Parker).

Giant redwoods and their close ancestors have been on the earth for at least 200 million years and, like their coastal cousins, once formed massive forests across the northern hemisphere. Today they are a truly relict species, occurring only in isolated groves on the western slopes of the Sierra Nevada in California.

Although the largest giant redwood in existence does not hold any records for being the oldest, tallest or broadest tree in the world, nothing can match its sheer volume. The tree known as the General Sherman, after the famous general in the American Civil War, contains an estimated 50,000 cu ft/1,415 cu m of wood. The largest trunk of any redwood is found on a tree in Alder Creek, which averages 53 ft/16 m around its base. Giant redwoods are virtually indestructible because they have fire-resistant bark. In fact, the trees need the clearing effect of forest fires to establish new seedlings successfully. They are also resistant to fungi and wood-boring insects. The main cause of death is being blown over.

Today there are just seventy-five groves of giant redwoods left, concentrated in the King's Canyon and Sequoia National Parks, with a further three groves located in Yosemite. Where they do appear, the redwood forests seem to be healthy and reproducing well. Giant redwood groves are found only on the slopes of upland ridges between major river canyons at 4,000–8,000 ft/1,220–2,440 m above sea-level. Here the climate is characterized by warm, dry summers and sunny winters. The latter are, however, interrupted by infrequent snowstorms, which may last from a few days to a week, leaving several feet of snow. The groves are generally tucked away from areas of high wind, but lightning strikes and thunderbolts are relatively common. Just why the giant redwoods are confined to isolated groves remains a mystery. Not a single tree is found outside these groves, even where the same climatic conditions prevail.

The giant redwood has cinnamon-coloured bark, which may grow to a massive 18 in/45 cm thick. Unlike the slim, tapering trunk of the coast redwood, the giant's trunk is conical in shape and has a broad base that can reach over 40 ft/12 m across. Even at 200 ft/60 m above the ground, it can still be more than 20 ft/6 m in diameter. Its main branches may grow to more than 8 ft/2.4 m wide, making the tree's biggest limbs the size of large trees themselves.

The tree stands on a shallow but widely spreading root-pad, which can be enormous, radiating from the trunk for up to 300 ft/91 m, but seldom reaching down into the earth more than 6 ft/1.8 m. Giant redwoods reach their maximum height in the first 500 years of their life, after which lateral expansion goes on for at least 3,000 years. It is not clear when a redwood stops expanding, because there is no definite record of any giant redwood dying of old age and they continue to grow indefinitely until a natural disaster, such as a lightning strike or storm-force wind, occurs. The greatest age that has been verified from a stump by its tree rings is 3,200 years. However, naturalist John Muir claimed to have discovered a stump containing 4,000 rings.

The giant redwoods start to produce seeds after only a few years of life. Mature trees generate about 600 new cones every year and, since each cone contains several hundred healthy seeds, a tree can produce more than 100,000 seeds annually. The largest giant redwood produces some 10,000 cones and as many as two million seeds each year. The cones do not simply fall, however, and release their seeds. This function is often performed unwittingly by the chickaree, or Douglas squirrel, which finds the fleshy scales of the cones delicious. As it feeds on them, the seeds are scattered onto the forest floor. Once the seeds reach the ground, they will germinate only under exactly the right conditions.

The sugar pines and yellow pines that, along with the redwoods, form the mixed conifer forests of the Sierra Nevada, all rely on fire to create gaps in the overhead canopy and clear the forest floor. The fires also dry the redwood cones on higher branches, which then release their seeds onto the cooling ashes below. The action of the fires allows the seeds to fall on areas of bare mineral soil, where the sunlight is able to filter through. Where fires have been prevented, the forest floor rapidly becomes colonized by shade tolerant white firs and incense cedars, hindering redwood regeneration.

31. The main purpose of this passage is to:

- **A.** argue that greater conservation efforts need to be undertaken to protect the giant redwood.
- **B.** give an overview of the giant redwood, focusing on its dimensions, reproduction, and habitat.
- **C.** trace the long evolution of the giant redwood while emphasizing its currently shrinking habitat.
- **D.** catalog the many threats the giant redwood faces from humans and from other plant species.

32. In terms of its role in the lives of giant redwoods, fire is most nearly described in the passage as being:

F. a key predator, especially of immature trees.
G. a serious threat to the trees' overhead canopy.
H. critical to the trees' reproductive cycle.
J. useful in removing dead layers of tree bark.

33. The main purpose of the fourth paragraph (lines 39–47) is to:

A. compare and contrast the coastal and giant redwood.
B. describe the giant redwood's coloration and bark.
C. provide details establishing the giant redwood's enormity.
D. reveal the massive size of the giant redwood's branches.

34. In order to accept the information in the fifth paragraph (lines 48–62) as accurate, a reader must also accept that:

F. tree rings are a reliable indicator of a giant redwood's age.
G. shallow but widely spreading root pads are typical of many types of trees besides giant redwoods.
H. John Muir's claim of having found the stump of a 4,000-year-old giant redwood is inaccurate.
J. the lack of depth of giant redwood roots renders the trees vulnerable to drought.

35. Based on the passage, the presence of white firs and incense cedars in a grove of giant redwoods should be seen as a:

A. normal occurrence in a mixed conifer forest.
B. healthy sign of the grove's increasing diversity.
C. danger to the redwoods already there.
D. threat to the grove's long-term survival.

36. According to the passage, which of the following statements comparing giant redwoods to other trees is accurate?

F. Not even the largest giant redwood holds a record relative to other trees.
G. The largest giant redwood has the broadest trunk of any tree in the world.
H. No other tree comes close to the size records held by the giant redwood.
J. The largest giant redwood has a greater volume than any other tree.

37. According to the passage, the main cause of death of giant redwoods is:

A. fire.
B. wind.
C. lightning.
D. old age.

38. The passage states that a mystery surrounding giant redwoods is:

F. why no one has tried to plant new groves.
G. whether they ever existed in large forests.
H. why they are limited to isolated groves.
J. how long they can continue to grow taller.

39. Which of the following statements about the giant redwood's trunk does the passage best support?

A. It is significantly wider at its base than at its top.
B. It maintains a constant width until reaching 200 feet above the ground.
C. It narrows until it reaches a height of 200 feet, at which point the narrowing stops.
D. It has a base whose diameter is smaller than the diameter of its main branches.

40. According to the passage, giant redwoods reach their maximum height within how many years?

F. 300
G. 500
H. 3,000
J. 3,200

END OF TEST 3

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

DO NOT RETURN TO A PREVIOUS TEST.

SCIENCE TEST

35 Minutes—40 Questions

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

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

Passage I

In certain solutions, beet cells undergo membrane disruption, causing the cells to release *betacyanin* (a red pigment). As membrane disruption increases, more betacyanin is released. To determine the amount of betacyanin released, the amount of light absorbed (at a specific wavelength) by the solution is measured. As the concentration of betacyanin in the solution increases, the amount of light absorbed increases.

To determine the amount of light absorbed by a solution, light is directed through a sample of the solution onto a detector (see Figure 1).

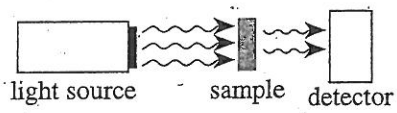


Figure 1

By measuring the amount of light that hits the detector, the amount of light absorbed by the sample can be determined.

Experiment 1

For each of 9 trials, a student placed a beet section (2 cm × 2 cm × 1 cm) in 100 mL of water at a specific temperature for 10, 20, or 30 min. The student then removed a sample of the solution and determined its absorbance (see Table 1).

Table 1

Trial	Temperature (°C)	Time (min)	Absorbance
1	25	10	0.12
2	25	20	0.14
3	25	30	0.16
4	50	10	0.31
5	50	20	0.37
6	50	30	0.43
7	75	10	0.62
8	75	20	0.71
9	75	30	0.82

Experiment 2

Experiment 1 was repeated, except that in each trial an acetone/water solution was used instead of water and the temperature was kept constant at 25°C (see Table 2).

Table 2

Trial	Acetone concentration (% by volume)	Time (min)	Absorbance
10	10	10	0.31
11	10	20	0.38
12	10	30	0.45
13	30	10	0.69
14	30	20	0.76
15	30	30	0.86
16	50	10	0.82
17	50	20	0.90
18	50	30	0.96

Experiment 3

Experiment 2 was repeated, except that in each trial a methanol/water solution was used instead of an acetone/water solution (see Table 3).

Table 3

Trial	Methanol concentration (% by volume)	Time (min)	Absorbance
19	10	10	0.15
20	10	20	0.18
21	10	30	0.20
22	30	10	0.21
23	30	20	0.24
24	30	30	0.26
25	50	10	0.29
26	50	20	0.33
27	50	30	0.36

The student then determined the absorbance of water, of acetone, and of methanol. Each had an absorbance of 0.00.

1. Suppose that in Experiment 3 a beet section had been placed in a solution that was 40% methanol by volume for 20 min. The absorbance of the sample from the resulting solution would most likely have been closest to which of the following?

   A. 0.15
   B. 0.30
   C. 0.45
   D. 0.60

2. Based on the results of Experiment 2, which of the following additional trials would have resulted in an absorbance closest to 0.80 ?

   F. 10% acetone for 15 min
   G. 10% acetone for 25 min
   H. 30% acetone for 25 min
   J. 30% acetone for 35 min

3. The results of Experiment 1 are most consistent with which of the following conclusions about the effects of temperature on membrane disruption and absorbance? Higher temperatures resulted in:

   A. greater membrane disruption and higher absorbances.
   B. greater membrane disruption and lower absorbances.
   C. less membrane disruption and higher absorbances.
   D. less membrane disruption and lower absorbances.

4. The student concluded that at a given concentration, acetone causes more membrane disruption than does methanol. Is this conclusion supported by the results of Experiments 2 and 3 ?

   F. No, because at each concentration tested, more betacyanin was released in the acetone solution than was released in the methanol solution.
   G. No, because at each concentration tested, less betacyanin was released in the acetone solution than was released in the methanol solution.
   H. Yes, because at each concentration tested, more betacyanin was released in the acetone solution than was released in the methanol solution.
   J. Yes, because at each concentration tested, less betacyanin was released in the acetone solution than was released in the methanol solution.

5. Suppose that in Experiment 1, betacyanin concentration was directly proportional to absorbance. Accordingly, the betacyanin concentration in the sample in Trial 7 was most likely twice as great as the betacyanin concentration in the sample in:

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

6. In Experiment 1, the student directly varied 2 *independent variables* and measured how these changes affected the value of the *dependent variable*. Which of the following lists an independent variable and the dependent variable in Experiment 1 ?

	Independent variable	Dependent variable
F.	absorbance	water concentration
G.	water concentration	methanol concentration
H.	methanol concentration	temperature
J.	temperature	absorbance

Passage II

How big a star looks at a given distance defines the star's *angular size*, θ (see Figure 1).

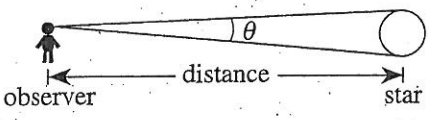


Figure 1

Table 1 gives θ of the Sun if it were observed from various distances. Table 2 gives θ of stars 8 light years away from Earth that have various diameters.

For a star to be seen as a disk through a telescope, the telescope's *resolution*, R, must be less than or equal to θ of the star. Table 3 shows R using yellow light for telescopes of various diameters. Table 4 gives R for a 10 m (diameter) telescope using light of different colors.

Table 1

Distance (light years*)	θ of Sun (10^{-2} arcsecond)
2	1.5
4	0.8
6	0.5
8	0.4

*1 light year = 9.5×10^{12} km

Table 2

Diameter of star (10^6 km)	θ of star (10^{-2} arcsecond)
7.5	2.0
15.0	4.1
22.5	6.1
30.0	8.2

Table 3

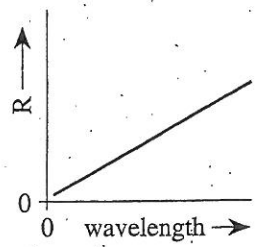
Diameter of telescope (m)	R (10^{-2} arcsecond)
2	7.5
4	3.8
6	2.5
8	1.9
10	1.5

Table 4

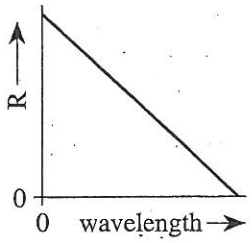
Color of light	Wavelength of light (10^{-7} m)	R (10^{-2} arcsecond)
Violet	4	1.0
Blue-green	5	1.3
Yellow	6	1.5
Red	7	1.8

7. Based on Table 4, which of the following graphs best illustrates the relationship between R and the wavelength of light?

A.



C.



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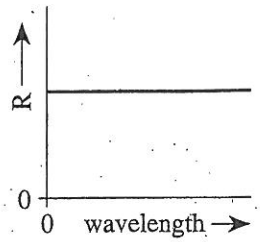
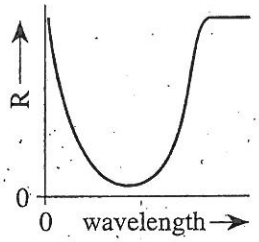


D.



8. According to Table 3, at a given wavelength, as the diameter of a telescope increases, the smallest angular size that an object can have and still be seen as a disk through the telescope:

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

9. The Sun's diameter is 1.4×10^6 km. How does the Sun's diameter compare with the diameters of the 4 stars listed in Table 2 ? The Sun's diameter is:

   A. greater than the diameters of all 4 stars.
   B. less than the diameters of all 4 stars.
   C. the same as the diameter of the 4 stars.
   D. greater than the diameters of 2 of the stars and less than the diameters of the other 2 stars.

10. Table 1 gives the angular size of the Sun if it were observed from a distance of 8 light years. How would this angular size compare with the angular sizes of the 4 stars listed in Table 2 ? The Sun's angular size would be:

    F. greater than the angular sizes of all 4 stars.
    G. less than the angular sizes of all 4 stars.
    H. greater than the angular size of 1 of the stars and less than the angular sizes of 3 of the stars.
    J. the same as the angular size of the 4 stars.

11. A hypothetical yellow star at a given distance from Earth has a θ of 2.0×10^{-2} arcsecond. Based on information in the passage, the star will be seen as a disk through Earth-based telescopes having which of the diameters listed in Table 3 ?

    A. 2 m only
    B. 2 m, 4 m, and 6 m only
    C. 8 m and 10 m only
    D. Any of the diameters listed in Table 3

Passage III

A solid cylinder is mounted on frictionless bearings. A thin string of negligible mass is wrapped around the cylinder and pulled with a constant force, as shown in Figure 1.

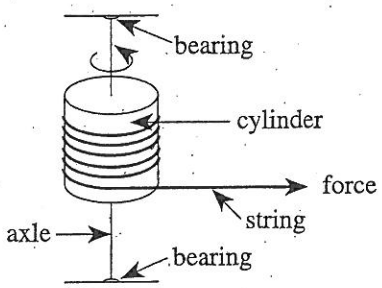


Figure 1

The force results in a *torque*, τ, on the cylinder that causes the cylinder to spin. The *angular acceleration*, α, of the cylinder is the change of the cylinder's rotational speed over time.

Tables 1, 2, and 3 give τ and α for various cylinder masses, cylinder radii, and forces, respectively. Table 4 shows the rotational speed of a particular cylinder at different times.

(Note: All of the cylinders described in Tables 1–4 have the same length.)

Table 1

Mass (kg)	Radius (m)	Force (N)	τ (N m)	α (rad/sec^2)
2.0	0.050	2.0	0.10	40
4.0	0.050	2.0	0.10	20
6.0	0.050	2.0	0.10	13
8.0	0.050	2.0	0.10	10

Table 2

Mass (kg)	Radius (m)	Force (N)	τ (N m)	α (rad/sec^2)
10	0.050	2.0	0.10	8.0
10	0.075	2.0	0.15	5.3
10	0.100	2.0	0.20	4.0
10	0.125	2.0	0.25	3.2

Table 3

Mass (kg)	Radius (m)	Force (N)	τ (N m)	α (rad/sec^2)
10	0.050	4.0	0.20	16
10	0.050	6.0	0.30	24
10	0.050	8.0	0.40	32
10	0.050	10.0	0.50	40

Table 4

Mass (kg)	Radius (m)	Force (N)	Time (sec)	Rotational speed (m/sec)
10	0.050	2.0	1.0	0.40
10	0.050	2.0	2.0	0.80
10	0.050	2.0	3.0	1.20
10	0.050	2.0	4.0	1.60

12. Was the cylinder described in Table 4 *accelerating* (speeding up) or *decelerating* (slowing down) between 1.0 and 4.0 sec ?

- **F.** Accelerating, because the rotational speed was decreasing.
- **G.** Accelerating, because the rotational speed was increasing.
- **H.** Decelerating, because the rotational speed was decreasing.
- **J.** Decelerating, because the rotational speed was increasing.

13. Based on Table 1, how is the torque τ related to the force pulling the string and the radius of the cylinder?

- **A.** Torque equals radius plus force.
- **B.** Torque equals radius minus force.
- **C.** Torque equals radius times force.
- **D.** Torque equals radius divided by force.

14. Based on Table 1, if a 2.0 N force were exerted upon a 5.0 kg cylinder with a radius of 0.050 m, α would be:

- **F.** less than 10 rad/sec^2.
- **G.** between 10 rad/sec^2 and 13 rad/sec^2.
- **H.** between 13 rad/sec^2 and 20 rad/sec^2.
- **J.** greater than 20 rad/sec^2.

15. Suppose we define the *frequency of rotation* of the cylinder as the number of rotations the cylinder completes in a second. Based on Table 2, 1 second after starting from rest, the cylinder having the highest frequency of rotation will be the one with a radius of:

A. 0.050 m.
B. 0.075 m.
C. 0.100 m.
D. 0.125 m.

16. Based on Table 4, rotational speed is proportional to:

F. time.
G. $time^2$.
H. $time^3$.
J. $time^4$.

Passage IV

Compost consists largely of organic matter that has been decomposed by bacteria that require oxygen. Compost is used as soil fertilizer. Two studies were done to examine the effect of compost use on the growth and yield of bean plants.

Study 1

Four different materials were selected for composting—coffee grounds, pine needles, crushed eggshells, and *alfalfa* (a plant). Each material was placed in a separate container. A small amount of distilled water was added to each material. The 4 containers were then left in a warm location for about a week to allow the materials to decompose. During the week, the materials were stirred periodically and moistened with distilled water. The decomposition process was considered complete when the temperature at the center of the material had risen to 40°C. For each type of compost, the pH, and the nitrogen, phosphorus, and potassium contents were then determined (see Table 1).

Table 1

Compost type	pH	Percent by dry weight of: nitrogen	phosphorus	potassium
Coffee grounds	6.0	2.3	0.6	0.6
Pine needles	5.5	0.5	0.3	0.0
Crushed eggshells	7.2	2.1	0.8	0.5
Alfalfa	6.5	3.5	0.7	1.2

Study 2

Each type of compost was added to 2 different amounts of a given soil to create mixtures that were either 20% compost or 50% compost. A ninth mixture contained 10% pine needles, 50% crushed eggshells, 20% alfalfa, and 20% soil. Each mixture was used to fill 5 pots. Ten bean seeds were planted in each pot. All pots received the same amount of light and distilled water. After 6 weeks, the number of mature bean plants growing in the pots and the number of bean pods on each plant were counted for each mixture. The percent of seeds that produced mature bean plants for each mixture is shown in Table 2. Figure 1 shows, for those plants that produced bean pods, the average number of bean pods present on mature bean plants growing in each mixture.

Table 2

Mixture of soil and:	Percent of seeds that produced mature bean plants
20% coffee grounds	10
50% coffee grounds	0
20% pine needles	20
50% pine needles	30
20% crushed eggshells	60
50% crushed eggshells	80
20% alfalfa	50
50% alfalfa	0
10% pine needles, 50% crushed eggshells, 20% alfalfa	80

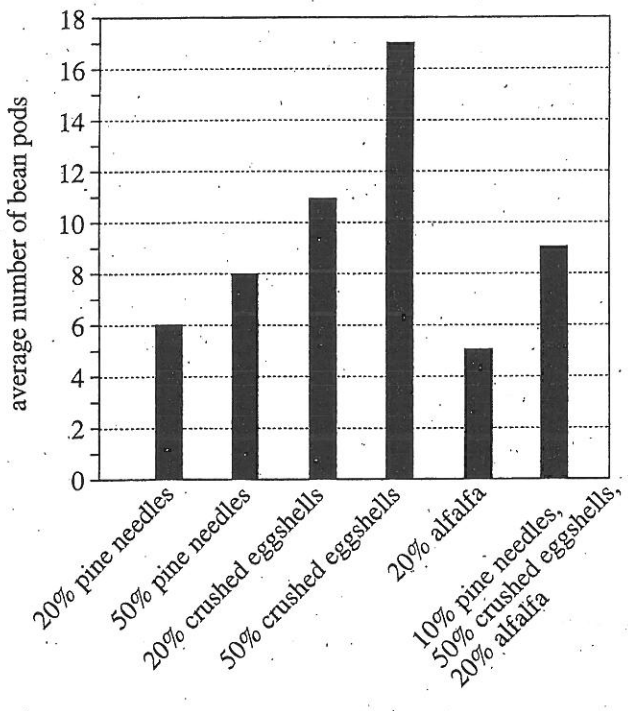


Figure 1

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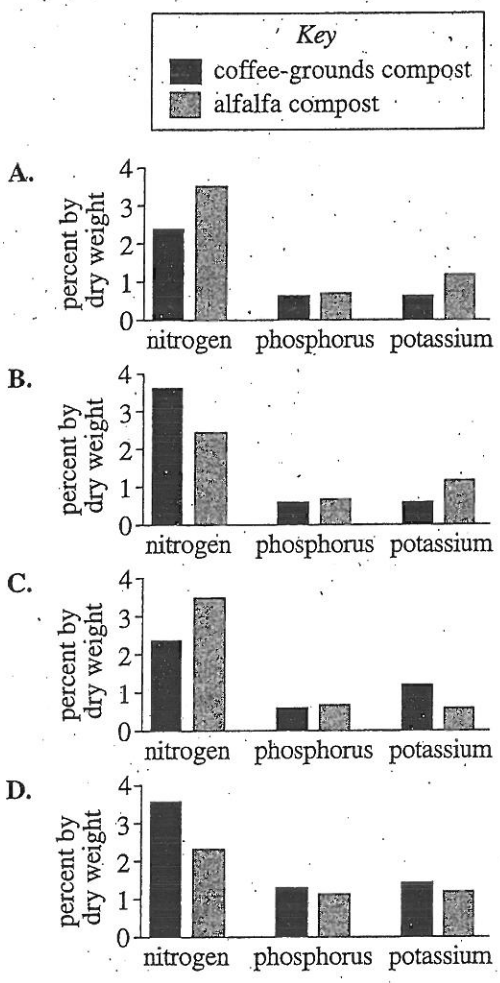
17. Which of the following graphs best represents the nitrogen, phosphorus, and potassium contents in the coffee-grounds compost and the alfalfa compost?



18. To determine whether adding compost to soil increases the percent of seeds that produce mature bean plants, the researchers should have included pots in Study 2 that contained:

F. pine needles only.
G. soil only.
H. 30% crushed eggshells and 70% soil.
J. 70% alfalfa and 30% soil.

19. It was hypothesized that the compost with the highest percent nitrogen, when added to soil, would produce mature bean plants from at least 75% of the planted bean seeds. Is this hypothesis supported by the results of Study 1 and Study 2 ?

A. Yes; alfalfa had the highest percent nitrogen, and both alfalfa mixtures produced mature bean plants from at least 75% of the planted seeds.
B. Yes; coffee grounds had the highest percent nitrogen, and both coffee-grounds mixtures produced mature bean plants from at least 75% of the planted seeds.
C. No; alfalfa had the highest percent nitrogen, but neither alfalfa mixture produced mature bean plants from at least 75% of the planted seeds.
D. No; coffee grounds had the highest percent nitrogen, but neither coffee-grounds mixture produced mature bean plants from at least 75% of the planted seeds.

20. Based on the description of Study 1, as organic matter decomposes, which of the following changes takes place?

F. The phosphorus content of the material being composted decreases.
G. The phosphorus content of the material being composted increases.
H. The temperature of the material being composted decreases.
J. The temperature of the material being composted increases.

21. The primary purpose of stirring the materials in Study 1 was to:

A. lower the pH of the materials.
B. raise the pH of the materials.
C. decrease the amount of oxygen in the materials.
D. increase the amount of oxygen in the materials.

22. It is known that bean plants must receive some potassium from the surrounding material in order to grow to maturity. Based on the results of Study 1, in Study 2, the mature bean plants in mixtures containing pine needles most likely obtained the required potassium from:

F. the pine needles only.
G. the soil only.
H. both the pine needles and the soil.
J. the added distilled water.

Passage V

When DNA is heated to its *melting temperature* (T_m) it *denatures* (breaks apart) into 2 strands. When cooled, the strands can relink to form less stable DNA, indicated by a lower T_m (see Figure 1).

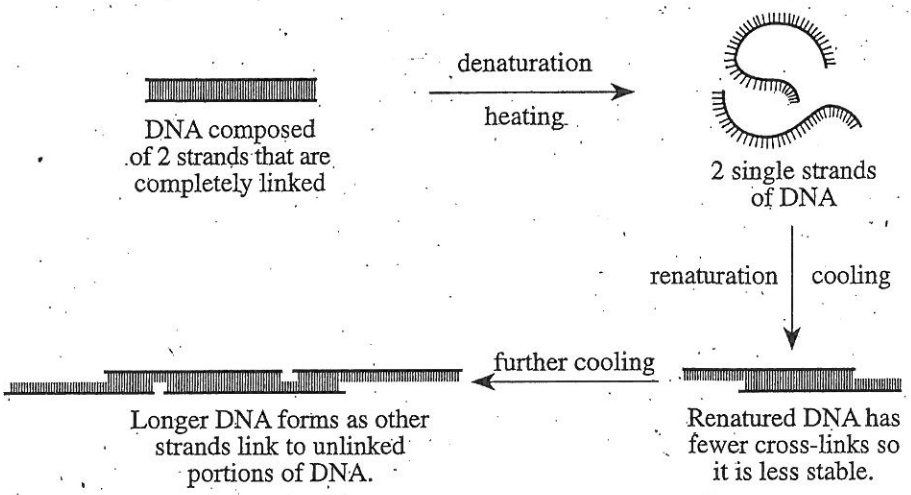


Figure 1

Figure 2 shows how the absorbance of light by a solution of DNA molecules, each initially composed of 2 completely linked strands, varied as it was heated and then cooled. When the DNA began to denature, the absorbance increased sharply. When the DNA began to renature, the absorbance decreased sharply.

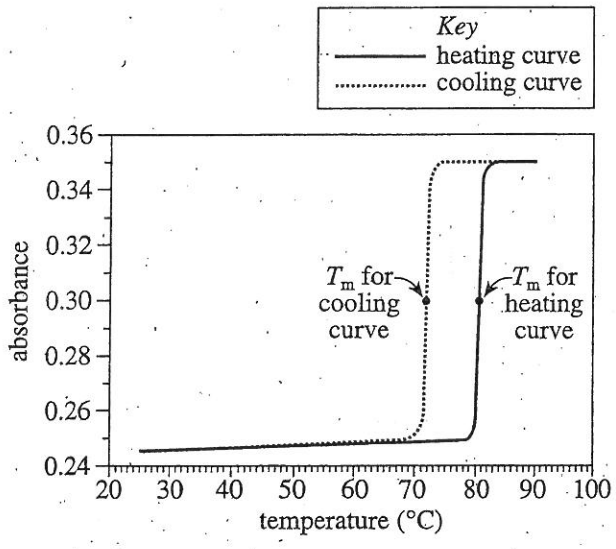


Figure 2

Figure 3 shows how T_m for heating varied for identical solutions of DNA previously exposed to UV light for different amounts of time.

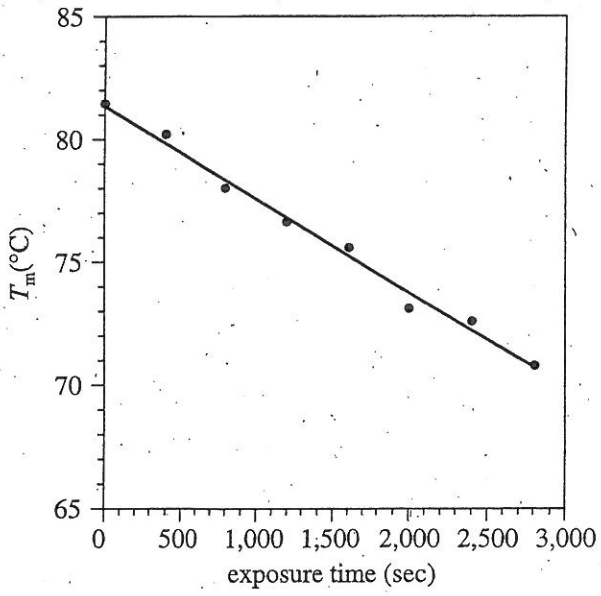


Figure 3

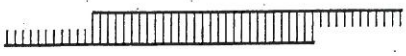
Figures 1–3 adapted from Charles M. Lovett, Jr., Thomas N. Fitzgibbon, and Raymond Chang, "Effect of UV Irradiation on DNA as Studied by Its Thermal Denaturation." ©1989 by Division of Chemical Education, Inc., American Chemical Society.

23. According to Figure 2, as the heated DNA solution was *cooled* from 90°C to 30°C, the absorbance:

A. increased sharply, then leveled off, then decreased sharply.
B. decreased sharply, then leveled off, then increased sharply.
C. stayed level, then increased sharply, then began to level off.
D. stayed level, then decreased sharply, then began to level off.

24. The following DNA molecules each consist of 2 identical strands. Based on Figure 1, a solution of which DNA would most likely have the *lowest* melting temperature?

F.


G.


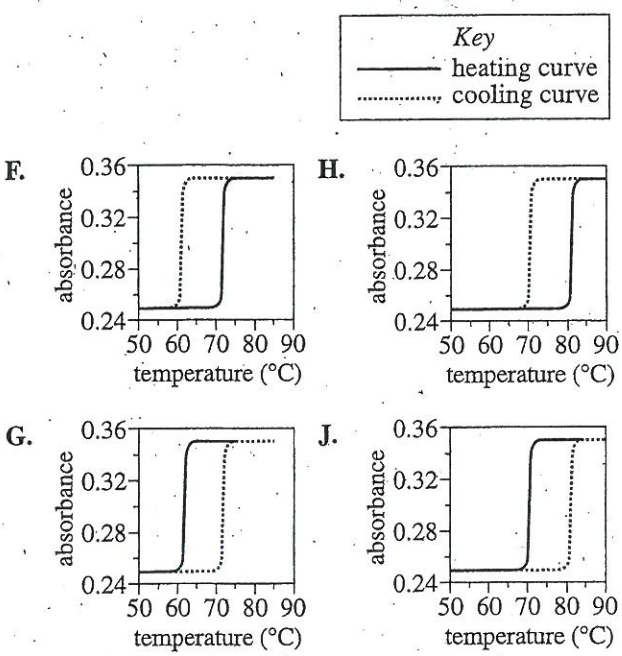
H.


J.


25. A chemist claimed that for DNA molecules composed of 2 completely linked strands, the longer the DNA is exposed to UV light, the greater the number of links that are broken. Does Figure 3 support her claim?

A. No; as exposure time increased, T_m only increased.
B. No; as exposure time increased, T_m only decreased.
C. Yes; as exposure time increased, T_m only increased.
D. Yes; as exposure time increased, T_m only decreased.

26. A heating/cooling curve was determined for a new solution containing only completely linked, double-stranded DNA molecules. The T_m for heating this solution was found to be 10°C *lower* than the T_m for heating the solution represented in Figure 2. Which of the following best shows the heating/cooling curve of the new solution?



27. Based on Figure 1, how did the DNA molecules in the solution that was heated and cooled to produce Figure 2 compare with the DNA molecules in the solution prior to heating? Prior to heating, each DNA molecule was composed of:

A. 2 completely linked strands only; after heating and cooling, each DNA molecule was composed of more than 2 linked strands.
B. 2 completely linked strands only; after heating and cooling, only single strands of DNA remained.
C. more than 2 linked strands; after heating and cooling, each DNA molecule was composed of 2 completely linked strands only.
D. more than 2 linked strands; after heating and cooling, only single strands of DNA remained.

Passage VI

A student performed 4 computer simulation studies to model the change at a gene in a population. For each study, the following rules applied:

- The gene has 2 *alleles* (possible forms): A and a.
- Each organism has 2 copies of the gene.
- Thus, there are 3 possible *genotypes* (allele combinations for the gene): AA, Aa, and aa.
- Different genotypes may have different *fitnesses* (the relative number of alleles per individual a genotype contributes to the next generation).
- The fitnesses of Genotypes AA, Aa, and aa are represented by $W(AA)$, $W(Aa)$, and $W(aa)$, respectively.
- p = the proportion of the alleles that are in Form A.
- Changes in p are due to differences in the fitnesses of the genotypes.
- Time is measured in generations.

Study 1

Three simulations were done. In each, $W(AA) = W(Aa) > W(aa)$, and the initial $p = 0.1$. See Figure 1.

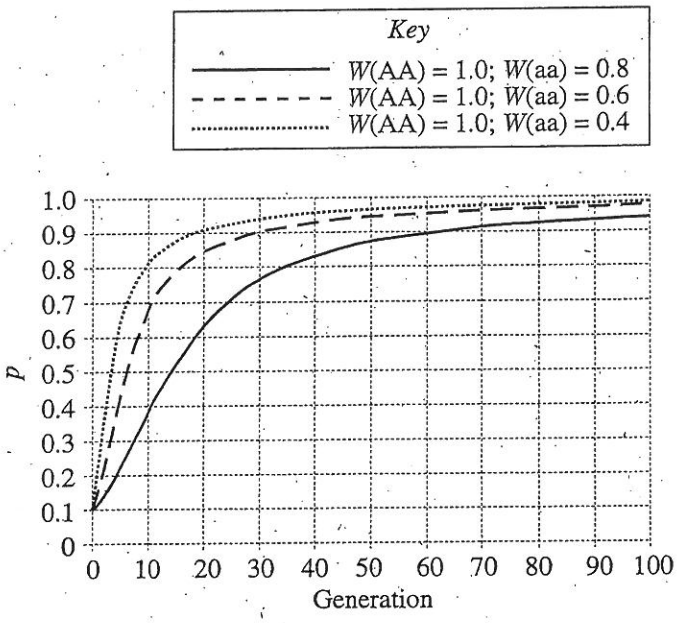


Figure 1

Study 2

Three simulations were done. In each, $W(AA) = W(Aa) < W(aa)$, and the initial $p = 0.9$. See Figure 2.

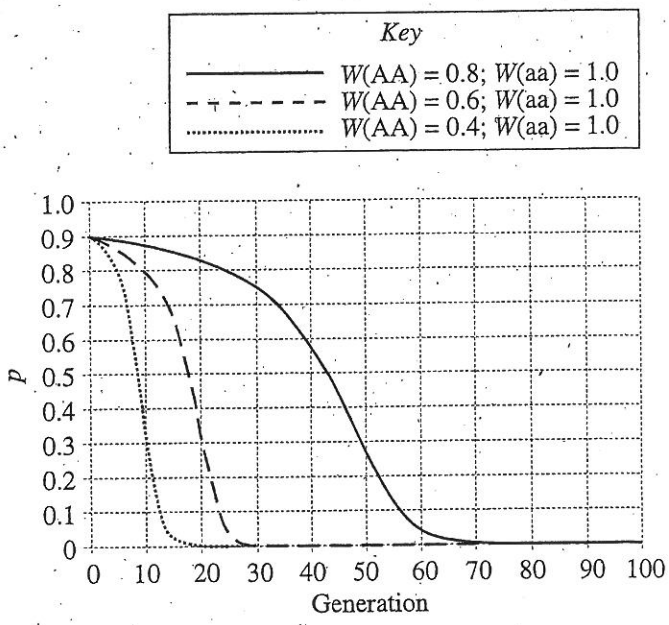


Figure 2

Study 3

Five simulations were performed. In each, $W(AA) = 0.8$; $W(Aa) = 1.0$; and $W(aa) = 0.6$. The initial p varied. See Figure 3.

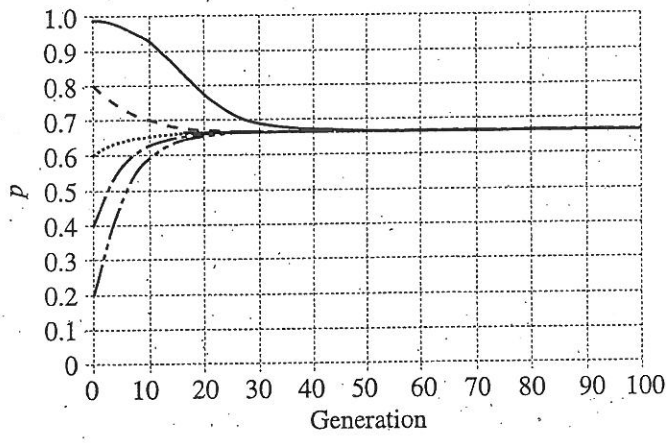


Figure 3

Study 4

Five simulations were performed. In each, $W(AA) = 0.625$; $W(Aa) = 0.5$; and $W(aa) = 1.0$. The initial p varied. See Figure 4.

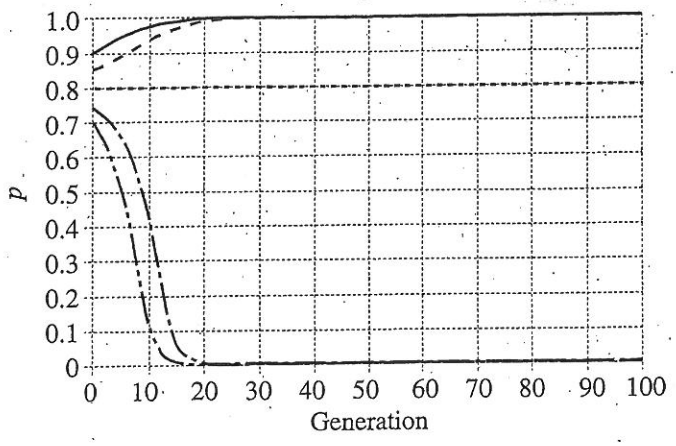


Figure 4

28. In Study 4, the initial values of p were:

F. 0.1, 0.25, 0.5, 0.75, and 1.0.
G. 0.4, 0.45, 0.5, 0.95, and 1.0.
H. 0.7, 0.75, 0.8, 0.85, and 0.9.
J. 0.8, 0.85, 0.9, 0.95, and 1.0.

29. For the simulation in Study 1 in which $W(aa) = 0.4$, the greatest change in p occurred during which of the following time frames?

A. Between Generation 0 and Generation 10
B. Between Generation 10 and Generation 20
C. Between Generation 20 and Generation 30
D. Between Generation 30 and Generation 40

30. Based on the information provided, which of the following shows the possible range for p ?

F. 0–0.5
G. 0–1.0
H. 0.5–1.0
J. 0.5–2.0

31. In all 3 simulations in Study 1, $W(Aa)$ equaled:

A. 0.8.
B. 1.0.
C. 1.2.
D. 2.0.

32. Which studies included at least 1 simulation in which the fitness of Genotype AA was greater than the fitness of Genotype aa ?

F. Studies 1 and 3
G. Studies 1 and 4
H. Studies 2 and 3
J. Studies 2 and 4

33. If the student wanted to run an additional simulation in Study 1 in which the initial $p = 0.1$ and p at Generation 10 was between 0.7 and 0.8, the student should set $W(AA) = 1.0$; $W(Aa) = 1.0$; and:

A. $W(aa) = 0.3$.
B. $W(aa) = 0.5$.
C. $W(aa) = 0.7$.
D. $W(aa) = 0.9$.

Passage VII

Students dissolved ammonium chloride (NH_4Cl) and silver cyanate (AgOCN) together in water. A solid, Product 1 (P1), formed and was isolated. Product 2 (P2) was then recovered from the water in the solution. Samples of the products had the properties listed below:

P1: Melting point > 400°C; hard and brittle; not soluble in water; not flammable; formula unknown

P2: Melting point = 132°C; soft and nonbrittle; soluble in water; flammable; formula is CH_4N_2O

Two students discuss the identity of these products.

Student 1

NH_4Cl and AgOCN both are salts. Salts are composed of positively charged cations and negatively charged anions that hold together because they have opposite charges. When salts dissolve in water, they *dissociate*, or break apart, into anions and cations. When NH_4Cl and AgOCN are dissolved in water, the following occurs:

$$NH_4Cl + AgOCN \rightarrow NH_4^+ + Cl^- + Ag^+ + OCN^-$$

The ions in solution then form new salts, silver chloride (AgCl) and ammonium cyanate (NH_4OCN):

$$NH_4^+ + Cl^- + Ag^+ + OCN^- \rightarrow AgCl + NH_4OCN$$

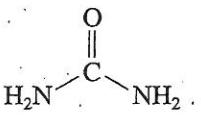
P1 is AgCl. AgCl is insoluble in water, and salts tend to be hard and brittle, to be nonflammable, and to have high melting points. P2 is NH_4OCN, which is a salt composed of an ammonium ion and a cyanate ion:

$$[NH_4^+][OCN^-]$$

This sample of NH_4OCN is soft and nonbrittle because it absorbed water from the air after it was isolated. This also caused the melting point to be lower than expected for a salt.

Student 2

P1 is AgCl, but P2 is not a salt. Ammonium ions do react with cyanate ions to form NH_4OCN, but this compound is unstable. To isolate P2, the solution was heated at 70°C to remove the water. This caused the salt to rearrange and form a more stable *covalent* compound. In a covalent compound, the atoms are held together by bonds, not by their opposite charges. P2 is *urea*, which has the following structure:



Covalent compounds are generally not as brittle as salts and tend to have lower melting points. Also, covalent compounds are much more likely to be flammable than are salts. Urea is also a compound that is found in mammalian urine, so it must be soluble in water.

34. A compound is *hygroscopic* if it absorbs water from the air. According to Student 1's hypothesis, which of the following compounds is hygroscopic?

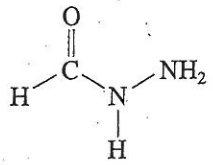
F. Urea
G. AgCl
H. NH_4Cl
J. NH_4OCN

35. Which of the students' hypotheses, if either, would be weakened if it were determined that P1 was NOT AgCl ?

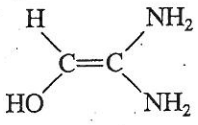
A. Student 1's only
B. Student 2's only
C. Both Student 1's and Student 2's
D. Neither Student 1's nor Student 2's

36. Based on the data collected for P2, which of the following compounds represents a possible structure for P2 ?

F.



G.



H. $[NH_4^+][CN^-]$

J. $[N_2H_5^+][OCN^-]$

37. In arguing that urea is soluble in water, Student 2 makes which of the following assumptions?

A. Mammalian urine is a water-based solution.
B. Mammalian urine contains many dissolved salts.
C. Urea dissociates when dissolved in water.
D. Urea absorbs water from the atmosphere.

38. Which of the following claims about the compounds discussed in the passage, if true, would NOT be consistent with Student 2's hypothesis?

F. AgCl is a salt.
G. NH_4OCN is a salt.
H. NH_4Cl is a salt.
J. Urea is a salt.

39. Compounds that have the same chemical formula but different chemical structures are called *isomers*. Based on the information in the passage, which of the following pairs of compounds are isomers?

A. Silver chloride and silver cyanate
B. Silver cyanate and ammonium chloride
C. Ammonium chloride and ammonium cyanate
D. Ammonium cyanate and urea

40. According to both Students 1 and 2, what solid was observed to form when the NH_4Cl and AgOCN were dissolved together in water?

F. NH_4OCN
G. Urea
H. AgCl
J. CH_4N_2O

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

Form 63C (December 2005)
The Joys of Walking

English

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

Math

1) B
2) F
3) D
4) K
5) E
6) F
7) B
8) H
9) A
10) J
11) C
12) J
13) B
14) G
15) B
16) H
17) E
18) J
19) C
20) G
21) C
22) K
23) B
24) G
25) E
26) J
27) A
28) F
29) C
30) K
31) B
32) J
33) C
34) J
35) C
36) H
37) D
38) F
39) D
40) F
41) B
42) H
43) D
44) K
45) D
46) K
47) E
48) J
49) B
50) F
51) C
52) F
53) C
54) G
55) A
56) J
57) E
58) F
59) E
60) G

Reading

1) C
2) F
3) D
4) F
5) A
6) G
7) D
8) H
9) D
10) F
11) B
12) H
13) A
14) J
15) D
16) H
17) B
18) J
19) C
20) F
21) A
22) G
23) C
24) F
25) C
26) J
27) B
28) G
29) A
30) F
31) B
32) H
33) C
34) F
35) D
36) J
37) B
38) H
39) A
40) G

Science

1) B
2) H
3) A
4) H
5) B
6) J
7) A
8) G
9) B
10) G
11) C
12) G
13) C
14) H
15) A
16) F
17) A
18) G
19) C
20) J
21) D
22) G
23) D
24) J
25) D
26) F
27) A
28) H
29) A
30) G
31) B
32) F
33) B
34) J
35) C
36) F
37) A
38) J
39) D
40) H

ACT Resource Links

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

※ **ACT English Practice Tests:**

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

※ **ACT Math Practice Tests:**

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

※ **ACT Reading Practice Tests:**

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

※ **ACT Science Practice Tests:**

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

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

ACT Real Past Papers Download:

https://www.crackab.com/act-downloads/

Digital SAT & New SAT Practice Tests:

https://www.cracksat.net

Real SAT Tests Download:

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

AP Exams Practice Tests:

https://www.crackap.com

https://www.apstudy.net

Explanation of Procedures Used to Obtain Scale Scores from Raw Scores

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

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

ACT Test 63C	Your Scale Score
English	_____
Mathematics	_____
Reading	_____
Science	_____
Sum of scores	_____
Composite score (sum ÷ 4)	_____

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

Scale Score	Raw Scores				Scale Score
	Test 1 English	**Test 2** Mathematics	**Test 3** Reading	**Test 4** Science	
36	75	60	40	39-40	**36**
35	74	58-59	39	38	**35**
34	72-73	57	38	37	**34**
33	71	56	37	--	**33**
32	70	55	36	36	**32**
31	69	53-54	35	35	**31**
30	68	52	34	--	**30**
29	66-67	50-51	33	34	**29**
28	65	48-49	32	33	**28**
27	63-64	45-47	31	32	**27**
26	61-62	42-44	29-30	30-31	**26**
25	59-60	40-41	28	29	**25**
24	56-58	37-39	27	27-28	**24**
23	54-55	35-36	25-26	25-26	**23**
22	51-53	33-34	24	24	**22**
21	48-50	31-32	23	22-23	**21**
20	45-47	29-30	21-22	20-21	**20**
19	42-44	27-28	20	18-19	**19**
18	40-41	25-26	19	16-17	**18**
17	37-39	21-24	17-18	15	**17**
16	35-36	17-20	16	13-14	**16**
15	32-34	14-16	15	12	**15**
14	29-31	11-13	13-14	11	**14**
13	27-28	09-10	12	10	**13**
12	25-26	07-08	10-11	09	**12**
11	23-24	06	08-09	08	**11**
10	21-22	05	07	07	**10**
9	19-20	04	06	06	**9**
8	16-18	03	05	05	**8**
7	13-15	--	--	04	**7**
6	10-12	02	04	03	**6**
5	08-09	--	03	02	**5**
4	06-07	01	02	--	**4**
3	04-05	--	--	01	**3**
2	03	--	01	--	**2**
1	00-02	00	00	00	**1**