

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

Barn Renaissance

Thoughts of San Francisco without its Victorian row houses or the New England coast without its lighthouses.

For many Americans, the thought of a Midwest without barns is just as inconceivable. Because of the industrialization of agriculture and a dwindling number of family farms, however, barns are being torn down at an increasing rate. A reasonable number of people are working to reverse that trend, arguing that these grand old buildings are cultural artifacts just as worthy of

preservation as other historic structures.

The National Trust for Historic Preservation has led the effort, sponsoring programs that educate people about the practical and aesthetic value of saving old barns. Largely as a result of the trust's leadership, on the other hand, nearly a dozen states have launched barn-preservation efforts. Among the most

1. A. NO CHANGE
B. When thinking
C. Think
D. Thinking

2. Which choice will most strongly suggest that the number of people interested in saving old barns is on the rise?
F. NO CHANGE
G. fair
H. growing
J. OMIT the underlined portion.

3. A. NO CHANGE
B. for
C. with
D. like

4. F. NO CHANGE
G. thus,
H. though,
J. OMIT the underlined portion.

effective tools are new tax incentives for those who
 renovate, rather than demolish, old barns. If you
 can save money ⁵ and save barns, why not do it?

Saving barns makes good sense for
 more than a variety ⁶ of reasons. The first is

practical, ⁷ often since a renovation or repair costs far less
 than new construction. An existing barn can become part

of a modern farming operation, and it is converted for use ⁸

as a store or residence. Each barn saved ⁹ additional
 represents a link to an agricultural heritage and can
 provide important historical and cultural information.

Because people in each region of the country and each
 ethnic group have tended to build different types of barns,
 these structures help define a landscape and tell ¹⁰ its story.

[1] Perhaps most important of all, barns are a symbol
 of the vitality of a rural region. [2] When farms were
 first settling, ¹¹ it was the building of a barn that announced
 to the world that the builders were planted on a piece of

land and intended to stay. [3] Future ¹² generation's are
 likely to thank barn preservationists for their efforts
 to preserve these useful and historical landmarks.

[4] A barn renovation ¹³ was making a similar

statement. ¹⁴

5. A. NO CHANGE
 B. renovate, rather than demolish
 C. renovate rather than demolish,
 D. renovate, rather than, demolish
6. F. NO CHANGE
 G. a various number
 H. a variety
 J. a varied assortment
7. The best placement for the underlined portion would be:
 A. where it is now.
 B. after the word *The*.
 C. after the word *renovation*.
 D. after the word *repair*.
8. F. NO CHANGE
 G. or it can be
 H. and that is why it can be
 J. because they are
9. A. NO CHANGE
 B. also
 C. extra
 D. excessively
10. F. NO CHANGE
 G. it's
 H. there
 J. the
11. A. NO CHANGE
 B. first settled,
 C. settling,
 D. having first settlers,
12. F. NO CHANGE
 G. generations,
 H. generations
 J. generations'
13. A. NO CHANGE
 B. can make
 C. was to make
 D. had made
14. For the sake of the logic and coherence of this paragraph, Sentence 3 should be placed:
 F. where it is now.
 G. before Sentence 1.
 H. after Sentence 1.
 J. after Sentence 4.

Question 15 asks about the preceding passage as a whole.

15. The writer is considering adding a subtitle to the title "Barn Renaissance" that would summarize the primary message of the essay. Which of the following statements would best accomplish that purpose?
- A. Old Barns Restore Midwestern Economy
 - B. Saving Old Barns Is Worth the Effort
 - C. Old Barns Are Filled with Historical Treasures
 - D. Old Barns Are Beautiful

PASSAGE II

Scuba Diving among the Barracudas

Every winter, thousands of visitors, come to southern

16

Florida. Many of them try scuba diving. One of the

17

country's fastest-growing sports. Almost every diving

18

center in the Florida Keys have boats equipped to take

19

divers to the coral reef that lies close offshore along

Florida's Atlantic coast. You don't even have to be a

certified diver to join the fun. With a brief course in the

20

proper use of scuba gear, even a beginner can dive safely

when accompanied by an instructor acting as a guide.

21

16. F. NO CHANGE
G. thousands, of visitors
H. thousands of visitors
J. thousands of visitors'
17. A. NO CHANGE
B. diving, one
C. diving; one
D. diving and one
18. F. NO CHANGE
G. country's fastly growing
H. countries fastest-growing
J. countries' fastest-growing
19. A. NO CHANGE
B. have boats and equipped
C. has boats equipped
D. has boats that equip
20. Which of the choices best helps the writer to stress that scuba diving is a participation sport rather than a spectator sport?
- F. NO CHANGE
 - G. get the idea.
 - H. go to Florida.
 - J. know how to dive.
21. A. NO CHANGE
B. whose job is to instruct him or her.
C. who goes along as a teacher.
D. instructing the diver, as a teacher.

1

Just imagine what you might see if you were to go diving. As you glide through the pleasant blue-green waters of the coral reef, some fish may swim up and peer at you through the clear glass of your waterproof mask. It seems that they're as curious about you as you are about them.

You'll be wise, though, to stay alert. Drifting lazily there behind your shoulder may be a barracuda, waiting for you to catch a dinner for it. These streamlined predators do not ordinarily attack humans, but many have learned, by experience that a fish

wounded by a diver's spear is easy prey.

On the other hand, beginning scuba divers should gain confidence before trying spearfishing, so

they won't panic when you actually attract

a barracuda.

Divers soon learn that most of their fear of ocean predators is based on first impressions. The barracuda's appearance has given it a mostly undeserved bad reputation.

The barracuda, however, is just one of many interesting species of marine life to be found along Florida's coasts.

22. In this sentence the writer wants to describe the beauty and appeal of the underwater scene on the reef. Which of the choices would most effectively and specifically help the sentence to accomplish this?
- F. NO CHANGE
 G. among the variety of sea plants and sea animals, some of them
 H. among brilliantly colored tropical fish, several friendly and harmless little ones
 J. you and your fellow divers might be surprised at what kinds of creatures

23. A. NO CHANGE
 B. learned
 C. learned;
 D. learned, and

24. F. NO CHANGE
 G. are easy
 H. are easily
 J. is easy to

25. A. NO CHANGE
 B. Therefore,
 C. As proof,
 D. Don't you suppose

26. F. NO CHANGE
 G. one actually attracts
 H. they actually attract
 J. us divers actually attract

27. The writer is considering adding the following sentence at this point:

The term *barracuda* is often used to describe someone whose business practices are aggressive or unethical.

Should the writer make this addition, and why?

- A. Yes, because it adds humor to the essay, and this is a good place in the essay to do that.
 B. Yes, because it explains why divers fear barracudas by proving that they are aggressive.
 C. No, because it does not add any new information to the essay.
 D. No, because it does not directly relate to the subject of the paragraph.
28. F. NO CHANGE
 G. This has also happened to many people.
 H. The Florida Keys region offers a wonderful climate and a perfect environment for students who want to major in marine biology.
 J. OMIT the underlined portion.

That elongated head, with their sharp teeth and intense stare, might intimidate you, but if you turn and point a finger at the fish, you will usually scare it away. It holds the world's record for the underwater dash, it's probably as wary of your unfamiliar size, shape, and smell as you are of its speed.

29. A. NO CHANGE
B. there
C. its
D. it's
30. F. NO CHANGE
G. dash
H. dash that's
J. dash, but

PASSAGE III

The following paragraphs may or may not be in the most logical order. Each paragraph is numbered in brackets, and question 44 will ask you to choose where Paragraph 3 should most logically be placed.

Asteroids and Dinosaurs

[1]

[1] In 1980, physicist Luis Alvarez and his son, geologist Walter Alvarez announced a startling discovery. [2] While analyzing rocks from the same geologic layer in both Europe and New Zealand, traces of iridium were found, an element more common in outer space than on Earth. [3] The iridium came from a single geologic layer dating back 65 million years. [4] Other scientists soon confirmed the discovery: a 65-million-year-old layer of iridium is present around the world. [5] Somewhere, the Alvarezes hypothesized, a large extraterrestrial object must have crashed into our planet, leaving iridium in places thousands of miles apart. [4]

31. A. NO CHANGE
B. son, geologist Walter Alvarez,
C. son geologist, Walter Alvarez,
D. son geologist Walter Alvarez,
32. F. NO CHANGE
G. iridium was found in trace amounts,
H. they found traces of iridium,
J. finding traces of iridium,
33. A. NO CHANGE
B. To some degree,
C. More or less,
D. However,
34. The writer is considering adding the following true statement to Paragraph 1:
Iridium, whose chemical symbol is Ir, was discovered in the early 1800s.
Should this sentence be added, and if so, where?
F. It should be added after Sentence 2.
G. It should be added after Sentence 4.
H. It should be added after Sentence 5.
J. It should NOT be added.

[2]

The search was on for the crater that the object must have left behind. In fact, the crater had been detected by Glen Penfield, on the job as a geologist working in the³⁵ Yucatán region of Mexico. While measuring underground magnetic fields, Penfield had discovered a circular pattern resembling an impact crater in rocks lying one mile³⁶ underground. After examining Yucatán rock samples,

Penfield also discovered telltale “shocked” quartz 37. Microscopic parallel lines in the quartz could only have

been created by an incredibly powerful collision. 38

[3]

These discoveries provided strong evidence³⁹ that a large asteroid crashed into Earth about 65 million years

ago, creating⁴⁰ what is known as the Chicxulub crater.

35. A. NO CHANGE
B. a geologist working
C. since he was a geologist who worked
D. the geologist who made the discovery while at work
36. F. NO CHANGE
G. rocks, laying
H. rocks' laying
J. rocks' lying
37. At this point, the writer is considering adding the following true statement:
—a condition that occurs when this mineral is subjected to high pressure at a fast rate
Should the writer make this addition here?
A. Yes, because it supplies details about Penfield's experience while discovering the crater.
B. Yes, because it helps explain evidence used to support the Alvarez's theory.
C. No, because it contradicts the theory of a powerful collision.
D. No, because it repeats information already clearly presented in the essay.
38. If the writer were to delete the word *only* from the preceding sentence, the paragraph would primarily lose:
F. the suggestion that Penfield could not have made his discovery without the earlier work of the Alvarez's.
G. the sense of the certainty that the quartz samples provide evidence of some enormous impact event.
H. the idea that only the quartz established proof that an extraterrestrial object had crashed into Earth.
J. a descriptive detail that is essentially meaningless and, therefore, unnecessary to the paragraph.
39. The writer wants to be consistent throughout the essay in presenting the Chicxulub asteroid event as a possibility rather than as an accepted fact. Which of the choices best maintains that consistency?
A. NO CHANGE
B. conclusively show
C. have clearly confirmed
D. give proof
40. Which of the following alternatives to the underlined portion would NOT be acceptable?
F. ago, and this event created
G. ago, which created
H. ago and creating
J. ago and created

1

Such an impact many scientists believe would have blanketed the planet with debris, blocking out sunlight and cooling Earth for many years. Acid rain created by the debris may have poisoned Earth's forests and water.

[4]

Many scientists theorize the Chicxulub asteroid event helped bring about the extinction of the dinosaurs, which happened and took place about 65 million years ago. According to this theory, the dinosaurs and about 70 percent of all other species died out because their food and water had been destroyed or poisoned. This mass extinction may also have been the key to the evolution in another life form: mammals.

41. A. NO CHANGE
 B. impact, many scientists believe.
 C. impact, many scientists believe
 D. impact many scientists believe,
42. F. NO CHANGE
 G. dinosaurs by means of occurring
 H. dinosaurs
 J. dinosaurs, which happened, as a matter of fact
43. A. NO CHANGE
 B. for the evolution to
 C. to the evolution of
 D. of the evolution to

Questions 44 and 45 ask about the preceding passage as a whole.

44. For the sake of the logic and coherence of this essay, Paragraph 3 should be placed:
- F. where it is now.
 G. before Paragraph 1.
 H. after Paragraph 1.
 J. after Paragraph 4.
45. Suppose the writer's goal had been to write a brief essay focusing on the geographic and geologic features of a particular region of Mexico. Would this essay successfully fulfill that goal?
- A. Yes, because the essay is mainly about geologic discoveries in the Yucatán region of Mexico.
 B. Yes, because the essay focuses on the Chicxulub crater, which was found in a particular region of Mexico.
 C. No, because the essay focuses on the extinction of the dinosaurs, not on geography or geology.
 D. No, because the essay focuses on particular scientific discoveries, not on a particular region.

PASSAGE IV

Beverly Harvard: Answering a Challenge

Beverly Harvard—the chief of police in Atlanta and the first African American woman to lead a major citys police department—began her career in law enforcement in an unusual way: to answer a challenge made by her

46. F. NO CHANGE
 G. cities
 H. cities'
 J. city's
47. A. NO CHANGE
 B. way; to answer
 C. way to answer
 D. way of winning

1

husband. A woman her size (five feet, four inches), he
 didn't think she had the strength to pass the grueling
 physical tests required for police recruits. So, Harvard,

whom held a master's degree in urban government
 and administration, bet him that she could pass the

tests and then signed on as a police recruit.

What followed were two months of arduous physical training. Harvard found that she enjoyed meeting the physical and mental demands. Indeed, she liked training so much she decided to continue, entering the police academy to study law and police procedures. By the time she graduated, she felt as though she had wanted to be a police officer all her life.

Once on the job, Harvard was given demanding assignments, including night patrol in the toughest neighborhoods. Undaunted, she thought of ways to improve the patrols and suggested it to her supervisors.

Eventually she was called on to be the person who headed
 special projects. Her dedication opened doors for her

within the department. Each one leading to a higher level

of command. 54

48. F. NO CHANGE
 G. At five feet, four inches, he didn't think a woman her size
 H. He didn't think a woman her size (five feet, four inches)
 J. A woman her size, he didn't think that at five feet, four inches she

49. A. NO CHANGE
 B. whom had
 C. by having
 D. who held

50. F. NO CHANGE
 G. tests, where she then signed
 H. tests, in that she then signed
 J. tests and then signing

51. A. NO CHANGE
 B. it was suggested by her
 C. they were suggested by her
 D. suggested them

52. F. NO CHANGE
 G. be the one who was the head of
 H. have it as her job to head
 J. head

53. A. NO CHANGE
 B. department, each
 C. department, in which each
 D. department and each

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

At that time, Eldrin Bell was the city's police chief.

Would this be a relevant addition to make here?

- F. Yes, because it provides information that helps the reader understand a police force's chain of command.
 G. Yes, because it supports the essay's focus on Harvard's rise to chief of police.
 H. No, because it undermines Harvard's achievement by comparing her to Bell.
 J. No, because it introduces information that does not focus on Harvard's professional career.

1

Appointed police chief in 1994, Harvard assumed responsibilities for approximately two thousand officers and civilian employees and a budget of more than \$90 million. One of her biggest challenges came two years later, when she helped assist in the coordination of security

for the Summer Olympic Games in Atlanta. Her efforts to deter crime have been praised by many community leaders,

admiring her calm style in dealing with problems. Such

praise does not come any easier to any big-city police chief, but Harvard applies her talents and works twelve-to-

sixteen-hour days to earn them. When asked about her future, she says that she doesn't worry about not being chief forever. "Right now," she says, "I just want to focus on being the best chief Atlanta has ever had."

55. A. NO CHANGE
B. for the coordination of
C. to assist in the coordination of
D. coordinate

56. F. NO CHANGE
G. has been
H. was
J. would have been

57. A. NO CHANGE
B. by admiring
C. who admire
D. being that they admire

58. F. NO CHANGE
G. easily
H. more easy
J. easier

59. A. NO CHANGE
B. these.
C. its.
D. it.

Question 60 asks about the preceding passage as a whole.

60. Suppose the writer's goal had been to write a brief essay detailing the ways that police departments are trying to offer more career opportunities to women. Would this essay successfully fulfill that goal?
- F. Yes, because the essay focuses on a woman who is a big-city police chief.
G. Yes, because the essay presents Atlanta's police department as striving to provide opportunities to women.
H. No, because the essay focuses on achievements of one person rather than on the efforts of police departments.
J. No, because the essay highlights opportunities created by the physical and mental demands of the police academy.

PASSAGE V

Return of the Sandhill Cranes

Early each spring, a chunk of land along the Platte River in Nebraska is a temporary home to one of the world's most spectacular wildlife displays: the migration of the sandhill cranes. A half-million of the birds gather here during their long journey for a six-week rest from

Texas and New Mexico to the Arctic Circle.

This gathering brought together the largest

heap of cranes to be found anywhere on the globe.

Winter in Nebraska, a part of the Central Great Plains, is often cold, windy, and raw. Beginning in mid-February, the birds flock to the wetlands along the broad Platte River, eating steadily to build fat reserves for the next leg of their epic journey. Though engineering projects have

shrunk the Platte and thus have in reality drastically

reduced the cranes' habitat, each year they return, messengers of spring in a land just emerging from a bitter winter.

61. Which choice would best help the reader visualize a length of land extending along the river for a considerable distance?
- A. NO CHANGE
B. ribbon
C. nugget
D. bundle
62. The best placement for the underlined portion would be:
- F. where it is now.
G. at the beginning of this sentence (revising the capitalization accordingly).
H. after the word *birds*.
J. after the word *here*.
63. A. NO CHANGE
B. Texas, and New Mexico
C. Texas and New Mexico,
D. Texas and, New Mexico
64. F. NO CHANGE
G. had brought
H. would bring
J. brings
65. A. NO CHANGE
B. concentration
C. bunch
D. supply
66. Given that all of the choices are true, which one would most effectively introduce the main subject of this paragraph?
- F. NO CHANGE
G. Sandhill cranes are one of the largest of all crane species.
H. Biologists are concerned about the future of the migration along the Platte.
J. For countless generations, central Nebraska has witnessed this spring ritual.
67. A. NO CHANGE
B. thus have in fact
C. lessened and
D. OMIT the underlined portion.
68. F. NO CHANGE
G. habitat; each
H. habitat. Each
J. habitat, and each

1

With their elongated bodies, sinuous necks, and stiltlike legs, the birds seem like visitors from another time. Therefore, sandhill cranes have graced the earth for

69

at least nine million years. They are considered to be the world's oldest surviving bird species. Their haunting, eerie cry is a primeval sound that makes an odd counterpoint to

the noise of cars and tractors. 71

During their stay along the Platte, the cranes maintain a wary coexistence with humans. The birds roost on sandbars in the river during the night, and during the day they feast on the remains of last year's crops in the surrounding fields. At dawn and dusk they form huge dark clouds in the sky as they travel between the river and the fields, their cries a loud cacophony carried on the prairie wind.

Though some Nebraskans complain about the growing number of visitors whom come to

72

take in an observation of the annual crane migration, many focus their attention on the birds themselves. "The

73

loneliest sound in the world," says one Nebraskan, "is the

74

69. A. NO CHANGE
B. However,
C. In contrast,
D. Indeed,
70. Which of the following alternatives to the underlined portion would NOT be acceptable?
F. years and
G. years, and they
H. years, they
J. years; they
71. If the writer were to eliminate the words *haunting*, *eerie*, and *primeval* from the preceding sentence, it would primarily lose:
A. wording that enhances the writer's description of the cranes as visitors from an ancient epoch.
B. supporting evidence that the birds are the oldest surviving bird species in the world.
C. details that contradict the idea that the cranes are noisy.
D. a humorous description of the birds' strange sounds.
72. F. NO CHANGE
G. visitors which
H. visitors who
J. visitors, whom
73. A. NO CHANGE
B. view and witness the once-a-year crane migration,
C. see the annual migration of the cranes every year,
D. observe the annual crane migration,
74. F. NO CHANGE
G. one Nebraskan is saying,
H. one Nebraskan will say,
J. one Nebraskan would have said,

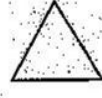
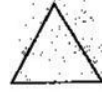
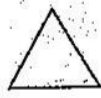
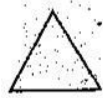
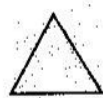
silence after the cranes leave.” 75

75. The writer is concerned that the final quotation is not appropriate for this essay and therefore is considering deleting the last sentence. Should the writer make this deletion?
- A. Yes, because the quotation has a much more formal tone than the rest of the essay.
 - B. Yes, because the quotation makes it appear as if all Nebraskans feel the same way about cranes.
 - C. No, because the quotation supports the assertion that the cranes are an important part of life on the Platte River.
 - D. No, because the quotation emphasizes the earlier description of the annoying nature of cranes' loud cries.

END OF TEST 1

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

2



2

MATHEMATICS TEST

60 Minutes—60 Questions

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

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

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

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

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

1. If $r = 7$, $b = 4$, and $g = -8$, what does $(r + b - g)(b + g)$ equal?

A. -76
B. -12
C. 12
D. 15
E. 76

2. Tasha's regular pay is \$12.00 per hour for a 40-hour workweek. For each hour over 40 hours she works in a week, she is paid $1\frac{1}{2}$ times her regular hourly pay. How much is Tasha paid for a week in which she works 49 hours?

F. \$588.00
G. \$601.50
H. \$642.00
J. \$661.50
K. \$882.00

3. To attend the Press Club Annual Banquet, members pay \$40 per ticket, while nonmembers pay \$50 per ticket. What is the revenue, in dollars, from the tickets when 100 member tickets and n nonmember tickets are purchased?

A. $n + 100$
B. $50n + 40(100)$
C. $50(n + 100)$
D. $50(n + 40)$
E. $(50 + 40)n$

4. How many integers between 9 and 59 can be divided by 5 with a remainder of zero?

F. 9
G. 10
H. 11
J. 12
K. 13

DO YOUR FIGURING HERE.

2



2

5. Of the 200 parking spaces in a parking lot, 4% of the spaces are reserved for handicapped parking, and 12 of the nonhandicapped spaces are suitable for compact cars only. How many spaces that are NOT reserved for handicapped parking are suitable for noncompact cars?

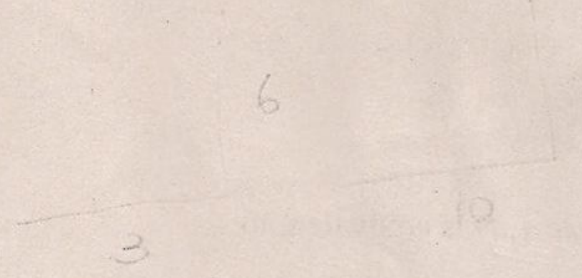
A. 192
 B. 188
 C. 184
 D. 180
 E. 168

DO YOUR FIGURING HERE.

6. The shadows of a fence post and a nearby flagpole (both vertical and on level ground) were measured at the same time. The fence post's shadow was 3 ft long, and the flagpole's shadow was 10 ft long. If the fence post is 6 ft tall, about how many feet tall is the flagpole?

F. 5
 G. 18
 H. 20
 J. 22
 K. 30

$$\frac{3}{6} = \frac{10}{x}$$

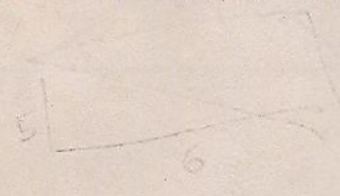


7. $-5(|-3 + 8|) = ?$

A. -55
 B. -25
 C. 0
 D. 25
 E. 55

8. A 5-inch-by-6-inch rectangle is cut along its diagonal to form 2 triangles. What is the area of each triangle, in square inches?

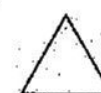
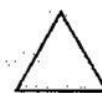
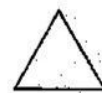
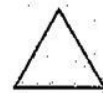
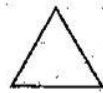
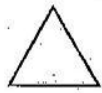
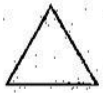
F. 5.5
 G. 7.5
 H. 11
 J. 15
 K. 30



9. Franco is riding in a seat on a Ferris wheel. The wheel rotates at a constant rate of 1 revolution every minute. What is the measure of the angle Franco's seat rotates around the center of the Ferris wheel, starting at the bottom, in $\frac{1}{2}$ minute?

A. $\frac{1}{2}^\circ$
 B. 1°
 C. 90°
 D. 180°
 E. 360°

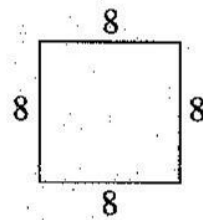
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10. Which of the following calculations gives the area, in square centimeters, of the square below, with sides 8 centimeters long?

- F. $8 + 8$
 G. $8 + 8 + 8 + 8$
 H. $8 \cdot 8$
 J. $8 \cdot 8 \cdot 8 \cdot 8$
 K. 8^8



DO YOUR FIGURING HERE.

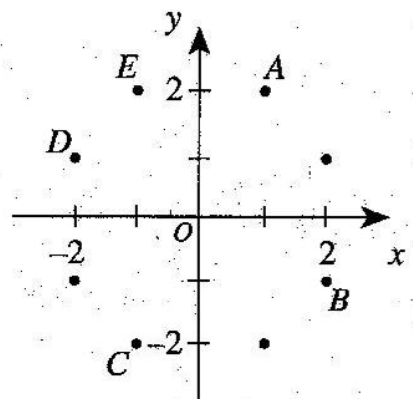
11. A recipe for 1 loaf of bread calls for $3\frac{3}{4}$ cups of flour. What is the maximum number of such loaves that can be made with a bag of flour that contains $12\frac{3}{8}$ cups of flour?

- A. 3
 B. 4
 C. 9
 D. 15
 E. 16

12. The expression $(3c - 2d)(2c + d)$ is equivalent to:

- F. $6c^2 - 7cd - 2d^2$
 G. $6c^2 - 7cd + 2d^2$
 H. $6c^2 - cd - 2d^2$
 J. $6c^2 - cd + 2d^2$
 K. $6c^2 - 2d^2$

13. Eight points with integer coordinates are plotted in the standard (x, y) coordinate plane below. Which of the plotted points has an x -coordinate less than 1 and a y -coordinate of at least 2?



- A. A
 B. B
 C. C
 D. D
 E. E

14. When George fell asleep one night, the temperature was 28° Fahrenheit. When George awoke the next morning, the temperature was -15° Fahrenheit. Which of the following, where + denotes a rise in temperature and - denotes a drop in temperature, best illustrates the temperature change from the time George fell asleep until the time he awoke?

- F. -43°F
 G. -13°F
 H. -7°F
 J. $+13^\circ\text{F}$
 K. $+43^\circ\text{F}$

2



2

15. Which of the following is equivalent to $(a^6)^{24}$?

- A. a^{-18}
- B. a^4
- C. a^{18}
- D. a^{30}
- E. a^{144}

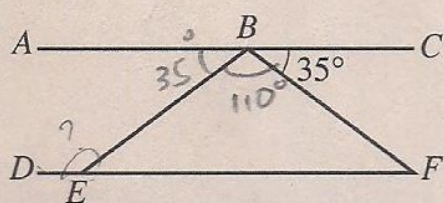
DO YOUR FIGURING HERE.

16. Ohm's law for electricity is $I = \frac{E}{R}$, where I is the current flow in amperes, E is the number of volts, and R is the number of ohms of resistance. A technician has a circuit with a resistance of 34 ohms and a current flow of 7 amperes. Which of the following expressions gives the number of volts for this circuit?

- F. $34 + 7$
- G. $34 - 7$
- H. $34 \cdot 7$
- J. $\frac{7}{34}$
- K. $\frac{34}{7}$

17. In the figure below, $\overline{AC} \parallel \overline{DF}$, $\triangle EBF$ is isosceles with $\overline{EB} \cong \overline{FB}$, and $\angle CBF$ measures 35° . What is the measure of $\angle DEB$?

- A. $107\frac{1}{2}^\circ$
- B. 110°
- C. 125°
- D. 135°
- E. 145°



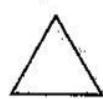
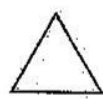
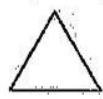
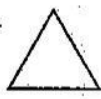
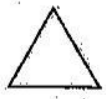
18. A sequence of 5 numbers has 6 as its first term and 32 as its last term. The first 3 numbers are an arithmetic sequence. The last 3 numbers are a geometric sequence with a common ratio of 2. What is the common difference among the first 3 terms?

- F. 0
- G. 1
- H. 61
- J. 67
- K. 72

19. Water in Lake Forman is frozen at Celsius temperatures at or below 0° . Which of the following expressions represents all the Celsius temperatures, T , at which water is frozen in Lake Forman?

- A. $T = 0$
- B. $T > 0$
- C. $T \geq 0$
- D. $T < 0$
- E. $T \leq 0$

2



2

20. Sarah swims in a rectangular-shaped swimming pool 18 feet wide and 24 feet long. About how many feet long is a diagonal of the surface of the water in the pool?

F. 21
 G. 30
 H. 42
 J. 441
 K. 900

DO YOUR FIGURING HERE.

21. Let a , b , c , and d be positive real numbers such that $a^{10} < b^{10} < c^{10} < d^{10}$. Which of the numbers a , b , c , or d is the greatest?

A. a
 B. b
 C. c
 D. d
 E. Cannot be determined from the given information

22. What value of x makes the equation $7x - 3(2x - 4) = 10$ true?

F. -12

G. -2

H. $-\frac{2}{13}$ J. $\frac{22}{13}$

K. 22

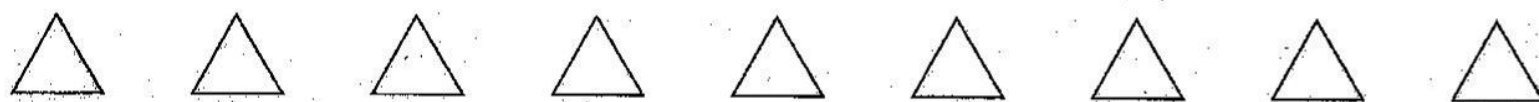
23. Which of the following (x,y) pairs is the solution for the system of equations $x + 2y = 5$ and $-2x + y = 10$?

A. $(-3,4)$ B. $(-1,3)$ C. $(1,2)$ D. $(5,0)$ E. $(\frac{35}{3}, -\frac{10}{3})$

24. For nonzero numbers x and y , which of the following expressions is NOT equivalent to $\frac{-x}{y}$?

F. $\frac{-x}{-y}$ G. $\frac{x}{-y}$ H. $-\frac{x}{y}$ J. $\frac{-\pi x}{\pi y}$ K. $-\frac{1}{\frac{y}{x}}$

2

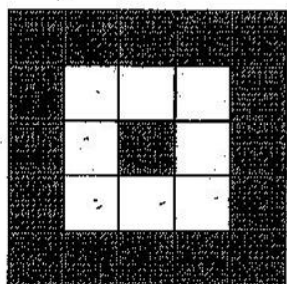


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25. In the figure below, the interior of a square with 5-inch sides is partitioned into smaller squares with 1-inch sides. The interior of the small square at the center of the figure and the interiors of all of the small squares that share at least 1 side with the large square are shaded. What percent of the interior of the large square is shaded?

DO YOUR FIGURING HERE.

- A. 17%
 B. 50%
 C. $66\frac{2}{3}\%$
 D. 68%
 E. 84%

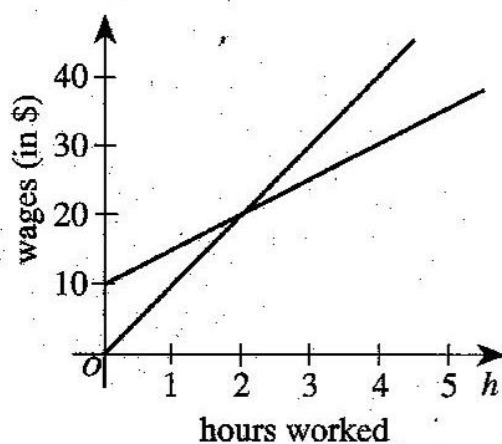


26. A researcher observed the growth of a certain colony of bacteria and recorded the data shown below.

Day	1	2	3	4	5
Number of cells in the colony	100	295	898	2,705	8,194

For the days observed, which of the following expressions best approximates the number of cells in the colony on the n th day?

- F. $100n$
 G. $300n$
 H. $300 \cdot 3^n$
 J. $100 \cdot 3^{n-1}$
 K. $300 \cdot 3^{n-1}$
27. Smiley the Clown charges \$10 for scheduling a party and \$5 per hour after arriving at the party. Happy the Clown charges \$10 per hour for a party but does not have a charge for scheduling a party. The graph below shows the 2 clowns' wages, with h as the number of hours worked for a party. For what range of hours worked for a party does Happy the Clown make as much or more than Smiley the Clown?



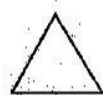
- A. $h \geq 0$
 B. $h \leq 2$
 C. $0 \leq h \leq 2$
 D. $h \geq 2$
 E. There is no range for which Happy the Clown will make as much or more than Smiley the Clown.

$$10 + 5h = 10n$$

$$10 = 5n$$

$$n = 2$$

2



2

28. Which of the following is an equation of the line that passes through the points $(1, -2)$ and $(4, 7)$ in the standard (x, y) coordinate plane?

F. $y = x - 2$

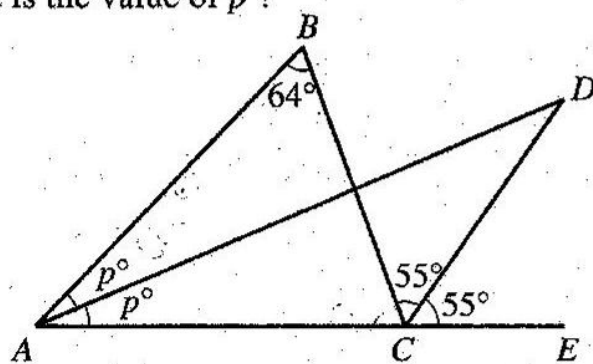
G. $y = 3x - 5$

H. $y = 4x + 7$

J. $y = \frac{5}{3}x + \frac{1}{3}$

K. $y = \frac{1}{3}x + \frac{17}{3}$

29. In the figure below, A , C , and E are collinear; $\triangle ABC$ and $\triangle ADC$ are as shown; and angle measures are as marked. What is the value of p ?



- A. 110
B. 58
C. 55
D. 46
E. 23

30. The diameter of a circle is 10 centimeters. What is its circumference, in centimeters?

- F. 5π
G. 10π
H. 20π
J. 25π
K. 100π

31. A day care center has 160 feet of fence that was donated to construct a fence around a play area. The area is to be rectangular with its length 12 feet longer than its width. Assuming all of the fence is used, what will be the approximate dimensions, in feet, of the play area?

- A. 28 by 40
B. 34 by 46
C. 36 by 44
D. 40 by 40
E. 74 by 86

32. An angle in a right triangle has measure α . If $\sin \alpha = \frac{24}{25}$ and $\tan \alpha = \frac{24}{7}$, then $\cos \alpha = ?$

F. $\frac{7}{25}$

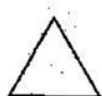
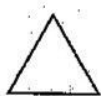
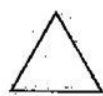
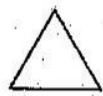
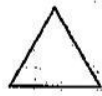
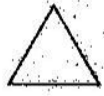
G. $\frac{7}{24}$

H. $\frac{7}{\sqrt{527}}$

J. $\frac{7}{\sqrt{1,201}}$

K. $\frac{25}{7}$

2



2

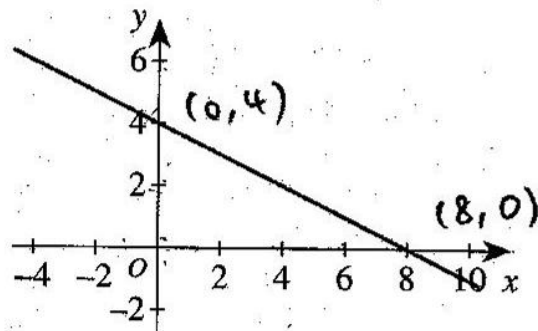
33. What is the distance, in coordinate units, between $(6,4)$ and $(8,10)$ in the standard (x,y) coordinate plane?

A. $\sqrt{8}$
 B. $\sqrt{32}$
 C. $\sqrt{40}$
 D. 4
 E. 8

DO YOUR FIGURING HERE.

34. One of the following is the slope of the line graphed in the standard (x,y) coordinate plane below. Which one is it?

F. -8
 G. $-\frac{1}{2}$
 H. $\frac{1}{2}$
 J. 2
 K. 4



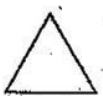
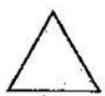
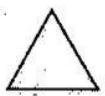
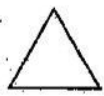
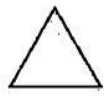
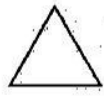
35. A formula for the area of a trapezoid is $A = \frac{1}{2}(b_1 + b_2)h$, where A is the area, b_1 and b_2 are the lengths of the bases, and h is the height of the trapezoid. In terms of A , b_1 , and b_2 , $h = ?$

A. $\frac{1}{2}A - b_1 - b_2$
 B. $2A - b_1 - b_2$
 C. $\frac{2A - b_1}{b_2}$
 D. $\frac{\frac{1}{2}A}{b_1 + b_2}$
 E. $\frac{2A}{b_1 + b_2}$

36. Which of the following equations has the pressure P varying directly as the square of the temperature T and inversely as the volume V ?

F. $P = \frac{10V}{T^2}$
 G. $P = \frac{10T^2}{V}$
 H. $P = \frac{10}{T^2V}$
 J. $P = 10T^2V$
 K. $P = 10\left(\frac{T}{V}\right)^2$

2



2

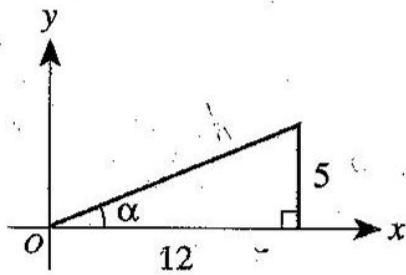
37. Which of the following is NOT a factor of $z^5 - 16z$?

- A. $z^2 - 1$
- B. $z^2 - 4$
- C. $z + 2$
- D. z
- E. $z - 2$

DO YOUR FIGURING HERE.

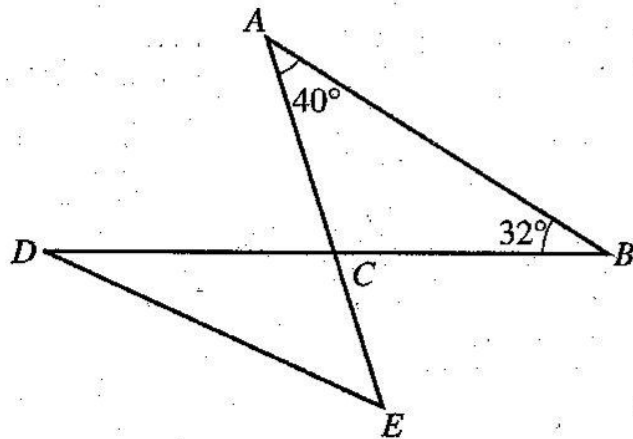
38. What is the sine of α in the right triangle shown in the standard (x,y) coordinate plane below?

- F. $\frac{5}{13}$
- G. $\frac{5}{12}$
- H. $\frac{12}{13}$
- J. $\frac{12}{5}$
- K. $\frac{13}{5}$



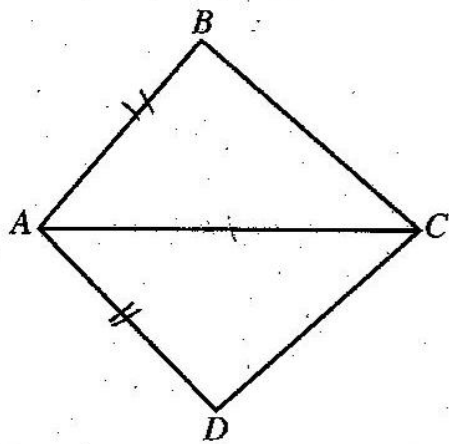
39. In the figure below, \overline{AE} and \overline{BD} intersect at C , and the measure of $\angle E$ is twice the measure of $\angle D$. The measure of $\angle A$ is 40° , and the measure of $\angle B$ is 32° . What is the measure of $\angle E$?

- A. 24°
- B. 40°
- C. 48°
- D. 72°
- E. 108°

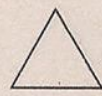


40. In the figure below, the measure of $\angle BAC$ is greater than the measure of $\angle DAC$ and $AB = AD$. Which of the following statements must be true?

- F. $AB > BC$
- G. $BC < DC$
- H. $BC = DC$
- J. $BC > DC$
- K. $AB + BC = AC$



2



2

41. In a math course, a student scored 100 on one test, 97 on another test, and 88 on each of the other tests. The student's test average for the course, where each test is weighted equally, is exactly 91. What is the *total number* of math tests that the student has taken in the course?

- A. 3
 B. 5
 C. 7
 D. 15
 E. Cannot be determined from the given information

DO YOUR FIGURING HERE.

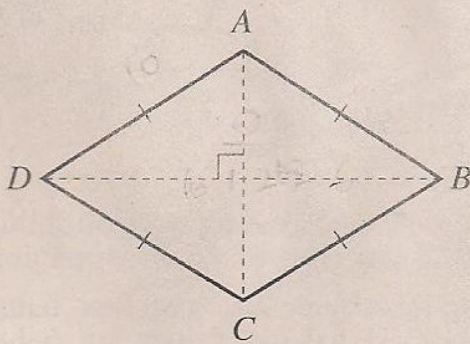
42. An equation of a particular circle is $(x - 3)^2 + y^2 = 10$. What are the coordinates of this circle's center and what is the length, in coordinate units, of this circle's radius?

- | | Center | Radius |
|----|-----------|-------------|
| F. | $(-3, 0)$ | $\sqrt{10}$ |
| G. | $(-3, 0)$ | 5 |
| H. | $(3, 0)$ | $\sqrt{10}$ |
| J. | $(3, 0)$ | 5 |
| K. | $(3, 0)$ | 10 |

43. The point $(3, -4)$ is the midpoint of the line segment in the standard (x, y) coordinate plane joining the point $(8, -11)$ and the point (a, b) . Which of the following is (a, b) ?

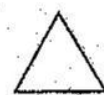
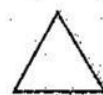
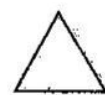
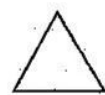
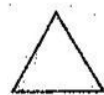
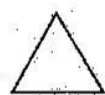
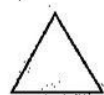
- A. $(-2, 3)$
 B. $(-2, -19)$
 C. $(2, -3)$
 D. $(2.5, -3.5)$
 E. $(5.5, -7.5)$

44. If $AC = 10$ feet and $BD = 12$ feet in the rhombus $ABCD$ shown below, what is its area, in square feet?



- F. 11
 G. 22
 H. 30
 J. 60
 K. 120

2

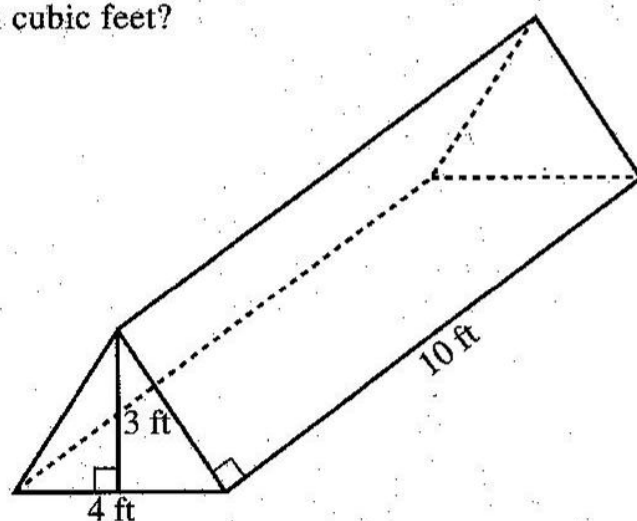


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45. A right, triangular prism that is 10 feet long, 4 feet wide, and 3 feet tall is shown below. What is its volume, in cubic feet?

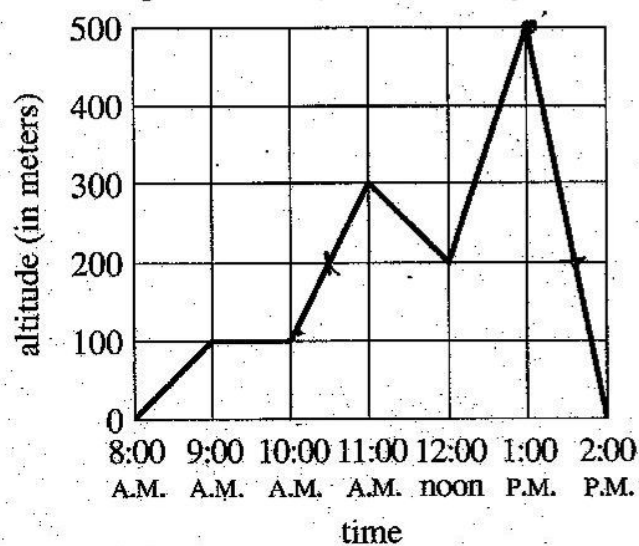
DO YOUR FIGURING HERE.

- A. 50
B. 60
C. 84
D. 114
E. 120



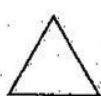
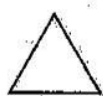
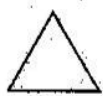
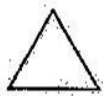
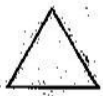
Use the following information to answer questions 46–49.

A balloonist collecting data on pollutants at various levels above the ground takes off at 8:00 A.M. When the balloon is in motion, it moves only straight up or straight down and at a constant speed within each hour-long interval. The balloon is at an altitude that is a multiple of 100 meters at the beginning of each hour. The balloon lands at 2:00 P.M. at the same spot from which it took off. The altitude of the balloon, in meters above the ground, is shown in the figure below.



46. Which of the following is closest to the total distance, in meters, that the balloonist traveled from 10:00 A.M. to 1:00 P.M.?
- E. 400
G. 500
H. 600
J. 680
K. 700
47. What was the total time, in hours and minutes, that the balloon was at least 200 meters above the ground?
- A. 1 hour 30 minutes
B. 1 hour 36 minutes
C. 3 hours 0 minutes
D. 3 hours 6 minutes
E. 3 hours 48 minutes

2

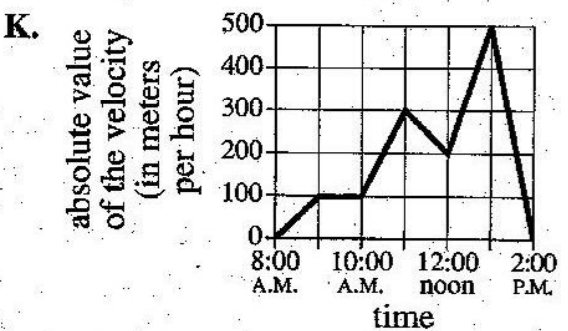
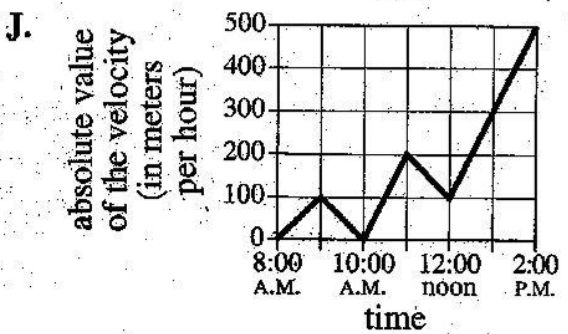
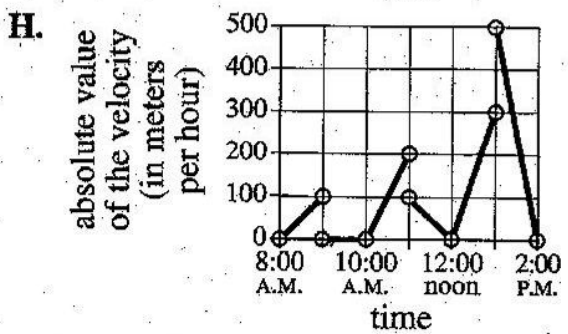
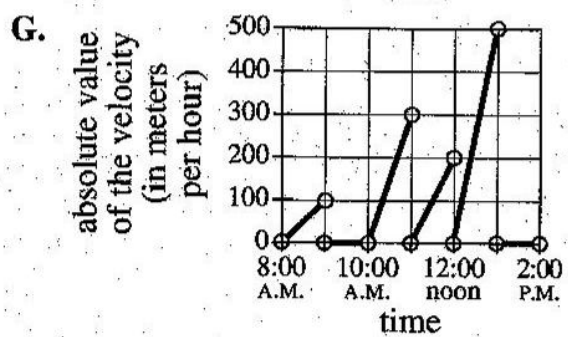
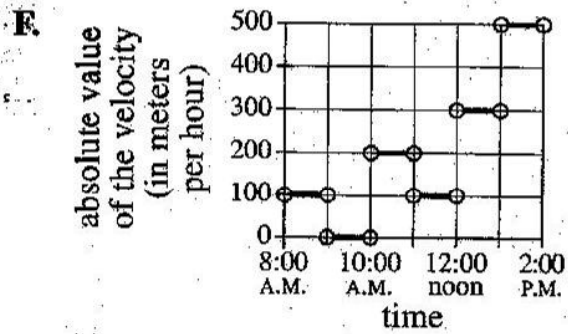


2

48. Which of the following graphs best represents the absolute value of the balloon's velocity, in meters per hour, between 8:00 A.M. and 2:00 P.M.?

DO YOUR FIGURING HERE.

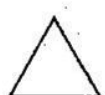
(Note: Ignore acceleration and deceleration.)



49. Which of the following phrases best describes the balloon's motion between 10:30 A.M. and 12:00 noon?

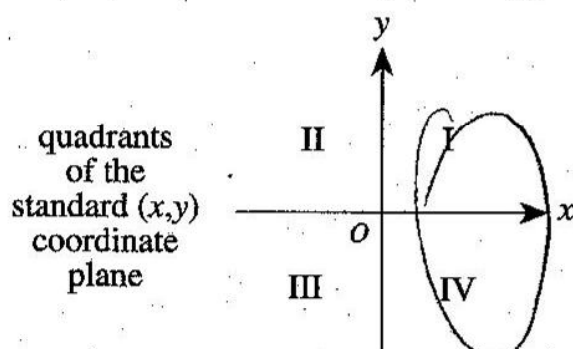
- Descended, and then ascended more quickly
- Descended, and then ascended more slowly
- Stayed at the same altitude
- Ascended, and then descended more quickly
- Ascended, and then descended more slowly

2



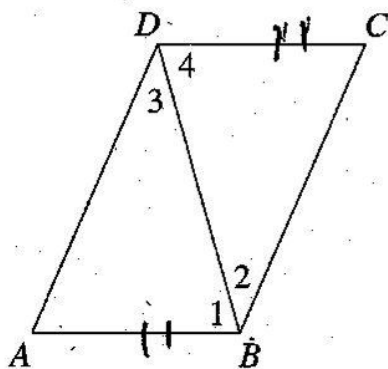
2

50. In the standard (x,y) coordinate plane shown below, $\triangle ABC$ has vertices at $A(-2,3)$, $B(-2,1)$, and $C(-1,1)$. A translation is performed on $\triangle ABC$, and the image of each point P with coordinates (x,y) is the point P' with coordinates (x',y') where $x' = x + 3$ and $y' = y - 2$. The vertices of $\triangle A'B'C'$ are in which quadrant(s)?



- F. Quadrant I only
 G. Quadrant II only
 H. Quadrant III only
 J. Quadrants I and IV only
 K. Quadrants II and III only

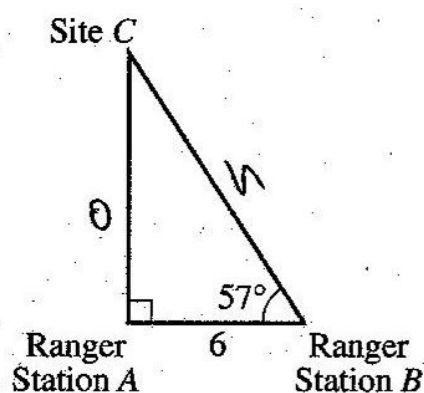
51. In the figure below, $\overline{AB} \cong \overline{CD}$. Fred wants to apply the Side-Angle-Side (SAS) congruence theorem to prove that $\triangle ABD \cong \triangle CDB$. Which of the following congruences, if established, is sufficient?



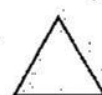
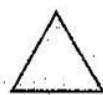
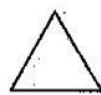
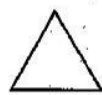
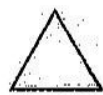
- A. $\angle A \cong \angle C$
 B. $\angle 3 \cong \angle 4$
 C. $\angle 2 \cong \angle 4$
 D. $\angle 2 \cong \angle 3$
 E. $\angle 1 \cong \angle 4$

52. A camper at Site C sends a distress signal. The signal is received by both Ranger Station A and Ranger Station B. As shown below, Ranger Station A is 6 miles directly west of Ranger Station B. Ranger Station A is directly south of Site C. The entire region is flat and level. On a map, the angle formed at Ranger Station B by drawing straight lines from Ranger Station B to Site C and to Ranger Station A measures 57° . About how many miles away from Site C is the closer of the 2 ranger stations?

- F. $\frac{6}{\sin 57^\circ}$
 G. $\frac{6}{\cos 57^\circ}$
 H. $6 \sin 57^\circ$
 J. $6 \cos 57^\circ$
 K. $6 \tan 57^\circ$



2



2

53. If the diameter of a circle is tripled, the area of the resulting circle is how many times the area of the original circle?

- A. 1.5
- B. 2.25
- C. 3
- D. 6
- E. 9

DO YOUR FIGURING HERE.

54. Only tenth-, eleventh-, and twelfth-grade students attend Washington High School. The ratio of tenth graders to the school's total student population is $86:255$, and the ratio of eleventh graders to the school's total student population is $18:51$. If 1 student is chosen at random from the entire school, which grade is that student most likely to be in?

- F. Tenth
- G. Eleventh
- H. Twelfth
- J. All grades are equally likely.
- K. Cannot be determined from the given information

55. When x and y are nonzero real numbers such that $|x| = -x$ and $|y| = y$, which of the following *must* be positive?

- A. x^y
- B. xy
- C. $x - y$
- D. $x + y$
- E. $y - x$

56. If $\frac{2x-y}{x+y} = \frac{2}{3}$, then $\frac{x}{y} = ?$

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

2



2

57. Kelly asked 120 students questions about skiing. The results of the poll are shown in the table below.

DO YOUR FIGURING HERE.

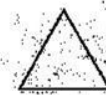
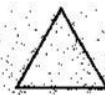
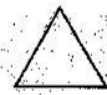
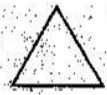
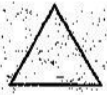
Question	Yes	No
1. Have you skied either cross-country or downhill?	65	55
2. If you answered Yes to Question 1, did you ski downhill?	28	37
3. If you answered Yes to Question 1, did you ski cross-country?	45	20

After completing the poll, Kelly wondered how many of the students polled had skied both cross-country *and* downhill. How many of the students polled indicated that they had skied both cross-country and downhill?

- A. 73
 B. 65
 C. 47
 D. 18
 E. 8
58. A right triangle has legs of length $25 \sin \theta$ feet and $25 \cos \theta$ feet for some angle θ that satisfies $0^\circ < \theta < 90^\circ$. What is the length, in feet, of the longest side of the triangle?
- F. θ
 G. 1
 H. 5
 J. 25
 K. Cannot be determined from the given information

59. For all nonzero x , y , and z such that $x = yz$, which of the following *must* be equivalent to xy ?

- A. $\frac{z}{x}$
 B. yz^2
 C. yz
 D. $\frac{x^2}{z}$
 E. $\frac{x}{y}$

2**2**

60. When $-3 \leq x \leq 4$ and $-1 \leq y \leq 2$, what is the least possible value for $x - y$?

- F. -5
- G. -3
- H. -2
- J. 3
- K. 5

DO YOUR FIGURING HERE.

END OF TEST 2

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

DO NOT RETURN TO THE PREVIOUS TEST.

READING TEST

35 Minutes—40 Questions

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

Passage I

PROSE FICTION: This passage is adapted from the short story "Mother" by Andrea Lee (©1984 by Andrea Lee).

It was easy for me to think of my mother in connection with caves, with anything in the world, in fact, that was dimly lit and fantastic. Sometimes she would rivet Matthew and me with a tale from her childhood: how, at nine years old, walking home through the cobblestone streets of Philadelphia with a package of ice cream from the drugstore, she had slipped and fallen down a storm drain accidentally left uncovered by workmen. No one was around to help her; she dropped the ice cream she was carrying (something that made a deep impression on my brother and me) and managed to cling to the edge and hoist herself out of the hole. The image of the little girl—who was to become my mother—hanging in perilous darkness was one that haunted me; sometimes it showed up in my dreams.

Perhaps her near-fatal tumble was responsible for my mother's lasting attraction to the bizarre side of life. Beneath a sometimes prudish exterior, she quivered with excitement in the same way her children did over newspaper accounts of trunk murders, foreign earthquakes, graves hidden in the New Jersey pine barrens. When she commented on these subjects, she attempted a firm neutrality of tone but gave herself away in the heightened pitch of her voice and in a little breathy catch that broke the rhythm of each sentence she spoke. This was the voice she used to whisper shattering bits of gossip over the phone. "When Mr. Tillet died," I heard her say once, with that telltale intake of breath, "the funeral parlor did such a poor job that his daughter had to wire her own father together."

At home Mama was a housekeeper in the grand old style that disdains convenience, worships thrift, and condones extravagance only in the form of massive Sunday dinners, which, like acts of God, leave family members stunned and reeling. Her kitchen, a long, dark, inconvenient room joined to a crooked pantry, was entirely unlike the cheerful kitchens I saw on television, where mothers who looked like June Cleaver unwrapped food done up in cellophane. This kitchen had more the feeling of a workshop, a laboratory in which the imperfect riches of nature were investigated and finally transformed into something near sublimity.

The sink and stove were cluttered with works in progress: hot plum jelly dripping into a bowl through cheesecloth; chocolate syrup bubbling in a saucepan; string beans and ham bones hissing in the pressure cooker; in a vat, a brownish, aromatic mix for root beer.

The instruments my mother used were a motley assemblage of blackened cast-iron pots, rusty-handled beaters, graters, strainers, and an array of mixing bowls that included the cheapest plastic variety as well as tall, archaic-looking stoneware tubs inherited from my grandmother, who had herself been a legendary cook. Mama guarded these ugly tools with jealous solicitude, suspicious of any new introductions, and she moved in her kitchen with the modest agility of a master craftsperson.

Like any genuine passion, her love of food embraced every aspect of the subject. She read cookbooks like novels, and made a businesslike note in her appointment book of the date that Wanamaker's received its yearly shipment of chocolate-covered strawberries. Matthew and I learned from her a sort of culinary history of her side of the family: our grandfather, for instance, always asked for calf brains scrambled with his eggs on weekend mornings before he went out hunting. Grandma Renfrew loved to drink clabbered milk, and was so insistent about the purity of food that once when Aunt Lily had served her margarine instead of butter, she had refused to eat at Lily's table for a year. My mother's sole memory of her mother's mother was of the withered woman scraping an apple in the corner of the kitchen, and sucking the pulp between her toothless jaws.

Mama took most pleasure in the raw materials that became meals. She enjoyed the symmetry, the unalterable rules, and also the freaks and vagaries that nature brought to her kitchen. She showed me with equal pleasure the handsome shape of a fish backbone; the little green gallbladder in the middle of a chicken liver; and the double-yolked eggs, the triple cherries, the peculiar worm in a cob of corn. As she enjoyed most the follies, the bizarre twists of human nature and experience, so also she had a particular fondness for the odd organs and connective tissues that others disdained. "Gristle is delectable," she would exclaim as Matthew and I groaned. "The best part of the cow!"

1. The passage is primarily told from the point of view of:
 - A. a young child describing and commenting on the events of her childhood as they happen to her.
 - B. a young child who knows both her own thoughts and those of the people around her, such as her mother.
 - C. an adult who is looking back at and describing her own experiences as a child.
 - D. an adult who is relating and commenting on her experiences as a mother.
2. It can reasonably be inferred that all of the following would be consistent with the homemaking style of the narrator's mother EXCEPT:
 - F. enjoying elaborate Sunday dinners.
 - G. using time-saving appliances such as a dishwasher.
 - H. mending clothes rather than replacing them.
 - J. preparing and enjoying sweets.
3. It can reasonably be inferred from the second paragraph (lines 16–30) that the narrator's mother responds as she does to stories of natural disasters and violence because she:
 - A. wants to counter her image of a prudish, proper housewife.
 - B. embraces the extraordinary events of life.
 - C. is as horrified as her children are by these events.
 - D. is reminded of images from her dreams.
4. The description in the fourth paragraph (lines 48–57) focuses on the narrator's mother's preference for:
 - F. new cooking tools in her kitchen.
 - G. invented cooking tools that she shared with her mother.
 - H. familiar cooking tools rather than anything new.
 - J. cooking tools displayed decoratively and not intended for use.
5. The information about the narrator's grandparents in lines 63–71 primarily serves to reveal about these characters their:
 - A. preoccupation with and inflexibility about certain kinds of food.
 - B. preference for certain foods, but also their willingness to try new things.
 - C. concern with maintaining the culinary history of the family for future generations.
 - D. belief that food is important and can help bring families together.
6. Lines 75–78 suggest that the pleasure the narrator's mother took in the raw materials that became meals resulted from her appreciation for:
 - F. her family's eating habits.
 - G. the precision and the whimsy produced by nature.
 - H. traditional kitchen practices.
 - J. the unalterable rules of culinary history.
7. It can reasonably be inferred from the passage that to the narrator, compared to the kitchens seen on television, her mother's kitchen was:
 - A. brighter, more neatly organized, and more convenient.
 - B. darker, less neatly organized, and more convenient.
 - C. brighter, more neatly organized, and less convenient.
 - D. darker, less neatly organized, and less convenient.
8. It can reasonably be inferred that the author uses italics in line 30 to emphasize that the narrator's mother feels all of the following emotions EXCEPT:
 - F. anger that such a private matter had been made public.
 - G. shock at the poor work done by the funeral parlor.
 - H. sympathy toward the daughter of Mr. Tillet.
 - J. eagerness to share such an unusual story.
9. It can most reasonably be inferred from lines 39–42 that the narrator believes her mother's cooking to be:
 - A. experimental and undesirable.
 - B. inappropriate for a child's diet.
 - C. equivalent to that of a fine restaurant.
 - D. almost perfect every time.
10. The last paragraph suggests that the narrator's mother's fondness for gristle was shared by:
 - F. neither most other people nor the narrator and Matthew.
 - G. Matthew and the narrator but not most other people.
 - H. most other people but not Matthew and the narrator.
 - J. most other people as well as Matthew and the narrator.

Passage II

SOCIAL SCIENCE: This passage is adapted from the article "Why Can't We All Just Relax?" by Verlyn Klinkenborg, which appeared in the magazine *Civilization* (©1997 by Capital Publishing L.P.).

The sense that leisure time has steadily diminished in recent years and is now disappearing altogether is not just an illusion, a prank of perspective. It's a fact nearly everyone feels. Work—and the time it takes to get to and from work—spills into corners of the day and night that used to belong to community and family life, to sleep, to oneself. What leisure there is comes in smaller and smaller increments and is increasingly overshadowed by the specter of economic strain and personal stress. Working hours declined throughout the first half of the 20th century, but they have been on the rise again since 1969, totaling an extra month of work per year for each "labor force participant" by the beginning of the 1990s, according to Juliet Schor, a Harvard economist and author of *The Overworked American*. Equally important, leisure is no longer folded continuously into the contours of the year in a pattern that reflects the rhythms of season and holiday. We work just as hard in winter as we do in summer, as hard by night as we do by day, as hard at home as we do at the office. Leisure time has been containerized in the weekend and the vacation, resulting in what can only be called the pressure to unwind.

What is illusory is the widely held assumption that humans have toiled miserably throughout history, only to be freed from labor by 20th-century technology. "The claim that capitalism has delivered us from excessive toil," Schor writes, "can be sustained only if we take as our point of comparison eighteenth- and nineteenth-century Europe and America—a period that witnessed what were probably the longest and most arduous work schedules in the history of humankind." In fact, she notes, ordinary people in premodern times led lives that, though not always pleasant, were often quite leisurely. Before the industrial revolution, laborers' time was not yet calibrated by the clocks of factory owners. The rhythms of work and rest were intricately patterned by a rich calendar of holidays and—on farms and in some trades—wide seasonal variation in the intensity of work. Medieval records show that even for peasants, the working year may have been as short as 120 to 150 days.

The industrial revolution completed with dramatic rapidity a process that had been going on for several centuries: the transformation of labor into a salable commodity. For this to occur, time itself had to be turned into a commodity, a means of measuring the sale of one's labor. The result was a very different, less elastic sense of what might be called the ownership of time, an ownership that employers took quite seriously and were able to measure with increasing, almost fanatical precision by the mid-18th century. But leisure was something that manual workers did not know they possessed until after they had exchanged agricultural jobs for industrial ones.

In the early 20th century, leisure began to undergo a broad social redistribution and, in fact, a shift in category. In a 1935 essay called "In Praise of Idleness," mathematician and philosopher Bertrand Russell declared that modern technology "has made it possible for leisure, within limits, to be not the prerogative of small privileged classes, but a right evenly distributed throughout the community." And yet if leisure indeed became a right, it was one that people virtually stopped fighting for during the manufacturing boom that followed World War II, when "workers" became better known as "consumers." The last significant congressional legislation pressing for reduction in the length of the workweek (to 30 hours) was scuttled by President Franklin Roosevelt after being passed by the Senate in 1933.

From a philosophical perspective, it's not hard to understand why leisure has evaporated in this country. Economically speaking, Americans are the heirs of economist Adam Smith, who viewed leisure as merely therapeutic. In *The Wealth of Nations*, he acknowledged that relaxation is a "call to nature" that follows on "great labour, either of mind or body." But in Smith's opinion, leisure, like sleep, is valuable mainly because it keeps *Homo economicus* healthy. He takes it for granted that human existence is meant to be economically productive, a principle that lies at the root of American society. When the pressure's on, Americans tend to cut back sharply on the elements of their lives that appear to be solely therapeutic. Sleep, good food, the bonds of community and family, leisure itself: These are the things that get squeezed.

11. The main purpose of the first paragraph in relation to the passage as a whole is to:
- discuss how the typical workplace has changed over the past several centuries.
 - compare and contrast late-twentieth-century labor with that of several other centuries.
 - describe the current state of leisure time in the United States.
 - disprove the illusion that leisure time is declining.

12. According to the passage, all of the following are accurate characterizations of leisure in the second half of the twentieth century in the United States EXCEPT that it has:
- F. been the focus of significant congressional legislation.
 - G. been given a lower priority than economic productivity.
 - H. been containerized in weekends and vacations.
 - J. come in smaller and smaller increments.
13. The author most likely includes the second paragraph (lines 24–42) to:
- A. argue that technology, rather than capitalism, was responsible for the decline in leisure time in the premodern era.
 - B. contrast the labor of the eighteenth and nineteenth centuries with that of the twentieth.
 - C. support the claim that capitalism has increased leisure in the United States in the twentieth century.
 - D. provide historical evidence to undermine the idea that people labored excessively up until the twentieth century.
14. In the last paragraph, Adam Smith contrasts the need for leisure with:
- F. economic priorities.
 - G. family bonds.
 - H. sleep.
 - J. a “call to nature.”
15. As presented in the last paragraph, Adam Smith’s remarks can most accurately be characterized as:
- A. philosophical opinion.
 - B. precise medical diagnosis.
 - C. carefully documented findings.
 - D. false assumptions about U.S. society.
16. The passage suggests that the primary reason for the current state of leisure in the United States is the:
- F. ending of the industrial revolution.
 - G. priority placed on economic productivity.
 - H. successful adoption of labor-saving technology.
 - J. reliance on vacations as a means to unwind.
17. According to the passage, the shift in thinking about the leisure of manual workers mentioned in lines 52–55 occurred when:
- A. peasants became land owners.
 - B. farmers became factory workers.
 - C. employees became industrialists.
 - D. workers became consumers.
18. The author most likely includes the quotation from Bertrand Russell in lines 60–63 to:
- F. press for congressional legislation reducing the workweek.
 - G. disprove the theory of the social distribution of labor.
 - H. praise the prerogatives of the privileged classes.
 - J. suggest that leisure has sometimes been considered a right.
19. Based on the passage, people’s attitude after World War II toward reducing the length of the workweek can best be described as:
- A. hopeful.
 - B. enthusiastic.
 - C. hostile.
 - D. unsupportive.
20. The author most likely uses the words *workers* and *consumers* in lines 66–67 to:
- F. make a distinction between two separate groups of people.
 - G. suggest the need to recognize laborers’ rights as consumers.
 - H. imply that a conceptual change in society took place after World War II.
 - J. highlight workers’ improved and more leisurely lives following World War II.

Passage III

HUMANITIES: This passage is adapted from “The Man Who Wants Buildings to Love Kids” by Roger Rosenblatt, an article that appeared in *Time* magazine (©1999 by Time Inc.).

When architecture firms began to compete for a clothing-store chain’s office complex in San Bruno, Calif., William McDonough saw it as a competition of ideas rather than for a contract. “Our idea,” he says, “was that if a bird flew over the building, it would not know that anything had changed.” If that sounds like pure eco-nut talk, try the question he puts to potential clients when he undertakes any of his architectural projects: “I ask, ‘How do we love all children, all species, all time?’”

After a day of McDonough’s instruction in much more than architecture, one sees that his utopianism is grounded in a unified philosophy that—in demonstrable and practical ways—is changing the design of the world. McDonough empathizes with birds because he’s a rare one himself, a visionary. The three points of his abstractly designed universe (he is given to drawing incomprehensible diagrams on any available surface) reflect that people who used to be impelled to make things by the old impulses of social and economic interests now must add the environment. “But not as an ism,” he cautions, not as an extreme. “What we’re trying to do is balance ecology, equity and economy.”

The clothing-store chain’s campus, which William McDonough + Partners completed in 1997, is an anomaly of a building that looks more beautiful in life than it does in photos, and seems to expand its beauty from the inside out. The inside is essentially the outside, so when one is there, one is also somewhere else. The “facts” of the structure read like an essay on “What I Did for the Environment Last Summer”: the roofs are planted with native grasses and wildflowers atop 6 in. of soil that both fools the birds and serves as a thermal and acoustical insulator.

The complex’s wood floors and veneer were harvested from sustainable forests. Not a single California live oak was cut down during construction, and a stand of the ancient trees rises in a dark elegance just beyond a piazza. Huge atriums carry daylight deep into the building, paints and adhesives are low toxicity, the place is 30% more energy efficient than state law requires, and so on.

But the special power of the structure is its palpable connection to the people who work there. On the day that McDonough and I visit, 600 employees go about their tasks, yet the building feels empty. The windows bring people to the sky. “When it’s a nice day,” says McDonough, “why feel as if you’ve missed it?” Stand in practically any spot, and one can see the greenery of the outside trees, the grassy lower roof or the grasses growing in one of the two interior courtyards. Light is everywhere. It fills the vast open hallways that seem to stretch on forever under ceilings

15 ft. high. McDonough says, “People have lofty thoughts in lofty places.”

A walking college lecture—he is also dean of the University of Virginia school of architecture—McDonough is a compendium of similar maxims, phrases and rules: “Honor commerce as the engine of change”; “respect diversity”; “build for abundance”; “eco-efficiency should be replaced by eco-effectiveness”; “design is the first signal of human intention”; “I want to do architecture that is timeless and mindful.”

All this and much more come from a 48-year-old innocent anarchist; his language has the touch of the poet and of the bomb thrower. He thinks abstractly, making it equally fascinating and difficult to talk to him, since he turns nearly every contribution one makes to the conversation into a refinement of his theories.

He believes the world needs to be rebuilt from the bottom up, in a “next industrial revolution.” That means everything from products to buildings to cities to “definitions of beauty” and constructs of the human mind. Beauty, he says, embodies function. A beautiful building that spews fumes and spreads cancer is not beautiful. “How do we love all children?” means “How can we look generations into the future if we leave behind the detritus of this designer society?” “For a strategy of change,” he says, “we need a strategy of hope.”

The caution here is one that applies to utopian visions generally: perfect is always imperfect, as it must be, and imperfect—a world of disappointments and surprises—is as good as it gets. It is hard to know whether McDonough recognizes this. He is in the first blush of success, where he wants everything to be right and believes it is possible. He asks, “Why should it ever be necessary to tear the [clothing-store chain’s] complex down?” and thinks that the question is rhetorical.

21. Which of the following best captures how the author characterizes McDonough?
- A. An “eco-nut” whose dedication to bird conservation forms his ideas on architecture
 - B. A tough competitor who gives clients what they want in order to win large corporate contracts
 - C. A teacher focusing his lectures on conservative design and maintaining tradition
 - D. An idealist who aspires to timeless, thoughtful building designs

22. In the passage, McDonough mentions that a work environment should provide workers with all of the following EXCEPT:
- F. abundant natural light.
 - G. a sense of spaciousness.
 - H. furnishings from a designer society.
 - J. places to experience nature indoors.
23. The author characterizes the clothing-store chain's office complex as:
- A. inventive and environmentally responsible.
 - B. traditional and lasting.
 - C. visionary and impractical.
 - D. light-filled and overly expensive.
24. According to the passage, McDonough believes that building design should be based on all of the following EXCEPT:
- F. environmental responsibility.
 - G. the needs of future generations.
 - H. physical attractiveness and function.
 - J. popular definitions of beauty.
25. In terms of the passage as a whole, the main function of the third and fourth paragraphs (lines 24–42) is to:
- A. provide specific details from one building to illustrate McDonough's philosophy of design.
 - B. argue that the external beauty of McDonough's building overwhelms its interior features.
 - C. provide a contrast to the more practical and environmentally safe methods of construction discussed elsewhere in the passage.
 - D. discuss the workers' reactions to a building in which the "inside is essentially the outside."
26. The main purpose of the fifth paragraph (lines 43–55) is to reveal:
- F. characteristics of McDonough's design that exceed state law standards.
 - G. the relationship between a particular building's design and the human response to it.
 - H. the process used to grow roof grasses and courtyard greenery.
 - J. construction methods used to build a structure that seems empty even on a busy workday.
27. It can reasonably be inferred from the passage that McDonough would characterize many buildings today as being:
- A. designed based on values from the past.
 - B. responsive to the emotional needs of workers.
 - C. environmentally sound and energy efficient.
 - D. of enduring quality and built to last.
28. According to McDonough, as he is presented in the passage, competition between the architectural firms bidding for the clothing-store office complex contract was based on:
- F. amount of professional experience.
 - G. cost.
 - H. ideas.
 - J. work schedules.
29. Which of the following new factors would McDonough most likely say should be incorporated into "the old impulses" referred to in line 20?
- A. Concern for the economic interests of industry
 - B. Consideration for the natural environment
 - C. Reshaping the landscape to accentuate new construction
 - D. Embracing socially accepted concepts of beauty
30. In the last paragraph, the author most nearly characterizes McDonough's vision as:
- F. idealistic but humble.
 - G. positive but inconsistent.
 - H. revolutionary but unrealistic.
 - J. intriguing but disappointing.

Passage IV

NATURAL SCIENCE: This passage is adapted from the article "The Hum of Bees" by Susan Brind Morrow, which appeared in *Harper's Magazine* (©1998 by the Harper's Magazine Foundation). Note that all worker honeybees are female.

A beehive in summer contains 30,000 bees or more. In the spring and summer a queen lays up to 1,500 eggs a day. The infant bees emerge, just as many older worker bees die, having shredded their wings to pieces in foraging flights. The life span of a worker is four to six weeks. The queen will live up to four or five years.

These are the intricate stages of a honeybee's career. First, maggotlike larvae hatch from the eggs laid in the hexagonal cells of the hive by the queen. Young workers of five days of age or more who have been feeding heavily on pollen produce for the larvae a protein-rich substance called bee milk or royal jelly. The larvae grow to five hundred times their original weight. In six days, when their bodies have swollen to fill their cells completely, they spin silk cocoons about themselves. Older workers cap the cells with a fine, light wax. The new bee miraculously evolves, translucent and perfect, and on the twelfth day after the capping chews her way out through the lid of her cell.

For the first three days of life the young bee walks around the brood comb, licking clean the newly emptied cells and polishing them with her saliva. Only if a cell has been prepared this way will the queen lower her abdomen into it and lay an egg. After three days, the hypopharyngeal glands in the young bee's head have fully developed, and she becomes a nurse. She begins by feeding the older, bigger larvae, but as she becomes more skilled she feeds the younger, more delicate larvae with bee milk from her mouth. At the end of ten days the glands on the head of the nurse begin to shrink; she can no longer produce royal jelly.

The four pairs of wax glands on her lower abdomen have now reached their full size, and she begins to secrete wax. The wax forms in scales and slides out from the underside of her abdomen. In the warmer months, when the population of the hive swells, the wax-producing bees begin to build layers of new comb. They gorge themselves on honey and secrete immense quantities of wax (consuming six to eight pounds of honey to produce one pound of wax). Workers roll the wax up away from their abdomens with their legs, and chew and soften it with saliva. With their mouths and feet they manipulate the wax to form the mathematically precise sheets of fragile hexagonal cells that honeybees have routinely created for millions of years.

In the second stage of life (between ten and twenty days old) worker bees go to the entrance of the hive and receive in their mouths the nectar that older foragers have brought back in their honey stomachs. A forager may visit hundreds of sources of nectar (for example, each of the florets on a head of clover) to fill her honey

stomach—a kind of holding tank—just once. Every teaspoon of honey may require thousands of trips to the field by forager bees.

The receiving bee holds the nectar in her honey stomach as she carries it up to the cells where the honey is stored. When she disgorges the nectar she adds to it fluids secreted from her salivary and now contracted hypopharyngeal glands, filled with enzymes to purify and preserve the honey. The receiving bees pack the nectar into honey cells. Other workers stand above, thrumming their wings to evaporate excess moisture and thicken the nectar.

The bees now begin to make their first excursions outside, short flights to familiarize themselves with the territory. Some are responsible for clearing refuse from the hive; they carry the corpses of other bees a distance from the hive and drop them to the ground. Others guard the entrance to the hive; they use their stingers to attack intruders, including honey-stealing bees from other hives.

In the final period of a worker bee's life, from about the twentieth day until her death, she becomes a forager, collecting water, resin, nectar, or pollen. Her body is ingeniously shaped for the work. Her inner back legs are covered with bristly brushes that mesh together on opposite legs. The bee brushes away pollen from a flower's thickly coated stamens, then forces the pollen through the stiff hairs of one leg with the bristles of the leg opposite, as though combing or sifting it. On the outer side of her back legs are deep indentations called pollen baskets. She moistens the pollen with honey that she has brought from the hive in her honey stomach. She forms the pollen into a ball, like bread dough, packs it into her pollen baskets, then flies back to the hive with bright bulbs of pollen bulging from her legs.

31. According to the passage, which of the following is an accurate sequence of the roles performed by a worker honeybee?
- A. Nurse, comb-builder, receiver, forager
 - B. Forager, nurse, comb-builder, receiver
 - C. Receiver, nurse, comb-builder, forager
 - D. Comb-builder, nurse, forager, receiver

32. The passage answers all of the following questions EXCEPT:
- F. How do worker honeybees protect their hive from invaders?
 - G. How much honey do worker honeybees consume in order to produce a certain quantity of wax?
 - H. What part of a flower is the source of the pollen that worker honeybees collect?
 - J. Which flowers yield the pollen that worker honeybees prefer when they are building new comb?
33. According to the second paragraph (lines 8–20), what happens to the weight of a worker honeybee larva between the time it hatches and the time it spins a cocoon?
- A. It increases 100-fold.
 - B. It increases 500-fold.
 - C. It decreases by half.
 - D. It doubles, then decreases slightly.
34. The third paragraph (lines 21–32) indicates that in feeding a smaller larva as opposed to a larger larva, a worker honeybee needs more:
- F. delicate methods of manipulating wax.
 - G. productive hypopharyngeal glands.
 - H. refined feeding techniques.
 - J. vigorous assistance from other bees.
35. According to the passage, the shape of the cells in a comb is a result of the worker honeybees' manipulation of wax using their:
- A. mouth and feet.
 - B. antennae and wax glands.
 - C. abdomen and saliva glands.
 - D. legs and lower abdomen.
36. Which of the following best describes some of the chores performed by worker honeybees in "the second stage" of life?
- F. Storing and purifying honey, producing royal jelly, building cells for egg-laying
 - G. Nursing the young, aiding the queen, gorging on honey in preparation for the next stage of life
 - H. Storing and purifying honey, cleaning the hive, guarding against intruders
 - J. Spinning a cocoon, cleaning cells, nursing the young
37. If the seventh paragraph (lines 66–73) were deleted, the passage would NOT indicate that:
- A. worker honeybees leave the hive to collect pollen.
 - B. corpses of honeybees are removed from the hive.
 - C. receiving worker honeybees pack nectar into honey cells.
 - D. pollen baskets develop on the outside of a worker honeybee's legs.
38. The passage states that bee milk is a substance rich in:
- F. calcium.
 - G. protein.
 - H. saliva.
 - J. honey.
39. According to the passage, at what point in a worker honeybee's life does she prepare cells for egg-laying?
- A. During the first three days after she emerges from her cocoon
 - B. Throughout her adult life as part of a set of ongoing duties for the hive
 - C. Anytime prior to forming her own cocoon
 - D. After she receives a special signal from the queen
40. Based on the passage, a foraging worker honeybee leaving the hive is likely to be carrying a supply of honey to:
- F. hide from honey-stealing bees.
 - G. sustain herself in her journey.
 - H. serve as a scent for other honeybees to follow.
 - J. mix with the pollen when filling her baskets.

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

Enzymes *catalyze* (speed up) the rate of a biological reaction without being consumed in the reaction. *Pyrococcus furiosus*, an organism that lives in ocean thermal vents where temperatures remain near 100°C, produces the enzyme *prolidase*. Prolidase catalyzes the breakdown of proteins to release the amino acid *proline*. An enzyme's *activity* is a measure of its effectiveness for a given reaction expressed as a percent of its maximum measured effectiveness.

Experiment 1

Many enzymes function only in the presence of a metal ion, called a *cofactor*. One mL of a standard solution containing prolidase and 0.4 mM (millimolar, a unit of concentration) cobalt ion (Co^{2+}) was mixed with 1 mL of a solution of Protein X (of which proline is a component) at a pH of 7.0 and 100°C. After 10 min, a substance that reacts with free proline to produce a bright red color was added to the solution. The solution was diluted to 100 mL, and the intensity of the red color was measured and used to calculate the activity. The procedure was repeated for different concentrations of Co^{2+} , and then for manganese ion (Mn^{2+}) and zinc ion (Zn^{2+}) at all of the concentrations (see Table 1).

Ion concentration (mM)	Activity (%)		
	Co^{2+}	Mn^{2+}	Zn^{2+}
0.0	0	0	0
0.4	62	35	0
0.8	86	49	0
1.2	100	68	0
1.6	92	66	0
2.0	84	57	0

Experiment 2

Experiment 1 was repeated, but Co^{2+} (held constant at 1.2 mM) was the cofactor in all trials, and the temperature was varied from trial to trial (see Table 2).

Temperature (°C)	Activity (%)
40	0
50	8
60	22
70	42
80	60
90	94
100	100

Experiment 3

Experiment 2 was repeated, but from trial to trial, temperature was held constant at 100°C, and pH was varied (see Table 3).

pH	Activity (%)
5.0	0
6.0	41
6.5	59
6.8	92
7.0	100
7.2	94
8.0	24
8.5	16
9.0	0

- If, in Experiment 2, a trial had been done at 85°C , the activity would most likely have been:
 - less than 42%.
 - between 42% and 60%.
 - between 60% and 94%.
 - greater than 94%.
- A researcher hypothesized that since *Pyrococcus furiosus* lives in a very hot environment, enzymes produced by the organism would catalyze reactions most efficiently at higher temperatures. Do the results of Experiment 2 support her hypothesis?
 - Yes; as the temperature increased, activity only increased.
 - Yes; as the temperature increased, activity initially decreased, but then increased.
 - No; as the temperature increased, activity only decreased.
 - No; as the temperature increased, activity initially increased, but then decreased.
- In which of the following ways was the procedure in Experiment 1 different from the procedure in Experiment 2? In Experiment 1:
 - 3 metal ions were studied; in Experiment 2, only 1 metal ion was studied.
 - 3 metal ions were studied; in Experiment 2, only 2 metal ions were studied.
 - only 1 metal ion was studied; in Experiment 2, 3 metal ions were studied.
 - only 1 metal ion was studied; in Experiment 2, only 2 metal ions were studied.
- Which of the following statements about the relationship between prolidase activity and Mn^{2+} concentration is supported by the results of Experiment 1? As the Mn^{2+} concentration increases from 0.0 mM to 2.0 mM, the activity of prolidase:
 - increases only.
 - decreases only.
 - increases, then decreases.
 - decreases, then increases.
- Human blood typically has a pH of 7.4 and temperature of 37°C . Based on the results of Experiments 2 and 3, would prolidase produced by *Pyrococcus furiosus* function as an enzyme in human blood?
 - No; the trend shows that prolidase would not be active at temperatures lower than 40°C .
 - Yes; the trend shows that prolidase would be active at temperatures lower than 40°C .
 - No; prolidase was not active at any of the pHs tested between 7.0 and 8.0.
 - Yes; prolidase was active at all pHs tested between 7.0 and 8.0.
- Which of the following is a plausible model for how the red color was produced in Experiments 1–3? The added substance interacts with:
 - proline to form a new compound that is red in color.
 - Protein X to form a new compound that is red in color.
 - water molecules in solution to form a complex that is red in color.
 - Co^{2+} ions to form a complex that is red in color.

Passage II

Ecologists use computer simulations to model population growth. The symbol N_0 indicates a population's initial size and N_t indicates the population's size at time t (t is the number of generations following N_0).

N_t is determined by the relationship between the birth rate (b) of the population (the number of individuals born

per generation per 1,000 individuals) and the death rate (d) of the population (the number of individuals that die per generation per 1,000 individuals).

The table below shows the results of 12 computer simulations (S) for population growth.

S	N_0	b	d	N_2^*	N_5^*	N_{10}^*	N_{15}^*	N_{20}^*
1	8	0.5	0.25	13	28	97	340	1,187
2	8	0.8	0.3	22	97	1,187	14,464	176,211
3	8	0.6	0.6	8	8	8	8	8
4	8	1.0	0.75	13	28	97	340	1,187
5	8	0.9	0.4	22	97	1,187	14,464	176,211
6	8	0.1	0.1	8	8	8	8	8
7	16	0.4	0.15	26	56	195	680	2,375
8	1,000,000	1.0	1.2	670,320	367,880	135,335	49,787	18,316
9	1,000,000	0.5	1.0	367,880	82,085	6,738	553	45
10	1,000,000	0.1	1.1	135,335	6,738	45	0	0
11	1,000,000	0.4	0.6	670,320	367,880	135,335	49,787	18,316
12	1,000,000	0.1	0.6	367,880	82,085	6,738	553	45

*Values are rounded to the nearest whole number.

7. According to the table, the population size increased most rapidly in which of the following simulations?
- Simulation 1
 - Simulation 3
 - Simulation 4
 - Simulation 5
8. Based on the table, the size of a population remains constant if:
- $b = d$.
 - $b > d$.
 - $b = 1$.
 - $b > 1$.
9. In which of the following simulations were deaths more frequent than births?
- Simulation 1
 - Simulation 4
 - Simulation 7
 - Simulation 10
10. Based on the information in the table, a population ($N_0 = 8$) with which of the following sets of birth rates and death rates will increase most rapidly?
- A birth rate of 1.0 and a death rate of 3.0
 - A birth rate of 2.0 and a death rate of 1.0
 - A birth rate of 3.0 and a death rate of 0.5
 - A birth rate of 4.0 and a death rate of 3.0
11. If a simulation were performed using the values $N_0 = 4$, $b = 1.0$, and $d = 0.75$, based on the results in the table, N_{10} would be closest to which of the following values?
- 12
 - 24
 - 48
 - 96

Passage III

The characteristics and genetics of *D. pseudoobscura* (a species of fruit fly) have been studied extensively. Table 1 shows the average egg production of different races and strains of female *D. pseudoobscura* at various temperatures throughout their lifetimes.

Race	Strain	Average egg production per female at a temperature (°C) of:			
		9	14	19	25
A	LaGrande	348	984	1,144	395
A	Texas	183	560	1,130	332
B	Humboldt	167	1,258	1,697	138
B	Seattle	104	1,093	1,591	75

Table 2 shows the results of a study on testis length in male *D. pseudoobscura* with different combinations of Race A and Race B chromosomes. Male *D. pseudoobscura* have one X chromosome, one Y chromosome, two Number 2 chromosomes, two Number 3 chromosomes, and two Number 4 chromosomes.

Group	Chromosomes*				Average testis length (μm)†
	X	Number 2	Number 3	Number 4	
1	A	AA	AA	AA	650
2	A	AA	AA	AB	550
3	A	AA	AB	AA	500
4	A	AB	AA	AA	640
5	A	AA	AB	AB	540
6	A	AB	AA	AB	640
7	A	AB	AB	AA	550
8	A	AB	AB	AB	380
9	A	BB	BB	BB	70
10	B	BB	BB	BB	480
11	B	BB	BB	AB	480
12	B	BB	AB	BB	530
13	B	AB	BB	BB	380
14	B	BB	AB	AB	530
15	B	AB	BB	AB	330
16	B	AB	AB	BB	390
17	B	AB	AB	AB	130
18	B	AA	AA	AA	23

*The origin of the Y chromosome did not affect average testis length and is not included in the table.
†1 μm = 10⁻⁶ m

Tables adapted from Theodosius Dobzhansky, *Genetics and the Origin of Species*. ©1982 by Columbia University Press.

12. According to Table 1, for the Seattle strain of *D. pseudoobscura* from Race B, as the temperature increased from 9°C to 25°C, average egg production:

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

13. According to Table 2, individuals within which of the following groups had the greatest number of Race B chromosomes?

A. Group 4
B. Group 10
C. Group 14
D. Group 17

14. A scientist wants to collect as many *D. pseudoobscura* eggs as possible from 10 females. Based on the data presented in Table 1, the scientist should use 10 females from which of the following strains at which of the following temperatures?

F. The LaGrande strain from Race A at 9°C
G. The LaGrande strain from Race A at 19°C
H. The Humboldt strain from Race B at 9°C
J. The Humboldt strain from Race B at 19°C

15. A male *D. pseudoobscura* had the following chromosomes: one X chromosome from Race B, two Number 2 chromosomes from Race B, two Number 3 chromosomes from Race B, one Number 4 chromosome from Race A, and one Number 4 chromosome from Race B. Accordingly, its average testis length was most likely closest to which of the following values?

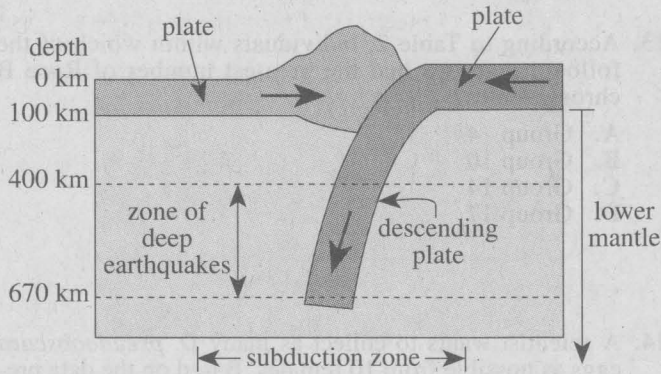
A. 280 μm
B. 380 μm
C. 480 μm
D. 580 μm

16. Table 2 does NOT include any male *D. pseudoobscura* with which of the following combinations of chromosomes?

F. Two Number 2 chromosomes from Race A and two Number 3 chromosomes from Race B
G. Two Number 2 chromosomes from Race A and two Number 3 chromosomes from Race A
H. One X chromosome from Race A and two Number 3 chromosomes from Race A
J. One X chromosome from Race A and two Number 3 chromosomes from Race B

Passage IV

Earthquakes occur when rocks under stress suddenly fracture and fault, releasing seismic energy from the *focus* (the location of the rocks' initial fracture). In *subduction zones* (see figure below), where 2 plates (composed of crust and upper mantle) collide and the edge of 1 plate is forced down into the lower mantle below, some earthquake foci are located at depths of 400 km to 670 km (*deep earthquakes*).



Scientists have wondered what causes deep earthquakes. Below 400 km depth, rocks are under high pressure and at temperatures greater than 1,500°C, so they should bend in response to stress rather than break, as they do above 400 km depth. Two scientists discuss possible causes of deep earthquakes.

Scientist 1

Common minerals in plate rocks, such as *serpentine*, contain water. As the edge of a plate descends into the lower mantle and is heated, these minerals dehydrate. This makes the rocks brittle and easier to fracture. The released water also helps lubricate existing fractures, allowing them to move. Dehydration usually occurs at depths shallower than 400 km. However, when the edge of a plate is forced down into the lower mantle, it may descend so rapidly that it remains much cooler than the surrounding mantle. In that descending plate, minerals retain water in their crystal structure to much greater depths. When they are heated to a point where they dehydrate, somewhere between 400 km and 670 km depth, the rocks become brittle and fracture, releasing seismic energy.

Scientist 2

Another common mineral in plate rocks, called *olivine*, changes to a denser mineral called *spinel* when subjected to the high temperatures in the lower mantle. This process usually occurs at mantle depths shallower than 400 km. However, when the edge of a plate is forced down into the lower mantle, it may descend so rapidly that it remains much cooler than the surrounding mantle. This allows olivine to exist well below the depths where it is normally found. At some depth below 400 km, the plate reaches a temperature that allows olivine in the rocks to suddenly change to spinel. This change causes a rapid compaction and fracturing of the rocks, releasing seismic energy.

17. Which of the following pairs of statements best explains the cause of the rock fracturing responsible for deep earthquakes according to the viewpoints of the 2 scientists?

Scientist 1	Scientist 2
A. Change of olivine to spinel	Dehydration of serpentine
B. Change of serpentine to spinel	Dehydration of olivine
C. Dehydration of serpentine	Change of olivine to spinel
D. Dehydration of olivine	Change of serpentine to spinel

18. According to the information provided, the *maximum* depth reached by descending plates in subduction zones is closest to which of the following?

- F. 100 km
G. 250 km
H. 400 km
J. 670 km

19. Which of the following statements about serpentine is most consistent with the information in Scientist 1's viewpoint?

- A. Serpentine is only 1 of the minerals in plate rocks that contain water.
B. Serpentine is the only mineral in plate rocks that contains water.
C. Serpentine can change its crystal structure to a denser, more compact form.
D. Serpentine is found only in the lower mantle.

20. Which of the following hypotheses about minerals would be most consistent with both of the scientists' viewpoints? Under temperatures and pressures similar to those in Earth's lower mantle:

- F. olivine dehydrates to form spinel.
G. spinel dehydrates to form olivine.
H. spinel dehydrates to form serpentine.
J. olivine dehydrates to form serpentine.

21. According to the information provided, which of the following is the most direct cause of the rock fractures that cause earthquakes?

- A. Movement of rocks in Earth's core
B. Stress on rocks
C. Cooling of rocks
D. Radioactive decay of elements in Earth's mantle

22. If it were discovered that plates, as they descend, instantly rise to the same temperature as the surrounding mantle, how would this discovery affect the viewpoints, if at all?
- F. It would strengthen the viewpoint of Scientist 1 only.
 - G. It would weaken the viewpoint of Scientist 2 only.
 - H. It would strengthen the viewpoints of both scientists.
 - J. It would weaken the viewpoints of both scientists.

23. In a lab, the masses of 2 mineral samples, one of olivine and one of spinel, of the same size and shape were determined. Which of the following statements about the samples is most consistent with the information in Scientist 2's viewpoint? The mass of the olivine sample would be:
- A. greater than the mass of the spinel sample because spinel is more dense than olivine.
 - B. less than the mass of the spinel sample because spinel is more dense than olivine.
 - C. greater than the mass of the spinel sample because olivine is more dense than spinel.
 - D. less than the mass of the spinel sample because olivine is more dense than spinel.

Table 2

Point A (°C)	Point B (°C)	Point C (°C)
10	15	20
15	20	25
20	25	30
25	30	35



Table 1

Point A (°C)	Point B (°C)	Point C (°C)
10	15	20
15	20	25
20	25	30
25	30	35

Passage V

Potential energy (PE) is stored energy. Kinetic energy (KE) is energy of motion. An object's total mechanical energy is the sum of PE and KE. Objects in motion lose total mechanical energy because of friction.

Students conducted 3 experiments to study mechanical energy.

Experiment 1

In a vacuum chamber, a sphere on a string was released from various heights (h) and allowed to swing. For spheres of different masses, PE and KE (in joules, J) were determined at h and at the lowest point of the swing, as shown in Figure 1. The results are given in Table 1.

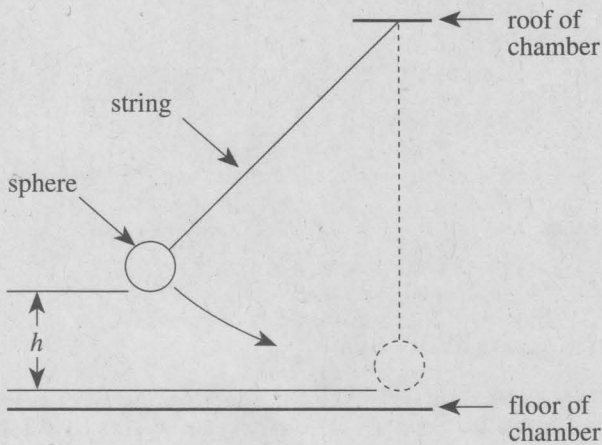


Figure 1

Trial	Mass (kg)	h (m)	PE at h (J)	KE at h (J)	PE at lowest point (J)	KE at lowest point (J)
1	1	1.0	9.8	0	0	9.8
2	1	2.0	19.6	0	0	19.6
3	1	3.0	29.4	0	0	29.4
4	2	1.0	19.6	0	0	19.6

Experiment 2

Carts having different masses were placed on a track in the presence of air. Starting from rest at Point A, each cart was allowed to roll, as shown in Figure 2. The results are given in Table 2. (Note: At Points B and D, a cart's PE = 0.)

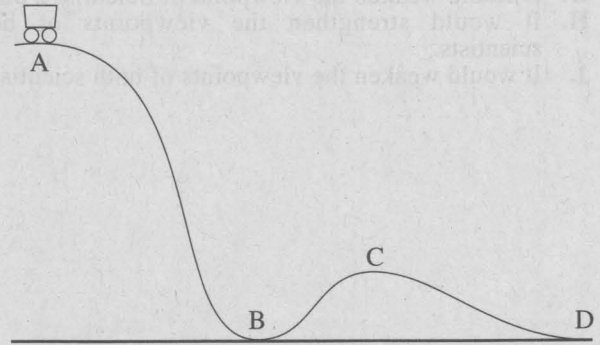


Figure 2

Trial	PE at Point A (J)	KE at Point B (J)
5	1.2	1.1
6	1.7	1.5
7	2.1	1.8

Experiment 3

A toy consisted of a spring affixed to the inside of a box. The spring had much less mass than the box. When the toy was dropped and hit the floor, the spring compressed and then extended, throwing the toy upward, as shown in Figure 3.

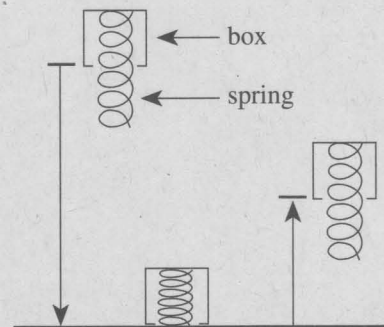


Figure 3

The students tested 3 toys having the same mass but springs with different stiffnesses. The students dropped each toy through the air from 1.0 m above the floor and observed the maximum height reached by the toy on its first bounce. The results are given in Table 3.

Trial	Spring	Maximum height (m)
8	A	0.5
9	B	0.4
10	C	0.2

24. Based on the results given in Table 3, one can conclude that the springs used in Experiment 3:

- F. stored the same amount of potential energy when compressed as a result of falling 1 m.
- G. stored different amounts of potential energy when compressed as a result of falling 1 m.
- H. had the same stiffness.
- J. had different masses.

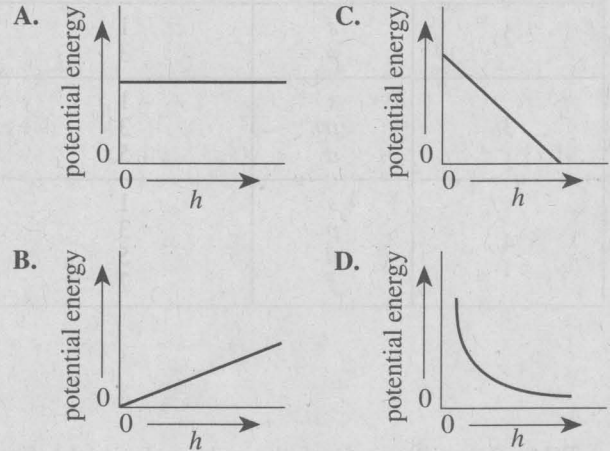
25. In Experiment 2, if the height of Point C were to be increased to equal the height of Point A, in which trial, if any, would the cart reach Point C?

- A. Trial 5
- B. Trial 6
- C. Trial 7
- D. None of the trials

26. For an object in motion, the total mechanical energy is conserved if the sum of the object's kinetic energy and its potential energy, $KE + PE$, is constant. Total mechanical energy was conserved in which of the following trials?

- F. Trial 4
- G. Trial 6
- H. Trial 8
- J. Trial 10

27. Based on the results of Experiment 1, the relationship between h and the potential energy of a given sphere is best represented by which of the following graphs?



28. In Experiment 1, the students used the 2 different spheres, rather than only one, most likely to study the relationship between a sphere's:

- F. height and its kinetic energy.
- G. height and its total mechanical energy.
- H. mass and its total mechanical energy.
- J. mass and its height.

29. In Trial 9, if none of the toy's total mechanical energy had been lost, the maximum height attained by the toy after the toy bounced would have been:

- A. 0.4 m.
- B. 0.6 m.
- C. 0.8 m.
- D. 1.0 m.

Passage VI

An *atomic orbital* can contain 0, 1, or 2 electrons. It is *filled* when it contains 2 electrons. An orbital's location and shape are determined by its *energy level* and *sublevel*. Table 1 lists the first 4 energy levels, their sublevels, and the number of orbitals in each sublevel.

Energy level	Sublevels	Number of orbitals
1	<i>s</i>	1
2	<i>s</i> <i>p</i>	1 3
3	<i>s</i> <i>p</i> <i>d</i>	1 3 5
4	<i>s</i> <i>p</i> <i>d</i> <i>f</i>	1 3 5 7

Table 2 names each of the sublevels in the first 4 energy levels.

Energy level	Sublevels
1	1 <i>s</i>
2	2 <i>s</i> , 2 <i>p</i>
3	3 <i>s</i> , 3 <i>p</i> , 3 <i>d</i>
4	4 <i>s</i> , 4 <i>p</i> , 4 <i>d</i> , 4 <i>f</i>

Table 3 shows the order in which the sublevels are filled with electrons. Each sublevel must be filled before an electron can be added to the next sublevel.

Order sublevels fill with electrons (from left to right)*							
1 <i>s</i>	2 <i>s</i>	2 <i>p</i>	3 <i>s</i>	3 <i>p</i>	4 <i>s</i>	3 <i>d</i>	4 <i>p</i>

*This pattern can vary if an atom contains more than 23 electrons or if an atom is not in its ground (lowest-energy) state.

Table 4 illustrates a notation used to indicate the number of electrons per sublevel.

Notation	Number of electrons in Sublevel:						
	1 <i>s</i>	2 <i>s</i>	2 <i>p</i>	3 <i>s</i>	3 <i>p</i>	4 <i>s</i>	3 <i>d</i>
1 <i>s</i> ² 2 <i>s</i> ¹	2	1					
1 <i>s</i> ² 2 <i>s</i> ² 2 <i>p</i> ⁴	2	2	4				
1 <i>s</i> ² 2 <i>s</i> ² 2 <i>p</i> ⁶ 3 <i>s</i> ¹	2	2	6	1			
1 <i>s</i> ² 2 <i>s</i> ² 2 <i>p</i> ⁶ 3 <i>s</i> ² 3 <i>p</i> ⁶ 4 <i>s</i> ² 3 <i>d</i> ²	2	2	6	2	6	2	2

Tables adapted from Kenneth W. Whitten and Kenneth D. Gailey, *General Chemistry*. ©1981 by Saunders College Publishing.

30. Based on Table 4, which of the following notations indicates an atom that has exactly 11 electrons?

- F. 1*s*²2*s*²2*p*⁶
 G. 1*s*²2*s*²2*p*⁶3*s*¹
 H. 1*s*²2*s*²2*p*⁶3*s*²3*p*¹
 J. 1*s*²2*s*²2*p*⁶3*s*²3*p*²

31. If an atom in its ground state has 15 electrons, how many electrons are in the 3*p* sublevel?

- A. 0
 B. 1
 C. 3
 D. 6

32. As the number of electrons in a group of ground state atoms increases from 3 to 13, the number of electrons in Sublevel:

- F. 1*s* decreases.
 G. 1*s* remains constant.
 H. 2*s* decreases.
 J. 2*s* remains constant.

33. If an atom in its ground state has 21 electrons, it will have more electrons in its:

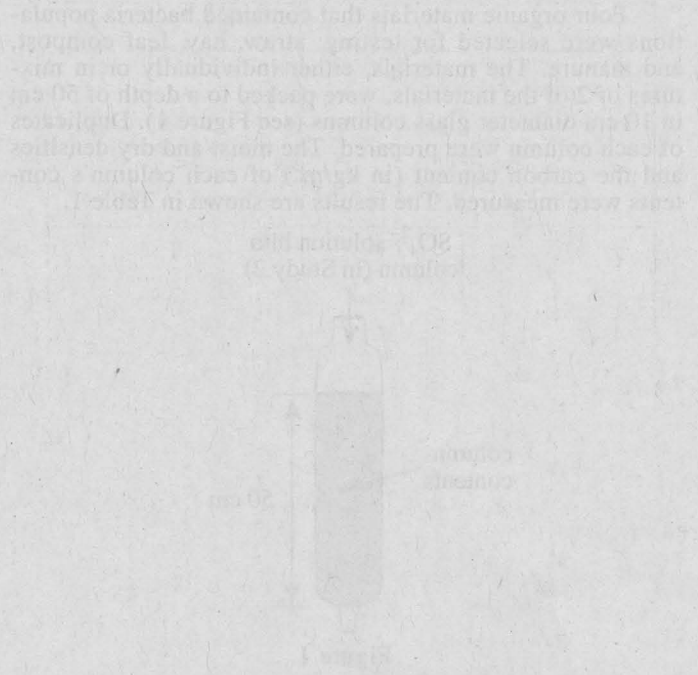
- A. 2s sublevel than in its 2p sublevel.
- B. 2p sublevel than in its 3p sublevel.
- C. 3s sublevel than in its 4s sublevel.
- D. 4s sublevel than in its 3d sublevel.

34. The pattern depicted in Table 3 does not work for chromium, which has 24 electrons. Compared to vanadium, which has 23 electrons, chromium has 1 less 4s electron and 2 more 3d electrons. Based on this information, which of the following notations best represents the electron distribution in chromium?

- F. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$
- G. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$
- H. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4 4s^2$
- J. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^3$



Year	CO ₂ concentration (%)
1800	~28
1820	~29
1840	~30
1860	~31
1880	~32
1900	~33
1920	~34
1940	~35
1960	~36
1980	~37
2000	~38



Year	CO ₂ concentration (%)
1800	~28
1820	~29
1840	~30
1860	~31
1880	~32
1900	~33
1920	~34
1940	~35
1960	~36
1980	~37
2000	~38

Passage VII

Some soil bacteria can remove sulfate (SO_4^{2-}) from acid mine drainage (AMD, polluted water drainage from mining areas). The bacteria use the soil's organic carbon for energy and remove SO_4^{2-} by reducing it to sulfide (S^{2-}). Oxygen-poor conditions are required for the reduction process. Researchers studied other organic materials containing bacteria populations to see if those mixtures could also reduce SO_4^{2-} in AMD.

Study 1

Four organic materials that contained bacteria populations were selected for testing: straw, hay, leaf compost, and manure. The materials, either individually or in mixtures of 2 of the materials, were packed to a depth of 50 cm in 10 cm diameter glass columns (see Figure 1). Duplicates of each column were prepared. The moist and dry densities and the carbon content (in kg/m^3) of each column's contents were measured. The results are shown in Table 1.

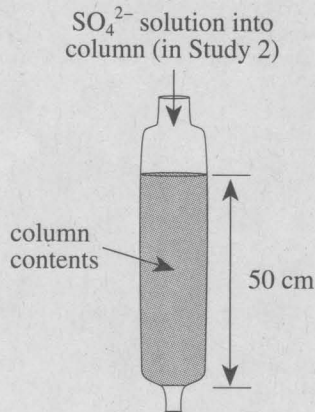


Figure 1

Column contents	Moist density (kg/m^3)	Dry density (kg/m^3)	Carbon content (kg/m^3)
Hay	100	92	41
Straw	75	68	31
Leaf compost	500	294	94
Straw and manure*	286	171	64
Hay and manure*	412	248	92

*Straw or hay was mixed with manure in a 1:2 ratio by dry weight.

Study 2

An aqueous solution with a concentration of 100 ppm SO_4^{2-} (simulated AMD) and a pH of 6.5 was put through each column at a flow rate of 80 mL/day. On Day 50, the S^{2-} concentration in the water in each column was measured at various depths. The results are shown in Figure 2. Table 2 shows the average S^{2-} concentration in a column's water on Days 50, 100, and 150.

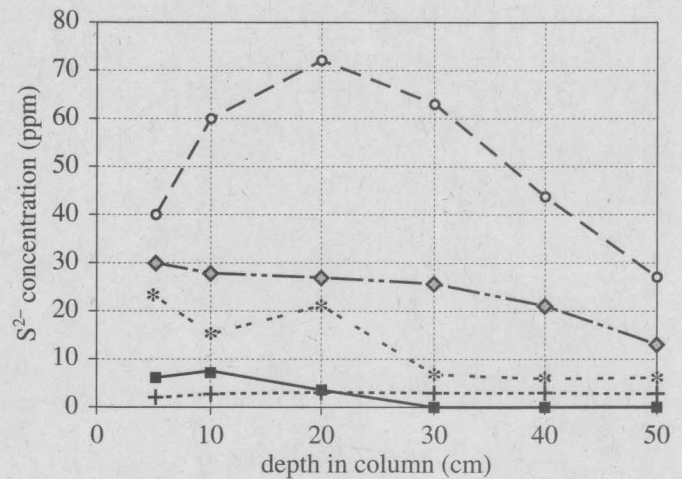
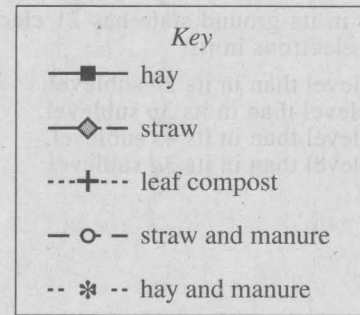


Figure 2

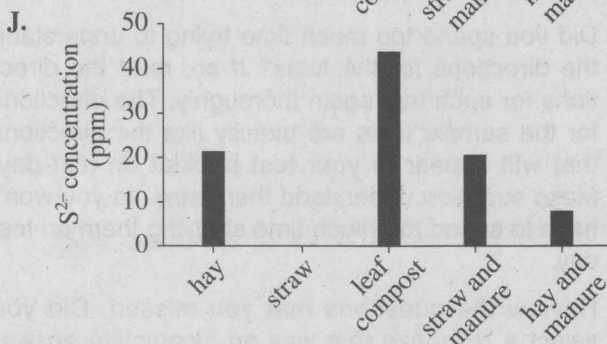
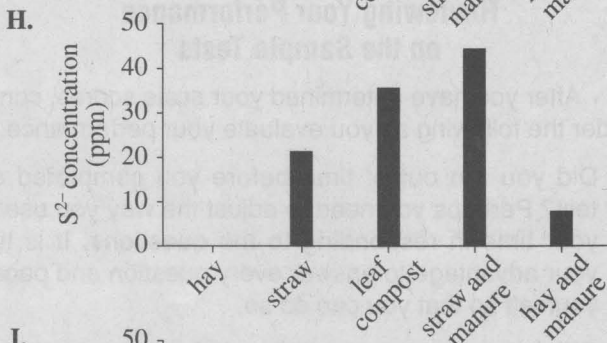
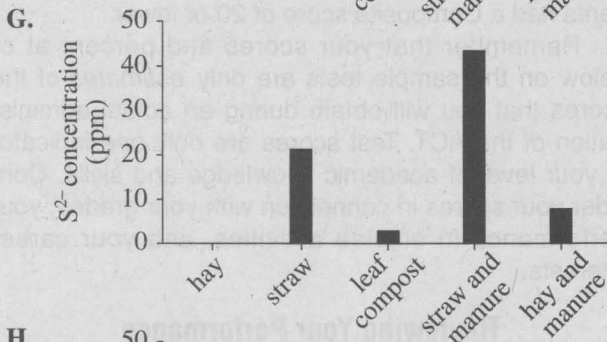
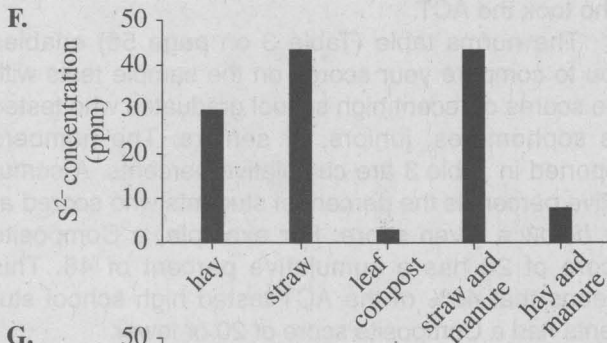
Column contents	S^{2-} concentration (ppm) in column water on Day:		
	50	100	150
Hay	5	23	32
Straw	25	60	70
Leaf compost	3	17	25
Straw and manure	48	120	170
Hay and manure	15	50	53

Tables and Figure 2 adapted from Martin Rabenhorst, Bruce James, and Joey Shaw, "Evaluation of Potential Wetland Substrates for Optimizing Sulfate Reduction." ©1992 by the American Society for Surface Mining and Reclamation.

35. According to the results of Study 1 for the materials packed in the columns, how do the carbon contents of equal volumes of straw and of leaf compost compare? Leaf compost has a carbon content that is approximately:

- one-half the carbon content of straw.
- the same as the carbon content of straw.
- twice the carbon content of straw.
- three times the carbon content of straw.

36. Based on Study 2, which of the following figures best represents the S^{2-} concentrations at a depth of 40 cm in the columns on Day 50?



37. Based on the results of Study 1, one would estimate that the manure used in the studies, when packed in a column by itself, would most likely have a dry density that is:

- A. less than the dry density of straw.
- B. between the dry density of straw and the dry density of hay.
- C. equal to the dry density of hay.
- D. greater than the dry density of hay.

38. A scientist hypothesized that the material with the highest carbon content would reduce the most SO_4^{2-} to S^{2-} by Day 50. Did the results of Study 1 and Study 2 support this hypothesis?

- F. Yes; leaf compost, which had the largest carbon content of any of the materials, actually produced the largest average reduction of SO_4^{2-} by Day 50.
- G. Yes; hay and manure, which had the largest carbon content of any of the materials, actually produced the largest average reduction of SO_4^{2-} by Day 50.
- H. No; leaf compost, which had the largest carbon content of any of the materials, actually produced the smallest average reduction of SO_4^{2-} by Day 50.
- J. No; hay and manure, which had the largest carbon content of any of the materials, actually produced the smallest average reduction of SO_4^{2-} by Day 50.

39. Suppose oxygen had been continuously pumped through the columns containing straw over the first 100 days of Study 2. Based on the information provided, the resulting S^{2-} concentration measured at Day 100 for the straw columns would most likely have been:

- A. less than 60 ppm.
- B. between 60 ppm and 100 ppm.
- C. between 100 ppm and 120 ppm.
- D. more than 120 ppm.

40. Which of the following assumptions about AMD was most likely made by the researchers when designing Study 2?

- F. AMD kills most soil bacteria on contact.
- G. AMD contains high concentrations of S^{2-} .
- H. One hundred ppm SO_4^{2-} is a concentration that is much lower than that found in AMD.
- J. One hundred ppm SO_4^{2-} is a concentration typical of that found in AMD.

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

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

TABLE 1
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 0861B	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	39-40	40	36
35	74	59	38	39	35
34	72-73	57-58	37	38	34
33	71	56	36	—	33
32	70	55	35	37	32
31	69	54	34	—	31
30	68	53	32-33	36	30
29	66-67	51-52	31	35	29
28	64-65	49-50	30	34	28
27	62-63	46-48	28-29	33	27
26	60-61	44-45	27	32	26
25	58-59	42-43	26	30-31	25
24	56-57	40-41	25	29	24
23	54-55	37-39	24	27-28	23
22	51-53	36	22-23	26	22
21	49-50	34-35	21	24-25	21
20	46-48	31-33	20	22-23	20
19	43-45	29-30	18-19	20-21	19
18	41-42	26-28	17	18-19	18
17	33-40	23-25	16	17	17
16	36-37	19-22	15	15-15	16
15	32-35	15-19	14	14	15
14	29-31	12-14	12-13	13	14
13	27-28	10-11	10-11	12	13
12	25-26	07-08	08-09	10-11	12
11	23-24	06	07	09	11
10	21-22	05	06	08	10
9	19-20	04	05	06-07	9
8	16-18	03	—	05	8
7	13-15	—	04	04	7
6	10-12	02	03	03	6
5	08-09	—	—	—	5
4	06-07	01	02	02	4
3	04-05	—	—	01	3
2	03	—	01	—	2
1	00-02	00	00	00	1