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ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the passages that follow, some words and phrases are underlined and numbered. In the answer column, you will find alternatives for the words and phrases that are underlined. Choose the alternative that you think is best, and fill in the corresponding bubble on your answer sheet. If you think that the original version is best, choose “NO CHANGE,” which will always be either answer choice A or F. You will also find questions about a particular section of the

passage, or about the entire passage. These questions will be identified either by an underlined portion or by a number in a box. Look for the answer that clearly expresses the idea, is consistent with the style and tone of the passage, and makes the correct use of standard written English. Read the passage through once before answering the questions. For some questions, you should read beyond the indicated portion before you answer.

PASSAGE I

The following paragraphs may or may not be in the most logical order. You may be asked questions about the logical order of the paragraphs, as well as where to place sentences logically within any given paragraph.

The Reappearance of the Ivory-billed Woodpecker

[1]

In the spring of 1999, a university student—also an avid hunter—stalked wild turkeys in the woods of Louisiana’s Pearl River Wildlife Management Area. Turkey license in hand, he did not expect to discover a far more rarer bird, one that had been declared extinct in 1994. The student’s report of seeing a pair of ivory-billed woodpeckers

eventually leading to an exhaustive search for the supposedly lost species in the vast 35,000-acre wilderness.

[2]

Extensive logging and unregulated hunting in the 1800s decimated the population of the ivory-billed woodpecker in the native habitat of the Southeastern United States.

By the 1920s, the species, which is the ivory-billed woodpecker, had been given up as extinct. By 1938, however, around 20 individuals were known to exist in an

1. A. NO CHANGE
 B. spring, of 1999, a university
 C. spring of 1999 a university
 D. spring of 1999; a university
2. F. NO CHANGE
 G. a bird that was even more rare, and also one that was
 H. a far more rare bird that had been
 J. a bird, which was far rarer, and that had been
3. A. NO CHANGE
 B. would eventually lead
 C. was leading eventually
 D. was eventually lead
4. F. NO CHANGE
 G. their
 H. its
 J. a
5. A. NO CHANGE
 B. the species, ivory-billed woodpeckers
 C. ivory-billed woodpeckers, the species,
 D. the species

GO ON TO THE NEXT PAGE.

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isolated tract of old-growth forest in Louisiana. Despite pleas from four state governments and the National Audubon Society, logging began in the forest, and by 1944 the last known ivory-billed woodpecker had disappeared from the ruined habitat. The only evidence of the species survival before its rediscovery at the end of the century was an unconfirmed recording of its distinctive call made in Texas in 1967.

[3]

[1] New hope of finding an ivory-billed woodpecker arose from the 1999 sighting. [2] This hope led a team of biologists to conduct an extensive search for the elusive bird in 2002. [3] Evidence of active woodpeckers was found in markings and large cavities in tree trunks. [4] They made a sound recording originally believed to be the distinctive double-tap sound of the elusive bird; but determined it later it was likely the echoes from a gunshot. [5] In the end, existence of the ivory-billed woodpecker could not be proven. [10]

[4]

[1] Subsequent deployment of remote listening devices and motion-sensing cameras finally gave scientists the evidence they needed to confirm existence of the bird, so then in 2004, a large woodpecker was videotaped.

[2] Its wings, flight, and plumage were cited as evidence that the bird was indeed an ivory-billed woodpecker. [3] Furthermore, the Arkansas researchers noted evidence of active woodpeckers in markings on trees, and they also documented several bird sightings.

6. F. NO CHANGE
G. Society, logging began in the forest; and
H. Society, logging began, in the forest and,
J. Society logging, began, in the forest, and
7. A. NO CHANGE
B. species' survival
C. survival of the species
D. surviving species'
8. Which of the alternatives best provides new, specific information about the search for the ivory-billed woodpecker?
F. NO CHANGE
G. A group of biologists searched the woods where the ivory-billed woodpecker had been spotted for almost a month in 2002.
H. After hearing of the sighting in 1999, Louisiana State University's biologists spent time searching for the ivory-billed woodpecker.
J. In 2002, biologists from Louisiana State University spent nearly a month in the Pearl River Wildlife Management Area searching for the bird.
9. A. NO CHANGE
B. bird, but later determined
C. bird but determined later that
D. bird. Later determined,
10. Which of the following sequences of sentences will make Paragraph 3 most logical?
F. NO CHANGE
G. 1, 2, 5, 3, 4
H. 2, 1, 5, 3, 4
J. 1, 2, 4, 3, 5
11. A. NO CHANGE
B. bird, in 2004
C. bird. In 2004
D. bird. It was in 2004
12. F. NO CHANGE
G. wings, flight and plumage
H. wings flight and plumage
J. wings, flight, and plumage,

GO ON TO THE NEXT PAGE.

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[4] Fearing birdwatchers flooding, further searches were conducted in secret, as was the rush by the privately funded Nature Conservancy to purchase potential woodpecker habitat in the Arkansas wilderness. [5] Additional audio evidence was gathered to support the claim of the bird's existence, and in 2005, a detailed report of the findings was published in a major scientific journal. [6] While there remain skeptics, the ornithology community now generally accepted the existence of the ivory-billed woodpecker.

[7] As such, it is no longer considered extinct, but rather extremely endangered.

13. A. NO CHANGE
 B. The birdwatchers flooding was a fear
 C. Fearing a flood of birdwatchers
 D. The fear of flooding birdwatchers

14. F. NO CHANGE
 G. accepts
 H. is accepting of
 J. accepting

15. The writer wants to add the following sentence to Paragraph 4:

Approximately 15 sightings were reported in early 2004, all possibly of the same bird.

This sentence would most logically be placed:

- A. before Sentence 1.
 B. before Sentence 2.
 C. after Sentence 2.
 D. after Sentence 3.

PASSAGE II

A Medical Journal

Working as an editor for my university's medical journal is very demanding, and my fellow editors and

I spent long hours year-round maintaining the various parts of the publication.

In late summer, the editorial board reconvenes in anticipation of the new fall semester. We develop a formal

16. Which of the following alternatives would NOT be an acceptable way to write the sentence?
 F. NO CHANGE
 G. demanding, my
 H. demanding. My
 J. demanding; my
17. A. NO CHANGE
 B. I am spending
 C. I, spending
 D. I spend
18. F. NO CHANGE
 G. In late summer, consequently, the
 H. However, in late summer the
 J. Later in the summer, as a result, the

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call for papers nationwide research institutions are
¹⁹
distributed to, from which we gather a wide variety of
¹⁹
 papers and reports dealing with all areas of medicine,

human biology, and public health. Researchers, and
²⁰
authors, are notified of our calls for papers through our
²⁰
 web site, e-mail list, and the flyers that we mail.

They all receive submissions by the end of October
²¹
 every year. Editors read each work carefully over the

following month and submit their critiques to the other
²²
 members of the board.

They always get as many bad papers as good ones.
²³

[24] Those we have trouble deciphering are

immediately declining, and if the formatting is poor,
²⁵
 we insist on a revised copy from the author. The editors
 agree that each paper must reflect the professional
 standards of the journal and the medical community.

For instance, they choose those works that they feel
²⁶
 provide the most beneficial information for the journal's
 readers. Despite this policy, disagreements can still occur.

19. A. NO CHANGE
 B. to which nationwide research institutions we distribute
 C. that we distribute to research institutions nationwide
 D. that are distributing nationwide to research institutions

20. F. NO CHANGE
 G. Researchers, and authors
 H. Researchers and authors
 J. Researchers and authors,

21. A. NO CHANGE
 B. All submissions we receive
 C. All the submissions received
 D. We receive all submissions

22. F. NO CHANGE
 G. month, and are submitting
 H. month; submitting
 J. month and then they submit

23. A. NO CHANGE
 B. There always are either
 C. Always, they get
 D. There are always

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

Some of the papers even come hand-written, which makes it hard to tell the good from the bad.

Would this be a logical and relevant addition to the essay?

- F. Yes, because it serves to establish the tone for the remainder of the passage.
 G. Yes, because it provides additional details regarding the journal submissions.
 H. No, because the passage does not discuss the relevance of the form of the submitted papers.
 J. No, because it is ambiguous whether hand-writing a paper is a good or bad thing.

25. A. NO CHANGE
 B. immediately declined
 C. declining immediately
 D. immediate declined

26. F. NO CHANGE
 G. In fact,
 H. Moreover,
 J. However,

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With passion, editors argue often for their choices.

By January, we have enough content to fill three
 monthly issues of the journal. Once we finalize the
 layout, we send all three issues to the print shop. When the
 pallet-loads of journals arrive in our office, we hire some
 undergraduates to address, sort, and bundle them for
 mailing. In the intervening time, the editorial board meets
 again to plan the next three issues and to call for more
 papers. The sixth and final issue of the year appears in
 June, and once all work is done, we take off to enjoy a few
 months of vacation, well-earned.

- 27. A. NO CHANGE
 B. Passionately and fervently, editors often argue for their choices.
 C. Editors often argue passionately for their choices.
 D. For their choices, editors argue passionately and often.
- 28. F. NO CHANGE
 G. layout, we're sending
 H. layout we send
 J. layout we just send
- 29. A. NO CHANGE
 B. meet
 C. meeting
 D. has been meeting
- 30. F. NO CHANGE
 G. well-earned vacation.
 H. vacation, that is well-earned.
 J. vacation earned well.

PASSAGE III

The following paragraphs may or may not be in the most logical order. You may be asked questions about the logical order of the paragraphs, as well as where to place sentences logically within any given paragraph.

Maria Montessori's Method

[1]

At the end of the 19th century, Maria Montessori became Italys' first modern woman physician. Early in her
 career, she struggled to advance by the male-dominated profession. As a member of the University of Rome faculty, she was assigned to the city's insane asylums to experiment with the patients' capacity to learn: a task considered menial by medical professionals at the time.

- 31. A. NO CHANGE
 B. the Italian
 C. Italys
 D. Italy's
- 32. F. NO CHANGE
 G. for a
 H. in the
 J. due to their
- 33. A. NO CHANGE
 B. learn, a
 C. learn a
 D. learn

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Although her education was in the science of the human³⁴
body, her interaction with mentally-disabled children drew³⁴
her to study the processes of the mind and, specifically,

how children learn.³⁵ By 1906, she had resigned from the
university to pursue a career in child education.

[2]

[1] Her observation of these children inspired her life's
work in teaching and the pursuit of progressive educational
restructuring. [2] With the first children that were³⁶
working class, numbering sixty, Montessori established a
“children's house”³⁶ in Rome to foster an environment
ideally suited for child development. [3] Her efforts led her
students—even those with supposed learning
disabilities—to excel at standardized examinations. [4] In
the children's house, Montessori realized how
ready children learn from their environment. [38]³⁷

[3]

At its core, the Montessori Method is a theory of³⁹

child development. Comparison of a child's development³⁹
to universal standards and norms is discouraged, since it is⁴⁰

34. At this point, the writer would like to provide specific information about Montessori's education. Which alternative does that best?

- F. NO CHANGE
- G. anatomy and physiology
- H. the way the human body works
- J. science

35. A. NO CHANGE
B. the method by which children learn
C. children learning
D. a child's ways to learn

36. F. NO CHANGE
G. She got her first sixty children that were working-class, and
H. Starting with sixty working-class children,
J. She had sixty working-class children first, so

37. A. NO CHANGE
B. children, readily
C. children ready
D. readily children

38. For the sake of logic and coherence, Sentence 1 should be placed:
F. where it is now.
G. after Sentence 2.
H. after Sentence 3.
J. after Sentence 4.

39. At this point, the writer would like to provide the reader with a more specific definition of the Montessori Method. Assuming all are true, which of the following does that best?

- A. NO CHANGE
- B. a philosophy of teaching.
- C. a means of fostering development and learning in children.
- D. a style of teaching utilized in many school districts.

40. F. NO CHANGE
G. child's development
H. developing child
J. child that is developing

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believed that children naturally develop in different⁴¹
ways, and acquire skills, at different times. Acknowledging
⁴¹

this, a Montessori educator closely observed⁴² the child and
provides him or her with the tools necessary for

independent learning. Adults avoid giving criticism for
mistakes and rewards for successes. The goal of these
steps is to ease the child into an environment of learning
without fear. Self-learning and self-correction are the
fundamental processes of the Montessori Method,

considering⁴³ Maria Montessori showed will foster a lifelong
love of learning and joy in the pursuit of one's goals.

[4]

Today, children are taught with the Montessori Method
in schools both public and private⁴⁴ in the United States and
many countries around the world. With increasing pressure
on schools to provide quality education to a growing
population, Montessori's visionary ideas of teaching
self-reliance and love of learning continue to gain
popularity. [45]

41. A. NO CHANGE
B. different ways and acquire skills
C. different ways, and acquire, skills
D. different ways; and acquire skills

42. F. NO CHANGE
G. is observing
H. observes
J. can observe

43. A. NO CHANGE
B. though
C. despite
D. which

44. F. NO CHANGE
G. schools, both public, and private,
H. both public and private schools
J. public schools and private schools both,

45. Suppose the writer were to eliminate Paragraph 4. This omission would cause the essay as a whole to lose primarily:
A. relevant details about the current development and utilization of Montessori education.
B. irrelevant details about the past development and utilization of Montessori education.
C. information that distracts from the essay's primarily biographical tone.
D. a conclusion that reiterates the main purpose of the passage.

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PASSAGE IV

The following paragraphs may or may not be in the most logical order. You may be asked questions about the logical order of the paragraphs, as well as where to place sentences logically within any given paragraph.

The Paris Metro

[1]

If you ever travel to Europe, you will likely want to visit the monuments and museums of Paris, one of the most beautiful cities in the world. You immerse yourself in art, architecture, and the history of Western civilization.

The cultural treasures of France's capital are awe-inspiring, but the most amazing thing about visiting Paris is the ease with which you can tour the city using the extensive subway network, in which the French call the *Métropolitain*, or simply the Metro.

[2]

The Metro was constructed in anticipation of the 1900 World Fair. Additional tunnels were excavated over the following three decades making the Metro one of the world's most extensive and most patronized subway systems. Second in size only to the New York City subway, the Metros stations throughout Paris.

[51] Paris does have buses and taxis, but nothing is faster or more convenient than catching a subway train. Not just a useful resource for Parisians, the Metro is ideal for

46. F. NO CHANGE
G. You will
H. You were going to
J. OMIT the underlined portion.
47. A. NO CHANGE
B. France's capital has cultural treasures, they are awe-inspiring
C. The awe-inspiring treasures of France's capital
D. The treasures of France's capital that inspire awe
48. F. NO CHANGE
G. network that being which
H. network, what
J. network;
49. A. NO CHANGE
B. decades—making
C. decades, making
D. decades; making
50. F. NO CHANGE
G. Metros'
H. Metro is
J. Metro has
51. At this point in the paragraph, the writer wishes to emphasize the expansiveness of the Metro system and the coverage that it provides. Which of the following sentences does that best?
A. Each station serves a multitude of travelers.
B. Sometimes, you have to walk as far as nine or ten blocks to get to the nearest Metro station.
C. If you cannot read or understand French, you might have a hard time navigating yourself from station to station.
D. You cannot walk anywhere along the streets of Paris without encountering a staircase that descends to a Metro station.

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tourist travel (no matter what country you are from!).

All major sites in the city have a nearby station, most

named by the attraction they are near. For example, the

Louvre-Rivoli Station drops you off next door to the

famous museum, and the Pont Neuf Station is at the foot of the famous bridge across the River Seine. I love the feeling of going underground at one attraction and coming back to the surface in another famous place. The Metro is also fast, with a train arriving at the station every few minutes.

Best of all, tourists can buy a day pass for unlimited

Metro trips, or a single ticket if just one trip is needed.

Swiping your ticket once and you may enter the network,

including all transfers between lines.

[3]

I would much rather use the Metro than rent a car

in Paris. Beyond the stresses of city driving, and parking,

and the high cost of fuel in Europe, the Metro keeps you

from ever getting lost. You can wander to your heart's

content, discovering the corners of Paris tourists rarely see.

Metro travel couldn't be easier!

[4]

People are accustomed generally to making

transportation arrangements ahead of time when traveling

to a new place. What I admire about the Paris Metro is the

52. F. NO CHANGE

G. (your country of origin aside)

H. (even if you are not French!)

J. OMIT the underlined portion.

53. A. NO CHANGE

B. named for

C. naming

D. names are

54. F. NO CHANGE

G. underground at one attraction, coming up

H. underground at one attraction, and come

J. underground at one attraction, and coming

55. A. NO CHANGE

B. You swiped

C. Swipe

D. You will swipe

56. The writer wishes to add a relevant example to Paragraph 2 without straying from the purpose of informing the reader as to how advantageous using the Metro is. Which of the following alternatives does that best?

F. I once made a trip from the end of one line to the end of another, with three transfers in between. I can't imagine how expensive such a taxi ride would have been!

G. I always purchase a day pass for unlimited trips. When I am in Paris, I want to cram as much sightseeing as possible into my schedule.

H. I once accidentally got on a train going the wrong direction, but I simply transferred trains and was on my way to the Notre Dame.

J. If you buy an unlimited day pass, be careful not to lose it. If you do, you will be forced to purchase a whole new ticket!

57. A. NO CHANGE

B. driving parking and the

C. driving, parking and the

D. driving, parking, and the

58. F. NO CHANGE

G. are generally accustomed

H. generally can be accustomed

J. generally accustom

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incredible freedom of movement that it provides.

59

As soon as you arrive at the airport, you can buy a pass and head underground. The monuments and museums of Paris are amazing, but I am equally impressed by how easy

and cheap it is to travel between them beneath the city.

59. A. NO CHANGE
 B. provided by the Paris Metro.
 C. the Paris Metro provides.
 D. providing it.

Question 60 asks about the preceding passage as a whole.

60. The writer wishes to include the following sentence in the essay:

When you've had your fill, you can simply stride right into the nearest Metro station, look at the map, and head straight for home.

This sentence will fit most smoothly and logically into Paragraph:

- F. 1, before the last sentence.
 G. 2, after the last sentence.
 H. 3, before the last sentence.
 J. 4, before the last sentence.

PASSAGE V

Peat: an Ancient and Modern Fuel

For the country of Ireland, peat is

an abundant and plentiful natural resource that has been

61

heating stoves and homes since the 8th century. The soft

organic material lies in huge bogs. Across 17 percent of

62

the Irish countryside. The plant, fungus, and animal

detritus that composes peat is kept from fully decomposing

among the acidic environment of these marshlands. When

63

peat is harvested, it can be dried and compressed to form a

64

solid fuel. Ancient inhabitants of Ireland relied on this

combustible material in areas of the island where trees

were scarce. Even today, stacks of freshly dug peat can be

seen dryer in rural Irish villages. Peat remains as useful as

65

61. A. NO CHANGE
 B. a plentifully abundant
 C. an abundant
 D. an abundant plentifully
62. F. NO CHANGE
 G. bogs across
 H. bogs—across
 J. bogs: across
63. A. NO CHANGE
 B. for
 C. in
 D. with
64. F. NO CHANGE
 G. harvested. It
 H. harvested; it
 J. harvested it
65. A. NO CHANGE
 B. drying
 C. as dry
 D. dry

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ever for heat production and soil enrichment. Using
millions of stacks of dried peat each year, Ireland still
 generates 13 percent of its power from peat-fired turbines.

Prior to the advent of heavy farming machinery, peat
 farmers plowed trenches throughout a virgin bog to drain
 the peat, which consist of about 95-percent water.
 Following the several years that it took for the peat to dry
 sufficiently, farmers would undertake the arduous task of
 hand-carving peat blocks from the earth. Today, the Irish
 peat industry is overseen by the state-owned company

Bord Na Móna. Which produces over four million metric
 tons of peat every year. About three-quarters is used for

domestic energy production, while the remainder is
 processed for horticultural applications.

Modern peat harvesting is a four-stage process. First,
 large tractors mill a thin layer of peat over a large area of
 bog. Over the next several days, a machine called a harrow
 passes over the milled peat, turning the crop several times
 to expedite drying. During the next step, a ridging machine
 passes over the dry peat, channeling it into straight rows
 ready for collection. Finally, the harvester past its large

vacuum over the ridges, drawing the peat into a large
 collection bin. The peat is then taken to processing
 facilities where it is further dried for briquette production
 or use in power plants.

66. Which of the following alternatives provides the contrast most appropriate and relevant to the essay?

F. NO CHANGE

G. Although the majority of its use is in smaller towns,
 H. Even though no other countries use peat as a heat source,

J. In spite of modern coal, natural gas, and hydroelectric technologies,

67. A. NO CHANGE

B. which consisted of about

C. that is about

D. consistent with about

68. F. NO CHANGE

G. Móna; which

H. Móna which

J. Móna, which

69. Which of the following is NOT an acceptable way to write this sentence?

A. production; the remainder

B. production. The remainder

C. production, the remainder

D. production, and the remainder

70. F. NO CHANGE

G. a harrow

H. a machine that they call a harrow

J. a harrow, the machine type used,

71. A. NO CHANGE

B. passed

C. passing

D. passes

72. F. NO CHANGE

G. the harvester draws the peat

H. the peat is drawn by the harvester

J. and peat draws

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With the history of abundance and renewability as

73

a fuel and nutrient source, peat remains an essential

74

part of Irish culture.

74

73. A. NO CHANGE

B. it's

C. its

D. OMIT the underlined portion.

74. The writer wants to link the essay's opening and concluding sentences. Which one of the following alternatives to the underlined portion most successfully achieves this effect?

F. peat will surely remain a part of Irish culture for generations to come.

G. the renewability of peat will surely make peat last as a power source for a long time to come.

H. modern peat harvesting has greatly simplified the collection and utilization of peat.

J. peat is not as useful today as it was centuries ago.

Question 75 asks about the preceding passage as a whole.

75. Suppose the writer had been assigned to write a brief essay on the evolution of power sources. Would this essay successfully fulfill the requirements?

A. Yes, because it describes an alternative power source not usually considered by essayists.

B. Yes, because the writer describes clearly the historical development of peat.

C. No, because Ireland is a historically unimportant country in the development of power sources.

D. No, because the writer only focuses on the evolution of a single power source from one specific country.

END OF THE ENGLISH TEST.

STOP! IF YOU HAVE TIME LEFT OVER, CHECK YOUR WORK ON THIS SECTION ONLY.

**MATHEMATICS TEST***60 Minutes—60 Questions*

DIRECTIONS: Solve each of the problems in the time allowed, then fill in the corresponding bubble on your answer sheet. Do not spend too much time on any one problem; skip the more difficult problems and go back to them later. You may use a calculator on this test.

For this test you should assume that figures are NOT necessarily drawn to scale, that all geometric figures lie in a plane, and that the word *line* is used to indicate a straight line.

- The lowest temperature on a winter morning was -7°F . Later the same day the temperature reached a high of 21°F . By how many degrees Fahrenheit did the temperature increase?
 - 32
 - 28
 - 21
 - 14
 - 7
- Disregarding sales tax, how much will you save when you buy a \$12.00 video that is on sale for 20% off?
 - \$0.24
 - \$0.48
 - \$1.20
 - \$2.40
 - \$3.60
- As part of a school report on the cost of gasoline, Raquel wants to find the average cost of purchasing a gallon of regular unleaded gasoline from local gas stations. She surveys 4 stations and finds the cost per gallon of regular unleaded gas from the 4 stations to be \$2.45, \$2.50, \$2.49, and \$2.56, respectively. Using this data, what is the average cost of purchasing one gallon of regular unleaded gasoline from these 4 gas stations?
 - \$2.55
 - \$2.53
 - \$2.50
 - \$2.49
 - \$2.45
- What is the volume, in cubic inches, of a cube whose edges each measure 5 inches in length?
 - 15
 - 25
 - 50
 - 125
 - 500
- If $3(a - 6) = -21$, then $a = ?$
 - 9
 - $-\frac{3}{2}$
 - 1
 - $\frac{7}{3}$
 - 5

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

2



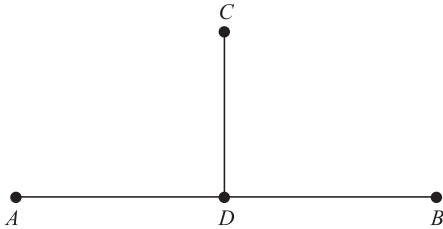
2

6. The price of a cantaloupe is directly proportional to its weight. If a cantaloupe that weighs 3.0 pounds costs \$3.87, approximately how much will a 2.25-pound cantaloupe cost?

F. \$2.90
 G. \$2.65
 H. \$2.25
 J. \$1.87
 K. \$1.29

DO YOUR FIGURING HERE.

7. In the figure below, D is a point on segment AB , and the segment CD is perpendicular to the segment AB . Based on this information, which of the following conclusions can be made?



- A. Point C is equidistant from A to B .
 B. Segments AD and DB are equal in length.
 C. The segment CD bisects the segment AB .
 D. Angle CDA is larger than angle CDB .
 E. Angle CDA is congruent to angle CDB .
8. If $6x - 5 = 3x - 16$, then $x = ?$
- F. -11
 G. -7
 H. $-\frac{11}{3}$
 J. $\frac{11}{3}$
 K. 7
9. Which of the following is always equal to $y(3 - y) + 5(y - 7)$?
- A. $8y - 35$
 B. $8y - 7$
 C. $-y^2 + 8y - 7$
 D. $-y^2 + 8y - 35$
 E. $8y^3 - 35$

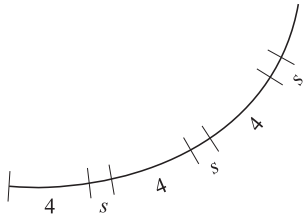
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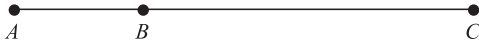
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10. The figure below shows part of a circle whose circumference is 40. If arcs of length 4 and length s continue to alternate around the entire circle so that there are 8 arcs of each length, what is the degree measure of each of the arcs of length s ?



DO YOUR FIGURING HERE.

- F. 6°
 - G. 9°
 - H. 12°
 - J. 18°
 - K. 36°
11. In a poll, 44 people were in favor of constructing a new high school, 58 were against it, and 8 people had no opinion. What fraction of those people polled were in favor of constructing a new high school?
- A. $\frac{1}{9}$
 - B. $\frac{1}{5}$
 - C. $\frac{2}{5}$
 - D. $\frac{3}{5}$
 - E. $\frac{4}{9}$
12. On the line segment below, the ratio of lengths AB to BC is 1:4. What is the ratio of AB to AC ?



- F. 1:5
 - G. 1:4
 - H. 1:3
 - J. 5:1
 - K. Cannot be determined from the given information
13. If a board 9 feet 6 inches in length is cut into 2 equal parts, what will be the length of each part?
- A. 3 feet 8 inches
 - B. 4 feet 5 inches
 - C. 4 feet 8 inches
 - D. 4 feet 9 inches
 - E. 5 feet 2 inches

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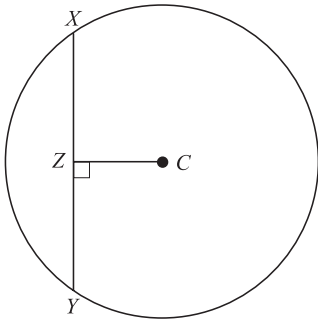


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14. The speed of a car exceeds twice the speed of a truck by 15 mph. If t is the speed of the truck, which of the following expresses the speed, in miles per hour, of the car?
- F. $t + 15$
 G. $t + 30$
 H. $t - 30$
 J. $2t + 15$
 K. $2t + 30$

DO YOUR FIGURING HERE.

15. The circle shown below has a radius of 5 meters, and the length of chord XY is 8 meters. If C marks the center of the circle, what is the length, in meters, of segment CZ ?



- A. $2\sqrt{3}$
 B. 3
 C. $\sqrt{13}$
 D. 5
 E. 9
16. What is the value of the expression $2x^3 - x^2 + 3x + 5$ for $x = -2$?
- F. -21
 G. -13
 H. 8
 J. 11
 K. 21
17. What is the next term after $-\frac{1}{3}$ in the geometric sequence $9, -3, 1, -\frac{1}{3}, \dots$?
- A. $-\frac{1}{9}$
 B. 0
 C. $\frac{1}{9}$
 D. $\frac{1}{6}$
 E. $\frac{1}{3}$

GO ON TO THE NEXT PAGE.



18. On the blueprint for Roger's house, $\frac{1}{4}$ inch represents an actual length of 1 foot. What is the area, in square feet, of Roger's rectangular living room, which is 3 inches by $4\frac{1}{4}$ inches on the blueprint?

F. 51
G. 104
H. 144
J. 204
K. 244

DO YOUR FIGURING HERE.

19. If $m > 0$ and $n < 0$, then $m - n$:
- A. is always positive.
B. is always negative.
C. is always zero.
D. cannot be zero, but can be any real number other than zero.
E. can be any real number.

20. If $x + \frac{2}{3} = \frac{8}{21}$, then $x = ?$

F. $-\frac{8}{21}$
G. $-\frac{2}{7}$
H. $-\frac{1}{21}$
J. $\frac{1}{21}$
K. $\frac{2}{7}$

21. What is the slope of the line given by the equation $3x + 4y = -12$?

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

22. The length of a side of a square is represented as $(3x - 2)$ inches. Which of the following general expressions represents the area of the square, in square inches?

F. $12x - 8$
G. $9x^2 - 4$
H. $9x^2 - 6x + 4$
J. $9x^2 - 12x - 4$
K. $9x^2 - 12x + 4$

23. Which of the following is a polynomial factor of $x^2 - 2x - 24$?

A. $x - 4$
B. $x + 4$
C. $x + 6$
D. $6 - x$
E. x

GO ON TO THE NEXT PAGE.

2



2

24. In the equation $r = \frac{4}{(2+k)}$, k represents a positive integer. As k gets larger without bound, the value of r :
- F. gets closer and closer to 4.
 - G. gets closer and closer to 2.
 - H. gets closer and closer to 0.
 - J. remains constant.
 - K. gets larger and larger.

DO YOUR FIGURING HERE.

25. While doing research on the climates of South American countries, Andrea notices that all of the temperatures are given in degrees Celsius. Because she is not as familiar with the Celsius temperature scale, it is difficult for her to know whether a location with an average temperature of 25°C has a warm climate. Fahrenheit, F , and

Celsius, C , are related by the formula $F = \left(\frac{9}{5}\right)C + 32$.

What is the temperature in degrees Fahrenheit of the location with an average temperature of 25°C ?

- A. 103
 - B. 88
 - C. 83
 - D. 77
 - E. 69
26. The length of a rectangle is 5 inches longer than its width. If the perimeter of the rectangle is 38 inches, what is the width, in inches?
- F. 5
 - G. 7
 - H. 12
 - J. 17
 - K. 28
27. What are all the solutions for x if $3x^2 - 2x - 21 = 0$?
- A. $x = -21$ only
 - B. $x = -7$ or $x = 3$
 - C. $x = -3$ or $x = \frac{7}{3}$
 - D. $x = -\frac{7}{3}$ or $x = 3$
 - E. $x = -3$ or $x = 7$
28. In Sulema's geography class, all tests count equally. So far, Sulema has taken 2 of the 3 tests in geography this marking period and earned scores of 88% and 79%, respectively. What is the minimum score Sulema needs on the third test to have a test average of 87%?
- F. 99%
 - G. 94%
 - H. 91%
 - J. 87%
 - K. 84%
29. If a , b , and c are positive integers such that $a^b = m$ and $c^{2b} = n$, then $mn = ?$
- A. $(ac^2)^b$
 - B. $(ac)^{3b}$
 - C. $2(ac)^b$
 - D. ac^{2b}
 - E. $a^b c$

GO ON TO THE NEXT PAGE.



30. What is the area, in square inches, of a circle with a diameter equal to 12 inches?

F. 144
G. 36
H. 12π
J. 36π
K. 144π

DO YOUR FIGURING HERE.

31. In Mrs. Hartley's foreign language class, students must take both a written exam and an oral exam. In the past, 85% of her students passed the written exam and 70% of those who passed the written exam also passed the oral exam. Based on these figures, about how many students in a random group of 100 students would you expect to pass both exams?

A. 85
B. 78
C. 70
D. 65
E. 60

32. If $\sin A = \frac{3}{5}$, then which of the following could be $\tan A$?

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

33. If x is any number other than 3 and 6, then

$$\frac{(x-3)(x-6)}{(3-x)(x-6)} = ?$$

A. 18
B. 1
C. 0
D. -1
E. -18

34. $\sqrt{27} + \sqrt{48} = ?$

F. $5\sqrt{3}$
G. $7\sqrt{3}$
H. $3\sqrt{3} + 3\sqrt{4}$
J. $12\sqrt{3}$
K. $3 + 4\sqrt{3}$

35. $\triangle ABC$ is similar to $\triangle XYZ$. AB is 5 inches long, BC is 8 inches long, and AC is 3 inches long. If the longest side of $\triangle XYZ$ is 20 inches long, what is the perimeter, in inches, of $\triangle XYZ$?

A. 16
B. 28
C. 40
D. 64
E. 88

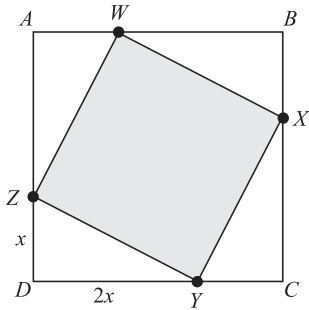
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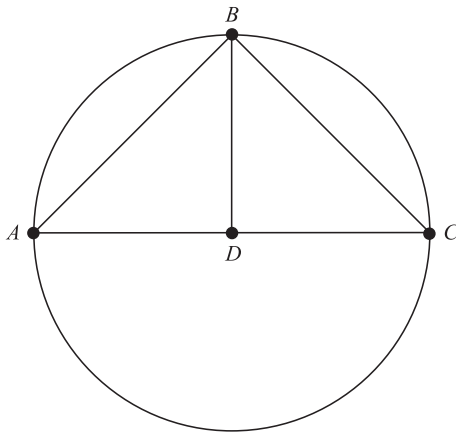
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36. Sides \overline{AB} , \overline{BC} , \overline{CD} , and \overline{DA} of square $ABCD$ are broken up by points W , X , Y , and Z as shown below. If \overline{AB} is 6 inches long, what is the area, in square inches, of the shaded region?

DO YOUR FIGURING HERE.



- F. 36
 - G. 32
 - H. 20
 - J. 16
 - K. 12
37. In the figure below, AC is the diameter of the circle, B is a point on the circle, AB is congruent to BC , and D is the midpoint of AC . What is the degree measure of angle ABD ?



- A. 30°
- B. 45°
- C. 60°
- D. 90°
- E. Cannot be determined from the given information



38. In the standard (x,y) coordinate plane, what are the coordinates of the midpoint of a line segment with endpoints $(-1,3)$ and $(2,5)$?

F. $(1,8)$

G. $(3,2)$

H. $\left(\frac{3}{2}, 1\right)$

J. $\left(\frac{1}{2}, 4\right)$

K. $\left(\frac{3}{2}, 4\right)$

39. Maria posted a time of 37 minutes and 29 seconds for a 5-mile running course. About how many miles per hour did she average during the run?

A. 12

B. 10

C. 8

D. 7

E. 5

40. For the 2 functions $f(x)$ and $g(x)$, tables of values are shown below. What is the value of $g(f(-1))$?

x	$f(x)$	x	$g(x)$
-3	-6	1	0
-1	2	2	3
1	-3	3	8
3	9	4	15

F. -3

G. 0

H. 2

J. 3

K. 8

41. For positive real numbers x , y , and z , which of the following expressions is equivalent to $x^{\frac{1}{2}}y^{\frac{3}{4}}z^{\frac{5}{8}}$?

A. $\sqrt[4]{xy^3z^5}$

B. $\sqrt[8]{x^2y^3z^5}$

C. $\sqrt[8]{x^4y^3z^5}$

D. $\sqrt[8]{x^4y^6z^5}$

E. $\sqrt[14]{xy^3z^5}$

DO YOUR FIGURING HERE.

2**2**

42. The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$, where b_1 and b_2 are the lengths of the two parallel sides and h is the height. Which of the following is an expression for b_1 ?

F. $\frac{2A}{h} - b_2$

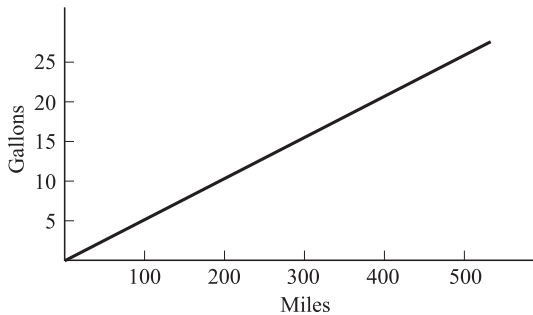
G. $\frac{2A}{h + b_2}$

H. $\frac{2h}{A - b_2}$

J. $2(Ah - b_2)$

K. $\frac{1}{2}Ah + b_2$

43. The line graphed below shows the predicted gasoline use for a certain truck. Which of the following is the closest estimate of this truck's predicted rate of gasoline use, in miles per gallon?



- A. 25
 B. 20
 C. 16
 D. 10
 E. 8

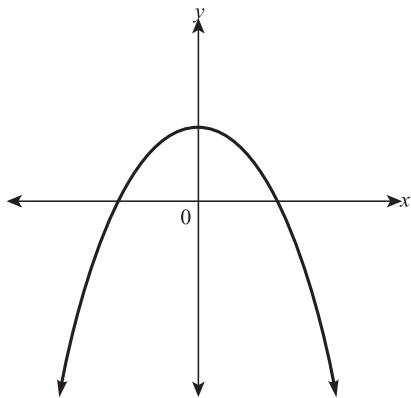
DO YOUR FIGURING HERE.

2



2

44. The graph of $y = ax^2 + bx + c$ in the standard (x,y) coordinate plane is shown below. When $y = 0$, which of the following best describes the solution set for x ?



DO YOUR FIGURING HERE.

- F. 2 imaginary solutions
 G. 1 double imaginary solution
 H. 1 real and 1 imaginary solution
 J. 1 double imaginary solution
 K. 2 real solutions
45. If $|x| = x + 12$, then $x = ?$
 A. -12
 B. -6
 C. 0
 D. 6
 E. 12
46. What fraction lies exactly halfway between $\frac{1}{3}$ and $\frac{1}{2}$?
 F. $\frac{3}{8}$
 G. $\frac{11}{24}$
 H. $\frac{5}{12}$
 J. $\frac{1}{6}$
 K. $\frac{2}{5}$
47. When entering information about the budget of her charity ball, Laura records an expense of \$20.00. However, Laura accidentally enters the \$20.00 as income instead of an expense. The balance of the charity ball budget now shows:
 A. \$40 less than it should.
 B. \$20 less than it should.
 C. the correct amount.
 D. \$20 more than it should.
 E. \$40 more than it should.

GO ON TO THE NEXT PAGE.

2



2

48. Rebecca is trying to schedule volunteers to help at a school carnival. There are 5 one-hour shifts to be filled by 5 different volunteers. If each shift must have one and only one volunteer, how many different arrangements can the schedule have?

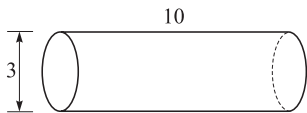
F. 5
G. 20
H. 25
J. 50
K. 120

DO YOUR FIGURING HERE.

49. In the standard (x,y) coordinate plane, what is the distance between the points $(4,-7)$ and $(-1,5)$?

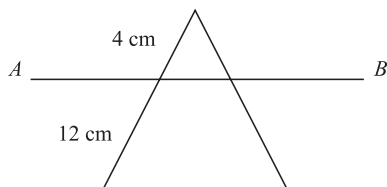
A. 5
B. 12
C. 13
D. 20
E. 26

50. A formula for the volume, V , of a right circular cylinder is $V = \pi r^2 h$, where r is the radius and h is the height. If a tanker truck has a tank as shown below with a diameter of 3 meters and a length of 10 meters and is filled with water, then the weight, in pounds, of the water cargo is: (Note: 1 cubic meter of water weighs approximately 2,205 pounds.)



F. less than 75,000.
G. between 125,000 and 175,000.
H. between 175,000 and 225,000.
J. between 225,000 and 275,000.
K. more than 275,000.

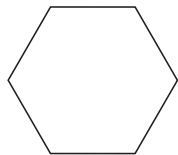
51. In the figure below, line AB is parallel to the base of the triangle and creates a smaller triangle inside of the original triangle. If the lengths of segments are as shown and the smaller triangle has an area of 8 cm^2 , what is the area, in centimeters, of the original triangle?



A. 16
B. 24
C. 32
D. 64
E. 128



52. The figure below is a regular hexagon. What is the measure of one of the interior angles of the hexagon?



- F. 108°
G. 120°
H. 135°
J. 150°
K. 720°
53. It is estimated that, from the beginning of 1993 to the end of 1997, the average number of CDs bought by teenagers increased from 7 per year to 15 per year. During the same time period, the average number of video games purchased by teenagers increased from 6 per year to 18 per year. Assuming that in each case the rates or purchase are the same, in what year did teenagers buy the same average number of CDs and video games?
- A. 1993
B. 1994
C. 1995
D. 1996
E. 1997
54. If $x^2 - 45b^2 = 4xb$, what are the 2 solutions for x in terms of b ?
- F. $15b$ or $-3b$
G. $5b$ or $-9b$
H. $15b$ or $3b$
J. $45b$ or $-4b$
K. $9b$ or $-5b$
55. Which of the following is (are) equivalent to the mathematical operation $a(b - c)$ for all real numbers a , b , and c ?
- I. $ca - ba$
II. $ab - ac$
III. $(b - c)a$
- A. II only
B. I and II only
C. I and III only
D. II and III only
E. I, II and III

DO YOUR FIGURING HERE.

2**2**

56. For values of x where $\sin x$, $\cos x$, and $\tan x$ are all defined, $\frac{(\cos x)}{(\tan x)(\sin x)} = ?$

F. $\frac{\cos^2 x}{\sin^2 x}$

G. $\tan^2 x$

H. 1

J. $\sin^2 x$

K. $\sec x$

DO YOUR FIGURING HERE.

57. If a is inversely proportional to b and $a = 36$ when $b = 12$, what is the value of a when $b = 48$?

A. 0

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

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

D. 4

E. 9

58. For which of the following values of c will there be 2 distinct real solutions to the equation $5x^2 + 16x + c = 0$?

F. 3

G. 12

H. 14

J. 15

K. 20

59. If the volume of a cube is 64, what is the shortest distance from the center of the cube to the base of the cube?

A. 2

B. 4

C. $2\sqrt{4}$

D. $\sqrt{32}$

E. 16

60. What is the slope of a line that is perpendicular to the line determined by the equation $5x + 8y = 17$?

F. -3

G. $-\frac{5}{8}$

H. $\frac{17}{8}$

J. $\frac{3}{17}$

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

**END OF THE MATHEMATICS TEST.
STOP! IF YOU HAVE TIME LEFT OVER, CHECK YOUR WORK ON THIS SECTION ONLY.**

3

3

READING TEST

35 Minutes—40 Questions

DIRECTIONS: This test includes four passages, each followed by ten questions. Read the passages and choose the best answer to each question. After you have selected your answer, fill in the corresponding bubble on your answer sheet. You should refer to the passages as often as necessary when answering the questions.

PASSAGE I

PROSE FICTION: *Extreme Dad*

As I was growing up, each autumn brought with it the excitement of a new school year and new friends. However, I did not look forward to the inevitable question young boys pose to one another: “What does your dad do?” Some people cannot remember being asked that question in school, but it bears special weight for me. My father is recently retired from his career as a Hollywood stunt performer. When I was a child, he would do more death-defying tricks in a week than I’m sure I will ever do in my lifetime. My father’s extreme career and energetic lifestyle made him the coolest dad in town, and I had to live up to him.

For American boys, no piece of plywood is safe; it has “ramp” written all over. We would prop some plywood up on a cinderblock and see how high it could launch us on a bike or skates. That was sufficiently fun for years, but eventually my father’s reputation caught up with me. Soon, my friends wanted to go bigger with the idea of a homemade launch pad. They urged me to seek my father’s help. At first, I resisted, since I didn’t want to start a trend of hair-raising stunts on my neighborhood street. Who knows what the old lady across the street would think?

As it turned out, my father was more eager than I was to introduce some stunts to my group of friends. Instead of building a giant ramp, he suggested, why not build a platform high in the ponderosa pine tree out back from which we could rappel to the ground? It sounded crazy to me, but I yielded to my father. He loved the cliché appeasement, “Trust me; I’m a professional.” So, that afternoon, my friends, father, and I piled in the truck and headed for the lumberyard. By this time, I was starting to warm to the idea of a rappelling platform in my backyard. My friends could hardly contain their excitement. After all, they were about to do something crazy under the supervision of a real stuntman!

My father cruised the aisles at the lumberyard with amazing deftness and efficiency. As he waited for some plywood to be cut, he filled his cart with all kinds of materials that little boys love: nails, screws, glue, chain, cable, nuts, and bolts. This would be the first time my friends and I had built anything out of shiny, new parts. No doubt this would be the most awesome stunt in town!

When we returned home, we unloaded all of the supplies near the base of the tree. Looking up the trunk, my friends and I realized we had a lot of cool building materials but no way to get them up the tree. At that moment, my dad emerged from the garage. “Here’s the last piece.” He held a climbing harness and rope in his hands. “Now I’m going to go up there and build the structure, then two of you can come up and help with the rigging.” For the next hour, we sat in stunned silence. My father threw one end of his rope around an upper limb, secured it, and started the slow process of drawing on the two mechanical ascenders. Before long, he had reached the notch in the tree, braced himself, and sent down a length of cord to us. “Put a quarter-inch bit in the drill and send it up,” he cried. We prepared the drill and tied it to the line. My father hoisted it and bored the boltholes into the tree. We repeated this process with two-by-fours, bolts, nuts, and finally the plywood square that would become the platform. My father built it with lightning speed. One of my friends gaped at how quickly my father could drive screws. Before long, Dad called down saying everything was finished and ready for “preliminary testing.” I didn’t know what he meant by that. “Stand back, guys,” my dad called. We hastily obliged. My father, already standing on the platform, looked strangely comfortable so high in the ponderosa tree. Granted, he was still in his harness roped to the tree, but nerves have a funny way of ignoring appeals to logic. Satisfied with his handiwork, my dad began bouncing lightly on the balls of his feet. The platform didn’t budge. Next, he started jumping up and down violently. This shook the platform and made the tree sway, but everything seemed soundly built and tightly secured. “All right, now we learn to rappel.”

My father slid down his rope and called us to join him in the attic of the garage. I had only seen what was up there a few times, and it mostly bored me. Behind an old armoire, though, was a dusty black trunk that I had never seen before. My father began pulling ropes and harnesses from it, then carabiners and rappelling devices. We eagerly grabbed the equipment and took it to the backyard. My father fit us for the harnesses and began an impromptu lesson on the critical safety rules of climbing and rappelling.

In a few hours and after a little practice off the roof of the house, we were all ready to tackle the huge tree in the back yard.

GO ON TO THE NEXT PAGE.

3

3

1. The passage establishes that the narrator and his father have all of the following traits in common EXCEPT:
 - A. an innate desire for danger.
 - B. a taste for exhilarating activities.
 - C. a pleasant attitude toward others.
 - D. an awareness of the fun that boys like to have.

2. Which of the following is NOT an accurate description of the passage?
 - F. A story about boys who endeavor to perform stunts and are helped by a professional.
 - G. A glimpse at one boy's change from being hesitant about to being proud of his father's occupation.
 - H. A look at how a group of boys had a great time, despite some early misgivings.
 - J. A portrait of a boy struggling to overcome the popularity of his father.

3. In both the first paragraph (lines 1–12) and the second paragraph (lines 13–23) the author is portraying a narrator who:
 - A. feels compelled to act differently from his father to avoid earning his negative reputation.
 - B. acts without caution in dangerous situations.
 - C. hesitates to involve his father in activities involving his friends.
 - D. loathes the reputation that precedes his father.

4. At the time of writing the story, the narrator is:
 - F. an adult reflecting on a difficult period he had as a youth.
 - G. a youth describing an example of the adventures he has with his father.
 - H. an adolescent analyzing how his father embarrasses him.
 - J. an adult reminiscing fondly about a childhood memory.

5. The passage states that the narrator had to cope with his father's reputation as:
 - A. famously daring and socially engaging.
 - B. severe and unyielding to the narrator's wishes.
 - C. incorrigibly unmindful of the narrator and the narrator's friends' activities in the neighborhood.
 - D. prone to reckless stunts and outlandish behavior.

6. Which of the following statements best describes the way the fourth paragraph (lines 38–45) functions in the passage as a whole?
 - F. It reveals the reason for the narrator's qualms about asking his father for help, as expressed in the second paragraph.
 - G. It details the mundane task of shopping for materials, which includes waiting for lumber to be cut and finding the appropriate hardware.
 - H. It shows the reader that as the plan to build the rappelling platform was moving forward, the narrator was warming to it.
 - J. It divides the passage into two parts, one about the narrator's relationship with his father and the other about tree climbing and rappelling.

7. The statement "eventually my father's reputation caught up with me" (lines 17–18) functions in the passage to support the narrator's view that:
 - A. his father's lifestyle made keeping boyhood friends difficult.
 - B. his father's unusual career pulled him into uncommon adventures.
 - C. his friends would have stopped building ramps if his father was not a stunt performer.
 - D. his father disapproved of untrained boys performing stunts on bikes and skates.

8. It can reasonably be inferred from the passage as a whole that the narrator views his father's reputation as one that developed:
 - F. to a degree that was exceptional even in the Hollywood stunt community, but not in his residential neighborhood.
 - G. to a degree that was common among all professionals in the area and, therefore, unremarkable.
 - H. to a lesser degree than those of the narrator's friends' fathers, in spite of a clear status disparity between his family and theirs.
 - J. to a degree that was based on his years of performing film stunts professionally, establishing his popularity with neighborhood youth.

9. As it is used in line 54, *rigging* most nearly means:
 - A. platform bracing.
 - B. branch trimming.
 - C. nuts and bolts.
 - D. rope system.

10. The narrator can most accurately be characterized as:
 - F. anxious and uncertain.
 - G. level-headed but fun-loving.
 - H. strong-willed but compassionate.
 - J. creative and enthusiastic.

GO ON TO THE NEXT PAGE.

3

3

PASSAGE II

SOCIAL SCIENCE: *The Gunpowder Plot*

*Remember, remember the 5th of November,
The gunpowder treason and plot.
I know of no reason why gunpowder treason
Should ever be forgot.*

5 This famous children's poem speaks directly to the Gunpowder Plot of 1605 in which a group of Roman Catholic coconspirators attempted to blow up Westminster Palace during the formal opening of Parliament. King James I of England (James VI of Scotland) was in attendance to address the joint assembly of the House of Lords and the House of Commons. The failed bomb plot certainly could have killed the King and potentially the rest of the English Legislature; it would have been a near-complete removal of the aristocracy. Guy Fawkes was instrumental in the final stages of the plot, but was apprehended just prior to completing his work. Shortly thereafter, Fawkes and his coconspirators were put to death for treason and attempted murder. It has been said by many—quite tongue-in-cheek—that Guy Fawkes was the only man ever to enter Parliament with honest intentions.

The plot, masterminded by Robert Catesby, had surprising origins. He and Guy Fawkes, along with several other Roman Catholics, were thought to be denouncers of the king's own Church of England. Consequently, they risked civil and criminal penalties. In realizing that Spain, at the time a great Catholic world power, was involved in too many wars to help the cause of English Catholics, Catesby decided that unless something was done from within, nothing would likely change.

Luck smiled upon the plotters when they stumbled upon a cellar for rent beneath the House of Lords; the original plan, to dig a mineshaft beneath Westminster, proved remarkably difficult, the rock and debris requiring removal in secret. Being able to rent a cellar under Parliament expedited their efforts immensely, allowing them to fill the cellar with 1,800 pounds of gunpowder.

The one crucial flaw in the plot, though, was that several conspirators had scruples over the potential for harm to other Catholics likely to be in attendance during the opening address. One of the men wrote a letter of warning to Lord Monteagle, a fellow Catholic, who received it on October 26. Learning about the letter the following day, several conspirators wished to abort the plan, yet the decision was made to continue when Guy Fawkes confirmed that nothing within the cellar had been discovered. Despite Fawkes' confidence, Lord Monteagle took the letter seriously, and tasked the secretary of state with completing a search of all spaces beneath Westminster. Early in the morning on November 5, Fawkes was apprehended in the cellar. Over the next few days, he was tortured until he confessed the identities of the other individuals who contributed to the plot. On January 31, 1606, each man convicted of treason was taken to Old Palace Yard to be hanged, drawn,

60 and quartered—this most exotic form of execution was intended as a lesson to the public: treason would not be tolerated under any circumstances.

Currently, on November 5 of each year, British children burn effigies of Fawkes and recite the renowned poem as a way of remembering this influential figure of the past. Guy Fawkes Day serves as a chilling reminder to everyone, not just the British, that if pressed hard enough, an individual will press back. No brutal threat can stop the most committed believer from rising in defense of his beliefs.

11. One of the points the author seeks to make in the passage is that some English Roman Catholics in 1605:
- A. were convicted of treason for supporting the king.
 - B. sought religious freedom by rebelling against the current regime.
 - C. were forced into hiding by the powerful religious minority behind the monarchy.
 - D. gained notoriety by conspiring against the Roman Catholic church.
12. The author asserts that the Gunpowder Plot coconspirators were generally:
- F. capable and sufficiently covert.
 - G. inept but sufficiently covert.
 - H. capable but insufficiently covert.
 - J. inept and insufficiently covert.
13. The author uses the description of the modern Guy Fawkes Day to point out that some acts are:
- A. too powerful to let their lessons fade into history.
 - B. so powerful that adults must make light of them for their children's sake.
 - C. more powerful for people today than they were at the time they occurred.
 - D. so powerful that children must be reminded of their depravity.
14. When the author asserts that Guy Fawkes had *honest intentions* (lines 21–22), he most likely means that members of parliament are:
- F. not concerned about their perception among the people.
 - G. too detached from average citizens to provide effective leadership.
 - H. prepared to surrender power to religious minorities.
 - J. prone to exploiting their power by being deceitful.

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15. According to the passage, when are citizens most pressed to act against the government?
- A. When parliament meets in joint session
 - B. When there is collusion between the monarch and the judiciary
 - C. When personal beliefs are threatened
 - D. When there are bad economic times
16. As it is used in line 60, the word *exotic* means:
- F. alluring.
 - G. mysterious.
 - H. unusual.
 - J. foreign.
17. According to the passage, under which of the following government actions would an uprising most likely occur?
- A. Government troops are given permission to conduct unwarranted searches of suspected dissidents.
 - B. An average-looking murder suspect at-large prompts police to round up for interrogation anyone who looks like the perpetrator.
 - C. Sales and income tax rates are raised sharply at the same time due to budget shortfalls.
 - D. Chocolate, gold, and other precious commodities are strictly rationed during wartime.
18. The passage makes the claim that brutal threats from the government are not a solution to the risk of public rebellion because:
- F. harsh punishment of dissenters only breeds further contempt.
 - G. there will always be certain individuals who risk the punishment to overthrow a government.
 - H. weapons of assassination are too easily concealed to provide reasonable security for government officials.
 - J. often the inciting rebels are impossible to locate.
19. As it is used in lines 33–34, the phrase *stumbled upon* most nearly means:
- A. discovered.
 - B. tripped over.
 - C. walked on.
 - D. sought.
20. The *mineshaft* in line 35 refers to:
- F. a tunnel dug to facilitate extraction of a particular mineral.
 - G. a metaphorical deep pit from which nothing can climb out.
 - H. an underground space to be filled with explosives.
 - J. a crawlspace to permit clandestine observation of Parliament.

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PASSAGE III

HUMANITIES: *Tennessee Williams: Celebrated Southern Gothic Writer*

American literature encompasses many unique styles and genres, including Southern Gothic. As its name implies, the literature reflects life in the American South. It maintains some of the characteristics of Gothic writing, such as use of the supernatural or the ironic; however, Southern Gothic does not focus on creating tension and suspense as do other Gothic genres. Instead, its storylines examine Southern people and their postbellum social structure.

Writers in the genre generally spurn the pre-Civil-War stereotype of the plantation gentleman and the glamorous Southern belle. Instead, the authors develop characters that are sinister or reclusive and not particularly pleasant on the surface. Nevertheless, these characters usually have redeeming qualities that allow and encourage the reader to sympathize with their situations and dilemmas. It is through these immoral and unhappy personalities that the Southern Gothic writer is able to present and explore moral issues of the American South, such as slavery and bigotry, without blatant accusations.

Many American authors are known for their Southern Gothic style. Playwright Tennessee Williams (1911–1983) is among the most celebrated. Williams' long list of plays and novels include the Pulitzer Prize winning stage dramas *A Streetcar Named Desire* (1948) and *Cat on a Hot Tin Roof* (1955). Williams' characters are known to be modeled directly on members of his own family. For instance, it is speculated that the pitiable character Laura in *The Glass Menagerie* (1944) is modeled after Williams' mentally disabled sister Rose. In the same play, Amanda Wingfield is said to mirror Williams' own mother. Williams even portrays himself in *Suddenly, Last Summer* (1958) and *The Glass Menagerie*. His adult life, plagued with depression and alcoholism, appears to play out in his embroiled characters.

If Tennessee Williams was a tormented man, it was due in no small part to his troubled family. As a seven-year-old in Mississippi, Williams contracted diphtheria and remained housebound for two years. His mother, fearing for Tennessee's mental wellbeing, pushed him toward creative arts during his period of illness. It was she who bought him a typewriter at age 13, which he heartily accepted.

Having already moved once, the Williams family eventually relocated to St. Louis, where Tennessee's increasingly abusive father Cornelius squeaked out a living as a traveling shoe salesman. Tennessee's mother Edwina was a genteel sort prone to smothering. The most traumatic event in the young writer's life, however, occurred when his sister Rose, described as a slender, refined beauty, was diagnosed with schizophrenia.

Various treatments were unsuccessful during Rose's years of residence in mental asylums. In 1943, the Williams parents consented to the now-defunct prefrontal lobotomy in an effort to treat her schizophrenia. The operation was ruinous and Rose lay vegetative

for the rest of her life. The fallout came when Tennessee blamed his parents for authorizing the operation. In the 1960s, he wrestled with the notion that he, too, would go insane. A decade of depression took hold. He would, at least nominally, overcome it, but Tennessee Williams' family life would haunt him the rest of his days.

21. The main purpose of the passage can best be described as an effort to:
 - A. explain how and why Tennessee Williams' life suited writing in the Southern Gothic style.
 - B. illustrate what the South was like at the time Tennessee Williams was writing his body of work.
 - C. discuss how Tennessee Williams' life changed during his youth and young adulthood.
 - D. describe the different elements of Southern Gothic style present in Tennessee Williams' works.
22. The author's attitude toward the subject of the passage can best be characterized as:
 - F. amused tolerance.
 - G. detached interest.
 - H. warm appreciation.
 - J. mild skepticism.
23. It can be reasonably inferred that the author believes Tennessee Williams' first great success came from a play published in:
 - A. 1944.
 - B. 1948.
 - C. 1955.
 - D. 1958.
24. According to the sixth paragraph (lines 55–66), compared to modern standards of medicine, the prefrontal lobotomy is described as:
 - F. more apt to produce symptom improvement, but at unacceptable risk to the patient.
 - G. more apt to cause discomfort to the patient, but in exchange for reduced mental anguish.
 - H. less apt to diminish schizophrenia, and likely to incapacitate the patient.
 - J. less apt to treat mental disease, but with very manageable side effects.

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25. As described in the passage, the effect Tennessee's family had on him can best be summarized by which of the following statements?
- A. His family's impact can be safely overlooked because many other authors with less traumatic pasts have written in the Southern Gothic style.
 - B. His family gave Tennessee his sense of melancholy, which faded in his prosperous later years.
 - C. His family problems directly influenced his decades of writing and left Tennessee conflicted and distraught.
 - D. The destruction of the Williams family caused Tennessee's plays to turn to darker themes that did not appeal well to audiences.
26. When the author states that Southern Gothic literature does not make "blatant accusations" (line 21), he most likely means that the genre avoids:
- F. defending the abolition of slavery and other social reforms in the postbellum South.
 - G. explicitly stating who among the characters are racist or otherwise morally corrupted.
 - H. addressing any social problems in the South, preferring that the reader juxtapose his own opinion with the facts of the plot.
 - J. righteous characters who overtly decry bigoted behavior of other characters.
27. The passage indicates that Tennessee Williams' creative streak began because:
- A. he was trapped in an abusive household where his only refuge was in the fantasies he wrote.
 - B. he was tortured by his sister's condition and took to writing as a way of searching for an explanation for her decline.
 - C. he was severely ill as a boy and his mother took care to engage him in creative pursuits when he could not be physically active.
 - D. he was inspired by the success of other family members and wished to capture the feeling in prose.
28. According to the author, the primary characteristic of the Southern Gothic genre is that it:
- F. indirectly uses distant or malevolent characters to raise issues of social justice.
 - G. incorporates the haunting religious themes of traditional Gothic literature into 20th-century Southern society.
 - H. is the first American genre to be able to set aside the issue of slavery.
 - J. carefully avoids volatile characters, in spite of plots set in tumultuous time periods.
29. The author calls some of Tennessee Williams' characters "embroiled" in line 37 most likely because they:
- A. exist in the sultry Southern climate at a time where dress was uncomfortably conservative.
 - B. seem doomed to create continual problems for themselves.
 - C. deal with daunting personal problems or overwhelming moral quandaries.
 - D. bear a larger-than-life aesthetic that makes their words and deeds uniquely impactful.
30. The "social structure" mentioned in line 9 most directly refers to what the author sees as:
- F. the remnants of racism and inequality in Southern culture following the end of slavery.
 - G. the unspoken disparity between rich landowners and poor farmhands at the turn of the 20th century.
 - H. the uncommon compassion and hospitality for which the South has become famous.
 - J. the system of vigilante justice that arose as a consequence of inadequate policing following the Civil War.

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PASSAGE IV

NATURAL SCIENCE: *Michigan's Beloved Songbird*

Sometimes an object in nature is so rare that it escapes mention in nature books. Such is the case with the delightful Kirtland's warbler, a plump, yellow-breasted bird that can be found nesting almost exclusively in the northern half of Michigan's Lower Peninsula. Although this bird migrates to the Bahamas for the winter, Michigan is its natural habitat. Unfortunately, so few Kirtland's warblers exist that the species is classified endangered. The remaining Kirtland's warblers now enjoy living in stands of young Jack pines located in protected Michigan forests.

Interestingly, the Kirtland's warbler nests on the ground in the jack pine forests, and not in the trees themselves. Male warblers generally return to Michigan in May to spend the summer. Females arrive as the males stake out territory and choose a suitable nesting area. At the completion of the long journey from the Bahamas to Michigan, female warblers begin to collect leaves and grass to build their nests. During this process, the female warblers' mates provides food. Eventually, female Kirtland's warblers each lay four to five speckled eggs. The eggs hatch in two to three weeks, and both the male and female warblers tend to the chicks. Five weeks after they hatch, the fledglings are prepared to survive on their own.

Kirtland's warblers are extremely fastidious about their habitat. This is probably why these birds have become endangered. Kirtland's warblers insist on living in expansive areas of Jack pine forest rooted in *Grayling sand*, which percolates quickly to prevent flooding of nests built on or near the ground. Grayling sand also supports the type of plant material that the warblers prefer for their diet and nest building.

If not for ongoing human conservation efforts, this special habitat and this rare bird would probably not exist today. As the massive 19th-century logging boom faded in Michigan, natural forest fires increased, fueled by the burgeoning undergrowth. Jack pine numbers increased dramatically, since the tree depends on regular fires to expose the seeds within its tough cones. The early 1900s, though, saw natural fires suppressed by new forest management policies and, consequently, Jack pine forests quickly diminished. This greatly reduced the number of nesting areas available for the Kirtland's warbler.

To correct this problem, Jack pine areas are currently managed on a rotating basis. This ensures an appropriate number of nesting sites, which encourages warblers to return and reproduce annually. The protected Jack pine forests are also home to the white-tailed deer, the black bear, the Eastern bluebird, the upland sandpiper, and the snowshoe hare. Unfortunately, for the Kirtland's warbler, the brown-headed cowbird is also prevalent in these woods. This brood parasite is well known for its tendency to steal the nests of other birds by replacing the original bird's eggs with its own eggs. When the chicks are hatched, the warblers raise the young cowbirds as their own. This, of course, negatively impacts the population of the Kirtland's warbler. Studies have shown that when a

cowbird lays one egg in a warbler's nest, generally only one to three warbler chicks will survive. If two or more cowbird chicks survive in a single warbler nest, none of the warblers will survive. To combat this dilemma, government programs have been established to trap and eradicate cowbirds that attempt to nest in the warblers' habitat. These efforts have greatly improved the survival and proliferation of the Kirtland's warbler over the past few decades.

The male Kirtland's warbler is prized as a songbird, emitting a persistent, melodic song audible up to a quarter-mile away. For researchers, counting these songs becomes important during mating season, since saving the warbler from extinction demands an annual census of the population to ensure that conservation measures are effective.

Debates periodically surface over whether to replace the robin with the Kirtland's warbler as Michigan's state bird. Admirers of the Kirtland's warbler argue that it is strictly a Michigan bird. Supporters of the robin point out that the Kirtland's warbler is only present in Michigan for, at most, half of the year. Perhaps this debate will continue until more residents have a chance to see the beautiful and elusive Kirtland's warbler, which calls Michigan home.

31. In the context of the passage as a whole, it is most reasonable to infer that the phrase "jack pine areas are currently managed on a rotating basis" (lines 46–47) means that:
- A. resources are limited, so work must be done on one small section of forest at a time.
 - B. forests are occasionally burned to encourage new tree growth.
 - C. lumber is harvested only as fast as tree re-growth permits.
 - D. efforts to restore the Kirtland's warbler habitat are detrimental to other species.
32. The passage suggests that the population of the Kirtland's warbler declined in the past because forest management policies:
- F. failed to account for unforeseen ecological consequences of fire prevention.
 - G. permitted excessive logging of nesting trees.
 - H. aimed to eliminate the jack pine.
 - J. catered exclusively to the powerful industrial establishment.

GO ON TO THE NEXT PAGE.

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33. What does the passage offer as evidence that Kirtland's warblers have environmental sensitivities?
- A. Cowbird eggs incubating at the expense of warbler eggs
 - B. Males and females arriving in Michigan at different times of year
 - C. Long period during which hatchlings need to stay in the nest
 - D. Nests requiring an uncommon environment
34. It can be inferred that the author feels Michigan, not the Bahamas, is the Kirtland's warbler's natural habitat because the birds:
- F. inhabit very specific parts of Michigan.
 - G. migrate from the tropics a great distance to summer in Michigan.
 - H. are protected by endangered species laws in the United States.
 - J. mate and raise offspring in Michigan.
35. According to the passage, what is the reason jack pine forests declined in the early 1900s?
- A. Logging in the 1800s decimated mature jack pines, which produce hearty seeds.
 - B. Logging in the 1800s left room for low-growing shrubs that accelerated the spread of many forest fires.
 - C. Forest management focused on eradication of the wildfires necessary for jack pine proliferation.
 - D. Forest management placed a higher value on some trees than others.
36. What does the author suggest in lines 54–55 by stating that the cowbird is a “brood parasite?”
- F. The cowbird exploits the nesting instincts of the Kirtland's warbler.
 - G. The cowbird feeds on the eggs of Kirtland's warblers.
 - H. The cowbird shows wanton disregard for the survival of the Kirtland's warbler.
 - J. The cowbird's appearance is marked by unappealing plumage.
37. The passage states that the habitat needs of the Kirtland's warbler, as compared to those of other birds, are:
- A. less specific.
 - B. more specific.
 - C. equally specific.
 - D. little understood.
38. According to the passage, which of the following correctly states the relationship of the Jack pine to fire?
- F. Fire is the mechanism by which cones release their seeds.
 - G. Fire stimulates the jack pine to produce seed-bearing cones.
 - H. Fire destroys small, weak trees, leaving room for jack pine seeds to grow to maturity.
 - J. Fire expands through jack pine forests particularly fast.
39. The author states that the main reason for the Kirtland's warbler's decline is:
- A. its rapid life cycle.
 - B. cowbird infestations.
 - C. strain on its habitat.
 - D. logging of jack pines in the past.
40. As it is used in lines 30–32, the term *Grayling sand* most nearly means:
- F. grey or silver soil, which is rich in ore deposits.
 - G. highly permeable soil suitable for some vegetation.
 - H. nutrient-poor sandy soil that occurs along salt water beaches.
 - J. dry riverbed soil that once supported a population of Grayling fish.

END OF THE READING TEST.

STOP! IF YOU HAVE TIME LEFT OVER, CHECK YOUR WORK ON THIS SECTION ONLY.

4



4

SCIENCE REASONING TEST

35 Minutes—40 Questions

DIRECTIONS: This test includes seven passages, each followed by several questions. Read the passages and choose the best answer to each question. After you have selected your answer, fill in the corresponding bubble on your answer sheet. You should refer to the passages as often as necessary when answering the questions. You may NOT use a calculator on this test.

PASSAGE I

Amino acids are considered the building blocks of *protein* in the body. Amino acids combine with each other to form chains called *peptides*, which then combine to form proteins. The human body requires twenty different amino acids, whose combinations produce every essential protein in the body. When amino acids form peptides, the *residue* is what is left after the amino acid sheds a molecule of water

(a hydrogen ion from one end and a hydroxide ion from the other end). The *reaction rate* is the factor by which the protein is able to build itself up through the combination of peptides. Figures 1–3 show the effects that changes in temperature, water volume, and residue concentration have on the rate of reaction of residue when Amino Acids A and B are present. Figure 4 shows the effects that changes in the concentrations of Amino Acids A and B have on the rates of reaction in residue solutions of the same concentration.

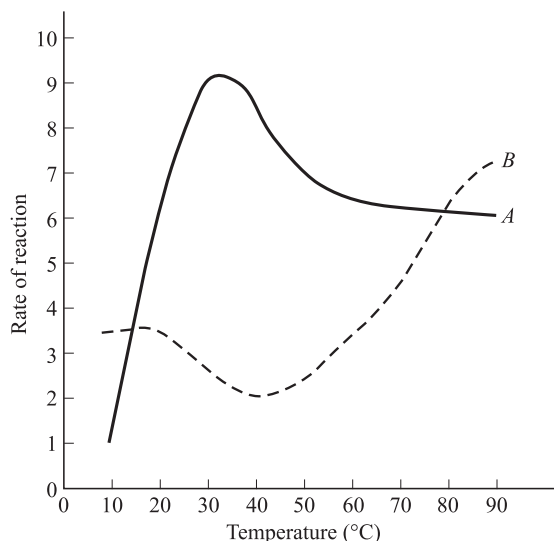
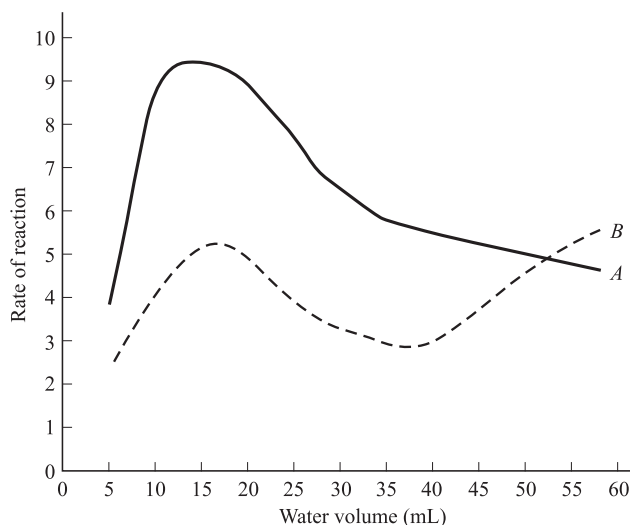


Figure 1



Note: The amount of amino acid is held constant.

Figure 2

4



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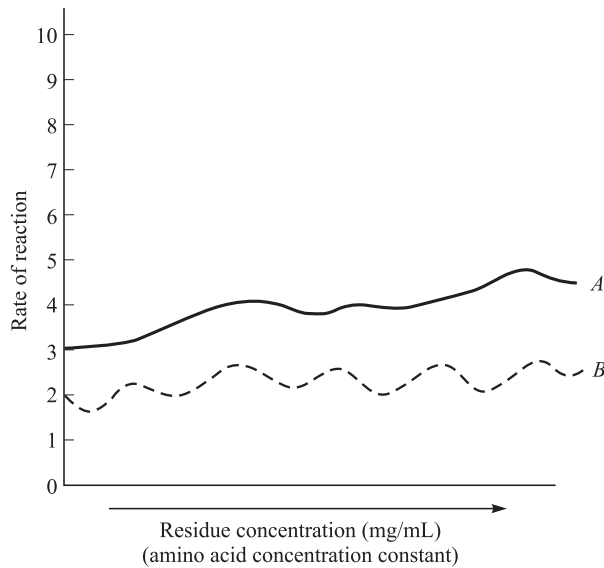


Figure 3

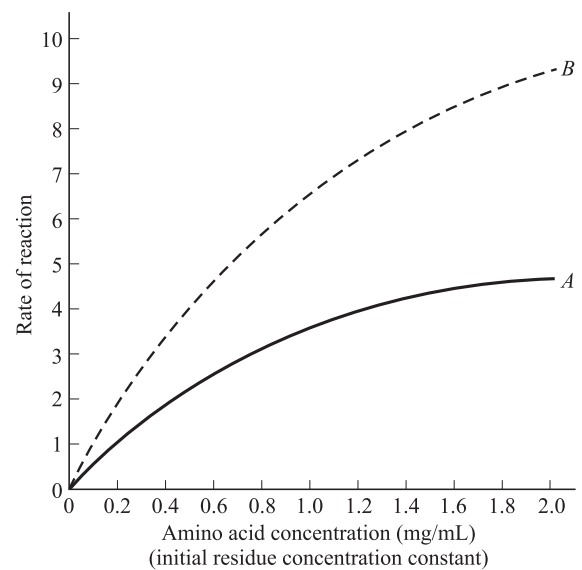


Figure 4

- According to Figure 2, Amino Acid A has the highest reaction rate at a water volume closest to:
 - 0
 - 4
 - 12
 - 20
- Based on the data presented in Figure 2, at approximately which of the following water volumes does Amino Acid A have the same reaction rate as Amino Acid B?
 - 30 mL
 - 40 mL
 - 50 mL
 - 60 mL
- A researcher claims that the reaction rate of Amino Acid B is dependent on both residue concentration and amino acid concentration. Do the data in Figures 3 and 4 support this claim?
 - No, the reaction rate is dependent on the amino acid concentration, but not on the residue concentration.
 - No, the reaction rate is not dependent on either the residue concentration or the amino acid concentration.
 - Yes, the reaction rate is dependent on both the residue concentration and the amino acid concentration.
 - Yes, the reaction rate is dependent on the residue concentration, but not on the amino acid concentration.

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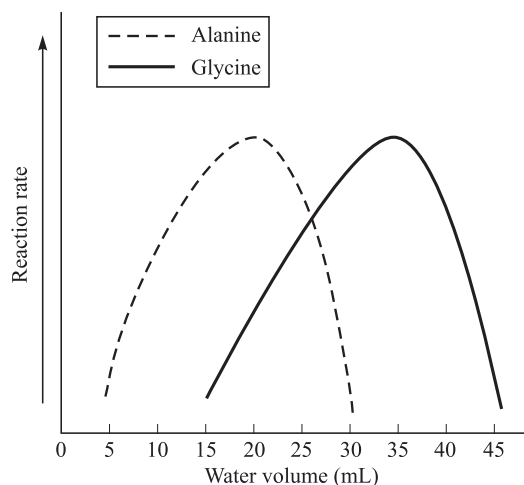


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4. A researcher claims that under the conditions used to determine the data for Figure 4, the reaction rate for Amino Acid A at any given concentration will always be greater than the reaction rate for Amino Acid B at the same concentration. Do the data support this conclusion?

- F. No, Amino Acid A has a lower reaction rate at all given residue concentrations tested.
- G. No, Amino Acid A has a lower reaction rate at all given amino acid concentrations tested.
- H. Yes, Amino Acid A has a higher reaction rate at all given residue concentrations tested.
- J. Yes, Amino Acid A has a higher reaction rate at all given amino acid concentrations tested.

5. The figure below shows the relative reaction rates for *alanine*, an amino acid found in DNA, and *glycine* an amino acid found in the muscles.



Note: The amount of amino acid is held constant.

Based on this figure, one would best conclude that compared to the water volume at the peak reaction rate of amino acids in DNA, the water volume at the peak reaction rate of amino acids in the muscles:

- A. is higher.
- B. is lower.
- C. is the same.
- D. cannot be measured.

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PASSAGE II

The Great Lakes are a group of five large lakes located in the United States and Canada. They make up the largest group of fresh water lakes in the world, and the Great Lakes-St. Lawrence River system is the largest freshwater system in the world. Recently, near-historic low water levels have plagued the water system. Two scientists discuss the causes of low lake level in the Great Lakes.

Scientist 1

Water levels are part of the ebb and flow of nature. The determining factor in whether the water level will rise, fall, or remain stable is the difference between the amount of water coming into a lake and the amount going out. When several months of above-average precipitation occur with cooler, cloudy conditions that cause less evaporation, the lake levels gradually rise. Likewise, the lowering of water levels will result from prolonged periods of lower-than-average precipitation and warmer temperatures.

The recent decline of water levels in the Great Lakes, now at lows not seen since the mid-1960s, is due to a number of causes. Higher degrees of evaporation from warmer than usual temperatures in recent years, a series of mild winters, and below-average snow pack in the Lake Superior basin all contribute to the phenomenon. Since precipitation, evaporation, and runoff are the major factors affecting the water supply to the lakes, levels cannot be controlled or accurately predicted for more than a few weeks into the future. Further, the influence of human regulation on lake levels is inconsequential. Because water is added through snow and rain and taken away through evaporation, nature has most of the control over lake levels.

Scientist 2

Several human activities have affected levels and flow of the water in the Great Lakes. For example, structures have been built to regulate the outflows of both Lake Superior and Lake Ontario. Lake Superior has been regulated since 1921 as a result of hydroelectric and navigation developments in the St. Mary's River, such as the Soo Locks. Lake Ontario has been regulated since 1960 after completion of the St. Lawrence Seaway and Power Project. Diversions bring water into, and take water out of, the Great Lakes. Many such diversions were constructed for hydropower generation and logging. For example, the Lake Michigan diversion at Chicago moves water out of Lake Michigan and into the Mississippi River for domestic, navigation, hydroelectric, and sanitation purposes.

In addition, the St. Clair and Detroit rivers have been dredged and modified. This has caused some drop in the levels of Lake Michigan and Lake Huron. Channel and shoreline modifications in connecting the channels of the Great Lakes have affected lake levels and flows as well, because the infilling of shoreline areas can reduce the flow carrying-capacity of the river. Further, the extensive use of groundwater deposited in massive aquifers (underground layers of water-bearing permeable rock) in the Midwest has affected the lake levels. Vast quantities of water deposited

in aquifers surrounding the Great Lakes are taken to population centers outside of the Great Lakes' watershed (region of land whose water drains into a specified body of water). Thus, the water in the lakes is not replenished.

6. Which of the following best describes the major point of difference between the scientists' viewpoints?
 - F. The major contributing factor of low lake levels.
 - G. The effects of water use on the environment.
 - H. The effects of reduced lake levels.
 - J. The major function of the Great Lakes.

7. With which of the following statements would both scientists likely agree?
 - A. The probability of lake level fluctuation is small.
 - B. Human activity is largely responsible for the changes in lake levels.
 - C. Recent trends show that the lake levels are decreasing.
 - D. The decreased lake levels are not a major concern.

8. Which of the following statements best describes how Scientist 1 would explain why human interference is of little importance in determining lake levels?
 - F. Aquifer use has little effect on lake levels.
 - G. Rivers flowing into the Great Lakes raise the water levels in the lakes.
 - H. Dredging or widening rivers can cause reductions in water levels in the lakes.
 - J. Lake levels are mainly controlled by nature and not manipulated by humans.

9. According to Scientist 2, human activity diverts lake waters, thus:
 - A. decreasing the density of the water in the lakes.
 - B. reducing the amount of water in the lakes.
 - C. increasing the amount of water in the lakes.
 - D. changing the weather patterns.

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10. Scientist 1's viewpoint would most likely be *weakened* by which of the following statements?
- F. Lake level fluctuation has severe consequences for coastal communities.
 - G. Studies have shown precipitation and evaporation levels to be stable for the last 50 years.
 - H. Studies detailing aquifer use announce a dramatic increase in volume in the last 5 years.
 - J. Recreational boating releases thousands of gallons of petroleum-based chemicals into the water system each year.
11. Scientist 2 claims that all of the following are human activities that are decreasing lake levels EXCEPT:
- A. destruction of watershed tributaries.
 - B. diversions for domestic, navigation, hydroelectric, and sanitation purposes.
 - C. dredging and modification of rivers.
 - D. infilling of shoreline areas.
12. How would the effect of the use of aquifer water differ from that described by Scientist 2 if all of the water taken from aquifers that surrounds the Great Lakes was used *within* the Great Lakes' watershed? The use of aquifer water would:
- F. continue to cause decreases in lake levels.
 - G. have little or no effect on lake levels.
 - H. have an increased effect on receding lake levels.
 - J. increase levels of pollution within the watershed region.

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PASSAGE III

Students conducted an experiment to determine the insulating properties of certain materials. In each trial, “blankets” made of different materials of different thicknesses were wrapped around an aluminum capsule filled with 0.250 L of water at a known initial temperature, T_i , and placed into an oven preheated to a certain temperature.

Heat was transferred through the insulating materials from the oven to the water inside the capsule. After 5 minutes, the temperature of the water inside the capsule, T_f , was recorded. The heat flow, measured in joules per second (J/s), is shown in Table 1.

(Note: In each trial, the same size and shape of aluminum capsule were used. One trial was done with no insulation around the aluminum capsule.)

Trial	Insulating material	Thickness of insulator (in.)	T_i (°C)	T_f (°C)	Temp of oven (°C)	Heat flow (J/s)
1	Fiberglass	1.0	70	43	25	−94
2	Fiberglass	1.0	90	63	45	−94
3	Fiberglass	0.5	20	36	75	56
4	Fiberglass	1.0	20	31	75	38
5	Fiberglass	1.5	20	28	75	32
6	Cellulose	1.0	20	37	75	59
7	Cellulose	1.5	20	33	75	45
8	Asbestos	1.0	20	30	75	31
9	Asbestos	1.5	20	27	75	24
10	Rubber	0.5	20	57	75	129
11	Rubber	1.0	20	52	75	112
12	Aluminum	****	20	70	75	174

13. According to the information provided, heat flowed from the water in the capsule at temperature T_i to the surrounding oven in which of the following trials?
- Trial 1
 - Trial 5
 - Trial 9
 - Trial 12
14. The best insulators are those that are the poorest heat conductors. According to Trials 3 through 11, which of the following materials would likely provide the best insulation between a room and the outdoors?
- Aluminum
 - Cellulose
 - Fiberglass
 - Rubber
15. According to Table 1, which of the following combinations of insulating material and insulator thickness resulted in the greatest heat flow?
- Fiberglass, 1.5 in
 - Fiberglass, 1.0 in
 - Cellulose, 1.5 in
 - Cellulose, 1.0 in

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16. Materials differ in their *thermal conductivity*: the higher the thermal conductivity, the greater the heat flow through the corresponding thickness of the insulating material. According to Trials 4 through 11, which of the following statements about relative thermal conductivities is NOT true?
- F. Fiberglass has a higher thermal conductivity value than asbestos.
 - G. Rubber has a higher thermal conductivity value than cellulose.
 - H. Cellulose has a lower thermal conductivity value than fiberglass.
 - J. Fiberglass has a lower thermal conductivity value than rubber.
17. Trials 3 and 5 provide evidence that heat flow depends on which of the following factors?
- A. Type of insulating material.
 - B. Temperature of oven.
 - C. Contact area.
 - D. Thickness of insulating material.

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PASSAGE IV

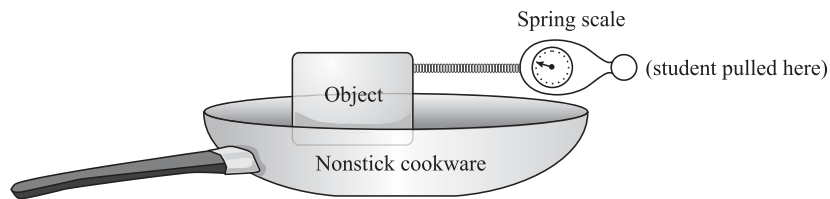
A group of students conducted several experiments using a variety of nonstick cookware, a spring scale, and several different weighted objects. Their goal was to determine which brand of cookware products had the best nonstick surface by measuring the *coefficient of static friction*, which is a measure of how resistant a stationary object is to movement.

Experiment 1

A student connected the spring scale to a weighted object that was placed inside a piece of nonstick cookware as shown in Figure 1.

The students planned to calculate the coefficient of static friction by determining the force required to disturb an object from rest. During the experiment, one student anchored the nonstick cookware by holding tightly to the handle while the other student attached a weighted, smooth steel object to the spring scale. The student pulled on the spring until the object began to move. A third student recorded the force in newtons, N, indicated on the spring scale at the moment the object began to move across the nonstick surface.

This procedure was repeated for 3 different brands of cookware; each brand of cookware was tested with various weighted objects. The coefficient of static friction was calculated by dividing the average force required to move the object by its weight (mass \times g , the gravitational constant). The results are shown in Table 1.

**Figure 1**

Cookware brand	Mass of weighted object (g)	Weight of object (N)	Force (N) to move object				Coefficient of static friction (force/weight)
			Trial 1	Trial 2	Trial 3	Average	
A	50	0.49	0.026	0.031	0.027	0.028	0.057
	150	1.47	0.074	0.085	0.081	0.080	0.054
	250	2.45	0.139	0.137	0.129	0.135	0.055
B	50	0.49	0.027	0.031	0.029	0.029	0.059
	150	1.47	0.087	0.091	0.092	0.090	0.061
	250	2.45	0.149	0.150	0.144	0.147	0.060
C	50	0.49	0.025	0.023	0.024	0.024	0.048
	150	1.47	0.074	0.070	0.072	0.072	0.049
	250	2.45	0.128	0.126	0.121	0.125	0.051

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Experiment 2

The students performed an experiment similar to Experiment 1, except three different brands of cooking spray were applied to the same cookware surface before the weights were put in place. The results are shown in Table 2.

Cooking spray brand	Mass of weighted object (g)	Weight of object (N)	Force (N) to move object				Coefficient of static friction (force/weight)
			Trial 1	Trial 2	Trial 3	Average	
X	50	0.49	0.019	0.021	0.023	0.021	0.043
	150	1.47	0.064	0.064	0.061	0.063	0.043
	250	2.45	0.111	0.107	0.106	0.108	0.044
Y	50	0.49	0.019	0.015	0.020	0.018	0.037
	150	1.47	0.057	0.056	0.055	0.056	0.038
	250	2.45	0.087	0.089	0.088	0.088	0.036
Z	150	1.47	0.064	0.069	0.071	0.068	0.046
	250	2.45	0.118	0.116	0.120	0.118	0.048

18. The results of the 2 experiments support the conclusion that as the weight of an object increases, the average force required to move it from rest generally:
- F. decreases.
 - G. increases.
 - H. varies, with no particular trend.
 - J. remains constant.
19. If Experiment 1 was repeated for Brand B cookware with a 200 gram mass, the average force needed to disturb the object from rest would be closest to:
- A. 0.03 N.
 - B. 0.06 N.
 - C. 0.12 N.
 - D. 0.18 N.
20. Based on the results of Experiments 1 and 2, which of the following combinations would result in the surface with the *least* coefficient of static friction?
- F. Cookware brand A and cooking spray brand X.
 - G. Cookware brand B and cooking spray brand Y.
 - H. Cookware brand C and cooking spray brand Y.
 - J. Cookware brand C and cooking spray brand Z.
21. Which brand(s) of cooking spray was/were tested with only 2 different weights in Experiment 2?
- A. Brand Y only.
 - B. Brand Z only.
 - C. Brands X and Y only.
 - D. Brands X and Z only.
22. According to the passage, for the students to accurately measure the coefficient of static friction, which force would have to be overcome?
- F. The weight of the object.
 - G. The force between the spring scale and the object.
 - H. The force of applying the cooking spray to the surface.
 - J. The force required to disturb the object from rest.
23. The students' instructor gave them one piece of nonstick cookware and asked them to identify the brand. The students repeated the procedures followed in Experiment 1 and obtained average forces of 0.088 N for the 150 gram object and 0.149 N for the 250 gram object. Which of the following brands would most likely have produced these results?
- A. Brand B only.
 - B. Brand C only.
 - C. Brand A and C only.
 - D. Brand B and C only.

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PASSAGE V

Aphids are small plant-eating insects known to feed on rosebushes. In the cultivation of roses, certain pesticides are often applied when the presence of aphids is detected. However, sometimes the flowers that are treated with the pesticides are not as vibrant or fragrant as those that did not receive the pesticide treatment. Two experiments were conducted to study the effects of certain pesticides on rosebushes.

Experiment 1

A gardener filled 125 pots with Soil Type 1. No pesticide was added to the soil in 25 pots. The other pots were divided into four groups of 25 and the soils in each group were treated with 5, 15, 25, or 35 parts per million (ppm) of either Pesticide A or Pesticide B. All other factors were held constant. Fully grown rosebushes with buds but no flowers were planted after the pesticide was placed in the soil. After 30 days the rosebushes were uprooted, sun-dried, and the total number of petals produced by the bushes was counted. The results are shown in Table 1.

Pesticide dose (ppm)	Number of petals	
	Pesticide A	Pesticide B
5	12	15
15	2	7
25	9	14
35	5	7
None	14	14

Experiment 2

Experiment 1 was repeated with 100 pots of Soil Type 1 and 100 pots of Soil Type 2. The same pesticide doses and type and number of rosebushes were used. All other factors were held constant. After 30 days the rosebushes were uprooted and weighed. The results are shown in Table 2.

Information on the composition of the two soil types used is given in Table 3.

Soil type	pH level	Organic matter (%)	Clay (%)
1	4.1	3.0	12.5
2	3.9	6.5	6.3

Pesticide dose (ppm)	Average weight of rosebush (oz)			
	Soil type 1		Soil type 2	
	Pesticide A	Pesticide B	Pesticide A	Pesticide B
5	47.5	51.4	52.7	61.2
15	37.1	42.3	40.3	51.7
25	27.5	32.9	31.1	40.3
35	19.7	22.1	23.6	29.7

Note: Average plant weight with untreated Soil Type 1 was 42.1 oz; average plant weight with untreated Soil Type 2 was 24.7 oz.

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24. Which of the following sets of rosebushes served as the control in Experiment 1?
- F. Rosebushes grown in soil with no pesticide added
 - G. Rosebushes grown in soil treated with 15 ppm of Pesticide A
 - H. Rosebushes grown in soil treated with 15 ppm of Pesticide B
 - J. Rosebushes grown in soil treated with 35 ppm of Pesticide A
25. Which of the following, if true, best explains why the pesticides were applied to the soil as opposed to being placed directly on the rosebushes?
- A. Pesticides are never applied to the soil when treating aphids or other pests.
 - B. Aphids are not affected when a pesticide is applied directly to the soil.
 - C. The experiments were testing how water levels affect growth patterns.
 - D. Rosebushes generally die when pesticides are applied to them directly.
26. Assume that there is a direct correlation between plant weight and the number of petals on the flowers. If a rosebush was grown in Soil Type 2, one would predict that the number of petals would be *lowest* under which of the following conditions?
- F. Pesticide B at 35 ppm.
 - G. Pesticide A at 35 ppm.
 - H. Pesticide B at 25 ppm.
 - J. Pesticide A at 15 ppm.
27. Assume that a rosebush was grown in soil treated with varying doses of a third pesticide (Pesticide C). Based on the results of the experiments, what prediction, if any, about the effect of Pesticide C on the growth of this rosebush can be made?
- A. Pesticide C would have no impact on the growth of the rosebushes.
 - B. Pesticide C would interfere with the growth of these rosebushes by making them smaller.
 - C. Pesticide C would interfere with the growth of these rosebushes by making them less fragrant.
 - D. No prediction can be made on the basis of the results.
28. The results of Experiment 2 indicate that, at every pesticide dose, average plant weight was *lowest* under which of the following conditions?
- F. Pesticide B and Soil Type 1
 - G. Pesticide A and Soil Type 1
 - H. Pesticide B and Soil Type 2
 - J. Pesticide A and Soil Type 2

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PASSAGE VI

Dopamines serve as *enhancers* or *catalysts* (a substance that initiates or increases the rate of impulses during a chemical reaction, but is not depleted during the process) to certain reactions involved in the activity of human thought. The dopamine *intropin* is involved in the stimulation of the neurotransmitters in the brain when thought is initiated. A student investigated the effects of dopamine activity on a specific neurotransmitter.

Experiment 1

To each of 10 test tubes, 7 milliliters (mL) of a *peptide* (a neurotransmitter) solution was added. Two mL of an intropin solution was added to each of Tubes 1–9. Tube 10 received 2 mL of water without intropin. The tubes were then stirred at a constant rate in water baths at various temperatures and incubated (heated) from 0 to 15 minutes (min). At the end of the incubation period, 0.3 mL of NaCl solution was added to each tube. The NaCl stopped the reaction between the intropin and the peptide. The *precipitates*, solids formed in a solution during a chemical reaction, which in this case were caused by the reaction of NaCl and the peptide, were removed from the tubes and dried. The masses of the precipitates, in milligrams (mg), were measured to determine the relative amount of enhancer that remained in the tube. The results are shown in Table 1.

Test tube	Temperature of water bath (°C)	Amount of intropin (mL)	Incubation time (min)	Mass of precipitate (mg)
1	25	2.0	0	4.3
2	25	2.0	5	3.9
3	25	2.0	10	2.8
4	25	2.0	15	1.7
5	30	2.0	5	3.6
6	30	2.0	10	2.5
7	30	2.0	15	1.4
8	35	2.0	5	1.8
9	35	2.0	10	1.3
10	35	0	15	0.2

Experiment 2

Peptide solution (8 mL) was added to an additional 8 test tubes to which 2 mL of intropin solution was then added. The tubes were incubated at 10 degrees Celsius and stirred at a constant rate for 15 min. The effect of acidity on the neurotransmitter was observed by varying the acidity levels (using the pH scale). The relative amount of neurotransmitter present in each tube was determined in the same manner as Experiment 1, by adding NaCl solution to each test tube. The results are shown in Table 2.

Test tube	pH	Mass of precipitate (mg)
11	2.0	2.5
12	5.0	2.7
13	6.0	2.9
14	7.0	3.0
15	8.0	6.2
16	9.0	4.1
17	12.0	3.8
18	13.0	3.6

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29. In Experiment 1, which of the following conditions allowed for the large amount of precipitate in Tube 1?
- A. Lack of intropin.
 - B. Higher temperature.
 - C. Lack of water.
 - D. Shorter incubation period.
30. In which of the following ways did the designs of Experiments 1 and 2 differ?
- F. A larger volume of the peptide solution was used in Experiment 2 than in Experiment 1.
 - G. The temperature was held constant in Experiment 1 and varied in Experiment 2.
 - H. No NaCl was added after incubation in Experiment 2, but it was in Experiment 1.
 - J. The remaining fluid level was measured in Experiment 1 but not in Experiment 2.
31. Which of the following hypotheses about the effects of pH on intropin activity is best supported by the results of Experiment 2? As the pH of the solutions increases from 2 to 13, the effectiveness of intropin:
- A. increases only.
 - B. decreases only.
 - C. increases, then decreases.
 - D. remains the same.
32. Suppose that NaCl had been added immediately to Tube 5 with no incubation period. Based on the results from Experiment 1, the best prediction about the amount of precipitate (in mg) formed would be:
- F. 4.1
 - G. 3.5
 - H. 2.1
 - J. 1.4
33. According to Table 1, which of the following combinations of water bath temperature and incubation time yielded the greatest amount of precipitate?
- A. 25°C, 5 min
 - B. 25°C, 10 min
 - C. 35°C, 5 min
 - D. 35°C, 10 min
34. According to the results of both experiments, one can predict that the LEAST amount of precipitate would be formed if tubes were incubated for 15 min under which of the following conditions?
- F. 20°C at pH of 2.0
 - G. 20°C at pH of 6.0
 - H. 30°C at pH of 2.0
 - J. 30°C at pH of 6.0

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PASSAGE VII

Several scientists considered some different environmental factors and their influence on the growth of certain bacteria. The following experiments used *Salmonella* bacteria to measure the effect of pH levels, nutrients, and temperature on the number of bacteria produced within a given time period.

Experiment 1

A known quantity of *Salmonella* bacteria was placed in each of 3 Petri dishes with the same nutrient concentration at the same temperature. The pH level of each nutrient concentration in each dish was varied according to Table 1. On the pH scale, 7 represents neutral, values less than 7 indicate an acid, and values greater than 7 indicate a base. The lids of the Petri dishes were replaced after the bacteria were added and the dishes were left alone. After 6 hours, the percent growth of *Salmonella* bacteria was recorded (Table 1).

Dish	pH level	Growth (%)
1	5	90
2	7	81
3	9	43

Experiment 2

A known quantity of *Salmonella* bacteria was placed in each of 3 Petri dishes with different nutrient concentrations in the form of organic compounds. The temperature and pH level (neutral 7) were held constant in each sample. The lids of the Petri dishes were replaced after the bacteria were added and the dishes were left alone. After 6 hours, the percent growth of *Salmonella* bacteria was recorded (Table 2).

Dish	Organic compound	Dry weight (%)	Growth (%)
1	Carbon	50	37
	Oxygen	20	
	Nitrogen	15	
2	Carbon	25	16
	Oxygen	10	
	Nitrogen	7	
3	Carbon	12.5	8
	Oxygen	5	
	Nitrogen	20	

Experiment 3

A known quantity of *Salmonella* bacteria was placed in each of 3 Petri dishes at different temperatures. The pH level and nutrient concentrations were held constant. The lids of the Petri dishes were replaced after the bacteria were added and the dishes were left alone. After 6 hours, the percent growth of *Salmonella* bacteria was recorded (Table 3).

Dish	Temperature (°C)	Growth (%)
1	10	13
2	40	83
3	90	24

35. According to Table 1, what might best contribute to the growth of *Salmonella* bacteria?
- A pH level above 9
 - A pH level below 5
 - A pH level near 7
 - A pH level near 5
36. According to the results of the three experiments, which combination of the three factors studied would be expected to produce the highest percent growth?
- pH level of 5, organic compound in Dish 2, temperature of 40°C
 - pH level of 7, organic compound in Dish 2, temperature of 10°C
 - pH level of 5, organic compound in Dish 1, temperature of 40°C
 - pH level of 9, organic compound in Dish 1, temperature of 90°C
37. Which of the following conclusions is strengthened by the results of Experiment 1?
- Salmonella* bacteria reproduce most efficiently in an acidic environment.
 - Salmonella* bacteria reproduce most efficiently in a neutral environment.
 - Salmonella* bacteria cannot reproduce in a basic environment.
 - Salmonella* bacteria cannot reproduce in an acidic environment.

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38. Bacteria will generally reproduce until all of the nutrients available have been depleted. How could the experiment be altered to maximize the length of time that bacteria will reproduce?
- F. Change the observation time from 6 hours to 12 hours.
 - G. Regularly re-supply each group of bacteria with unlimited nutrients.
 - H. Increase the rate of growth by decreasing the pH levels.
 - J. Do not test the effect of different nutrient combinations on growth.
39. Which of the following was the independent variable in Experiment 3?
- A. pH level
 - B. temperature
 - C. organic compound
 - D. percent growth
40. The experiments recorded the percent growth that occurred over a 6-hour period. Bacteria often reproduce at a rate that drastically varies from one stage to the next. The best way to study the different stages of growth would be to record the percent growth:
- F. after 2 hours only.
 - G. after 4 hours, then again after 6 hours.
 - H. after 8 hours only.
 - J. every 15 minutes for 3 hours.

**END OF THE SCIENCE REASONING TEST.
STOP! IF YOU HAVE TIME LEFT OVER, CHECK YOUR WORK ON THIS SECTION ONLY.**

WRITING TEST PROMPT

DIRECTIONS: This test is designed to assess your writing skills. You have 30 minutes to plan and write an essay based on the stimulus provided. Be sure to take a position on the issue and support your position using logical reasoning and relevant examples. Organize your ideas in a focused and logical way, and use the English language to clearly and effectively express your position.

When you have finished writing, refer to the Scoring Rubrics discussed in the Introduction (page 4) to estimate your score.

In some school districts, policy makers are expanding the radius around the school that does not receive bus service. As a result, more students must walk, bicycle, or seek alternative transportation to and from school every day. People who support the measure feel that it is a practical solution to alleviate pressure on school budgets, and, coincidentally, encourage more exercise. Opponents say transportation costs will simply be forced upon the students who no longer receive bus transportation, since they will most likely begin driving personal vehicles to school or receiving rides from others.

In your opinion, should school districts limit bus service either to save costs or to promote exercise?

In your essay, take a position on this question. You may write about either one of the two points of view given, or you may present a different point of view on this question. Use specific reasons and examples to support your opinion.

ANSWER KEY**English Test**

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

Mathematics Test

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

Reading Test

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

Science Reasoning Test

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