

# **ACT Practice Test #2**

**Section 1: English**

**Section 2: Math**

**Section 3: Reading**

**Section 4: Scientific Reasoning**

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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 by either 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

## A Blessing in Disguise

Last spring, I had been<sup>1</sup> fortunate to be chosen to participate in an exchange study program. In my application essay, I was careful to express how much I wanted to see France. I suppose my excitement really came through in my words. Once I knew that I was going, all I could think about was the fun of foreign travel and making all sorts of new and interesting friends. While traveling was inspiring and meeting people was exciting, nothing about my semester in France was what I expected.

The moment I arrived in Paris, I was greeted by a nice French couple who<sup>2</sup> would become my host parents. The bit of French I had taken in high school began pouring from my mouth<sup>3</sup>. Speaking the language would only become more natural over the course of the semester. At the airport, we all got into the couple’s little two-door hatchback and began the journey to their townhouse in the suburbs. We talked the whole way there, getting to know one another bit by bit. Everyday thereafter, I eat<sup>4</sup> breakfast

1. A. NO CHANGE  
B. will be  
C. was  
D. have been

2. F. NO CHANGE  
G. couple that  
H. couple, Jean and Christine  
J. couple, in a few hours

3. A. NO CHANGE  
B. pouring from my mouth, speaking  
C. pouring from my mouth speaking  
D. pouring from my mouth by speaking

4. F. NO CHANGE  
G. was eating  
H. began to eat  
J. would eat

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with the two of them, so we'd all go our separate ways for the day. In the evening, my host mother would make delicious dinners for the three of us. My entire experience was joyous and exhilarating until I received some shocking news from my program coordinator: there had been a death in my host parents extended family. They had to

travel outside France for several weeks, so tending to all the business that arises from an unforeseen death. That afternoon, I had to move out of one family's house and into another so I'd have to repack my suitcases.

The exchange coordinator told me I'd have a roommate this time and asked whether I could share a bedroom with

an English speaker or someone who didn't speak English.

To avoid the temptation to speak my native language, I asked not to be placed with an English-speaking

roommate. When I got to my new room, I introduced myself to my new roommate Paolo, a Brazilian the same age as I, whom I was surprised to find playing one of my favorite CDs on the stereo!

In just a few hours, we knew we'd be attached at the hip for the rest of the term.

I left France with many stories, so when people ask me what my favorite part of the trip was, they are always

surprised to hear me talk, about my Brazilian friend Paolo, and the scores of weekdays in class, weeknights on the town, and weekends exploring France we enjoyed together.

5. A. NO CHANGE  
B. since  
C. therefore  
D. then

6. F. NO CHANGE  
G. host parent's  
H. host parents'  
J. host's parents

7. A. NO CHANGE  
B. weeks to tend  
C. weeks, tended  
D. weeks

8. F. NO CHANGE  
G. which would probably be about the same size.  
H. which I hope would be closer to the supermarket.  
J. OMIT the underlined portion and end the sentence with a period.

9. A. NO CHANGE  
B. English speaker and one who was not.  
C. English speaker or a person, not an English speaker.  
D. English speaker.

10. F. NO CHANGE  
G. which  
H. that  
J. he who

11. Given that all the choices are true, which one provides the most relevant information with regard to the narrator's friendship with Paolo?  
A. NO CHANGE  
B. He hadn't heard of a lot of my CDs, though.  
C. We didn't have a lot of classes together, but at least we liked the same music.  
D. I didn't speak Portuguese, so it took some time to start to understand each other.

12. F. NO CHANGE  
G. talk about my Brazilian friend Paolo  
H. talk about my Brazilian friend, Paolo,  
J. talk, about my Brazilian friend Paolo,

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I love people, how they end up being so similar, but are

<sup>13</sup>

so different. The most valuable lesson I gained from studying in France wasn't just to respect the French people but to respect all people, for your next best friend could be just a continent away. [15]

- 13. A. NO CHANGE  
B. I love how people seem so different and are so similar.  
C. People seem so different, so I love how they end up being so similar.  
D. I love how people can seem so different, but end up being so similar.
- 14. Which of the choices would be most appropriate here?  
F. NO CHANGE  
G. enjoyable  
H. fun  
J. supportive
- 15. Which of the following sentences, if inserted here, would best conclude the essay as well as maintain the positive tone established earlier in the essay?  
A. France is an interesting place once you grasp the language.  
B. I would recommend an exchange program to anyone who wants to experience foreign cultures.  
C. High school is going to be quite boring now, especially since my new friend Paolo won't be there.  
D. It will be nice to graduate at the end of this year.

PASSAGE II

My Favorite Lunch Spot

A few blocks south of the apartment, I'm renting, Joe's Lunch Bucket serves up amazing sandwiches. The owner runs the place, so he stays open as late as he has customers, usually until some time after midnight. The

restaurant is at the end of an alley, and if you sit on the last stool by the window, you can see the big public

fountain, in the adjacent square. There are usually swarms of children and teenagers milling around the area; no one really enforces the curfew, especially in the summer when the nights are warm and families stroll around the shops and public spaces downtown.

[1] Joe has a menu stuck to the front window with masking tape that is yellowed and cracked from years in the sun. [2] Never mind the dingy interior, noisy kitchen, and lack of parking. [3] I just go there for the food.

- 16. F. NO CHANGE  
G. apartment I'm renting  
H. apartment I'm renting,  
J. apartment, I'm renting
- 17. A. NO CHANGE  
B. was located  
C. had been  
D. will be
- 18. F. NO CHANGE  
G. fountain in  
H. fountain in,  
J. fountain; in

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[4] I've never stopped to read it and, as far as I can tell, neither have the other regulars. [5] I like to sit at the bar along the window and relax with the sinfully deliciousness<sup>19</sup>

of Joe's Special Rueben. [6] Newcomers to Joe's who<sup>20</sup> have never seen his creations<sup>20</sup> marvel at the stack of

corned beef and sauerkraut; spilling<sup>21</sup> from the bread onto

my paper plate. [22]

Joe's is my home away from home.<sup>23</sup> The sign outside is hardly eye-catching and the restaurant always appears to be dimly lit, but one can't help noticing the large smiley face decal affixed to the front door that reads "Keep Smiling!" The sandwiches certainly make me smile, but I can't say they do the same for Joe himself. His constant ugly expression belies, the<sup>24</sup> care that he takes with his meats, breads, and cheeses. So, too, does his quirky restaurant. The counters are dented and scratched from years of knife abuse. The old refrigerator case clicks and whines<sup>25</sup> constantly. As I savor my sandwich, my gaze always drifts toward the caulk along the window panes, once white, which is slowly deteriorating with the rest of the place. In fact, I've often thought to offer Joe my painting services in exchange for some sustenance. [26]

19. A. NO CHANGE  
B. sinfully delicious  
C. sinful deliciousness  
D. sinful delicious
20. F. NO CHANGE  
G. Newcomers to Joe's  
H. Newcomers to Joe's who need a menu to order  
J. People who've never had the pleasure of a Joe's sandwich
21. A. NO CHANGE  
B. sauerkraut, spilling  
C. sauerkraut, spilling,  
D. sauerkraut spilling
22. For the sake of logic and coherence, Sentence 4 of this paragraph should be placed:  
F. where it is now.  
G. before Sentence 1.  
H. after Sentence 2.  
J. after Sentence 1.
23. Which choice most effectively guides the reader from the preceding paragraph into this new paragraph?  
A. NO CHANGE  
B. Joe takes good care of his property.  
C. May be Joe learned his sandwich secrets at culinary school.  
D. Good food is the key to Joe's success.
24. F. NO CHANGE  
G. belies that the  
H. belies, and the  
J. belies the
25. A. NO CHANGE  
B. clicks to whine  
C. clicking and whining  
D. click and whine
26. At this point, the writer wants to add a sentence that would further describe the condition of the restaurant. Which of the following sentences would best accomplish this?  
F. Regardless of the appearance of the place, I still enjoy my delicious sandwich.  
G. I would like to see who his maintenance man is.  
H. If I had a restaurant, I'd make sure it was clean.  
J. People seem to ignore the building, though.

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The food is, after all, the only charm this little place needs.

A lot of people pay daily visits to the sandwich shop.

I know much of their faces by now, but I could more  
easily recall their tastes in sandwiches. Older people like

the classics—chicken salad, corned beef, and the like. [28]

Kids come in after school for grilled cheeses or Joe's

tuna salad. Back home, as I am reminiscing on this place,

I picture all these people with their favorite meals.

Perhaps it's the familiarity that makes Joe's my favorite sandwich shop. I know that I can come in whenever I please and someone would look away from a savory sandwich and offer a friendly hello. It's nice to know that Joe's Lunch Bucket. And its neighborly ambience are just a short walk away.

27. A. NO CHANGE  
B. many  
C. mostly  
D. none

28. The writer is considering deleting the following phrase from the preceding sentence:  
chicken salad, corned beef, and the like.

If the writer were to make this deletion, the essay would primarily lose:

- F. foreshadowing of the conclusion.  
G. irrelevant information.  
H. specific descriptive material.  
J. an understatement of important information.
29. A. NO CHANGE  
B. When I am back home and reminiscing, I picture all of these people with their favorite meals.  
C. Back home, I picture all these people with the favorite meals when I reminisce.  
D. Reminiscing back home makes me picture all these people with their favorite meals.

30. F. NO CHANGE  
G. Bucket, and  
H. Bucket and  
J. Bucket;

### PASSAGE III

#### Slowly Spanning the Straits

The Straits of Mackinac, located between Lake Huron and Lake Michigan, divide Michigan's Upper and Lower Peninsulas. Native Americans in the former wilderness

territory know how to paddle between several islands to make their way across the Straits. Settlers in the

eighteenth, and nineteenth, centuries crossed the Straits by

ferry. However, ferries soon prove to be costly in both lives

31. A. NO CHANGE  
B. knew  
C. have known  
D. knows

32. F. NO CHANGE  
G. eighteenth, and nineteenth  
H. eighteenth and nineteenth  
J. eighteenth and nineteenth,

33. A. NO CHANGE  
B. proved  
C. proves  
D. have proven

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and money. By the 1880s, the Michigan Legislature had begun discussing the idea of building a bridge to span the,

Strait noting the success of the newly-built Brooklyn Bridge. However, many hurdles stood in the way.

<sup>34</sup> During the late nineteenth century, the Legislature heard plans for an elaborate system of bridges and causeways that would use three islands as intermediate points.

However, no action was ever taken on the project. In the 1920s, an assembly ordered resumption of ferry service

between the peninsulas; so within five years, Governor

Fred Green felt there great cost warranted investigation of the bridge idea once again. The State Highway Authority concluded that a bridge could be built for around \$30 million.

In the 1930s, The Mackinac Bridge Authority twice sought federal funding for construction of the bridge, but was denied each time. Even so, a route was plotted and careful study of the lakebed and the rock below began.

Any progress, however, that was put on hold for the duration of World War II, and it was not until 1950 that funds were fully invested in the bridge project.

Construction of the Mackinac Bridge finally began in 1954. It would become a crowning achievement for design engineer David Steinman and, for years, would be

34. F. NO CHANGE  
G. Giving up by the 1880s  
H. Until the 1880s  
J. In terms of the 1880s

35. The writer is considering deleting the underlined portion from the sentence. If the writer were to delete this phrase, the essay would primarily lose:  
A. a minor detail in the essay's opening paragraph.  
B. an explanation of the impetus for discussion of a potential bridge.  
C. the writer's opinion about the historical significance of the Mackinac Bridge.  
D. an indication of Michigan's desire to keep pace with the transportation development taking place in New York City.

36. F. NO CHANGE  
G. for the project  
H. by the project  
J. of the project

37. A. NO CHANGE  
B. peninsulas so  
C. peninsulas, but  
D. peninsulas; and

38. F. NO CHANGE  
G. their great cost  
H. it's great cost  
J. its great cost

39. A. NO CHANGE  
B. however that  
C. however  
D. however,

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the longest suspension bridge in the world. <sup>40</sup> U.S. Steel Company received the contract to build the massive steel superstructure. It was a two-and-a-half year ordeal that cost the state more than \$44 million and cost five men

their lives. On November 1, 1957, the Mackinac Bridge,  
<sup>41</sup>  
in spite of decades of problems, opened to traffic. Those  
<sup>41</sup>  
 who did not know the history of the project were elated by the bridge's "on schedule" completion.

Today, the Mackinac Bridge is as solid as ever. In 1998  
<sup>42</sup>  
 it collected its 100 millionth toll. It will continue to serve

drivers and highway travelers well into the future and  
<sup>43</sup>

stand as a monument to Michigan's perseverance.  
<sup>44</sup>

40. If the writer were to delete the preceding sentence, the paragraph would primarily lose:

- F. an explanation of how the Mackinac Bridge was erected.
- G. details about the significance of the Mackinac Bridge.
- H. background information on the history of building bridges.
- J. biographical information about David Steinman.

41. A. NO CHANGE

- B. On November 1, 1957, the Mackinac Bridge opened, in spite of decades of problems, to traffic.
- C. The Mackinac Bridge opened to traffic, in spite of decades of problems, on November 1, 1957.
- D. In spite of decades of problems, the Mackinac Bridge opened to traffic on November 1, 1957.

42. F. NO CHANGE

- G. Since,
- H. Meanwhile,
- J. Historically,

43. A. NO CHANGE

- B. highway drivers and travelers
- C. drivers—and highway travelers—
- D. highway travelers

44. Which of the following alternatives to the underlined portion would be LEAST acceptable in terms of the context of this sentence?

- F. mark the union of Michigan's two peninsulas.
- G. serve as a symbol of suspension bridges around the world.
- H. provide an image of strength and grace to all who cross it.
- J. pay tribute to the progress of a great state.

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer had intended to write a brief essay that describes the entire process of designing and building the Mackinac Bridge. Would this essay successfully fulfill the writer's goal?

- A. Yes, because it offers such details as the material of the superstructure, the identity of the designer, and the cost of construction.
- B. Yes, because it explains in detail each step in the design and construction of the bridge.
- C. No, because it focuses primarily on the difficulty and delay in seeing construction of a bridge across the Strait come to fruition.
- D. No, because it is primarily a historical essay about the motivation behind the bridge project.

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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.

## Care with Cards

[1]

Does anyone have a real hobby anymore? I must admit I was disheartened when my brother, younger by 10 years, didn't want to go into the sports card shop with me.

We went to a department store instead. Every boy

46

which I have known as a kid had a box in his

47

room, brimming, with cards. Some boys were into

48

basketball and football cards, but my passion was for

baseball cards. I couldn't believe the shocked look on my

brother's face when he saw some of the expensive

offerings in the shop's window display. He just couldn't

appreciate the history behind the cards and the care taken

to preserve them over the decades. For him, no piece of

cardboard are worth any sum of money. He would rather

49

have a video screen to distract him.

[2]

[1] I appreciate the arguments in favor of television,

50

video games, and other electronic entertainment.

50

46. F. NO CHANGE  
 G. We decided to go to a department store instead, to look for shoes.  
 H. (We were in the mall to do some shoe shopping.)  
 J. OMIT the underlined portion.
47. A. NO CHANGE  
 B. whom I knew  
 C. I knew  
 D. OMIT the underlined portion.
48. F. NO CHANGE  
 G. room, brimming  
 H. room brimming  
 J. room brimming,
49. A. NO CHANGE  
 B. has  
 C. was  
 D. could of been
50. Which choice would most effectively and appropriately lead the reader from the topic of Paragraph 1 to that of Paragraph 2?  
 F. NO CHANGE  
 G. Electronic forms of entertainment involve the creative mind instead of the organized, mathematical mind.  
 H. I find nothing entertaining about television, video games, and other electronic entertainment.  
 J. Baseball cards decreased in popularity while electronic entertainment has increased.

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[2] The technology is dynamic and, for the most part,  
engaging. [3] There's indeed something for everyone.

[4] I also believe, however, that these new forms of  
entertainment have taken time away from "unplugged"

fun. [5] A good hands-on hobby should be an important  
part of any childhood. [6] Instead of simple story books,  
toddlers have interactive learning computers that read for  
them. [7] When children aren't watching satellite  
television, they have console games to entertain them.

[8] It seems to me that more and more of the joys of  
childhood are being lost to the allure of the video screen.

[3]

Building a sports card collection is a rewarding endeavor  
for children and adults alike that is fun for everyone. It  
teaches quality lessons, such as patience and organization.  
For young fingers, it develops a careful touch. I remember  
how hard I tried to slide each card into a plastic sleeve  
without damaging the delicate corners of the card. Nearly  
all weekend, there was a card show at the local mall where  
I learned to bargain and trade for all the cards that I  
needed to fill the gaps in my collection. Although I very  
much enjoyed spending time alone looking at the cards,  
I often shared the experience with others. Card collecting  
is a social activity too encouraging the old and young to  
swap cards and stories. Today's electronic entertainment,  
however, keeps people apart and does little to benefit  
developing minds. The video screen silences spectators as  
it holds their attention to the screen. Television and video  
games deliver instant gratification. Tune a channel or insert  
a disc and off you go. Hours and hours of sedentary

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

- A. and, generally,
- B. but, thoroughly
- C. and, therefore,
- D. and, as such,

52. For the sake of logic and coherence of Paragraph 2 this  
sentence should be:

- F. placed where it is now.
- G. placed after Sentence 1.
- H. placed after Sentence 7.
- J. OMITTED, because the paragraph focuses only on  
electronic forms of entertainment.

53. A. NO CHANGE

- B. alike.
- C. alike, which can benefit both groups.
- D. alike that want a wholesome hobby.

54. F. NO CHANGE

- G. each and every
- H. every
- J. every unique

55. A. NO CHANGE

- B. we often shared
- C. I often share
- D. I then shared

56. F. NO CHANGE

- G. too, encouraging
- H. too; encouraging
- J. too, by encouraging

57. A. NO CHANGE

- B. at the screen.
- C. for the screen.
- D. OMIT the underlined portion and end the sentence  
with a period.

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satisfaction are at their fingertips!

58

[4]

I am concerned that this trend toward electronics will lead to less physical activity and make the fun in life effortless and instant available. The younger generation needs to know that pleasure can also come from a hobby that demands patience, care, hard work, and concentration.

59

58. F. NO CHANGE  
G. your  
H. one's  
J. people's

59. A. NO CHANGE  
B. instants  
C. instantly  
D. more instant

Question 60 asks about the preceding passage as a whole.

60. Suppose the writer had chosen to write an essay that indicates that sports card collecting is superior to electronic entertainment. Would this essay fulfill the writer's goal?
- F. No, because the writer admits that electronic entertainment has become more popular than sports card collecting.  
G. No, because the writer states that electronic entertainment is dynamic and engaging.  
H. Yes, because the writer claims that, unlike electronic entertainment, sports card collecting teaches valuable life skills such as organization and careful handling of fragile items, and also provides a medium for social interaction.  
J. Yes, because the writer suggests that any hands-on hobby is better than watching television.

#### PASSAGE V

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.

#### Spies Online

[1]

People who choose to use a personal computer to connect to the Internet should know the risks that this poses. Most computer users have some experience with slow computers, unexplainable program crashes, and indecipherable warnings about missing system files. These same computer users are more likely to wait, until

61

61. A. NO CHANGE  
B. wait, until,  
C. wait until,  
D. wait until

**GO ON TO THE NEXT PAGE.**

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these problems get too bad to manage. They would buy a new system entirely before trying to fix their current one.

Online, the biggest threat is spyware, which is crippling unsecured computers and data networks around the world.

[2]

Like a computer virus, a spyware program is not purely malicious. The developer of the spyware program stands to

gain from installing it on your computer, often just in information, but usually financially, too. These programs may monitor your online activity and track your keystrokes and buying habits. This data is sold to marketing agencies for demographic research, and to more unscrupulous firms that will bombard you with email

solicitations and sales calls. Not all spyware; however has legitimate commerce behind it.

[3]

Both computer viruses and spyware can cause problems. Other programs show up as system messages, luring unaware users to click their way into corrupting their own operating systems and revealing sensitive personal

information. Not only do these programs cause a depletion of system resources, but they waste time and test the nerves of even the most patient user.

[4]

There are plenty of solutions designed to eliminate the spyware problem. The first step is to rid your computer of any unwanted programs. Detection utilities that detect spyware are widely available, many at no cost,

- 62. F. NO CHANGE
- G. spyware, which crippling
- H. spyware, and it's crippled by
- J. spyware, and its crippled

- 63. A. NO CHANGE
- B. As with
- C. Unlike
- D. Comparable to

- 64. F. NO CHANGE
- G. except
- H. always
- J. instead of

- 65. A. NO CHANGE
- B. spyware, however,
- C. spyware, however
- D. spyware however

- 66. Which choice is the most effective first sentence of Paragraph 3?
  - F. NO CHANGE
  - G. Among the most serious spyware programs are those called "keystroke loggers."
  - H. Most people don't know their computers are infected with spyware.
  - J. Due to unsecured internet connections, spyware is far more prevalent than computer viruses.

- 67. A. NO CHANGE
- B. initiate depletion of system resources,
- C. lead to depleting system resources,
- D. deplete system resources,

- 68. F. NO CHANGE
- G. Detection utilities
- H. Spyware can be found by detection utilities that
- J. Detection utilities that find spyware

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that scans the computer for undesirable programs and then removes them. <sup>69</sup> Once this is accomplished, the utilities <sup>69</sup> monitor the system constantly to prevent any new installation of spyware. It is important to understand how your computer protects and to keep your software updated. <sup>70</sup>

[5]

Good web surfing habits are essential, too. Avoid web sites you don't trust. Spyware originates from many <sup>71</sup>

kinds of web sites. <sup>71</sup> Go online never <sup>72</sup> without a firewall and active virus and spyware protection. Remember that a computer is just a machine. If you turn it on and never touch it, <sup>73</sup> it will likely remain fast and reliable. It is generally what the user does to the computer that affects it.

69. A. NO CHANGE  
 B. that scan the computer for undesirable programs and remove them.  
 C. that scan the computer for undesirable programs and removes them.  
 D. that scans the computer for undesirable programs then removing them.
70. F. NO CHANGE  
 G. has been protected  
 H. protects them  
 J. is protected
71. In this paragraph, the writer intends to recommend a number of sound web surfing habits. This is to be the second recommendation. Given that all of the choices are true, which one would best accomplish the writer's intention?  
 A. NO CHANGE  
 B. Don't buy anything online from a store with no physical address.  
 C. Shut down your computer when you aren't using it.  
 D. Know the various names of spyware programs.
72. The best placement for the underlined portion would be:  
 F. where it is now.  
 G. after the word *Go*.  
 H. after the word *firewall*.  
 J. at the beginning of the sentence.
73. A. NO CHANGE  
 B. it  
 C. it, while it  
 D. it, it,

Questions 74 and 75 ask about the preceding passage as a whole.

74. Upon reviewing this essay and realizing that some information has been left out, the writer composes the following sentence, incorporating that missing information:
- If you own a computer, it is vital to understand it, for noxious software is becoming increasingly sophisticated and infectious.
- The most logical and effective place to add this sentence would be after the last sentence of Paragraph:
- F. 2.  
 G. 3.  
 H. 4.  
 J. 5.

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75. Suppose the writer had decided to write an essay discussing the moral and ethical consequences of programming spyware to illicitly collect private information. Would this essay successfully fulfill the writer's goal?
- A. Yes, because the essay explains the moral and ethical consequences when spyware is installed on a computer.
  - B. Yes, because the essay details the process of ridding a computer of spyware, which helps the reader to understand the consequences of programming spyware.
  - C. No, because the essay does not explain how to program spyware, so the reader has no basis for making a moral or ethical judgment.
  - D. No, because the essay limits itself to a brief description of spyware and the basic precautions to be taken against it.

**END OF THE ENGLISH TEST.**

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



## MATHEMATICS TEST

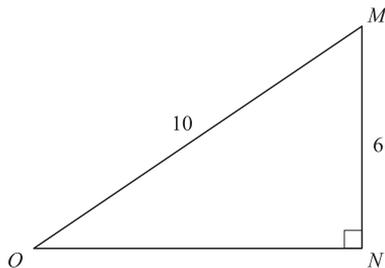
60 Minutes—60 Questions

**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.

- In the standard  $(x,y)$  coordinate plane, point  $X$  has coordinates  $(-4,0)$  and point  $Y$  has coordinates  $(0,-8)$ . What are the coordinates of the midpoint of  $\overline{XY}$ ?
  - $(-6,-1)$
  - $(-2,-4)$
  - $(0,2)$
  - $(2,4)$
  - $(6,-1)$
- Given right triangle  $\triangle MNO$  below, how many units long is  $\overline{NO}$ ?

**DO YOUR FIGURING HERE.**



- $2\sqrt{2}$
  - 4
  - 6
  - $\sqrt{60}$
  - 8
- A distance in meters,  $M$ , can be approximated by multiplying a distance in yards,  $Y$ , by 1.0936. Which of the following expresses this approximation method? (Note: The symbol  $\approx$  means “is approximately equal to.”)
    - $M \approx \frac{Y}{1.0936}$
    - $M \approx \frac{1.0936}{Y}$
    - $M \approx Y(1.0936)$
    - $M \approx Y + 1.0936$
    - $M \approx Y(1.0936Y)$

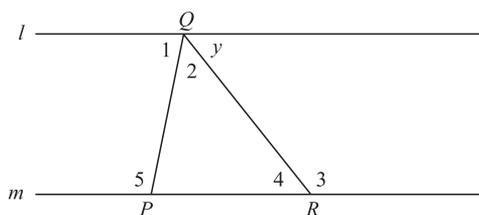
**GO ON TO THE NEXT PAGE.**



4. Seth has 4 plaid shirts and 5 solid-colored shirts hanging together in a closet. In his haste to get ready for work, he randomly grabs 1 of these 9 shirts. What is the probability that the shirt Seth grabs is plaid?

**DO YOUR FIGURING HERE.**

- F.  $\frac{1}{5}$
- G.  $\frac{1}{4}$
- H.  $\frac{4}{9}$
- J.  $\frac{1}{9}$
- K.  $\frac{4}{5}$
5. The daily totals of enrollments at Sunnyside Summer Camp last Monday through Saturday were 17, 19, 23, 14, 25, and 28. What was the average number of enrollments per day?
- A. 126
- B. 28
- C. 21
- D. 18
- E. 14
6. In the figure showing  $\triangle PQR$  below, line  $l$  is parallel to line  $m$ . Which one of the following angles must be congruent to  $\angle y$ ?



- F.  $\angle 1$
- G.  $\angle 2$
- H.  $\angle 3$
- J.  $\angle 4$
- K.  $\angle 5$
7. A carton of paper is priced at \$27.00 now. If the paper goes on sale for 25% off the current price, what will be the sale price of the carton?
- A. \$6.75
- B. \$20.25
- C. \$22.00
- D. \$26.75
- E. \$33.75



8. What is the slope of any line parallel to the line  $2x - 3y = 7$ ?

F.  $-3$

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

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

J.  $2$

K.  $3$

9. Andrew won a cash prize on a game show. Andrew paid taxes of 30% on the original cash prize and had \$28,000 remaining. How much was the original cash prize?

A. \$19,600

B. \$28,300

C. \$36,400

D. \$40,000

E. \$84,000

10. Melissa had 3 fewer apples than Marcia. Then, she gave 2 apples to Marcia. Now how many fewer apples does Melissa have than Marcia?

F. 0

G. 2

H. 3

J. 5

K. 7

11. What is the value of  $|5 - a|$  if  $a = 9$ ?

A.  $-14$

B.  $-4$

C. 4

D. 9

E. 14

12. For all  $m$  and  $n$ ,  $(3m + n)(m^2 - n) = ?$

F.  $3m^3 + 2m^2 - 2n$

G.  $m^3 - 2n^2$

H.  $2m^2 - n - n^2$

J.  $3m^2 + 3mn - 2n^2$

K.  $3m^3 - 3mn + m^2n - n^2$

13. For all  $x$ ,  $13 - 2(x + 5) = ?$

A.  $-2x + 3$

B.  $11x + 55$

C.  $13 + 10x$

D.  $23 - 2x$

E.  $23 + 2x$

14.  $(n^7)^{11}$  is equivalent to:

F.  $n^{77}$

G.  $n^{18}$

H.  $11n^4$

J.  $11n^7$

K.  $77n$

**DO YOUR FIGURING HERE.**



15. What is the 217th digit after the decimal point in the repeating decimal  $0.\overline{3456}$ ?

A. 0  
B. 3  
C. 4  
D. 5  
E. 6

**DO YOUR FIGURING HERE.**

16. The perimeter of a square is 48 centimeters. What is its area, in square centimeters?

F. 12  
G. 96  
H. 144  
J. 192  
K. 2,304

17. What is the product of the 2 solutions of the equation  $x^2 + 3x - 21 = 0$ ?

A. -63  
B. -21  
C. -20  
D. 20  
E. 21

18. Which of the following expressions is a polynomial factor of  $a^{16} - 16$ ?

F.  $a^4 - 4$   
G.  $a^4 + 4$   
H.  $a^4 + 2$   
J.  $a + 2$   
K.  $a - 2$

19. When  $n = \frac{1}{4}$ , what is the value of  $\frac{2n - 5}{n}$ ?

A. 18  
B. 9  
C. -3  
D. -9  
E. -18

20. A proofreader can read 40 pages in one hour. How many pages can this proofreader read in 90 minutes?

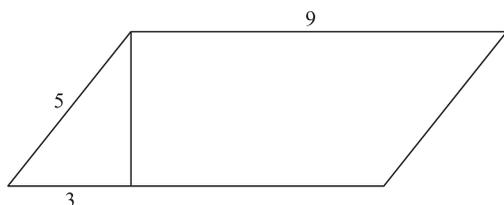
F. 45  
G. 60  
H. 150  
J. 360  
K. 940

2



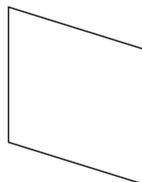
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21. The area of a parallelogram may be found by multiplying the base by the height. What is the area, in square inches, of the parallelogram below?



DO YOUR FIGURING HERE.

- A. 27  
 B. 36  
 C. 45  
 D. 48  
 E. 81
22. For a certain quadratic equation,  $ax^2 + bx + c = 0$ , the 2 solutions are  $x = \frac{3}{4}$  and  $x = -\frac{2}{5}$ . Which of the following could be factors of  $ax^2 + bx + c$ ?
- F.  $(4x - 3)$  AND  $(5x + 2)$   
 G.  $(4x - 2)$  AND  $(5x + 3)$   
 H.  $(4x + 2)$  AND  $(5x - 3)$   
 J.  $(4x + 3)$  AND  $(5x - 2)$   
 K.  $(4x + 3)$  AND  $(5x + 2)$
23. All sides of a rhombus are the same length, as shown below.



- If one diagonal is 12 inches long and the other is 32 inches long, how many inches long, to the nearest hundredth of an inch, is a side of the rhombus?
- A. 8.54  
 B. 17.09  
 C. 34.17  
 D. 35.78  
 E. 48.00
24. A rectangular parking lot that is 3 feet longer than it is wide has an area of 550 square feet. How many feet long is the parking lot?
- F. 19  
 G. 20  
 H. 22  
 J. 25  
 K. 28

GO ON TO THE NEXT PAGE.



25. In the standard  $(x, y)$  coordinate plane, what is the slope of the line joining the points  $(3, 7)$  and  $(4, -8)$ ?
- A.  $-15$   
B.  $-1$   
C.  $-\frac{1}{7}$   
D.  $\frac{21}{32}$   
E.  $15$
26. Which of the following is the solution set of  $x + 2 > -4$ ?
- F.  $\{x: x < -6\}$   
G.  $\{x: x > -6\}$   
H.  $\{x: x < -2\}$   
J.  $\{x: x > 2\}$   
K.  $\{x: x < 6\}$
27. What is the center of the circle with equation  $(x - 3)^2 + (y + 3)^2 = 4$  in the standard  $(x, y)$  coordinate plane?
- A.  $(3, 3)$   
B.  $(3, -3)$   
C.  $(\sqrt{3}, -\sqrt{3})$   
D.  $(-3, 3)$   
E.  $(-\sqrt{3}, \sqrt{3})$
28. In the standard  $(x, y)$  coordinate plane, what is the length of the line segment that has endpoints  $(-3, 4)$  and  $(5, -6)$ ?
- F.  $9$   
G.  $2\sqrt{41}$   
H.  $18$   
J.  $20\sqrt{2}$   
K.  $40$
29. A triangle has sides of length  $4.7$  meters and  $9$  meters. Which of the following CANNOT be the length of the third side, in meters?
- A.  $5$   
B.  $7$   
C.  $8$   
D.  $11$   
E.  $14$
30. If  $\frac{n^x}{n^y} = n^2$  for all  $n \neq 0$ , which of the following must be true?
- F.  $x + y = 2$   
G.  $x - y = 2$   
H.  $x \times y = 2$   
J.  $x \div y = 2$   
K.  $\sqrt{xy} = 2$

**DO YOUR FIGURING HERE.**

**2****2**

31. In the standard  $(x, y)$  coordinate plane, what is the  $y$ -intercept of the line given by the equation  $3x + 5y = 8$ ?
- A. 3
- B.  $\frac{5}{3}$
- C.  $\frac{8}{5}$
- D.  $-\frac{3}{5}$
- E. -3
32. There are 16 ounces in one pound. If 3.4 pounds of beef cost \$4.95, what is the cost per ounce, to the nearest cent?
- F. \$0.09
- G. \$0.31
- H. \$1.05
- J. \$1.46
- K. \$10.99
33.  $\left(\frac{1}{2}\right)^2 + \left(\frac{1}{3}\right)^2 + \left(\frac{1}{4}\right)^2 = ?$
- A.  $\frac{1}{29}$
- B.  $\frac{3}{29}$
- C.  $\frac{61}{144}$
- D.  $\frac{15}{32}$
- E. 9
34. One route along flat terrain from Hermansville to Melville is to drive straight north from Hermansville for 120 miles to Jamestown, then, at Jamestown, to drive straight west for 80 miles to Melville. If a straight, flat road existed between Hermansville and Melville, approximately how many miles long would it be?
- F. 200
- G. 144
- H. 100
- J. 98
- K. 40
35. In order to clean her aquarium, Stephanie must remove half of the water. The aquarium measures 30 inches long, 16 inches wide, and 12 inches deep. The aquarium is currently completely full. What volume of water, in cubic inches, must Stephanie remove?
- A. 1,440
- B. 2,880
- C. 4,320
- D. 5,760
- E. 7,200

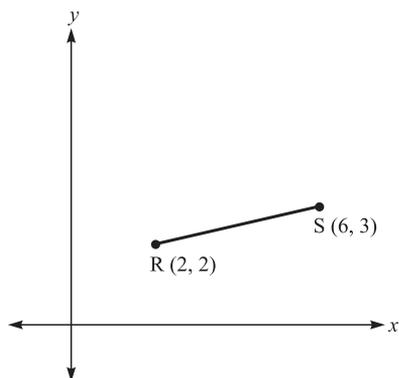
**DO YOUR FIGURING HERE.****GO ON TO THE NEXT PAGE.**



36. The bowling league selects its 4 officers by first selecting the president, then the vice president, then the secretary, then the treasurer. If there are 40 bowlers who are eligible to hold office and no member can hold more than one office, which of the following gives the number of different possible results of the election?

F.  $37^4$   
 G.  $39^4$   
 H.  $40^4$   
 J.  $39 \times 38 \times 37 \times 36$   
 K.  $40 \times 39 \times 38 \times 37$

37. The points  $R(2,2)$  and  $S(6,3)$  in the standard  $(x,y)$  coordinate plane below are 2 vertices of triangle  $RST$ , which has a right angle at  $S$ . Which of the following could be the third vertex,  $T$ ?



A.  $(5,7)$   
 B.  $(5,-5)$   
 C.  $(4,6)$   
 D.  $(4,9)$

E.  $\left(4, \frac{9}{2}\right)$

38. What value of  $x$  will satisfy the equation  $0.2(x - 2,700) = x$ ?

F.  $-675$   
 G.  $-540$   
 H.  $0$   
 J.  $540$   
 K.  $675$

39. If  $0^\circ \leq x \leq 90^\circ$  and  $\tan x = \frac{15}{8}$ , then  $\cos x = ?$

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

B.  $\frac{15}{17}$

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

D.  $\frac{17}{15}$

E.  $\frac{8}{15}$

**DO YOUR FIGURING HERE.**

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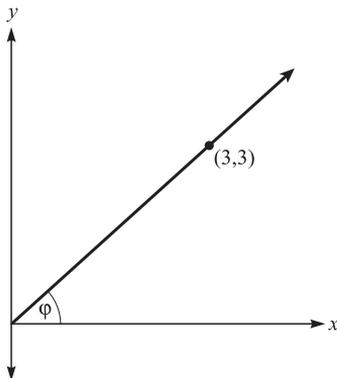
**2****2**

40. A square pool with an area of 81 square feet is to be placed entirely within a circular enclosure with a radius of 10 feet. Tiles will be laid within the entire enclosure around the pool (but not under it). What is the approximate area, in square feet, of the enclosure that will be tiled?
- F. 81  
G. 233  
H. 315  
J. 396  
K. Cannot be determined without knowing the exact placement of the pool.

**DO YOUR FIGURING HERE.**

41. In the standard  $(x,y)$  coordinate plane, which of the following lines goes through  $(3,4)$  and is parallel to  $y = 2x + 2$ ?
- A.  $y = \frac{1}{2}x + 2$   
B.  $y = 2x - 2$   
C.  $y = 2x + 4$   
D.  $y = 2x + 10$   
E.  $y = 3x + 2$

42. In the figure below,  $\tan \phi = ?$



- F.  $\frac{1}{\sqrt{2}}$   
G.  $\sqrt{2}$   
H. 1  
J. 3  
K.  $3\sqrt{2}$
43. Which of the following operations will produce the smallest result when substituted for the blank in the expression:  $\frac{2}{3}$  \_\_\_\_\_  $- 3$ ?
- A. plus  
B. minus  
C. multiplied by  
D. divided by  
E. averaged with

**GO ON TO THE NEXT PAGE.**

**2**  $\triangle$   $\triangle$   $\triangle$   $\triangle$   $\triangle$   $\triangle$   $\triangle$   $\triangle$   $\triangle$  **2**

44. The value of  $b$  that will make  $\frac{b}{3} + 2 = \frac{1}{4}$  a true statement lies between which of the following numbers?

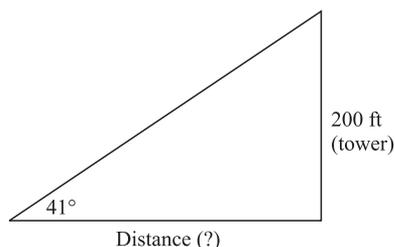
F.  $-4$  and  $-6$   
G.  $-1$  and  $-3$   
H.  $-1$  and  $1$   
J.  $1$  and  $3$   
K.  $3$  and  $5$

**DO YOUR FIGURING HERE.**

45. What is the solution set of  $|3a - 2| \leq 7$ ?

A.  $\{a: a \leq 3\}$   
B.  $\{a: -\frac{5}{3} \leq a \leq 3\}$   
C.  $\{a: -\frac{5}{3} \geq a \geq 3\}$   
D.  $\{a: -\frac{5}{3} \leq a \geq 3\}$   
E.  $\{a: -\frac{5}{3} \geq a \leq 3\}$

46. When measured from a point on the ground that is a certain distance from the base of a cell phone tower, the angle of elevation to the top of the tower is  $41^\circ$ , as shown below. The height of the cell phone tower is 200 feet. What is the distance, in feet, to the cell phone tower?



- F.  $200 \tan 41^\circ$   
G.  $200 \sin 41^\circ$   
H.  $200 \cos 41^\circ$   
J.  $200 \sec 41^\circ$   
K.  $200 \cot 41^\circ$
47. For the area of a square to triple, the new side lengths must be the length of the old sides multiplied by:
- A.  $\sqrt{3}$   
B.  $3$   
C.  $4$   
D.  $2\sqrt{3}$   
E.  $9$

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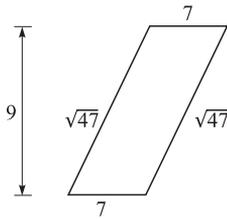


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48. The volume of a cube is given by the formula  $s^3$ , where  $s$  is the length of a side. If a cube has a volume of 64, and the length of each side is halved, the new cube's volume will be:
- F. 3  
G. 6  
H. 8  
J. 16  
K. 32

DO YOUR FIGURING HERE.

49. In the parallelogram below, lengths are given in inches. What is the area of the parallelogram, in square inches?



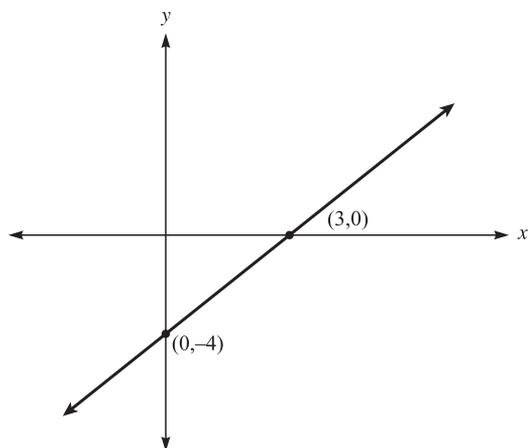
- A.  $\sqrt{94}$   
B.  $7\sqrt{47}$   
C. 49  
D. 63  
E.  $16\sqrt{47}$
50. If  $8a^6b^3 < 0$ , then which of the following CANNOT be true?
- F.  $b < 0$   
G.  $b > 0$   
H.  $a = b$   
J.  $a < 0$   
K.  $a > 0$
51. If  $\log_4 x = 3$ , then  $x = ?$
- A.  $\frac{1}{\log_{12}}$   
B.  $4 \log^3$   
C. 12  
D. 64  
E. 81

2



2

52. If a system of 2 linear equations in 2 variables has NO solution, and 1 of the equations is graphed in the  $(x,y)$  coordinate plane below, which of the following *could* be the equation of the other line?



- F.  $y = -2$
- G.  $y = -\frac{1}{4}x + 2$
- H.  $y = -2x - 4$
- J.  $y = \frac{4}{3}x + 2$
- K.  $y = 4x - 4$
53. In a game, 80 marbles numbered 00 through 79 are placed in a box. A player draws 1 marble at random from the box. Without replacing the first marble, the player draws a second marble at random. If both marbles drawn have the same ones digit (that is, both marbles have a number ending in 0, 1, 2, 3, etc.), the player is a winner. If the first marble drawn is numbered 35, what is the probability that the player will be a winner on the next draw?
- A.  $\frac{1}{79}$
- B.  $\frac{7}{80}$
- C.  $\frac{7}{79}$
- D.  $\frac{1}{10}$
- E.  $\frac{8}{79}$

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

**2****2**

54. In the standard  $(x,y)$  coordinate plane, what is the equation of the line that passes through the origin and the point  $(3,4)$ ?

F.  $y = \frac{1}{4}x + \frac{3}{4}$

G.  $y = \frac{1}{4}x - \frac{1}{3}$

H.  $y = \frac{4}{3}x$

J.  $y = \frac{1}{2}x + \frac{3}{4}$

K.  $y = \frac{9}{4}x$

55. The measure of the vertex angle of an isosceles triangle is  $(a + 30)^\circ$ . The base angles each measure  $(2a - 15)^\circ$ . What is the measure in degrees of one of the base angles?

A.  $36^\circ$

B.  $45^\circ$

C.  $57^\circ$

D.  $66^\circ$

E.  $90^\circ$

56. What is the smallest possible value for the product of 2 integers that differ by 7?

F. 8

G. 0

H. -6

J. -10

K. -12

57. Three distinct lines, all contained within a plane, separate that plane into distinct regions. What are all of the possible numbers of distinct regions of the plane that could be separated by any such three lines?

A. 4, 6, 7

B. 4, 5, 6

C. 3, 5, 7

D. 3, 5, 6

E. 3, 4, 5

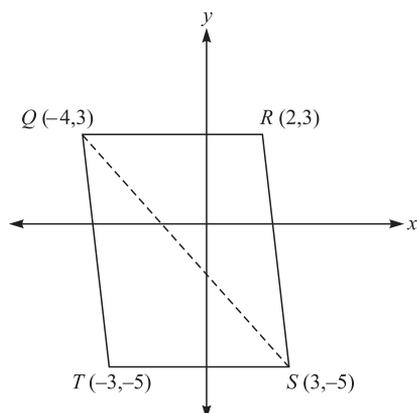
**DO YOUR FIGURING HERE.**

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58. Given the vertices of parallelogram  $QRST$  in the standard  $(x, y)$  coordinate plane below, what is the area of triangle  $QRS$ , in square units?



DO YOUR FIGURING HERE.

- F. 24  
 G. 28  
 H. 48  
 J. 60  
 K. 80
59. The first and second terms of a geometric sequence are  $a$  and  $ab$ , in that order. What is the 643rd term of the sequence?
- A.  $(ab)^{642}$   
 B.  $(ab)^{643}$   
 C.  $a^{642}b$   
 D.  $a^{643}b$   
 E.  $ab^{642}$
60. Points  $A$ ,  $B$ , and  $C$  are three distinct points that lie on the same line. If the length of  $AB$  is 19 meters and the length of  $BC$  is 13 meters, then what are all the possible lengths, in meters, for  $AC$ ?
- F. 6 only  
 G. 32 only  
 H. 6 and 32 only  
 J. Any number less than 32 or greater than 6  
 K. Any number greater than 32 or less than 6

**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: *The Summer Sandwich Club*

Maxwell was one of those kids I know I will remember for the rest of my life. I first met Max three summers ago when he showed up at the park on the first day of camp with his mother Katherine. After a brief good morning, he went off to play with the rest of the five and six year olds who I would be counseling for the next several weeks. As his mother walked back to her car, I couldn't help but notice that she looked as though she had just finished running a marathon; however, that thought left my mind soon after she drove away, as I was surrounded by the smiling faces of thirty brand new campers.

The summer started off great, and Max and I hit it off right away; he looked up to me as an older brother, and I thought he was a great little kid. There were a few things that stuck out in my mind as odd, though, like when he would complain of being hungry an hour or so after lunch at least once or twice a week. By the third week of camp, I decided that it was something I needed to investigate, and during lunch time I went over to his table and asked if I could sit next to him. He giggled and said, "Sure Jake," feeling special that I would want to spend my lunch break with him. His lunch consisted of a bag of potato chips, a can of soda, and a chocolate bar—hardly a healthy meal for a five year old. I offered him half of my sandwich and his eyes lit up like it was his birthday.

That afternoon, when Katherine came to pick Max up from the park, I pulled her aside to discuss the lunch issue.

"Katherine, Maxwell needs to have a healthy lunch." She looked down at the ground.

"What do you mean, Jake?"

"I mean Max can not keep eating junk food every day."

"Oh. That. I'm sorry about that. It's just that I work back-to-back jobs every night and barely make it home in time to get him out of bed and dressed before camp starts in the morning. His babysitter is supposed to pack Max's lunch for him at night when she puts him to bed. We have had a couple of new babysitters

lately, and sometimes they forget to do it, so I end up having to throw something together at the last minute. I'll make sure it doesn't happen any more."

45 "It happens to the best of us; I just wanted to make sure you knew what he was eating. After a couple days of him being hungry I got worried and wondered who was making his lunch for him. See you tomorrow morning then."

50 Several days later I expected to see Max eating a sandwich when I went over to him at lunchtime. His lunch once again consisted entirely of junk food. Something had to change; at the very least he needed to be eating much less sugar.

55 "Katherine," I called to his mother as she stepped out of her car that afternoon. I really had no idea what I was supposed to say. It was quite a predicament. "We really need to fix this problem with Max's lunch."

60 "Jake, I know, it's just that the house payment was due yesterday, and I haven't had the, uh, time to get to the grocery store," she trailed off. "Things are just a little hard for us right now."

65 She was obviously self-conscious at the moment, and I felt bad for having brought it up again. I told her that I had a plan, and not to worry about it. After explaining what I meant, the look on her face was one of relief and thanks, and she and Max headed home for the day.

70 For the rest of the summer, I spent my lunches with Max and his friends, having meetings of what we called the "Sandwich Club": every day I would bring a couple of extra sandwiches, and anybody who wanted to try one could have some. Max never seemed to care what kind of sandwiches I brought to the club, but just giggled and smiled up at me every afternoon.

75 At the end of the summer, I got a letter from Katherine, thanking me for being so kind to she and Max. I wrote back telling her that I could hardly wait until the next meeting of the "Sandwich Club," and to tell Max that I said hello.

80 For the next two years, the "Sandwich Club" had regular meetings, Monday-Friday at noon, all summer long. After that, Max and his mother moved to be closer to his grandparents, and I went back to having my lunch

GO ON TO THE NEXT PAGE.

3

3

- 85 with the rest of the staff. But for those few years, the “Summer Sandwich Club” brought joy to one camp counselor and many young campers.
- When Jake says, “It happens to the best of us,” he is primarily saying that:
    - he understands that sometimes things happen that are beyond our control.
    - Katherine is a perfect parent, and he is surprised that Max is unhappy.
    - Max is a picky eater and would not eat a healthy lunch anyway.
    - Max is his favorite camper, despite the problems faced by Max’s mother.
  - It can be reasonably inferred from the conversations with Jake, that Katherine:
    - is a stay-at-home-mother.
    - does not care about her son.
    - works two jobs to make ends meet.
    - believes that junk food is healthy.
  - The idea that Jake’s mother is trying her best to take care of her son is least supported by which of the following quotations from the passage?
    - “It’s just that I work back-to-back jobs every night and barely make it home in time to get him out of bed and dressed before camp starts in the morning.”
    - “Katherine, Maxwell needs to have a healthy lunch.”
    - “Things are just a little hard for us right now.”
    - “I’ll make sure it doesn’t happen any more.”
  - As it is used in line 57 the word *predicament* most nearly means:
    - joke.
    - solution.
    - complaint.
    - challenge.
  - It can be inferred from the passage that Jake is:
    - Max’s older brother.
    - dissatisfied with his job.
    - a good influence on Max.
    - someone Max barely knows.
  - The passage makes it clear that the “Sandwich Club”:
    - lasted as long as Max was a camper.
    - met only when it rained.
    - was an insult to Katherine.
    - was Max’s favorite part of camp.
  - You may reasonably infer from the details in the passage that Katherine and Max:
    - dislike Jake.
    - are very wealthy.
    - do not trust other people.
    - have little money.
  - Katherine can most accurately be characterized as:
    - indifferent and withdrawn.
    - caring but distracted.
    - cruel and arrogant.
    - friendly but aloof.
  - The word *issue*, as it is used in line 30, most nearly means:
    - publication.
    - incident.
    - idea.
    - problem.
  - The title, “The Summer Sandwich Club,” combined with details presented in the passage imply that:
    - everyone loves sandwiches.
    - Jake only eats sandwiches in the summer.
    - children should join clubs to make friends.
    - the club was created because of Max.

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## PASSAGE II

SOCIAL SCIENCE: *Lewis and Clark Go West*

Over two hundred years ago, at the request of President Jefferson, the corps of volunteers for “North Western Discovery” set off under the command of Meriwether Lewis and William Clark to find the fastest water route across North America. The path they were to carve out would be the first of its kind; they were setting a course through the territory of potentially dangerous Indian tribes and ferocious animals. None but the fearless and inventive, the most resourceful and curious, would dare to undertake such a venture. In 1803, virtually no one had attempted to cross the stretch of land between the mighty Mississippi and the vast Pacific Ocean using only water routes. All of the wonders of those states in the West are, in part, the result of this expedition. These intrepid pioneers, especially Lewis and Clark, deserve to be remembered now some two centuries after their courageous journey into the unknown lands west of the Mississippi. The rolling hills of the breadbasket, the ski-resorts in the snow-capped Rocky Mountains, and the lush, fertile valleys of the coast echo the bravery of all those involved.

After receiving wilderness training in Washington D.C., Meriwether Lewis set out on July 5, 1803, picked up guns at Harpers Ferry, Virginia, and then moved to Pittsburgh to pick up a 55-foot keelboat. Floating it down the Ohio, he met with Clark in Indiana, who took over command of the boat and crew, while Lewis then rode on to get supplies in St. Louis. Months later, in May, the entire party gathered in St. Louis. The forty-some men were to travel from there to the Pacific Ocean in only the keelboat and two smaller boats, all of which were moved by sails, towropes, poles, or oars.

The beginning of their journey was a voyage of confirmation; traders had gathered information of various possible water routes to the Pacific, and Lewis and Clark’s job was to confirm the truth of such reports and observe anything else of importance along the way. They also catalogued new species of plants and animals which they encountered, and worked toward peace with several Indian tribes. History tells us that the few messages the men were able to send back told of their health and high spirits. They were all eager to explore just what might lie beyond the Mississippi.

Despite having adequate supplies and equipment, including guns, the men’s journey was still a dangerous one. They were traversing the wild and until this point, the only other individuals to have crossed it were fur traders and trappers. It was largely Indian territory and although most tribes, such as the Otos, the Missouris, and the Mandans were friendly, the Sioux and the Blackfeet tried to impede the group’s progress on more than one occasion. Illness claimed the life of one man early, but despite the strenuous pace of the expedition, there were no further losses.

Throughout it all, including long winters and the harsh conditions of wilderness living, the travelers continued to forge west in search of an efficient trade route using only the rivers. In September of 1806, some three years after they started on their voyage, Lewis, Clark, and their team made it to the Pacific Ocean. Relying on

the Missouri and Columbia rivers as their main “highways,” and taking the help of friendly Indian tribes whenever they could, the expedition was a success, and served as an example for all manner of westward expansion.

Despite the success of their expedition, proving that there was indeed a water route from the Mississippi River to the Pacific Ocean, future travelers to the West found faster passage on land, utilizing the Oregon Trail. Keelboats were eventually replaced by covered wagons and trains, and America pushed ever onward into the West. The settlers who came after Lewis and Clark went forward with blind-devotion knowing then that it could be done. The initial breakthrough into that unknown land was all that the country really needed. From there on out, the rest was history.

11. One of the main points that the author seeks to make in the passage is that westward expansion:
  - A. was never attempted prior to the Lewis and Clark expedition.
  - B. was a challenging but important aspect of the growth of the United States.
  - C. led to the discovery of many new and dangerous Indian tribes.
  - D. resulted in the development of the corps of volunteers for “North Western Discovery.”
12. The focus of the passage can best be summarized as a study of both the:
  - F. Lewis and Clark Expedition and the characteristics of the United States in the early 1800s.
  - G. history of Midwest development and the Lewis and Clark Expedition.
  - H. Lewis and Clark Expedition and the legendary Northwest Passage.
  - J. losses and difficulties faced by the Lewis and Clark Expedition.
13. According to the information presented in the passage, which of the following best describes the relationship between the Lewis and Clark Expedition and the settlers who came after them?
  - A. Everyone to follow the Expedition used Lewis and Clark’s water route.
  - B. The settlers who went west after the Expedition were much more cautious.
  - C. Both the Lewis and Clark expedition and the future settlers suffered great losses.
  - D. The Lewis and Clark Expedition gave others confidence to head West.
14. According to the passage, the motivation for the Lewis and Clark Expedition was to:
  - F. make money.
  - G. catalog the animals of North America.
  - H. discover a water route to the Pacific.
  - J. reach the Rocky Mountains.

GO ON TO THE NEXT PAGE.

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15. As it is used in the 2nd paragraph (lines 22–32), the word *party* most nearly means:
- A. a joyous celebration.
  - B. a group of people setting out on a trip.
  - C. a segment of the population.
  - D. a meeting to discuss business matters.
16. As it is depicted in the passage, the initial mood of the Lewis and Clark expedition can best be described as:
- F. hopelessly discouraged.
  - G. eagerly determined.
  - H. remarkably cautious.
  - J. overtly happy.
17. It can be inferred that the word *forge* as it is used in Paragraph 5 (lines 55–65) refers to:
- A. creating new tools out of metal.
  - B. searching for food.
  - C. continuing a journey.
  - D. crossing a river on foot.
18. According to the passage, which of the following were the primary dangers faced by the Lewis and Clark expedition?
- F. Illness and lack of motivation.
  - G. Fast moving water.
  - H. Wagons that fell apart.
  - J. Conflicts with the indigenous people.
19. As it relates to the passage, all of the following were methods used to move the boats EXCEPT:
- A. man power.
  - B. wind power.
  - C. rowing power.
  - D. steam power.
20. According to the passage, in the early part of their journey members of the Lewis and Clark Expedition were doing all of the following EXCEPT:
- F. receiving wilderness training.
  - G. cataloguing new species of plants and animals.
  - H. confirming possible water routes across the continent.
  - J. sending back messages regarding their status.

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## PASSAGE III

HUMANITIES: *Colorful Reflections on Fairfield Porter*

My first encounter with the international artist and art critic Fairfield Porter was actually through the poetry of his wife, Anne (Channing) Porter. While both grew to become quite celebrated in their crafts,

5 Fairfield's story is unique.

Born into an affluent, artistic family in 1907, the boy who was to one day become a renowned artist and respected art critic showed a comparative lack of artistic ability when seen next to his siblings. While his older brother Eliot took to photography, Fairfield Porter, despite being remarkably intelligent, appeared to be lacking any natural artistic talents. It seemed that, although a member of a family full of artists, his true skill lay in the critiquing of others' artistry. This was evidenced in his second year at Harvard by Fairfield's decision to pursue art history as his major field of study. After studying at Harvard under Arthur Pope and then traveling briefly through Europe, Fairfield came back to the United States to further his education at the Art Students League in New York City. There he became acquainted with the famed photographer Alfred Stieglitz—the work of whom is said to have positively influenced Fairfield's paintings to some degree.

Between the years 1931 and 1932, Fairfield spent the majority of his time in Italy learning to appreciate and critique the works of the great Renaissance painters. His training came from both direct study under world-famous art historian Bernard Berenson, and from countless hours spent in museums and galleries observing the greatest pieces of Italian art.

Following his marriage to Anne upon his return from Italy, Fairfield spent the better part of the next two decades developing his skills as a painter while caring for his autistic son. During this period his meetings with the French Intimist painter Willem De Kooning would prove to have a profound effect on his later works. Porter was the first to publicly acclaim the work of Kooning.

In fact, what made Porter so famous was his knack for responding directly to an artist's work. He found fault with the common "talk based" criticism that spoke to art only in reference to its past or to some vague theoretical framework; such criticism attempted to shape the future of art and was far too biased for Porter. His time as an art critic for such publications as *Art News* and *The Nation* ended, however, in 1961 when he decided to pursue a full-time painting career.

The other side of his fame, his uncommon approach to painting, is just as important to the understanding of Fairfield Porter's contributions to the world of art. His personal philosophy comes from a blending of two views; art should be personal, emotional, and representative of its subject, while at the same time be boldly colorful, expressive, and generally abstract. Drawing on his vast knowledge of art history, especially the styles of French Intimism, Porter fused these two feelings to create a powerful, emotive collection of paintings about families, individuals, and the home, as well as moving nature scenes such as

60 *The Door to the Woods* (1971) and *Maine – Toward the Harbor* (1967).

When he died in 1975, on a morning walk along the ocean, he left the world as one of the most respected art critics in the past century. On top of that, his work as a painter is still viewed within the art community as amazingly distinctive and especially representative of his life. It is sad to say that now, however, some thirty years after his death, he is still virtually unknown outside of art circles. This remarkably insightful, articulate, creative individual needs to be discovered by the common man and revered for his continuing influence on the artists of today. The words of this intellectual were some of the best and most honest critiques of art ever spoken.

21. The main purpose of the passage can best be described as an attempt to:
- A. explain Porter's renowned ability to candidly address artists' works.
  - B. illustrate the influence several renowned artists had on the works of Porter.
  - C. appraise Porter's unusual methods of painting and critiquing artwork.
  - D. chronicle Porter's life, particularly the events and beliefs that shaped his career.
22. The author's attitude towards the subject of the passage can best be characterized as:
- F. detached interest.
  - G. amused tolerance.
  - H. warm appreciation.
  - J. deep abhorrence.
23. As described in the passage, Porter's method of criticizing art can best be summarized by which of the following statements?
- A. Porter's criticisms were frank and forthright, and were based solely on his evaluation of the piece of art that he was appraising.
  - B. Porter criticized art based on the context of the painting and conceptual structures that he found most useful in his evaluations.
  - C. Porter's critiques were comparable to those of Bernard Berenson, who greatly influenced Porter's outlook on art.
  - D. Porter targeted his criticisms at helping artists by attempting to influence their forthcoming works.
24. Porter's painting style can be described by all of the following EXCEPT:
- F. stirring.
  - G. vivid.
  - H. trite.
  - J. individualistic.

GO ON TO THE NEXT PAGE.

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25. Without the first paragraph, the passage would lose:
- A. an overview of the passage as a whole.
  - B. a brief introduction and transition into the topic.
  - C. important detail that later becomes relevant to the passage.
  - D. an explanation of the logic behind the author's viewpoint.
26. In line 11, the statement "despite being remarkably intelligent" is intended to:
- F. call attention to the fact that although Porter was a well-respected art critic, he failed to impress his college professors.
  - G. communicate to the reader that Porter's lack of a formal education did not detract from his ability to critique art.
  - H. emphasize to the reader that Porter's high level of intelligence was not related to his artistic ability.
  - J. inform the reader that Porter's position as an art critic was so difficult that it challenged his intellect.
27. The word *revered* in line 71 most nearly means:
- A. trusted.
  - B. depreciated.
  - C. reminiscent.
  - D. honored.
28. According to the passage, when did Fairfield Porter become serious about becoming an artist?
- F. Immediately upon his return from Italy.
  - G. While he was studying at the Art Students League.
  - H. Just before his death in 1975.
  - J. Approximately thirty years after he returned from Italy.
29. The third paragraph states that, during 1931 and 1932, Fairfield Porter was:
- A. continuing his training as an art critic.
  - B. the greatest art critic in Italy.
  - C. planning his marriage to Anne Channing.
  - D. training to become a Renaissance painter.
30. The author uses the phrase "other side of his fame" (line 48) most likely in order to:
- F. suggest that Fairfield Porter was better known as an artist than as an art critic.
  - G. indicate that Fairfield Porter was both a renowned art critic and painter.
  - H. show that Fairfield Porter was not aware of his popularity as a painter.
  - J. suggest that other art critics of the time were more famous than was Fairfield Porter.

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## PASSAGE IV

**NATURAL SCIENCE:** *This passage discusses some of the controversy surrounding the existence of dark matter in the universe.*

Dark matter in the universe is believed by some scientists to be a substance that is not readily observable because it does not directly refract light or energy. Its existence can only be deduced because of the effect that it has on surrounding matter. In fact, some members of the scientific community have argued that dark matter does not actually exist. Others, however, believe in its existence, in part because the scientific community does not have a complete understanding of gravitational science. On the other hand, some would argue that it is the understanding of gravitational science that leads most scientists to believe in the existence of dark matter, because without dark matter, there are many cosmological phenomena that are difficult to explain.

For example, dark matter in the universe may have a peculiar effect on the Milky Way galaxy. Some scientists believe that the interaction between dark matter and other smaller, nearby galaxies is causing the Milky Way galaxy to take on a warped profile. It has been asserted that not only does dark matter exist, it may also be responsible for the Milky Way's unusual shape. The interaction referenced involves two smaller galaxies near the Milky Way, called Magellanic clouds, moving through an enormous amount of dark matter, which, in effect, enhances the gravitational pull that the two Magellanic clouds could have on the Milky Way and other surrounding bodies. Without the existence of the dark matter, the Magellanic clouds would not have sufficient mass to have such a strong effect on the bend of the Milky Way galaxy.

The strongest evidence for the validity of this hypothesis rests in Newtonian physics, and the hypothesis that anything with mass will exert a gravitational pull. The Milky Way and other galaxies with peculiar warped shapes are being molded by a gravitational force. However, there is nothing readily observable with sufficient mass that could cause such a high level of distortion via gravitational pull in the vicinity of the Milky Way. Therefore, something that is not easily observed must be exerting the necessary force to create the warped shape of the galaxy.

Aaron Romanowsky and several colleagues have questioned the effect that dark matter might have on galaxies. They point to the existence of several elliptical galaxies surrounded by very little dark matter as evidence that dark matter is not, in fact, the cause of the warped galaxies. While they do not claim that their findings should be interpreted to conclude that dark matter does not exist, they apparently believe that the results of their studies cast doubt on some of the conventional theories of galaxy formation and manipulation.

Several models constructed by researchers from the University of California at Berkeley, however, point to the idea that dark matter is the most likely explanation for the distorted shape of the Milky Way and other galaxies. Using computer models, they have

mapped the likely interactions between certain galaxies and the surrounding dark matter, and those models have shown not only the possibility that dark matter is responsible for the warped shape of the Milky Way, but that the relationship between the dark matter and the Magellanic clouds is dynamic; the movement of the clouds through the dark matter seems to create a wake that enhances their gravitational influence on the Milky Way.

31. As it is used in line 14, the term *phenomena* most nearly means:
- A. occurrences.
  - B. problems.
  - C. attitudes.
  - D. surprises.
32. The passage states that some members of the scientific community are reluctant to believe in the existence of dark matter because:
- F. there is absolutely no evidence for the existence of dark matter.
  - G. no one understands how to apply gravitational science.
  - H. dark matter cannot be directly observed.
  - J. dark matter has little effect on surrounding matter.
33. What does the passage offer as evidence for the existence of dark matter?
- A. A complete understanding of gravitational science.
  - B. The enormous mass of Magellanic clouds.
  - C. The shape of the Milky Way galaxy.
  - D. A photograph taken with the aid of a refracting telescope.
34. According to the passage, what is Aaron Romanowsky's theory regarding dark matter?
- F. It cannot be conclusively proven that dark matter affects the shape and formation of galaxies.
  - G. The discovery of certain galaxies disproves the theory that dark matter exists in the universe.
  - H. Computer models suggest that dark matter is responsible for warped galaxies.
  - J. Dark matter has no effect at all on the shape of a galaxy.

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35. The last paragraph supports the general hypothesis provided earlier in the passage that:
- A. the effect of Magellanic clouds on galaxies is enhanced by dark matter.
  - B. computer models are necessary for an understanding of gravitational science.
  - C. dark matter has little to no effect on the formation of certain cosmological phenomena.
  - D. the shape of the Milky Way galaxy can be deduced by observing the matter surrounding it.
36. The main purpose of the third paragraph is to point out that:
- F. dark matter was first discovered by applying Newtonian physics.
  - G. different viewpoints exist regarding gravitational science.
  - H. galaxies with peculiar shapes could not exist in the presence of dark matter.
  - J. scientific theories provide support for the existence of dark matter in the universe.
37. The word *conventional* in line 51 most nearly means:
- A. easily understood.
  - B. formally disputed.
  - C. strictly interpreted.
  - D. generally accepted.
38. Which one of the following is NOT mentioned in the passage as a scientific theory regarding dark matter?
- F. The existence of dark matter cannot be proved by direct observation.
  - G. Dark matter may be responsible for the shape of the Milky Way.
  - H. It is certain that dark matter has no influence on surrounding celestial bodies.
  - J. Magellanic clouds require the presence of dark matter in order to influence the shape of galaxies.
39. According to the passage, dark matter cannot be readily detected because:
- A. dark matter does not actually exist.
  - B. most of the dark matter in the universe is hidden behind galaxies.
  - C. it does not directly interact with light or energy.
  - D. it has no effect on the surrounding matter.
40. The passage supports which of the following statements about dark matter?
- F. Its existence is inferred by some researchers based on observations of cosmological bodies composed of ordinary matter.
  - G. Its existence has been conclusively proven by computer models.
  - H. If it does not exist, the universe is largely empty.
  - J. Its presence is readily observable to researchers who completely understand how to apply gravitational science.

**END OF THE READING TEST.**

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

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4

**SCIENCE REASONING TEST**

35 Minutes—40 Questions

**DIRECTIONS:** This test includes seven passages, each followed by several questions. Read the passage 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.

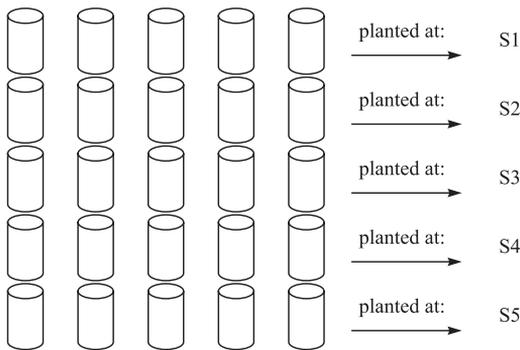
**PASSAGE I**

A researcher has conducted two experiments to test the rate of pinecone production in the *Pinus palustris* Miller (a type of pine tree).

*Experiment 1*

*P. palustris* Miller seeds were collected from 5 different populations (A1, A2, A3, A4, A5) each of which was from a different site (S1, S2, S3, S4, S5).

The seeds were grown under controlled conditions in a greenhouse. 300 of these seedlings from each population were chosen at random. Each set of seedlings was divided into 30 groups with 10 seedlings in each group. The seedlings were planted in marked cylindrical containers which were then placed at each of the 5 sites. Figure 1 shows the procedure for A1.



**Figure 1** 25 Cups containing a total of 250 A1 seedlings

Table 1 shows the number of pinecones that were produced on each tree.

The researchers also collected data on the root structure of the trees. From the information they collected they came up with the following formula relating the root structure in inches to the number of pinecones produced:

$$\text{number of pinecones} = 0.037 + 0.147 (\text{root thickness})$$

Statistical analysis indicated that this equation was accurate.

Site	Pinecones produced per tree				
	A1	A2	A3	A4	A5
S1	2.1	7.1	12.0	2.4	3.1
S2	3.9	2.5	8.5	6.2	6.4
S3	0.4	6.7	3.1	9.3	7.2
S4	5.2	2.1	2.9	0.2	4.5
S5	1.8	6.3	0.9	3.7	8.5

*Experiment 2*

*P. palustris* Miller seeds were collected and grown in the same manner as in Experiment 1. When the seeds had grown into seedlings, 150 containers were prepared with 5 A1 seedlings and 5 seedlings from either A2, A3, A4 or A5. Seven containers for each of the 4 combinations were planted at each site.

Table 2 shows how many pinecones were produced on each A1 plant.

Site	Pinecones produced per A1 tree when planted with			
	A2	A3	A4	A5
S1	5.7	3.2	6.7	3.5
S2	3.2	1.7	4.3	5.2
S3	9.6	8.4	0.8	7.0
S4	4.2	3.2	1.3	0.2
S5	4.9	6.1	6.1	3.9

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1. In Experiment 1, trees from A5 produced more pinecones than did trees from A4 at which of the following sites?
  - A. S4 only
  - B. S1 and S5 only
  - C. S1, S2, S4, and S5 only
  - D. S1, S2, S3, S4, and S5 only
2. In Experiment 1, A1 trees produced the largest number of pinecones at which of the following sites?
  - F. S1
  - G. S3
  - H. S4
  - J. S5
3. The procedures utilized in Experiment 2 were repeated, except that only 25 containers were planted at a sixth site (S6). The results appear in Table 3.

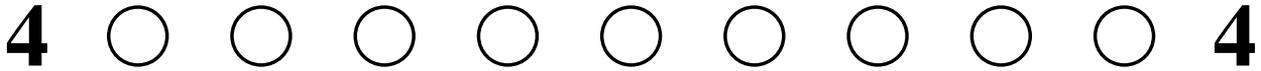
Table 3				
Site	Pinecones produced per A1 tree when planted with			
	A2	A3	A4	A5
S6	4.1	6.4	1.9	0.3

Based on these data, one should conclude that A1 trees produced more pinecones at S6 than at which of the following sites in Experiment 2?

- A. S1
- B. S3
- C. S4
- D. S5

4. A student wanted to produce the greatest number of pinecones from 6 A1 trees, using the procedures from Experiment 2. Which plants and site should the A1 trees be combined with to achieve the desired results?
  - F. A4 and S1
  - G. A2 and S3
  - H. A3 and S2
  - J. A5 and S5
5. In which of the following ways was Experiment 2 different from Experiment 1?
  - A. Experiment 2 included trees from more than 1 population.
  - B. Experiment 2 combined trees from more than 1 species.
  - C. Experiment 2 trees were planted at all 5 sites.
  - D. Experiment 2 trees were planted at only 1 site.

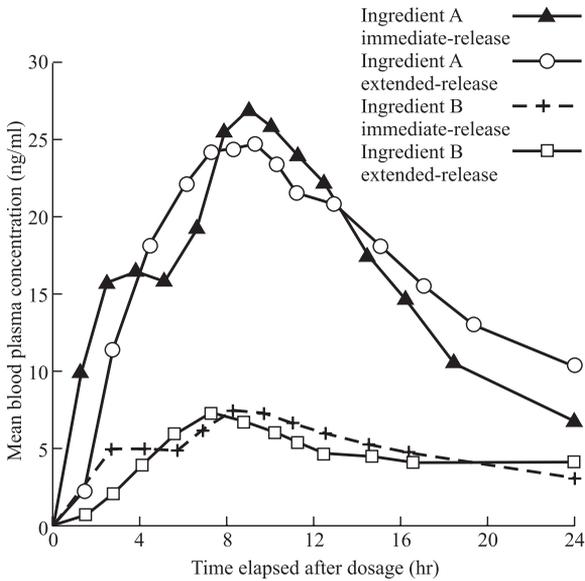
6. In Experiment 2, how many seedlings were planted in each container?
  - F. 6
  - G. 8
  - H. 10
  - J. 12



**PASSAGE II**

Researchers conducted trials on a certain prescription drug delivered in immediate-release capsules and extended-release capsules.

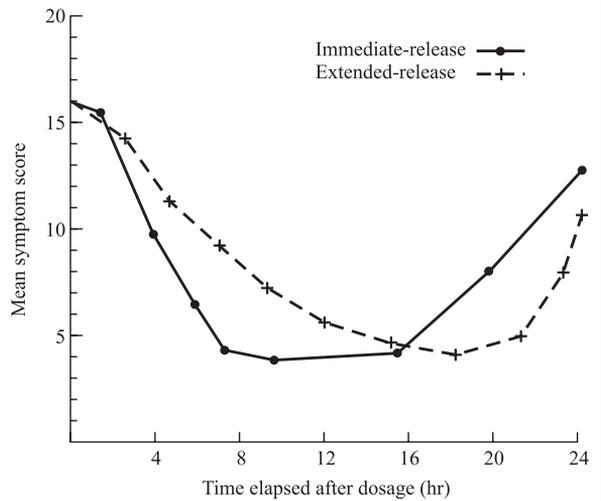
Figure 1 shows the mean concentration (nanograms per milliliter [ng/mL]) of the two active ingredients of the prescription drug in patients' blood plasma over time (hr).



**Figure 1**

In clinical trials of the prescription drug, subjects given the prescription drug were interviewed at regular intervals about the symptoms the prescription drug is meant to relieve. After each interview, the subjects were assigned a symptom score. A high symptom score corresponds to high intensity of symptoms, and a low symptom score indicates low intensity of symptoms. Figure 2 shows the mean symptom score over time (hr) for subjects who took the prescription drug.

In the clinical trials, some subjects were given the prescription drug and some subjects were given a placebo (an inactive pill). Table 1 shows the percentage of subjects from both groups who reported various adverse side effects.



**Figure 2**

Table 1			
Body system	Side effect	Prescription drug group (%)	Placebo group (%)
General	Feeling of weakness	6	5
	Headache	26	14
Digestive system	Loss of appetite	32	5
	Diarrhea	8	0
	Dry mouth	31	5
	Nausea	14	0
Nervous system	Anxiety	7	4
	Dizziness	9	0
	Insomnia	25	11
	Irritability	11	4
Cardiovascular system	Rapid heart rate	10	2
Nutritional	Weight gain	15	0

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7. According to Figure 1, 16 hours after taking the extended-release form of the prescription drug, the difference in mean blood plasma concentration between Ingredient A and Ingredient B is closest to:
- A. 7 ng/ml.
  - B. 9 ng/ml.
  - C. 11 ng/ml.
  - D. 16 ng/ml.
8. Based on the data in Figures 1 and 2, the researchers should make which of the following conclusions about the overall change in mean blood plasma concentration and mean symptom score over time following dosage?
- F. Both mean blood plasma concentration and mean symptom score increase then decrease.
  - G. Both mean blood plasma concentration and mean symptom score decrease then increase.
  - H. Mean blood plasma concentration increases then decreases, and mean symptom score decreases then increases.
  - J. Mean blood plasma concentration decreases then increases, and mean symptom score increases then decreases.
9. According to Figure 1, mean blood plasma concentration of Ingredient A administered in immediate-release form increases most during which of the following time periods?
- A. From the moment of dosage to 3 hours after dosage.
  - B. From 3 hours after dosage to 10 hours after dosage.
  - C. From 10 hours after dosage to 14 hours after dosage.
  - D. From 14 hours after dosage to 24 hours after dosage.
10. Which of the following conclusions about adverse side effects caused by the prescription drug is consistent with the results shown in Table 1?
- F. Results from the placebo group most question the number of instances of feeling of weakness caused by the prescription drug.
  - G. Results from the placebo group most question the number of instances of insomnia caused by the prescription drug.
  - H. Results from the placebo group least question the number of instances of anxiety caused by the prescription drug.
  - J. Results from the placebo group least question the number of instances of irritability caused by the prescription drug.
11. The symptom score of a clinical trial subject given the extended-release form of the prescription drug remained unchanged for 8 hours. Based on Figure 2, the 8-hour period most likely began:
- A. 3 hours after dosage.
  - B. 5 hours after dosage.
  - C. 9 hours after dosage.
  - D. 14 hours after dosage.

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## PASSAGE III

The atmosphere is made up of 4 distinct layers: the troposphere, stratosphere, mesosphere, and thermosphere. Different types of clouds form in the different layers depending on the pressure in the atmosphere and the ambient temperature. The cloud types include nimbus, stratus, cumulus, and cirrus. Figure 1 shows the location of the

barriers of the atmosphere when the temperature and pressure are at an ideal condition for cloud formation. It also shows the different types of clouds formed at the different levels. Note: Clouds are formed mostly of water crystals, but can also contain particles of rock and dust.

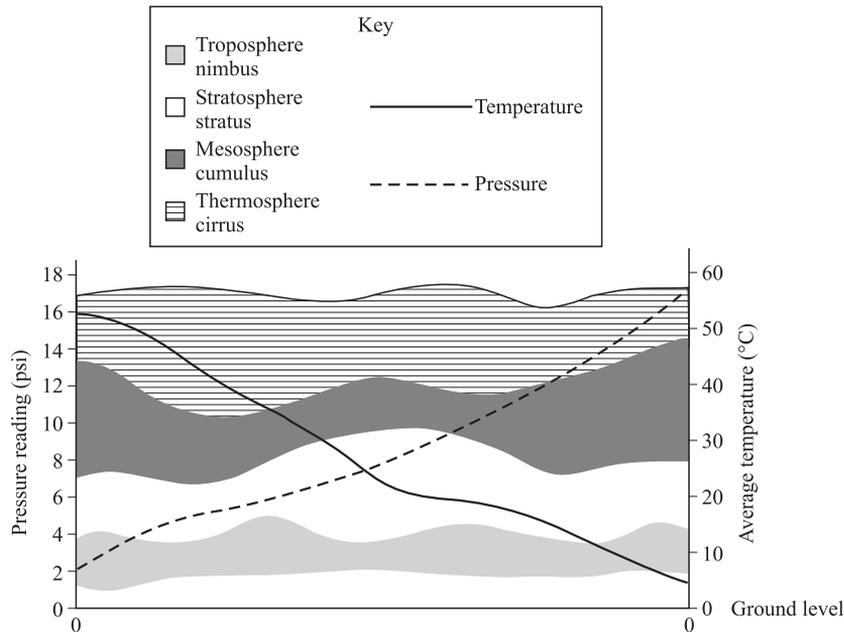


Figure 1

12. According to Figure 1, the atmospheric layer with the greatest range in pressure is the:
- F. mesosphere.
  - G. thermosphere.
  - H. stratosphere.
  - J. troposphere.
13. Which of the following statements about the formation of cumulus clouds is supported by the data presented in Figure 1? Cumulus clouds typically form in:
- A. pressures between 8 and 12 psi and at an average temperature of 35°C.
  - B. pressures between 12 and 16 psi and at an average temperature of 22°C.
  - C. a pressure of 4 psi and at average temperatures between 12°C and 22°C.
  - D. a pressure of 18 psi and at average temperatures between 50°C and 60°C.
14. According to Figure 1, as pressure within the atmospheric layers increases, temperature within the atmospheric layers:
- F. increases only.
  - G. decreases only.
  - H. increases up to 6 psi, then decreases.
  - J. decreases up to 10 psi, then increases.
15. According to the information given in Figure 1, clouds within the stratosphere are most likely formed:
- A. under a pressure of 4 psi and 20°C.
  - B. under a pressure of 10 psi and 30°C.
  - C. over a pressure of 12 psi and 40°C.
  - D. over a pressure of 14 psi and 50°C.
16. If a pressure of 7 psi were sustained within the atmosphere, according to Figure 1, which of the following types of clouds would likely form?
- F. Cirrus
  - G. Cumulus
  - H. Nimbus
  - J. Stratus

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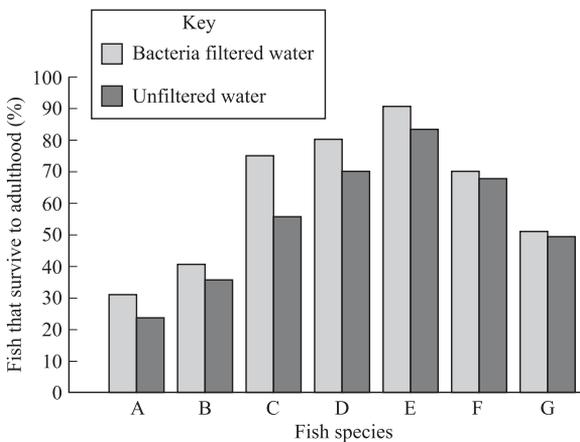
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**PASSAGE IV**

Because fish live in water they are exposed to any bacteria that exist in the water. Table 1 lists the habitat choices of 7 species of fish in a local pond and the fish's ability to combat the effects of the bacteria found in the water.

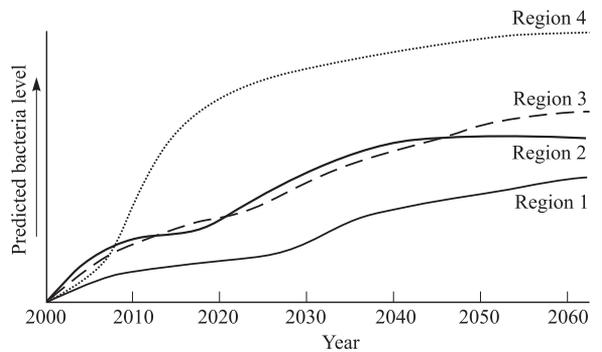
Fish species	Relative ability to combat bacteria	Habitat	Exposure to waterborne bacteria
A	<0.2	Shallow water with plants	None
B	<0.3	Shallow water with no plants	Low
C	0.2	Shallow water with no plants	Low
D	0.3	Deep water with no plants	Moderate
E	0.4	Shallow water with plants	High
F	0.6	Shallow water with plants	High
G	1.3	Shallow water with plants	High

Figure 1 shows the percent of fish that survive to adulthood in the lab for the 7 species, after exposure to water with bacteria present or exposure to water with the bacteria removed.



**Figure 1**

Figure 2 shows predicted bacteria levels over time in 4 geographic regions with fish populations.



**Figure 2**

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17. Based on the information in Figure 1, fish from which species are most likely to survive prolonged exposure to bacteria?
- A. Species A
  - B. Species B
  - C. Species D
  - D. Species E
18. According to the data in Figure 1, which species showed the greatest difference between the percent of fish that survived to adulthood after exposure to unfiltered water, and the percent of fish that survived to adulthood after exposure to filtered water?
- F. Species A
  - G. Species C
  - H. Species E
  - J. Species G
19. Researchers recently discovered a new species of fish that lives in deep water without plants. Based on the data in Table 1, the researchers would predict that this species' relative ability to combat bacteria is most likely:
- A. high.
  - B. moderate.
  - C. low.
  - D. nonexistent.
20. According to the information in Table 1, for all the species shown, as the exposure to bacteria increases, the relative ability to combat the bacteria generally:
- F. decreases only.
  - G. increases only.
  - H. decreases, then increases.
  - J. increases, then decreases.
21. Based on the data in Table 1 and Figure 1, fish that had the lowest percent of individuals survive to adulthood when exposed to bacteria tend to:
- A. live in shallow water without plants.
  - B. live in shallow water with plants.
  - C. live in deep water without plants.
  - D. live in deep water with plants.

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**PASSAGE V**

While digging in a remote site in Africa, paleontologists discovered a collection of fossilized dinosaur bones. The bones were dated back to the Jurassic period, and have been confirmed to be from a dinosaur known as a velociraptor. Two paleontologists discuss the finding.

*Paleontologist 1*

Once the well-preserved bones are assembled it is clear that they are velociraptor bones from the Jurassic period. The bones are long in the arms, indicating that the velociraptor was definitely capable of flight. You can see that there are cuts within the arm/wing bones of this dinosaur, indicating that it was caught while in flight. Perhaps it was attempting an escape from a more predatory dinosaur, such as tyrannosaurus rex. It is obvious from the body structure of the velociraptor that it was an effective hunter and predator. It was most likely quick to swoop in on its prey and was more than able to carry the prey away on its own. The form and function of the velociraptor has been misunderstood until this important discovery. The condition of these bones offers a clear picture of the way in which the velociraptor lived.

*Paleontologist 2*

Indeed, the velociraptor bones are in excellent condition. The long arm bones are indicative of the dinosaur's ability to scavenge prey and fend off larger predators. The cuts within the arm bones show that the velociraptor often stole its meals—the marks resemble defense wounds, perhaps from forcing other would-be scavengers away from the free meal. The structure of the velociraptor's feet indicates that it was a fast runner and was able to maneuver well through the high trees and undergrowth. This would certainly have allowed the velociraptor to quickly escape predators and possibly arrive at a kill-site before other larger dinosaurs, such as tyrannosaurus rex, descended upon the leftovers. The bones that were discovered answer many questions about the velociraptor, but they also bring up many new issues to consider.

22. Paleontologist 1's viewpoint contains the basic assumption that the velociraptor must have been:
- F. unknown until the discovery of these bones.
  - G. an ineffective hunter.
  - H. previously mischaracterized.
  - J. unable to escape large predators.
23. Paleontologist 1 would most likely state that the cuts on the velociraptor bones were the result of:
- A. failed attempts to fly.
  - B. fending off a competing scavenger.
  - C. an attack by a larger predator.
  - D. mistakes made in assembling the bones.
24. Suppose that the fossilized remains of another dinosaur species with long arm bones were discovered, and scientists determined that this dinosaur lived at the same time as the velociraptor. According to the passage, Paleontologist 2 would most likely conclude that:
- F. the new dinosaur could fly.
  - G. the new dinosaur could be a scavenger.
  - H. the new dinosaur could not escape from predators.
  - J. the new dinosaur could swoop in on its prey.
25. Paleontologist 2's viewpoint regarding the velociraptor as a scavenger was based on the dinosaur's:
- A. strong musculature.
  - B. excellent condition.
  - C. long arm bones.
  - D. ability to fly.
26. Paleontologist 1 would most likely support which of the following statements about the lifestyle of the velociraptor?
- F. The velociraptor was a predatory dinosaur capable of flight, and is only now being understood.
  - G. The velociraptor was a dinosaur who scavenged other dinosaurs' kills.
  - H. The velociraptor was a fast runner that could easily out-manuever its predators in order to survive.
  - J. The velociraptor was hunted by many other dinosaurs during its time on Earth.
27. Assuming all are true, both paleontologists would most likely agree with which of the following facts concerning the velociraptor?
- A. It was threatened by larger dinosaurs, such as tyrannosaurus rex.
  - B. It was unable to sustain flight.
  - C. It was not built for speed, and therefore, could not easily fend for itself.
  - D. It was not an effective hunter.
28. Both Paleontologists 1 and 2 would most likely agree with which of the following statements about the discovery of the velociraptor bones? The bones:
- F. did not clarify any assumptions about the velociraptor.
  - G. provided some useful information regarding the velociraptor.
  - H. could not be assembled properly due to the poor condition in which they were found.
  - J. completely altered both paleontologist's viewpoints regarding the velociraptor.

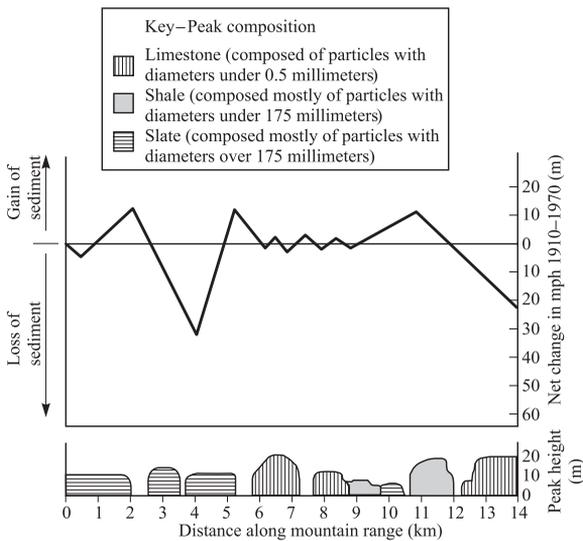
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**PASSAGE VI**

The peaks of mountains often lose sediment due to wind erosion. Figure 1 shows mountain peak compositions, mountain heights, in meters (m), and the net change in meters (m), in mean peak height (MPH) from 1910 to 1970 along a section of the Rocky Mountains. A net negative change in MPH indicates a net loss of sediment and a net positive change in MPH indicates a gain of sediment.



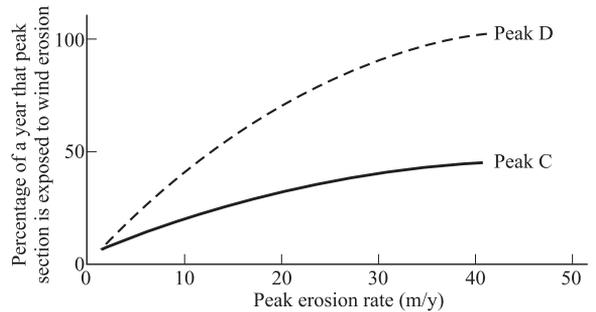
**Figure 1**

Table 1 shows the percentage of a year that horizontal sections of a mountain are exposed to wind.

Table 1	
Peak section height (m)	Percentage of the year that peak section is exposed to wind
0.0–0.5	1.1
0.5–1.0	3.1
1.0–1.5	7.2
1.5–2.0	10.5
2.0–2.5	14.2
2.5–3.0	19.4
3.0–3.5	23.7
3.5–4.0	29.3
4.0–4.5	37.4
4.5–5.0	42.3
5.0–5.5	48.0

Note: Heights are measured from mean (average) sea level.

Figure 2 shows Peak C and D erosion rates, in m/y, as they relate to percentage of a year that mountain peak section is exposed to wind.



**Figure 2**

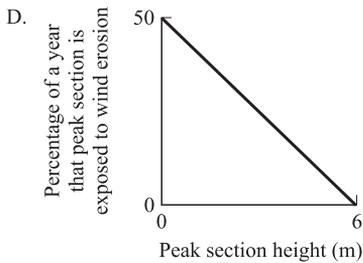
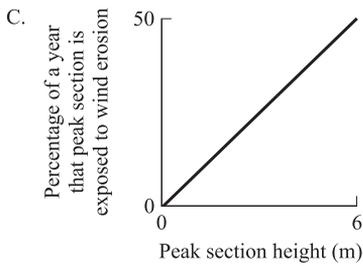
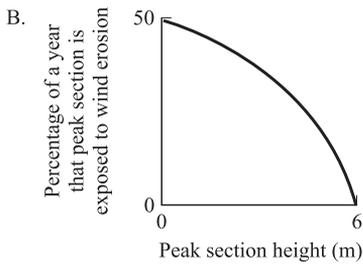
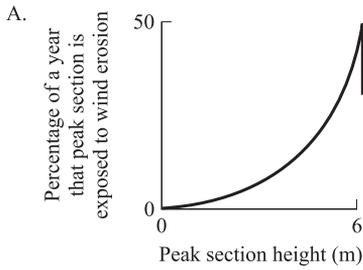
29. According to Figure 1, at a distance of 9 km along the mountain range, peaks of what composition are present, if any?
  - A. Peaks of slate
  - B. Peaks of shale
  - C. Peaks of limestone
  - D. No peaks are present
  
30. According to the information in Figure 1, which of the following properties was used to distinguish the various materials that compose the peaks in the study area?
  - F. Particle size
  - G. Particle clarity
  - H. Particle color
  - J. Particle density
  
31. Based on the information listed in Table 1, a peak section with a height of 5.5–6.0 m would be exposed to wind approximately what percentage of a year?
  - A. 22%
  - B. 39%
  - C. 48%
  - D. 53%
  
32. According to Figures 1 and 2, the difference between Peak C and Peak D erosion rates could best be explained as a difference in the:
  - F. heights of the two peaks.
  - G. force of the winds on the two peaks.
  - H. composition of the two peaks.
  - J. annual snowfall on the two peaks.

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33. According to Table 1, which of the following figures best represents the relationship between the height of a peak section and the percentage of a year that peak section is exposed to wind erosion?



34. According to information in the passage, wind erosion often results in:

- F. an increase in the percentage of a mountain peak that is exposed to snow.
- G. a reduction in the overall surface area of mountain peaks.
- H. a higher number of slate and shale deposits on mountain peaks.
- J. a lower number of record snowfalls each year.

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**PASSAGE VII**

A biologist investigated some of the environmental factors that could influence the growth of certain types of bacteria. The following experiments were conducted at a constant temperature, and no sample was tested more than once.

*Experiment 1*

Ten samples of bacteria were placed in each of 2 Petri dishes, the bottoms of which were each half moist and half dry. The dishes were covered with Petri dish lids. Dish 1 was placed in a darkened area and Dish 2 was placed in a lighted area. After 2 hours the location of bacterial growth in each dish was recorded (Table 1).

	Dry side	Moist side
Dish 1 (in dark)	1	9
Dish 2 (in light)	2	8

*Experiment 2*

Ten samples of bacteria were placed in each of 2 Petri dishes. The dishes were covered with Petri dish lids. Dish 1 was placed in a darkened area and Dish 2 was placed directly under a 25-watt incandescent lamp, creating a warm, lighted environment. After 2 hours the amount of bacterial growth in each dish was recorded and compared to the amount of growth in a control sample that was placed in a Petri dish and left in a regularly lighted area (Table 2).

	Growth proportional to control
Dish 1 (in dark)	0.93
Dish 2 (under lamp)	1.06

*Experiment 3*

Ten samples of bacteria were placed in each of 2 Petri dishes. Four different environments were created in each dish—dry/lighted, dry/dark, moist/lighted, and moist/dark. The bottoms of the Petri dishes were each half moist and half dry. The dishes were covered with Petri dish lids. Dish 1 was placed in a darkened area and Dish 2 was placed directly under a 25-watt incandescent lamp, creating a warm, lighted environment. After 2 hours the amount of bacterial growth in each dish was recorded and compared to the amount of growth in a control sample that was placed in a Petri dish and left in a regularly lighted area (Table 3).

	Growth proportional to control	
	Moist side	Dry side
Dish 1 (in dark)	0.99	0.53
Dish 2 (under lamp)	1.15	0.67

35. One reason refrigeration might be used as a means to control bacteria growth is that bacteria:
- A. grow at a faster rate in warm environments.
  - B. grow at a slower rate in warm environments.
  - C. require good ventilation.
  - D. prefer dry environments.
36. Based on the results of Experiment 3, the greatest proportional growth was observed:
- F. on the moist side of Dish 1.
  - G. on the moist side of Dish 2.
  - H. on the dry side of Dish 1.
  - J. on the dry side of Dish 2.
37. Which of the following conclusions is supported by the results of Experiment 1?
- A. Bacteria prefer light environments to dark environments.
  - B. Bacteria exhibit an equal preference for light and dark environments.
  - C. Bacteria prefer moist environments to dry environments, regardless of lighting conditions.
  - D. Bacteria exhibit an equal preference for dry and moist environments.
38. One criticism of these experiments might be that the presence of more than one sample of bacteria in each Petri dish might have had an effect on the results. Which of the following changes in experimental design could be made to counter this criticism?
- F. Use additional species of bacteria in each test.
  - G. Use only bacteria that was taken directly from nature and not generated in a lab.
  - H. Place each sample in a separate Petri dish.
  - J. Vary the size of the starting sample.

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39. Bacteria are known to exist on nearly every surface of the world. On the basis of the experimental results, which of the following environments would provide the conditions best suited for a high growth rate?
- A. The surface of a desert rock.
  - B. The bottom of a Great Lake.
  - C. The surface of Antarctic ice sheet.
  - D. Beneath a rock in a tropical forest.
40. In the 3 experiments, the environmental factors that could influence growth were evaluated by recording data about growth after 2 hours. Because bacteria double population size in short intervals, better information about growth might be achieved by recording data:
- F. after 10 minutes.
  - G. at 30-minute intervals for 1 hour.
  - H. after 1 hour.
  - J. at 10-minute intervals for 2 hours.

**END OF THE SCIENCE REASONING TEST.**

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