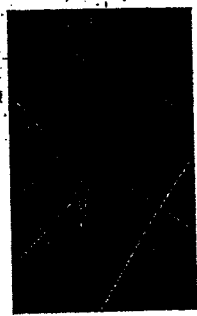


# Form 67A

(December 2008)



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## ENGLISH TEST

45 Minutes—75 Questions

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

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

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

## PASSAGE I

## Miami Time

My family is part of the Miami tribe a Native American people, with strong ties to territory in present-day Ohio, Indiana, and Illinois. Growing up in the Midwest, I often heard my grandmother talk about "Miami time." When she was doing something she loved, whether it was making freezer jam or researching tribal history, she refused to be rushed in a hurry. "I'm on Miami time today," she would say. Conversely, if we were running late for an appointment. She would chide us by saying, "Get a move on. We're not running on Miami time today, you know."

1. A. NO CHANGE  
B. tribe, a Native American, people  
C. tribe, a Native American people  
D. tribe; a Native American people
2. At this point, the writer would like to provide a glimpse into the grandmother's interests. Given that all the choices are true, which one best accomplishes this purpose?  
F. NO CHANGE  
G. being actively involved in her pursuits,  
H. things I really hope she'll teach me one day,  
J. historical research as well as domestic projects,
3. A. NO CHANGE  
B. hurried or rushed.  
C. made to go faster or rushed.  
D. rushed.
4. F. NO CHANGE  
G. appointment; she  
H. appointment and she  
J. appointment, she

1

It was a difficult concept for me to grasp. My  
 grandmother tried to explain that "Miami time" referred to.

those moments, when time seemed to slow down or stand

still. Recently, the meaning of her words started to sink in.

One morning, my son and I will inadvertently slip out of  
 the world measured in seconds, minutes, and hours, and  
 into one measured by curiosity and sensation.

[1] On a familiar trail near our house, I was pushing  
 Jeremy in his stroller and were thinking of the day ahead  
 and the tasks I had to complete. [2] Suddenly, he squealed  
 with pure delight and pointed toward a clearing. [3] There,  
 two does and three fawns stood watching us. [4] Five pairs  
 of ears flicked like antennae seeking a signal. [5] After a  
 few moments, the deer lowered their heads and began to  
 eat, as if they had decided we were harmless. [6] By then,  
 my son's face was full of wonder. [11]

We spent the rest of the morning veering from the  
 trail to investigate small snatches of life. Lizards lazing  
 in the sun and quail rustled through grasses surprised us.

Wild blackberries melted on our tongues. For example, the  
 aroma of crushed eucalyptus leaves tingled in our noses.

5. Given that all the choices are true, which one provides the best opening to this paragraph?
  - A. NO CHANGE
  - B. I remember being late for a doctor's appointment one day.
  - C. My grandmother lived with us, and as a result she and I became close over the years.
  - D. My son asks me about my grandmother, whom he never met.
6. F. NO CHANGE
  - G. moments when
  - H. moments, as if
  - J. moments, because
7. A. NO CHANGE
  - B. spoken statements to my ears
  - C. expressed opinions on the matter
  - D. verbal remarks in conversation
8. F. NO CHANGE
  - G. inadvertently slip
  - H. are inadvertently slipping
  - J. inadvertently slipped
9. A. NO CHANGE
  - B. were having thoughts
  - C. thinking
  - D. DELETE the underlined portion.
10. F. NO CHANGE
  - G. does, and three fawns
  - H. does and three fawns,
  - J. does and, three fawns
11. For the sake of the logic and coherence of this paragraph, Sentence 3 should be placed:
  - A. where it is now.
  - B. before Sentence 1.
  - C. after Sentence 1.
  - D. after Sentence 4.
12. F. NO CHANGE
  - G. rustling
  - H. were rustling
  - J. DELETE the underlined portion.
13. A. NO CHANGE
  - B. On the other hand, the
  - C. Just in case, the
  - D. The

1

By the time we found our way back to the car, the sun was high in the sky. We had taken three hours to complete a hike we usually finished in forty-five minutes. Yet the hike felt shorter than ever. As we drove off, I remembered something else my grandmother used to say: "Miami time <sup>14</sup> passes all too quickly."

14. F. NO CHANGE  
G. more shorter than  
H. the shortest than  
J. shorter than

Question 15 asks about the preceding passage as a whole.

15. Suppose the writer's goal had been to write a brief essay conveying a personal experience with "Miami time." Would this essay successfully fulfill that goal?
- A. Yes, because it presents the narrator's firsthand experience of a morning spent in Miami time.  
B. Yes, because it reveals that after a conversation with the grandmother, the narrator decided to live in Miami time.  
C. No, because it shares the views of more than one person with regard to the meaning of Miami time.  
D. No, because the term "Miami time" belonged to the grandmother, not to the narrator.

## PASSAGE II

### Faith Ringgold's Quilting Bee

The artist Faith Ringgold has made a name for herself with her "story quilts," lively combinations of painting, quilting, and storytelling. Each artwork consists of a painting framed by quilted squares of fabric and story panels. One of these artworks, *The Sunflowers Quilting Bee at Arles*, depicts a scene of women at work on a quilt in a field of towering yellow flowers that eight African American women sit around the quilt that covers their laps. <sup>16</sup> Who are these people stitching among the flowers? What brings them so close that their shoulders touch?

16. F. NO CHANGE  
G. flowers and eight  
H. flowers. Eight  
J. flowers, eight

1

Thus, the answers to these questions can  
 be found in the artwork itself. Ringgold has told

the story of this gathering on two horizontal panels of text.

One panel is sewn into the piece's top border,

the other into its bottom border. These eight

women the story explains, strove

in their various ways to support  
 the cause of justice in the world.

In reality, these women never met to piece together

a quilt. The scene comes out of the artists' imagination as  
 a statement of the unity of purpose that she perceives in  
 their lives. Sojourner Truth and Harriet Tubman fought  
 to abolish slavery and, later, was active in the crusade  
 for suffrage. Newspaper journalist Ida B. Wells

courageously spoke out for social and racial justice  
 in the late nineteenth and early twentieth centuries.

17. A. NO CHANGE  
 B. Instead, the  
 C. Furthermore, the  
 D. The
18. F. NO CHANGE  
 G. of this gathering the story on two horizontal panels of text.  
 H. on two horizontal panels the story of this gathering of text.  
 J. the story on two horizontal panels of text of this gathering.
19. A. NO CHANGE  
 B. its'  
 C. its  
 D. their
20. F. NO CHANGE  
 G. women, the story explains—  
 H. women the story explains—  
 J. women; the story explains,
21. The underlined phrase could be placed in all the following locations EXCEPT:  
 A. where it is now.  
 B. after the word *support*.  
 C. after the word *cause*.  
 D. after the word *world* (ending the sentence with a period).
22. F. NO CHANGE  
 G. summary,  
 H. addition,  
 J. contrast,
23. A. NO CHANGE  
 B. artist's imagination  
 C. artists' imagination  
 D. artists imagination,
24. F. NO CHANGE  
 G. was actively engaged  
 H. was engaged  
 J. were active
25. Given that all the choices are true, which one provides the most relevant information at this point in the essay?  
 A. NO CHANGE  
 B. married Ferdinand Barnett, editor of the first Black newspaper in Chicago, the *Chicago Conservator*.  
 C. wrote for newspapers in Memphis, New York City, and finally, Chicago.  
 D. was born in Holly Springs, Mississippi, in 1862, the eldest of eight children.

Establishing her own hair products business, herself<sup>26</sup>  
in the first decade of the twentieth century,

millions of dollars were later bequeathed by Madam<sup>27</sup>  
C. J. Walker to charities and educational institutions.

<sup>27</sup>  
Among the schools that benefited from this

generosity; were those that Mary McLeod Bethune<sup>28</sup>  
opened and ran in order to provide a better education  
for Black students. And Fannie Lou Hamer, Ella Baker,  
and Rosa Parks showed leadership and strength during the  
civil rights movement, it happened in the 1950s and 1960s.

<sup>29</sup>  
In the artwork, Ringgold has surrounded these women  
with bright sunflowers. The flowers seem to celebrate the  
women's accomplishments and the beauty of their shared  
vision. 30

26. F. NO CHANGE  
G. business belonging to her  
H. business, herself,  
J. business

27. A. NO CHANGE  
B. Madam C. J. Walker later bequeathed millions of  
dollars to charities and educational institutions.  
C. charities and educational institutions later received  
millions of dollars from Madam C. J. Walker.  
D. millions of dollars were later bequeathed to chari-  
ties and educational institutions by Madam C. J.  
Walker.

28. F. NO CHANGE  
G. generosity; were  
H. generosity were  
J. generosity were:

29. A. NO CHANGE  
B. movement, it took place in  
C. movement, that happened in  
D. movement of

30. If the writer were to delete the preceding sentence, the  
essay would primarily lose;  
F. an interpretation of the artwork that serves to sum-  
marize the essay.  
G. a reflection on the women depicted in the artwork  
that compares them to Ringgold.  
H. a description of a brushwork technique that refers  
back to the essay's opening.  
J. an evaluation of Ringgold's artistic talent that  
places her in a historical context.

### PASSAGE III

#### 1902: A Space Odyssey

Our technologically advanced times has allowed<sup>31</sup>  
filmmakers to create spectacular science fiction films to  
intrigue us with worlds beyond our experience. Imagine  
the excitement in 1902 when audiences first saw *Le Voyage*<sup>32</sup>  
*dans la lune* (*A Trip to the Moon*), a groundbreaking movie  
produced by Georges Méliès.

31. A. NO CHANGE  
B. have allowed  
C. allows  
D. was allowing

32. F. NO CHANGE  
G. 1902, and when  
H. 1902, which  
J. 1902, where



1

1

[1] Undaunted, Méliès honed his photographic skills to tell fantasy stories instead. [2] Méliès, a French magician, was fascinated by the workings of the new motion picture camera. [3] Specializing in stage illusions, he thought the camera offered potential to expand its spectacular magic productions. [4] By 1895, he <sup>33</sup> was working with the new invention. [5] He found <sup>34</sup> out, however, that the public preferred live magic acts to filmed versions. [35]

Méliès's magician's eye led him to discover the basics of special effects: [36] He experimented with effects such as speeding up and slowing down the action, reversing it for backward movement, and superimposing images of fantastic creatures over real people. Using overhead

pulleys and trapdoors, he was able to do interesting things.

<sup>37</sup> Aware of the popularity of Jules Verne's science fiction novels, Méliès saw exciting possibilities in filming a space odyssey. The interplanetary travel film that he created, *A Trip to the Moon*, had production costs of

\$4,000, highly excessively for its time. In this film, a space

<sup>38</sup> capsule that is fired and thereby launched and projected from a cannon lands in the eye of the Man in the Moon.

33. A. NO CHANGE  
B. their  
C. his  
D. it's

34. F. NO CHANGE  
G. out, however;  
H. out, however  
J. out however,

35. For the sake of the logic and coherence of this paragraph, Sentence 1 should be placed:  
A. where it is now.  
B. after Sentence 2.  
C. after Sentence 3.  
D. after Sentence 5.

36. The writer is considering deleting the preceding sentence from the essay. The sentence should NOT be deleted because it:

- F. describes Méliès's ability as a magician, which is important to understanding the essay.  
G. begins to explain the techniques of trick photography that Méliès eventually learned.  
H. creates a transition that provides a further connection between Méliès the magician and Méliès the filmmaker.  
J. indicates that Méliès's interest in learning about trick photography existed before his interest in magic.

37. Given that all the choices are true, which one would best conclude this sentence so that it illustrates Méliès's skill and inventiveness?

- A. NO CHANGE  
B. he used effects commonly seen in his stage productions.  
C. his actors could enter and leave the scene.  
D. he perfected eerie film entrances and exits.

38. F. NO CHANGE  
G. exceeding highly  
H. high excessively  
J. exceedingly high

39. A. NO CHANGE  
B. fired  
C. fired from and consequently projected  
D. fired and thereby propelled



In a strange terrain filled with hostile creatures, the  
 space travelers experience many adventures. They  
 escape back to earth in the capsule by falling off the  
 edge of the moon, landing in the ocean, they bob  
 around until a passing ship finally rescues them.

Producing the film long before  
 interplanetary explorations had begun,

Méliès could arouse his audience's  
 curiosity with unconstrained fantasy.

People are still going to theaters to see  
science fiction films.

40. F. NO CHANGE  
 G. creatures, who they now realize live there,  
 H. creatures, whom they are encountering,  
 J. creatures who are found there,

41. A. NO CHANGE  
 B. moon after landing  
 C. moon. Landing  
 D. moon, after landing

42. F. NO CHANGE  
 G. would of begun,  
 H. have began,  
 J. had begun,

43. Which of the following alternatives to the underlined word would be LEAST acceptable?

- A. whet  
 B. stimulate  
 C. awaken  
 D. disturb

44. Given that all the choices are true, which one would most effectively express the writer's viewpoint about Méliès's role in science fiction filmmaking?

- F. NO CHANGE  
 G. This first space odyssey provided the genesis for a film genre that still packs theaters.  
 H. Méliès made an important contribution to filmmaking many years ago.  
 J. In Méliès's production even the film crew knew a lot about space.

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer's goal had been to write a brief essay highlighting the contributions a single artist can make to a particular art form. Would this essay fulfill that goal?

- A. Yes, because the essay asserts that Méliès's work as a magician never would have succeeded without the contributions of the artists in the film industry.  
 B. Yes, because the essay presents Méliès as a magician who used his talents and curiosity to explore and excel in the film world.  
 C. No, because the essay focuses on the process of making science fiction films, not on a single artist's work.  
 D. No, because the essay suggests that it took many artists working together to create the success that Méliès enjoyed.

## PASSAGE IV

## Nancy Drew in the Twenty-First Century

I thought the Nancy Drew mystery series had  
 went out of style. I was sure that girls growing up  
 today would have more up-to-date role models and my

generation's favorite sleuth would of been retired to the

library's dusty, back rooms. I was wrong.

Nancy Drew, the teenaged heroine of heaps of young

adult mystery novels, is alive and well and still on the job.

I know because my niece, Liana, and her friends were

reading that all summer long. By the time Liana went back

to school and had followed Nancy Drew on a safari to

solve *The Spider Sapphire Mystery* and had explored Incan

ruins for clues to *The Secret of the Crossword Cipher*.

With Nancy's help, Liana had read about different  
 places and various cultures all over the world.

46. F. NO CHANGE

G. gone out of

H. went from

J. gone from

47. A. NO CHANGE

B. would have been

C. would of

D. DELETE the underlined portion.

48. F. NO CHANGE

G. libraries dusty,

H. libraries dusty

J. library's dusty

49. Which choice provides the most specific information?

A. NO CHANGE

B. a high number

C. hundreds

D. plenty

50. F. NO CHANGE

G. novels, is alive,

H. novels is alive,

J. novels is alive

51. A. NO CHANGE

B. the mysteries

C. up on that

D. it over

52. F. NO CHANGE

G. school, she had

H. school, having

J. school, she

53. A. NO CHANGE

B. solve:

C. solve;

D. solve,

54. Given that all the choices are true, which one best illustrates the variety of settings for the Nancy Drew mysteries and also expresses Liana's interest in these books?

F. NO CHANGE

G. Along with Nancy, Liana had many breathtaking adventures involving all sorts of colorful characters.

H. With Nancy in the lead, Liana had chased suspects from Arizona to Argentina, from Nairobi to New York.

J. Through her exposure to Nancy, Liana learned about many new places around the world.

1

When I was a girl in the 1960s,  
my friends and I loved Nancy Drew. <sup>55</sup>

We loved her loyal companions, her bravado, and

there was a love for her freedom to do what she wanted.

<sup>56</sup>

We also loved how smart she was and how pretty, how  
<sup>57</sup>  
confident and successful. We were surprised and delighted  
that eighteen-year-old Nancy was so accomplished at so

many things. She was able to solve crimes, win golf  
<sup>58</sup>  
tournaments, kick bad guys in the shins, and impress her  
father's distinguished clients. She did it all—and without  
scuffing her shoes or losing her supportive boyfriend, Ned.

Liana and her friends don't seem to care that Nancy is  
pretty or popular. They laugh, mockingly I think, at  
Nancy's friend Bess, who squeals at spiders. They prefer  
her other girlfriend George, the judo expert and computer  
whiz. They skip over the long descriptions of outfits and  
fashion accessories. According to Liana, they just want to  
get on with the story.

55. At this point, the writer is thinking about adding the following true statement:

One of a number of series that have featured the young female detective, the Nancy Drew Mystery Story series was begun in 1930 and now totals 173 books.

Should the writer make this addition here?

- A. Yes, because it supports statements about the longevity and popularity of this series.
- B. Yes, because it helps to explain why the narrator "loved Nancy Drew."
- C. No, because it distracts the reader from the main focus of this paragraph.
- D. No, because it fails to include relevant information about the author of the series.

56. F. NO CHANGE

- G. a love for her freedom to do what she wanted.
- H. her freedom to do what she wanted.
- J. the freedom to do as one wants.

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

- A. furthermore
- B. therefore
- C. likewise
- D. DELETE the underlined portion.

58. F. NO CHANGE

- G. was capable of solving crimes,
- H. was good at crime solving,
- J. solved crimes,



Perhaps I am overly optimistic, but I'd like to believe that Liana's generation doesn't love Nancy Drew because she's a successful girl detective. They don't need to be reminded that girls can be successful they know that.

What these girls need and love are the stories themselves:

those exciting adventure tales spiced with mystery.

59. A. NO CHANGE  
 B. successful they already know  
 C. successful; they know  
 D. successful, knowing.
60. Which choice most effectively supports the point being made in the first part of this sentence?  
 F. NO CHANGE  
 G. the answers to the mysteries of their lives.  
 H. a strong role model for their generation.  
 J. the ability to overcome obstacles.

# PASSAGE V

## Visiting Mars on a Budget

With its distinctive red tint and its polar ice caps, the planet Mars has fascinated humans for thousands of years. There were ancient Babylonian astronomers who associated Mars with their war god Negral, to twentieth-century science fiction writers whose works become best-sellers, this planet has often been a symbol of ill will and danger.

The United States has competed with other countries to explore space. By 2003, the National Aeronautics and

Space Administration (NASA) would of sent thirty

spacecraft to the red planet, speculation has been prompted that a human voyage may no longer be the stuff of fiction.

61. A. NO CHANGE  
 B. When  
 C. From  
 D. Those
62. Given that all the choices are true, which one is most relevant to the statement that follows in this sentence?  
 F. NO CHANGE  
 G. with their wild imaginations about outer space,  
 H. who penned spine-tingling stories of "little green men from Mars,"  
 J. who created images of Mars in literature,
63. Given that all the choices are true, which one best leads from the preceding paragraph to the subject of this paragraph?  
 A. NO CHANGE  
 B. Today, such negative associations seem to be dissipating.  
 C. In 1958, the United States founded an agency to run its space program.  
 D. Earth and Mars are both planets in the inner solar system.
64. F. NO CHANGE  
 G. had sent  
 H. send  
 J. have sent
65. A. NO CHANGE  
 B. to which speculation has prompted  
 C. prompting speculation  
 D. which is speculation

1

Few would deny that the idea of a human mission to Mars <sup>66</sup> is exciting, who is ready to pay for such an expedition?

Recent reports suggest that the cost of a human voyage to Mars could run as high as 100 billion dollars. This is a startling number, especially in light of the fact that the International Space Station, the most ambitious NASA project yet, <sup>67</sup> carried a projected price tag of "only" 17 billion dollars. In the end, NASA overspent on the International Space Station. <sup>68</sup> One can only imagine

if the final price of a human voyage to Mars would be. <sup>69</sup>

In contrast, the two Mars Rovers—robotic spacecraft launched in 2003—<sup>70</sup> carried a combined price tag of less than one billion dollars. These Rovers are sophisticated pieces of

technology, with the capacity and ability <sup>71</sup> to examine soil and rocks. Their equipment may answer questions that have long been posed about the presence of water and life on Mars.

66. F. NO CHANGE  
G. Maybe a few  
H. Although few  
J. Few, if any,

67. A. NO CHANGE  
B. yet  
C. yet:  
D. yet—

68. The writer is considering adding the following true information to the end of the preceding sentence (placing a comma after the word *Station*):  
with a final construction cost of almost 30-billion dollars.

Should the writer make this addition?

- F. Yes, because it strengthens the assertion made in this sentence by adding explicit detail.  
G. Yes, because it proves space flight will be more affordable in the future.  
H. No, because it weakens the point made in the paragraph about the cost of human flight to Mars.  
J. No, because it detracts from the essay's focus on the human experience in travel to Mars.

69. A. NO CHANGE  
B. what  
C. how  
D. DELETE the underlined portion.

70. Given that all the choices are true, which one most effectively describes what the Mars Rovers are?  
F. NO CHANGE  
G. which captured the imagination of the general public—  
H. the products described at length in the media—  
J. familiar to many who watched the news coverage at the time—

71. A. NO CHANGE  
B. genuine capacity  
C. potential capacity  
D. capacity

Sending machines unaccompanied by humans to Mars does drain some of the romance out of aging or older <sup>72</sup>

visions of space travel. In other words, <sup>73</sup> we need to keep in mind that the right equipment can accomplish as much as

any crew of scientists, if not more—such as <sup>74</sup> a fraction of the cost. Before any astronaut boards a spacecraft for that distant planet, the staggering expense of such a mission should be carefully considered. 75

72. F. NO CHANGE

- G. old age
- H. aging old
- J. age-old

73. A. NO CHANGE

- B. For that reason alone,
- C. In that time frame,
- D. Even so,

74. F. NO CHANGE

- G. at
- H. but only
- J. DELETE the underlined portion.

75. The writer is considering ending the essay with the following statement:

With the passage of time, humans will continue to gaze in awe toward the heavenly skies as a source of inspiration and mystery.

Should the writer add this sentence here?

- A. Yes, because it captures the emotion that is the basis for the space exploration described in the essay.
- B. Yes, because it invites the reader to reflect on the insignificance of money in relation to the mystery of space.
- C. No, because it does not logically follow the essay's chronological history of people who traveled in space.
- D. No, because it strays too far from the essay's focus on Mars and the cost of sending humans there.

**END OF TEST 1**

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





## MATHEMATICS TEST

60 Minutes—60 Questions

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

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

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

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

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

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

1. If  $\frac{3x}{2} + 12 = 4$ , then  $x = ?$

- A. -8
- B.  $-\frac{16}{3}$
- C.  $\frac{4}{3}$
- D.  $\frac{16}{3}$
- E.  $\frac{32}{3}$

DO YOUR FIGURING HERE.

2.  $2x^4 \cdot 5x^7$  is equivalent to:

- F.  $7x^3$
- G.  $7x^{11}$
- H.  $10x^{11}$
- J.  $7x^{28}$
- K.  $10x^{28}$

3. Let  $f(x) = \frac{x^2 + 12}{x - 6}$ . What is the value of  $f(10)$ ?

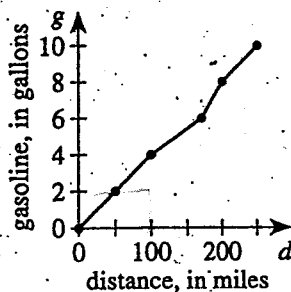
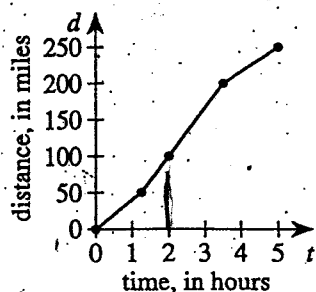
- A. 112
- B. 28
- C. 12
- D. 10
- E. 8

2



4. The 2 graphs shown below represent a car trip. The graph on the left shows the total distance as a function of time. The graph on the right shows the total number of gallons of gasoline used as a function of the total distance. Approximately how many gallons of gasoline were used during the first 2 hours of the trip?

DO YOUR FIGURING HERE.

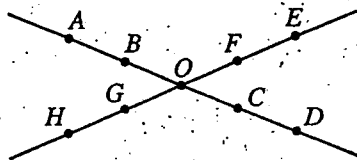


- F. 2  
G. 4  
H. 8  
J. 25  
K. 100
5. What is the value of  $442 + 325 + 287$ , rounded to the nearest hundred?
- A. 700  
B. 800  
C. 900  
D. 1,000  
E. 1,100
6. A bus company always keeps 3 tires in stock for every bus it owns, plus an additional 30 tires in stock for emergencies. According to this policy, the bus company needs to have a total of 120 tires in stock. How many buses does the company own?
- F. 30  
G. 35  
H. 40  
J. 45  
K. 50
7. For what value of  $x$  is the equation  $2(x - 6) + x = 36$  true?
- A. 24  
B. 16  
C. 14  
D. 10  
E. 8



8. Five points are shown on each of the 2 lines in the figure below. Point  $O$  is the intersection point of the 2 lines. Which of the following rays does NOT contain point  $O$ ?

- F.  $\overrightarrow{AB}$   
 G.  $\overrightarrow{BD}$   
 H.  $\overrightarrow{CD}$   
 J.  $\overrightarrow{EF}$   
 K.  $\overrightarrow{EG}$



DO YOUR FIGURING HERE.

9. Let  $r$ ,  $s$ , and  $t$  be positive integers such that  $rs = 24$ ,  $st = 36$ , and  $t = 3$ . What is the value of  $r$ ?

- A. 2  
 B. 4  
 C. 6  
 D. 8  
 E. 12

10. Mele earned scores of 75, 70, 92, 95, and 97 points (a total of 429 points) on the first 5 tests in Economics II. Solving which of the following equations for  $s$  gives the score he needs to earn on the 6th test to average exactly 85 points for all 6 tests?

- F.  $\frac{429}{5} + s = 85$   
 G.  $\frac{429}{6} + s = 85$   
 H.  $\frac{s + 429}{5} = 85$   
 J.  $\frac{s + 429}{6} = 85$   
 K.  $\frac{s + 429}{6} = \frac{85}{100}$

11. For how many whole numbers from 44 through 55 is the ones digit greater than the tens digit?

- A. 3  
 B. 4  
 C. 5  
 D. 11  
 E. 12

12. The weight of a circular rod of a certain type is proportional to its length. A 15-foot circular rod of this type weighs 35 pounds. What is the weight, in pounds, of a 21-foot circular rod of this type?

- F. 41  
 G. 44  
 H. 47  
 J. 49  
 K. 56

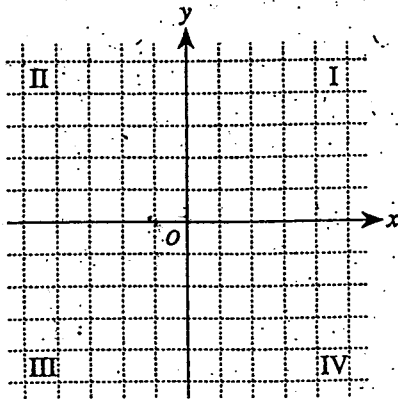
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2

DO YOUR FIGURING HERE.

13. The vertices of a rectangle are  $(-1, -2)$ ,  $(4, -2)$ ,  $(4, 3)$ , and  $(-1, 3)$ . When the rectangle is graphed in the standard  $(x, y)$  coordinate plane below, what percent of the total area of the rectangle lies in Quadrant III?



- A. 8%  
 B. 12%  
 C. 12.5%  
 D. 32%  
 E. 48%
14. Which of the following expressions is equivalent to the one given below?

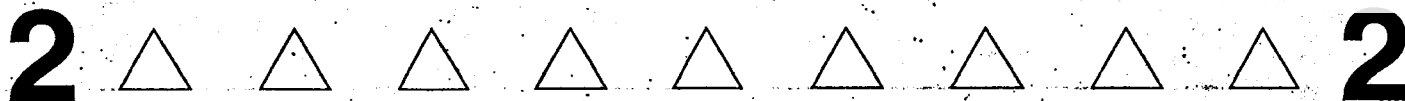
$$\frac{3 + 7(x - 6)}{3(x - 6) + 10}$$

- F.  $\frac{10}{13}$   
 G.  $\frac{7}{10}$   
 H.  $\frac{39}{8}$   
 J.  $\frac{7x - 39}{3x - 8}$   
 K.  $\frac{10x - 42}{13x - 18}$
15. In the standard  $(x, y)$  coordinate plane, an equation of a circle is  $x^2 + y^2 = 81$ . At what points does the circle intersect the  $y$ -axis?
- A.  $(0, 1)$  and  $(0, -1)$   
 B.  $(0, 9)$  and  $(0, -9)$   
 C.  $(0, 18)$  and  $(0, -18)$   
 D.  $(0, 27)$  and  $(0, -27)$   
 E.  $(0, 81)$  and  $(0, -81)$
16. Four points,  $A$ ,  $B$ ,  $C$ , and  $D$ , lie on a circle having a circumference of 17 units.  $B$  is 5 units counterclockwise from  $A$ .  $C$  is 3 units clockwise from  $A$ .  $D$  is 11 units clockwise from  $A$  and 6 units counterclockwise from  $A$ . What is the order of the points, starting with  $A$  and going clockwise around the circle?
- F.  $A, B, C, D$   
 G.  $A, B, D, C$   
 H.  $A, C, B, D$   
 J.  $A, C, D, B$   
 K.  $A, D, C, B$



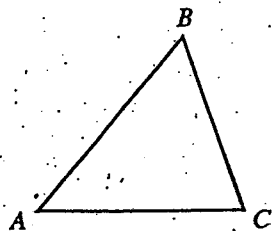
DO YOUR FIGURING HERE.

17. In 1985, the cost of clothing for a certain family was \$620. In 1995, 10 years later, the cost of clothing for this family was \$1,000. Assuming the cost increased linearly, what was the cost of this family's clothing in 1991?
- A. \$908  
B. \$848  
C. \$812  
D. \$810  
E. \$772
18. For a math homework assignment, Karla found the area and perimeter of a room of her house. She reported that the area of her rectangular living room is 180 square feet and that the perimeter is 54 feet. When drawing a sketch of her living room the next day, she realized that she had forgotten to write down the dimensions of the room. What are the dimensions of Karla's living room, in feet?
- F. 9 by 20  
G. 10 by 18  
H. 12 by 15  
J. 14 by 13  
K. 16 by 11
19. If  $1.056 \cdot 10^n = 0.0001056$ , what is the value of  $n$ ?
- A. -7  
B. -4  
C. -3  
D. 4  
E. 7
20. The value of  $m$  is directly proportional to the value of  $p$ . When  $m = 2$ ,  $p = 6$ . What is  $m$  when  $p = 9$ ?
- F.  $\frac{1}{3}$   
G.  $\frac{4}{3}$   
H. 3  
J. 5  
K. 27
21. To park a car at a short-term parking lot costs \$1.75 for the 1st hour or any part thereof, \$1.50 for the 2nd hour or any part thereof, and \$0.75 for each additional hour or any part thereof after the 2nd hour. Your ticket shows that you parked your car in this lot from 10:47 a.m. to 4:35 p.m. on the same day. What is the cost of parking your car, according to this ticket?
- (Note: Prices include all applicable sales tax.)
- A. \$4.75  
B. \$5.50  
C. \$5.86  
D. \$6.10  
E. \$6.25



22. The degree measures of the interior angles of  $\triangle ABC$ , shown below, form an arithmetic sequence with common difference  $10^\circ$ . What is the first term of the sequence?

DO YOUR FIGURING HERE.



- F.  $80^\circ$   
 G.  $60^\circ$   
 H.  $50^\circ$   
 J.  $40^\circ$   
 K.  $30^\circ$
23. Point  $B$  lies on  $\overline{AC}$  between  $A$  and  $C$ . Point  $D$  is a point not on  $\overline{AC}$  such that the measure of  $\angle ABD$  is  $38^\circ$ . What is the measure of  $\angle CBD$ ?
- A.  $38^\circ$   
 B.  $52^\circ$   
 C.  $76^\circ$   
 D.  $128^\circ$   
 E.  $142^\circ$
24. Let  $2x + 3y = 4$  and  $5x + 6y = 7$ . What is the value of  $8x + 9y$ ?
- F.  $-10$   
 G.  $-1$   
 H.  $2$   
 J.  $7$   
 K.  $10$
25. Which of the following is the equation  $3(x - y) = 5$  solved for  $y$ ?
- A.  $y = x - \frac{5}{3}$   
 B.  $y = \frac{5}{3} - x$   
 C.  $y = 15 - x$   
 D.  $y = x - 15$   
 E.  $y = \frac{5}{3}x$
26. Which of the following statements is true about odd and/or even numbers?
- F. The sum of any 2 even numbers is odd.  
 G. The sum of any 2 odd numbers is odd.  
 H. The quotient of any 2 even numbers is odd.  
 J. The quotient of any 2 even numbers is even.  
 K. The product of any 2 odd numbers is odd.





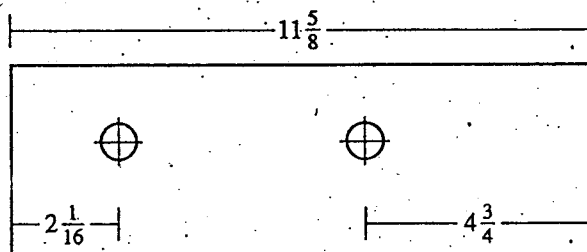
27. A deck of cards for a children's game contains 10 red cards, 10 blue cards, and 10 yellow cards. The players take turns, each drawing a card at random from the deck and placing the card on the table. When it is the fourth player's turn, there are 3 yellow cards on the table. What is the probability that the fourth player will draw a yellow card?

- A.  $\frac{7}{30}$   
 B.  $\frac{7}{27}$   
 C.  $\frac{1}{3}$   
 D.  $\frac{4}{10}$   
 E.  $\frac{7}{10}$

28. To win the student council election, a candidate must receive over 50% of the votes cast. There were 750 votes cast. Which of the following expressions is true about  $x$ , the minimum number of votes that a candidate must have received to win the election?

- F.  $x < 375$   
 G.  $x = 375$   
 H.  $x > 375$   
 J.  $x < 376$   
 K.  $x > 376$

29. A machine part is diagrammed in the figure below with the dimensions given in inches. If the centers of the circles lie on the same line parallel to the bottom of the part, what is the distance, in inches, between the centers of the 2 holes in the machine part?



- A.  $5\frac{3}{16}$   
 B.  $5\frac{1}{16}$   
 C. 5  
 D.  $4\frac{13}{16}$   
 E.  $4\frac{3}{16}$

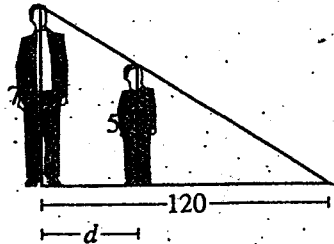
DO YOUR FIGURING HERE.

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DO YOUR FIGURING HERE.

30. A father and his son are standing near each other on level ground late one afternoon so that their shadows end at the same place. The father is 75 inches tall, the son is 50 inches tall, and the father's shadow is 120 inches long, as shown in the figure below. Which of the following is closest to the distance,  $d$  inches, between the father and his son?



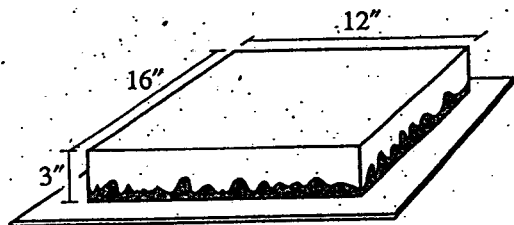
- F. 25  
G. 40  
H. 60  
J. 70  
K. 80
31. In the standard  $(x,y)$  coordinate plane, what is the distance, in coordinate units, between  $(-3,-2)$  and  $(5,5)$ ?
- A.  $\sqrt{13}$   
B.  $\sqrt{15}$   
C.  $\sqrt{113}$   
D. 5  
E. 15
32. Chayton decides to save money in a savings account for a vacation. He deposits \$10 in his savings account the 1st month. Each month thereafter, the amount he deposits is \$10 more than the amount he deposited the previous month. Thus, Chayton's deposit is \$20 the 2nd month, \$30 the 3rd month, and so on. He makes his final deposit of \$360 the 36th month. What is the total amount of Chayton's 36 deposits?
- F. \$ 710  
G. \$1,850  
H. \$6,300  
J. \$6,480  
K. \$6,660
33. One side of a triangle is 15 cm long, and another side is 28 cm long. Which of the following is a possible length, in centimeters, for the third side?
- A. 2  
B. 12  
C. 31  
D. 44  
E. 52
34. The expression  $\frac{2x+3}{12x^2}$  is equivalent to:
- F.  $\frac{1}{3}$   
G.  $\frac{1}{x}$   
H.  $\frac{1}{2x}$   
J.  $\frac{x+1}{2x^2}$   
K.  $\frac{1}{6x} + \frac{1}{4x^2}$



DO YOUR FIGURING HERE.

Use the following information to answer questions 35–37.

Ken baked, frosted, and decorated a rectangular cake for the last Math Club meeting. The cake was 3 inches high, 12 inches wide, and 16 inches long. He centered the cake on a piece of cardboard whose rectangular top surface had been covered with aluminum foil, as shown in the figure below.



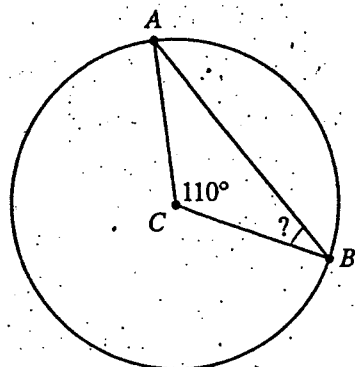
35. Ken used a piece of cardboard large enough to allow the cardboard to extend 2 inches beyond the cake on all sides. What is the area, in square inches, of the aluminum foil that is exposed on the top surface of the cardboard?
- A. 60  
B. 64  
C. 88  
D. 96  
E. 128
36. At the Math Club meeting, Principal Gonzales cut the entire cake into pieces. Each piece is 2 inches wide, 2 inches long, and 3 inches high. What is the number of pieces Principal Gonzales cut the cake into?
- F. 16  
G. 20  
H. 28  
J. 48  
K. 96
37. The Math Club will pay Ken \$5.00 for preparing the cake and will also pay him for the cost of the cake mix at \$1.73, the frosting mix at \$2.67, and the sales tax of 5% on these 2 items. What is the total amount the Math Club will pay Ken?
- A. \$4.67  
B. \$9.40  
C. \$9.45  
D. \$9.62  
E. \$9.87

2



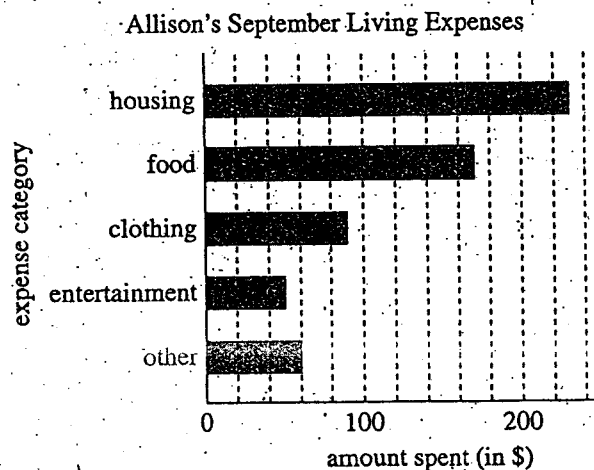
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38. Points  $A$  and  $B$  lie on the circle below, where central angle  $\angle ACB$  measures  $110^\circ$ . What is the measure of  $\angle ABC$ ?



- F.  $35^\circ$   
 G.  $40^\circ$   
 H.  $45^\circ$   
 J.  $55^\circ$   
 K. Cannot be determined from the given information

39. The graph below shows Allison's living expenses, which totaled \$600, during September of her freshman year in college.



Trying to limit her spending, Allison decides that in October she could spend \$60 less for food and \$40 less for clothing. If she can accomplish this and the rest of her expenses are the same as they were in September, approximately what percent of Allison's October expenses will be for entertainment?

- A. 5%  
 B. 8%  
 C. 10%  
 D. 17%  
 E. 20%



40. Nadia works exactly 40 hours each week and earns a minimum of \$1,200 every 4 weeks. Her hourly rate of pay is determined by the job she is assigned and may vary. If  $x$  is Nadia's average hourly pay for a 4-week period, which of the following inequalities best describes  $x$ ?

F.  $x \leq \$ 7.50$   
 G.  $x \geq \$ 7.50$   
 H.  $x \leq \$ 30.00$   
 J.  $x \geq \$ 30.00$   
 K.  $x \geq \$120.00$

DO YOUR FIGURING HERE.

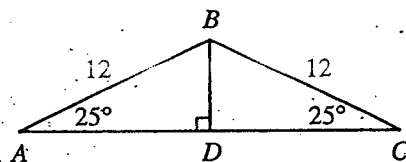
41. If  $x$  is any positive integer, then the sum of  $8x$  and  $13x$  is *always* divisible by which of the following?

A. 5  
 B. 8  
 C. 13  
 D. 21  
 E. 104

42. The coordinates of the endpoints of  $\overline{MN}$  in the standard  $(x,y)$  coordinate plane are  $(-13,-4)$  and  $(5,4)$ . What is the  $x$ -coordinate of the midpoint of  $\overline{MN}$ ?

F. -8  
 G. -4  
 H. 0  
 J. 4  
 K. 9

43. The diagram of the roof for a new storage shed is shown below. Some lengths are given in meters, but the length of the vertical support,  $\overline{BD}$ , has been left off. Which of the following expressions gives the length, in meters, of  $\overline{BD}$ ?



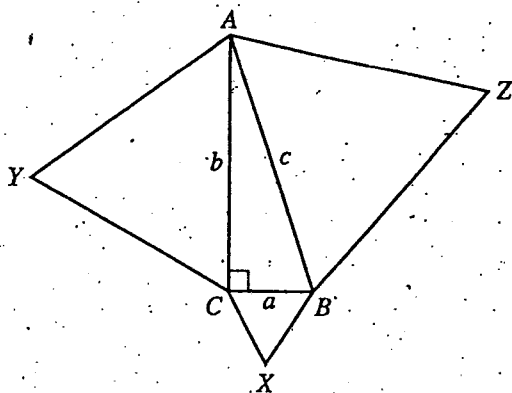
A.  $12 \sin 25^\circ$   
 B.  $12 \tan 25^\circ$   
 C.  $12 \cos 25^\circ$   
 D.  $\frac{12}{\cos 25^\circ}$   
 E.  $\frac{12}{\sin 25^\circ}$



Use the following information to answer questions 44–46.

DO YOUR FIGURING HERE.

In the figure below,  $\triangle ACB$  is a right triangle with legs of length  $a$  units and  $b$  units, where  $0 < a < b$ , and hypotenuse of length  $c$  units. The triangles  $\triangle YCA$ ,  $\triangle ZBA$ , and  $\triangle XCB$  are equilateral. The area of an equilateral triangle with sides  $x$  units long is  $\frac{\sqrt{3}}{4}x^2$  square units.



44. What is the perimeter of pentagon  $AZBCY$ , in units?

- F.  $a + b + 2c$
- G.  $a + 2b + 2c$
- H.  $a + 3b + 3c$
- J.  $2a + 2b + 2c$
- K.  $3a + 3b + 3c$

45. For all values of  $a$  and  $b$  such that  $0 < a < b$ , which of the following lists the angles  $\angle XCY$ ,  $\angle CAZ$ , and  $\angle CBZ$  in order of their measures from *least* to *greatest*?

- A.  $\angle CBZ$ ,  $\angle XCY$ ,  $\angle CAZ$
- B.  $\angle CBZ$ ,  $\angle CAZ$ ,  $\angle XCY$
- C.  $\angle XCY$ ,  $\angle CAZ$ ,  $\angle CBZ$
- D.  $\angle CAZ$ ,  $\angle CBZ$ ,  $\angle XCY$
- E.  $\angle CAZ$ ,  $\angle XCY$ ,  $\angle CBZ$

46. If  $b = 2a$ , what is  $\tan(\angle ABC)$ ?

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



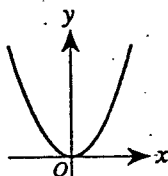


47. The sum of 3 consecutive odd integers is  $k$ . In terms of  $k$ , what is the sum of the 2 smaller of these integers?

DO YOUR FIGURING HERE.

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

48. The graph of  $y = x^2$  is shown in the standard  $(x, y)$  coordinate plane below. For which of the following equations is the graph of the parabola shifted 3 units to the right and 2 units down?



- F.  $y = (x + 3)^2 + 2$
  - G.  $y = (x + 3)^2 - 2$
  - H.  $y = (x - 2)^2 + 3$
  - J.  $y = (x - 3)^2 + 2$
  - K.  $y = (x - 3)^2 - 2$
49. Lucky found \$8.25 in pennies, nickels, dimes, and quarters while walking home from school one week. When she deposited this money in the bank, she noticed that she had twice as many nickels as pennies, 1 fewer dime than nickels, and 1 more quarter than nickels. How many quarters did Lucky find that week?
- A. 3
  - B. 9
  - C. 16
  - D. 21
  - E. 26
50. The mean of 4 numbers is 32. The smallest of the 4 numbers is 5. What is the mean of the other 3 numbers?

- F.  $30\frac{3}{4}$
- G. 32
- H. 36
- J. 41
- K.  $42\frac{2}{3}$

2



2

DO YOUR FIGURING HERE.

51. If the statement "If a cat is tricolor, then it is a female" were true, which of the following statements would also have to be true?

A. "If a cat is a female, then it is tricolor."  
 B. "If a cat is not a female, then it is tricolor."  
 C. "If a cat is not a female, then it is not tricolor."  
 D. "If a cat is not tricolor, then it is a female."  
 E. "If a cat is not tricolor, then it is not a female."

52. What is the set of all the values of  $b$  that satisfy the equation  $(x^3)^{4-b^2} = 1$  for all nonzero values of  $x$ ?

F.  $\{0\}$   
 G.  $\{2\}$   
 H.  $\{4\}$   
 J.  $\{-\sqrt{7}, \sqrt{7}\}$   
 K.  $\{-2, 2\}$

53. Which of the following trigonometric functions is equivalent to the function  $g(x) = \sin x \sec x$ ?

(Note:  $\sec x = \frac{1}{\cos x}$ )

A.  $f(x) = \cos x$   
 B.  $f(x) = \cot x$   
 C.  $f(x) = \csc x$   
 D.  $f(x) = \sin x$   
 E.  $f(x) = \tan x$

54. The table below gives some  $(x,y)$  pairs that satisfy a linear relationship. What does  $z$  equal?

$x$	$y$
-2	-7
2	5
0	-1
-3	$z$

F. -10  
 G. -8  
 H. -7  
 J. -2  
 K. 0

55. The volume of a right circular cylinder with a height of 6 cm is  $150\pi$  cubic centimeters. What is the lateral surface area, in square centimeters, of this cylinder?

(Note: For a right circular cylinder with radius  $r$  and height  $h$ , the lateral surface area is  $2\pi rh$  and the volume is  $\pi r^2 h$ .)

A.  $25\pi$   
 B.  $36\pi$   
 C.  $50\pi$   
 D.  $60\pi$   
 E.  $110\pi$



56. Whenever  $w$  is an integer greater than 1,  $\log_w \frac{w^2}{w^6} = ?$

F. -4

G. -3

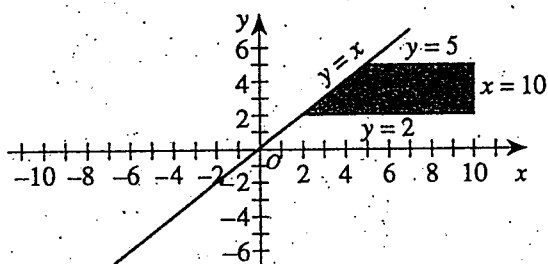
H.  $-\frac{1}{3}$

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

K. 3

DO YOUR FIGURING HERE.

57. Amal's teacher assigned each student in class to draw a trapezoid using a segment of the line  $y = x$  as one side. The interior of Amal's trapezoid is shown shaded in the standard  $(x,y)$  coordinate plane below. The equations of the lines that intersect to form the trapezoid are also shown.



The next part of the assignment was to reflect the trapezoid across the  $x$ -axis and write a set of inequalities defining the reflected trapezoid and its interior. Which of the following sets of inequalities should Amal have written?

- A.  $x \leq 10$ ,  $2 \leq y \leq 5$ ,  $y \leq x$   
 B.  $x \leq 10$ ,  $-5 \leq y \leq -2$ ,  $y \geq -x$   
 C.  $x \leq 10$ ,  $-5 \leq y \leq -2$ ,  $y \leq -x$   
 D.  $x \leq -10$ ,  $2 \leq y \leq 5$ ,  $y \leq -x$   
 E.  $x \leq -10$ ,  $-5 \leq y \leq -2$ ,  $y \geq x$

58. In the standard  $(x,y)$  coordinate plane below, an angle is shown whose vertex is the origin. One side of this angle with measure  $\theta$  passes through  $(4,-3)$ , and the other side includes the positive  $x$ -axis. What is the cosine of  $\theta$ ?

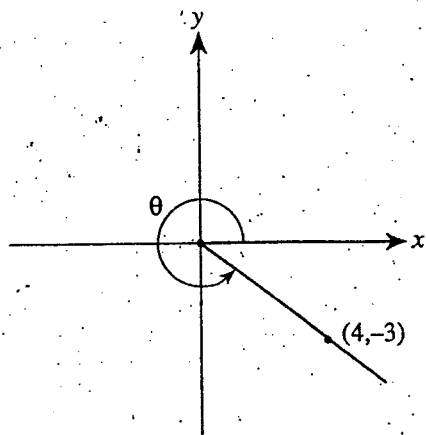
F.  $-\frac{4}{3}$

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

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

J.  $\frac{4}{5}$

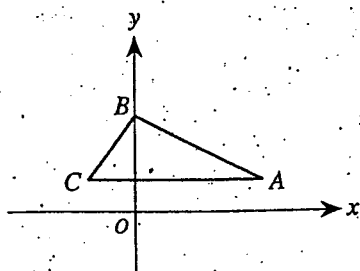
K.  $\frac{5}{4}$



# 2

DO YOUR FIGURING HERE.

59. Triangle  $\triangle ABC$  has vertices  $A(8,2)$ ,  $B(0,6)$ , and  $C(-3,2)$ . Point  $C$  can be moved along a certain line, with points  $A$  and  $B$  remaining stationary, and the area of  $\triangle ABC$  will not change. What is the slope of that line?



60. Let the function  $f(a,b)$  be defined as  $f(a,b) = b^2 - a$ . For all  $x$  and  $y$ ,  $f((x^2 + y^2), (x - y)) = ?$

A.  $-\frac{1}{2}$   
 B.  $-\frac{3}{4}$   
 C. 0  
 D.  $\frac{4}{3}$   
 E. 2

F.  $2y^2$   
 G. 0  
 H.  $-2y^2$   
 J.  $-2xy + 2y^2$   
 K.  $-2xy$

END OF TEST 2

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

## READING TEST

35 Minutes—40 Questions

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

## Passage I

**PROSE FICTION:** This passage is adapted from the novel *Winter Wheat* by Mildred Walker (©1944 by Harcourt, Brace and Company, Inc.).

The setting is the northern prairies of Montana in 1940.

September is like a quiet day after a whole week of wind. I mean real wind that blows dirt into your eyes and hair and between your teeth and roars in your ears after you've gone inside. The harvesting is done and the wheat stored away and you're through worrying about hail or drought or grasshoppers. The fields have a tired peaceful look, the way I imagine a mother feels when she's had her baby and is just lying there thinking about it and feeling pleased.

- 10 It was hot, though, like a flash-back to July. I was glad we weren't cooking for harvest hands. There wasn't any fire in the stove and everything was spick-and-span because I had just washed the dinner dishes. Mom was out having another look for the turkeys that were always wandering off. Dad was lying on the couch in the other room waiting for the noon broadcast of wheat prices to come on. We had to sell our wheat this month and not hold it over; that is, we did if I was going to the university that fall. It might go higher along toward Christmas, but we couldn't wait for that.

The house was so quiet I could hear Mom calling the turkeys down by the barn. Dad told Mom not to bother, they'd come back by themselves, but Mom worried if anything was lost or left unlocked.

- 25 "When I've got something, I take care of it," she always said.

- I washed some cucumbers while I was waiting. They were bright-green and shiny in the water. I used to play they were alligators when I was a child. Then I fenced them in with my hand and poured off the water into the kettle on the stove. When you have to carry every drop of water you use half a mile, you don't throw away any.

- And then it began. I knew before Dad turned it up. The voice of the man who announces the wheat prices is as familiar to me as Dad's. It's different from anybody's voice around Gotham—more like one of those

city voices that broadcasts the war news. That voice touches us here, and all the ranches spread out over the prairies between the Rockies and the Mississippi. It touches all the people in Clark City, thirty miles from here, who live on the ranches, even though they try to forget it.

- "Here is your Grain Market Broadcast for today: 45 Spring and Winter . . . up two."

I could add two to yesterday's price, so I didn't have to hear any more, but I listened out of habit and because I love to hear it.

- "One heavy dark Northern Spring . . . fifty-two." 50 The words came so fast they seemed to roll downhill. Nobody ever calls it all that; it's just spring wheat, but I like the words. They heap up and make a picture of a spring that's slow to come, when the ground stays frozen late into March and the air is raw, and the skies are sulky and dark. The "Northern" makes me feel how close we are to the Rockies and how high up on the map, almost to Canada.

"One dark hard Winter . . . fifty-three."

- It's just winter wheat to the people who raise it, 60 only to me it means more than that. It means all the winter and all the cold and the tight feeling of the house in winter, but the rich secret feeling I have, too, of treasure in the ground, growing there for us, waiting for the cold to be over to push up strong and green. They sound like grim words without any comfort to them, but they have a kind of strength all their own.

"Durum, Flax, and Rye . . . up one." The broadcast ran on. Mom came in while I was standing there listening.

- 70 "Wheat's up," I told her.

- Mom nodded. She stood there untying her bandanna and I watched her as though I didn't know her face better than my own. Mom's is a quiet face with a broader forehead than mine and dark brows and eyes and a wide mouth. She doesn't show in her face what she thinks or feels—that's why people in Gotham think she's hard to know—but when she laughs, the laughter goes deeper down in her eyes than anybody's I know.

I look more like Dad. He is tall and thin and has light hair and blue eyes and his face shows what he thinks or feels. I am strong like Mom, though, and I like working in the fields better than in the house.

Dad clicked off the radio and came out to the kitchen. "Well, we'll go over and tell Bailey we're going to sell. Fifty-three is good enough. Come on, Ellen, you can drive me over."

I took off my apron and was running across to the barn for the pickup before Dad had taken his hat from behind the door. I felt so excited I couldn't walk soberly.

Glory, it was hot! I had the doors of the truck tied open with a piece of rope so the air could rush through, but it felt hot enough to scorch my bare ankles, and the heat of the engine came up through the rubber soles of my sneakers.

- The point of view from which the passage is told is best described as that of a young woman who:
  - is unsure whether she would like to attend college in the fall but is aware that she will have the option.
  - had made plans to go to college in the fall but is now convinced that the high cost to attend will prevent her from going.
  - had assumed that she would go to college in the fall but is now considering working on the family ranch for a year instead.
  - is anxiously anticipating attending college in the fall but is aware of the conditions that could affect her plans.
- The passage most strongly suggests that the narrator's family grows:
  - wheat only.
  - wheat and rye only.
  - wheat, rye, and durum only.
  - wheat, rye, durum, and flax.
- The passage does NOT mention which of the following as something that at least one member of the family monitors carefully?
  - The turkeys
  - Land disputes in Gotham
  - How water is used
  - Wheat price fluctuations
- The narrator describes her mom as having all of the following EXCEPT:
  - facial features that differ from those of the narrator's dad.
  - a strength that the narrator identifies with.
  - a noticeable sense of worry over the current year's wheat prices.
  - a commitment to caring for her belongings.
- As it is used the first time in line 34, the word *it* most precisely refers to:
  - the radio.
  - one of the city voices that broadcasts the war news.
  - the narrator's dad's voice.
  - the noon broadcast of wheat prices.
- The narrator's statement in lines 75–78 most nearly means that she believes her mom is:
  - a somewhat moody person who is often difficult for the narrator and her dad to understand.
  - an expressive person who is known for laughing openly and deeply.
  - a serious person who rarely interacts with most of the people of Gotham.
  - a warm person who is not well understood by people in Gotham.
- As it is used in line 2, the word *real* most nearly means:
  - factual.
  - positive.
  - established.
  - powerful.
- Which of the following does the narrator NOT directly identify as a threat to the wheat crop?
  - Grasshoppers
  - Wind
  - Hail
  - Drought
- As it is used in line 30, the word *fenced* can reasonably be said to mean all of the following EXCEPT:
  - shut.
  - penned.
  - committed.
  - held.
- When the narrator's dad tells her that he has decided to sell the current crop of wheat, the narrator reacts to the news with a feeling of excitement that:
  - she tries to hide from him.
  - consumes her.
  - is paired with discontent.
  - is tinged with guilt.



## Passage II

**SOCIAL SCIENCE:** This passage is adapted from the article "Virtually Rebuilt, A Ruin Yields Secrets" by Sam Lubell (©2002 by The New York Times Company).

Everyone knows that the Roman Colosseum is an architectural marvel. Built so that thousands of people could be ushered in and out in minutes, it is a testament to the genius of Roman engineering. Or is it? By reconstructing the building with three-dimensional computer modeling and then virtually "walking through" it, researchers have discovered dark, narrow upper hallways that probably hemmed in spectators, slowing their movement to a crawl.

Such three-dimensional modeling is turning some of archaeology's once-established truths on their heads. Because 3-D software can take into account the building materials and the laws of physics, it enables scholars to address construction techniques in ways sometimes overlooked when they are working with two-dimensional drawings.

The Colosseum, a vast four-story oval arena, was built from around A.D. 70 to 80. It once held as many as 50,000 spectators. Earthquakes and the ravages of time have destroyed much of the building, but an impressive amount, including most of its facade, still stands.

Dean Abernathy, a doctoral student who helped reconstruct the Colosseum, confronted the issue of the third-level hallways. His model drew on the findings of a team of experts on Roman architecture assembled by the University of California at Los Angeles who had studied similar amphitheaters, drawings of the Colosseum and records of the building's construction and expansion. The team also examined what was left of the upper hallways, an area that had previously been all but closed to researchers.

Bernard Frischer, a classics professor at UCLA and director of its Cultural Virtual Reality Lab, said that researchers have generally held that the entire Colosseum was a masterpiece of circulation, with people able to enter and leave in as little as 10 minutes. After touring the virtual Colosseum, now he is not so sure. "Most scholars just never focused on the problem of circulation throughout the building," he said. "They assumed that each of the floors was going to look like the bottom," which is spacious and well lighted.

Such reconstructions have challenged traditional thinking about other sites as well. Analysis of UCLA models suggests that the Roman Senate may have been poorly ventilated and lighted and had inferior acoustics. The models also raised some new questions about the Temple of Saturn, whose design may have been altered centuries after its construction.

Samuel Paley, a classics professor at the State University of New York at Buffalo, and members of the

virtual reality lab there have worked with a design company that specializes in archaeological visualizations to produce virtual models of several Assyrian palaces. Moving through a simulation of the northwest palace of Ashur-Nasir-Pal II of Assyria, an ancient site in modern-day Iraq, he caught a glimpse of three leaf bas-relief sculptures in a row. The sculptures, which depicted a ritual involving the king, courtiers and protective gods, could be viewed as a single, isolated tableau only from his position on the threshold of the throne room—as was evidently the intention of the palace's designers. When Paley described his finding at a lecture, "the room went absolutely silent," he said. "I think people realized right then that this is a useful technology that helps them see things in a different way."

Some experts hesitate to rely on such modeling, saying that it can gloss over the realities of the past. Kenneth Kolson, deputy director of the division of research programs for the National Endowment for the Humanities, said that virtual images conveyed a "false sense of integrity and purity." He added, "Those images, especially the stunningly seductive ones, convey as much or more about our own values and cultural aspirations as about the ancients."

Even Frischer and other scholars who have embraced interactive 3-D modeling caution that their reconstructions can never be accepted as fact, partly because new information is always surfacing. "We're working the stuff out," said Mark Wilson Jones, a member of the UCLA committee of Roman architecture experts and a lecturer in architecture. "Nothing's ever final." One advantage of using digital models, scholars say, is that they can easily be updated with new findings.

Fikret Yegul, a professor of architectural history at the University of California at Santa Barbara, acknowledges that computer modeling can shed new light on the past. Still, he questions some of the theories of the team of experts assembled by UCLA. "VR models can never be seen as the last word," he said. "They are only another perspective."

11. The main function of the first paragraph is to:

- A. state then question a widely held notion about the Colosseum.
- B. praise the Colosseum as an architectural and engineering marvel.
- C. show how people in ancient times moved quickly in and out of the Colosseum.
- D. point out a flaw in the design and construction of the Colosseum and how it was later corrected.

33

12. The passage indicates that in its research on the Colosseum, the UCLA-assembled team of Roman architecture experts made use of all of the following sources of information EXCEPT:
- F. the remains of a part of the Colosseum usually inaccessible to researchers.
  - G. records of the Colosseum's construction and expansion.
  - H. studies of amphitheaters similar to the Colosseum.
  - J. models of the Colosseum made from clay.
13. Frischer attributes the theory that "the entire Colosseum was a masterpiece of circulation" (lines 35–36) directly to:
- A. flawed experiments yielding incorrect results.
  - B. misleading computer models.
  - C. erroneous data about the building's bottom floor.
  - D. false assumptions left unquestioned by most scholars.
14. The author describes the Roman Senate and the Temple of Saturn as two buildings that:
- F. have yet to be studied by UCLA researchers.
  - G. are being reevaluated thanks to computer modeling.
  - H. underwent design changes long after their construction.
  - J. featured inferior ventilation, lighting, and acoustics.
15. As Paley relates it, the lecture audience's reaction to his finding about an Assyrian palace is best described as:
- A. stunned amazement.
  - B. silent contempt.
  - C. mild concern.
  - D. feigned interest.
16. In the context of the eighth paragraph (lines 68–76), the statement in lines 73–76 most nearly means that:
- F. computer models reveal a great deal about the values and culture of the ancient world.
  - G. because they reflect modern ideas, computer models risk obscuring the ancient past.
  - H. modern people have aspirations similar to those of the people of the ancient world.
  - J. through their images, the ancients vividly conveyed their values and hopes.
17. When Mark Wilson Jones talks about "working the stuff out" (line 81), he is most likely referring to:
- A. correcting errors in computer models as new data emerge.
  - B. eliminating serious flaws in the software used to make computer models.
  - C. ending the conflict between supporters and critics of computer modeling.
  - D. integrating architecture and archaeology into his classroom lectures.
18. The author most likely places the words "walking through" in quotation marks in line 6 to:
- F. reveal the speed at which ancient Romans moved through the Colosseum's upper hallways.
  - G. suggest that tourist visits to the Colosseum in Rome are best done at a leisurely pace.
  - H. warn readers that researchers are just beginning to develop computer models of the Colosseum.
  - J. stress that researchers' tours of the reconstructed Colosseum are actually taken via computer.
19. According to the passage, which of the following is true about the present state of the Colosseum?
- A. As a result of earthquakes, little of the Colosseum's facade remains.
  - B. Impressively, the Colosseum remains unaffected by the passage of time.
  - C. Much of the Colosseum has been destroyed, but a notable amount is still standing.
  - D. The Colosseum's facade remains intact, but the rest of the structure has been destroyed.
20. The passage mentions which of the following as a strength of using computer models in archaeology?
- F. They cost relatively little to produce.
  - G. They can easily be updated with new findings.
  - H. They entertain and inform the public.
  - J. They encourage improvements in technology.

## Passage III

**HUMANITIES:** This passage is adapted from the article "India Resounding in New York" by Jon Pareles (©2004 by The New York Times Company).

When *Bombay Dreams*, the musical about making it in the Indian film capital known as Bollywood, was imported from London to Broadway in 2004, it introduced some listeners to the madcap eclecticism of *filmi*, the song-and-dance numbers that punctuate Bollywood's sprawling musicals. But Broadway was the last to know about the rendezvous of Indian and Western music. The profound improvisations of South Asian classical music have long been welcome in New York City's concert halls. Jazz musicians have been absorbing ideas and collaborating with Indian musicians at least since the 1960's. Hip-hop has latched on to Indian rhythms. In New York's clubs, the sounds of Bollywood and other South Asian fusions have been drawing crowds for years.

As often happens, the music follows demographics. In the 1960's, a change in immigration law brought a wave of white-collar Indians and Pakistanis and Bangladeshis to the United States. Now their sons and daughters are establishing their place in the arts as well as in the wider American economy, and they are making sense of a musical upbringing that is likely to include Bollywood tunes alongside hip-hop, Western classical music, Indian classical music, rock and jazz.

For South Asian and Asian-American musicians, producers and disc jockeys who have been building their own scene in New York, the latest East-West hybrids are not just occasion for musical connections and experiments. They are also affirmations of an identity that grows ever more complex and cosmopolitan. Vijay Iyer, a pianist who brings his Indian background to jazz, said: "Making music is very much aligned with activism and sociopolitical cultural work, and that actually is something that does unite this community. It's not just making music to be cool or look hip or be sexy, but actually to make a difference in the world. Especially in New York, that's a mobilizing force for the South Asian community."

The New York wave of South Asian music was preceded by influential South Asian hybrids from England. The documentary *Mutiny: Asians Storm British Music* details the way established Indian and Pakistani communities in London confronted racism with music. In the 1970's and 80's, bands in London merged Indian elements—notably a 4/4 Punjabi beat called bhangra—with other music that connoted resistance, like punk, reggae and hip-hop. And in the 1990's, studio wizards came up with styles that became known as Asian Underground, which swirled together South Asian music with the beats and textures of electronica.

The music traveled to New York at such parties as DJ Rekha's Basement Bhangra. "It's very urban, very New York, and that's what makes it exciting," Rekha

said. "We play big-room hip-hop and a little bit of dancehall as well as bhangra, and the music has gotten a lot more intense. The drums are more pronounced; the production is much better. The music has come of age." Regular visitors include groups of young South Asians who participate in intercollegiate bhangra dance competitions around the country.

AR Rahman, who wrote the songs for *Bombay Dreams*, is one of the top modern *filmi* composers, but also one of the most Western-flavored. Through the decades, *filmi* have tossed together everything from electro to salsa to surf music to funk with vocals that hint at ancient Indian traditions; there's a daring shamelessness to the way they steal from and one-up their sources.

Iyer has collaborated with disc jockeys and Indian classical musicians as well as jazz improvisers. His own compositions and arrangements reach deep into both the labyrinthine harmonies of modern jazz and the rhythmic cycles of Indian music. Iyer grew up in Rochester, New York, surrounded by American culture as much as by the Indian music his parents had brought with them. "I went to hundreds of Indian music concerts," he said. "Without trying to pretend that I'm an expert on it, because that's something you have to devote your whole life to, it's a second language that something in my heart was really drawing me toward. It was really about trying to make sense of who I am. I'm not trying to recapitulate Indian music or pretend that I'm playing Indian music."

"It's very trendy right now to be associated with all things South Asian," Iyer said. "I don't know how long that's going to last. But I can't escape it; this is what I am. And I'm going to be with this forever."

21. The passage devotes the LEAST attention to which of the following topics?
  - A. The people making and promoting music influenced by South Asia
  - B. The growing influence of South Asian music on the American music scene
  - C. The plot of *Bombay Dreams* and how it makes use of song-and-dance numbers
  - D. The significance of the latest East-West musical hybrids for some South Asians and Asian Americans
22. Which of the following developments does the passage indicate occurred first chronologically?
  - F. *Bombay Dreams* has its U.S. premiere.
  - G. London bands merge Indian elements with punk, reggae, and hip-hop.
  - H. Studio wizards develop the styles known as Asian Underground.
  - J. The Basement Bhangra party starts in New York.



3

3

23. In the passage, who most directly expresses the opinion that South Asian musical hybrids have matured musically?
- Iyer
  - Rekha
  - Rahman
  - Iyer's parents
24. Viewed in the context of the passage, the words *daring*, *shamelessness*, *steal*, and *one-up* (lines 66–67) are most likely intended by the author to convey a tone of:
- scorn.
  - alarm.
  - indifference.
  - appreciation.
25. Information about and quotations from Iyer in the passage best support the conclusion that he:
- emphasizes modern jazz harmonies over Indian rhythms in his compositions and arrangements.
  - considers himself an expert in Indian music after having attended hundreds of concerts where such music was played.
  - is just now starting to explore American culture after years of studying the Indian music of his parents.
  - finds Indian music personally and professionally rewarding though he doesn't feel he understands it fully.
26. The passage claims that collaborations between jazz and Indian musicians:
- began no later than the 1960s but may have occurred earlier as well.
  - started before the 1960s, the decade that saw the most collaborations.
  - ended in the 1960s when hip-hop began using Indian rhythms.
  - couldn't have started before the 1960s, the decade jazz was born.
27. In describing white-collar South Asians who immigrated to the United States in the 1960s, the author characterizes their children's musical upbringing as generally being:
- shaped by a variety of Indian and Western musical forms.
  - focused primarily on classical traditions from India and the West.
  - directed mainly toward American musical styles, such as rock and jazz.
  - influenced first by Bollywood tunes, then later by classical music.
28. The quotation in lines 32–38 most strongly stresses the role of music making in:
- maintaining a hip image in the South Asian community.
  - bringing people together to promote change in the world.
  - uniting New Yorkers in a love of South Asian music.
  - improving the quality of entertainment throughout the world.
29. The passage states that the documentary *Mutiny* deals with how:
- Indian and Pakistani communities first became established in London.
  - influential South Asian musical hybrids came to London from India and Pakistan.
  - established Indian and Pakistani communities in London used music to confront racism.
  - London's Indian and Pakistani residents came to appreciate the 4/4 bhangra beat.
30. The passage identifies Rahman as being both:
- hugely popular with audiences and greatly under-rated by music critics.
  - highly successful as a *filmi* composer and strongly influenced by Western music.
  - interested in modern *filmi* and dedicated to preserving Indian musical traditions.
  - fond of electro and salsa and uncomfortable with surf music and funk.

## Passage IV

**NATURAL SCIENCE:** This passage is adapted from the article "A Mystery Squid Found Lurking at Ocean Bottom" by Carol Kaesuk Yoon (©2001 by The New York Times Company).

In a finding that has thrilled deep-sea scientists and put squid experts in a tizzy, researchers have reported the discovery of a bizarre squid reaching 23 slimy feet in length lurking the oceans' depths all across the globe. In *Science* magazine, an international team of researchers documents eight sightings of the creatures. At rest, the beasts look something like a pair of elephant ears atop bent, threadlike arms resembling moon-landing gear. Scientists still have not captured the animals, which were seen near the sea floor in the Atlantic, Pacific and Indian Oceans and the Gulf of Mexico at crushing depths, one to three miles below the surface.

"It occurred to me that these things were showing up all over the place in deep water," said Dr. Mike Vecchione, a squid biologist with the National Oceanic and Atmospheric Administration and the lead author of the *Science* paper. "For this large, highly visible animal to be common in the largest ecosystem on earth and for us to know nothing about it seems fairly remarkable."

Unlike the 60-foot-long giant squids, however, these new squids have never washed up on shore or been found in the stomachs of whales. Researchers say that is not surprising because they are probably too delicate to survive such passage without disintegrating or being eaten. Not even the giant squid, *Architeuthis*, has been seen alive in its natural deep-sea habitat.

Scientists calculate that the deep sea—the lightless zone of the ocean that includes everything below 3,000 feet—encompasses more than 90 percent of the earth's biosphere. The skin of habitat on land is miniscule in comparison. Yet because the ocean's depths are dangerous and expensive to explore, very little is known about the deep sea—so little that even a big, common creature can go undetected.

"It's just a fantastic finding," said Dr. J. Frederick Grassle, the director of the Institute of Marine and Coastal Sciences at Rutgers University. "I've made a lot of dives in submersibles and never seen anything like these. It's remarkable that there have been so many sightings recently."

Perhaps most remarkable is that researchers could piece the sightings together at all. Dr. Vecchione said all the squids were spotted incidentally, by scientists or oil company workers looking for something else on the ocean floor. The chance observations occurred over the last 13 years. Dr. Vecchione said the first videotape he saw of one of these animals was made not for science, but for love, by a man aboard an oil exploration vessel using a remotely operated submersible. When the submersible came across the squid, the man filmed it, because his girlfriend was interested in marine biology.

"It was just pure luck," Dr. Vecchione said. Once aware of the new squid, he began learning of the other observations.

The squids are unusual in a number of ways, including their excessively long arms held in a unique bent stance, their large fins and their apparent lack of concern with the proximity of the submersibles. When observed, the squids were mostly hanging in the water, gently waving their fins to hold their position, arms dangling beneath them. Unlike most squids, which have two long tentacles and eight shorter arms, the new squid's arms and tentacles are indistinguishably long.

"It's a very exciting animal," said Dr. Clyde Roper, a zoologist at the National Museum of Natural History at the Smithsonian Institution. "This animal probably doesn't weigh more than 25 to 50 pounds. Most of its length is in these very, very thin, tendrilous appendages."

Without specimens in hand, it is impossible for scientists to say whether the squids represent one or more species. The animals remain unnamed. The mystery squids are most similar to small, young squids discovered several years ago near Hawaii and California that had large fins and long, slender arms. Dr. Vecchione speculated that the new squids might eat small crustaceans that they grabbed with what scientists suspected were sticky arms. "One of the squids actually got its arms stuck on a submersible, and it had trouble letting go," he said. "I think what it has are many really tiny suckers on it."

Dr. Ron O'Dor, a senior scientist at the Census of Marine Life, says the new finding proves how far biologists have to go in understanding the deep sea. "We'll be exploring essentially unknown territory," Dr. O'Dor said. Even as scientists undertook more detailed studies, he said much would remain unseen because any animal too fast or too smart to be caught in the lights of submersibles would remain out of view.

31. The passage implies that for researchers, the biggest obstacle to learning more about the new squid is(are) the:

- A. reluctance of the squid to approach submersibles or to be filmed.
- B. uncertainty over how many different species the squid represents.
- C. declining number of sightings of the squid in recent years.
- D. risks and costs imposed by the squid's remote habitat.

3

3

32. The language of the first paragraph is most likely intended to convey a sense of:
- F. excitement generated by an intriguing discovery.
  - G. confusion over a newly encountered species.
  - H. skepticism about an allegedly important finding.
  - J. enthusiasm for the practical benefits of a research study.
33. Which of the following statements best summarizes the comments in the passage from O'Dor?
- A. Deep-sea exploration is wasteful because so much of the ocean will remain unseen.
  - B. Biologists are getting close to a full understanding of the deep sea.
  - C. New submersibles will be needed to study the ocean's smart, fast creatures.
  - D. A great deal about the deep sea is unknown and will likely stay that way.
34. According to the passage, *Architeuthis* is a name for:
- F. both the giant squid and its close relative, the new squid.
  - G. both the giant squid and its distant relative, the new squid.
  - H. the giant squid only.
  - J. the new squid only.
35. The passage states that the giant squid has yet to be:
- A. found washed up on shore.
  - B. found in the stomach of a whale.
  - C. seen alive in its natural habitat.
  - D. reported on in *Science* magazine.
36. The author refers to "the skin of habitat on land" (line 31) primarily to:
- F. contend that researchers should look underground rather than underwater for new animal species.
  - G. emphasize the vastness of deep-sea habitat in contrast to land habitat.
  - H. suggest that land habitats are just as worthy of study as ocean habitats.
  - J. point out that much deep-sea research could be performed more safely and cheaply on land.
37. Within the passage, Grassle's statement in the fifth paragraph (lines 36–41) serves mainly to:
- A. emphasize the value and uniqueness of the discovery of the new squid.
  - B. offer an urgent call for more submersible-based studies of the new squid.
  - C. reveal that he spends most of his time as a researcher making dives in submersibles.
  - D. explain the role the Institute of Marine and Coastal Sciences has in squid research.
38. In the passage, Vecchione claims that all of the sightings of the new squid were made:
- F. intentionally by scientists looking specifically for the squid.
  - G. intentionally by scientists hoping to find several new species of marine life.
  - H. unintentionally by scientists or oil company workers searching for something else.
  - J. unintentionally by oil company workers exploring the ocean floor with submersibles.
39. It can most reasonably be inferred that the word *love* in line 49 refers to the man's love for:
- A. the new squid.
  - B. marine biology.
  - C. another person.
  - D. submersibles.
40. The passage characterizes the idea that the new squid eats small crustaceans obtained with sticky arms as:
- F. a fact verified by examination of tiny suckers on the squid's arms.
  - G. a fact supported by the study of similar squids found near Hawaii and California.
  - H. an opinion founded on videotaped images of the squid's mouth and teeth.
  - J. an opinion based in part on an incident involving one of the squids and a submersible.

END OF TEST 3

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

DO NOT RETURN TO A PREVIOUS TEST.

## SCIENCE TEST

35 Minutes—40 Questions

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

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

## Passage I

When a substance dissolves in  $\text{H}_2\text{O}$ , heat is either absorbed from or given off to the solution. Experiments were done in which a known mass of a solute was added to a known mass of  $\text{H}_2\text{O}$  at a known initial temperature ( $T_i$ ) in a closed, insulated container. When the maximum temperature change of the solution had occurred, the final temperature ( $T_f$ ) was recorded. The maximum temperature change ( $\Delta T$ ) was then calculated as follows:

$$\Delta T = T_f - T_i$$

Figures 1 and 2 show the results for lithium chloride ( $\text{LiCl}$ ) and ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ), respectively. In each trial, all of the solute completely dissolved.

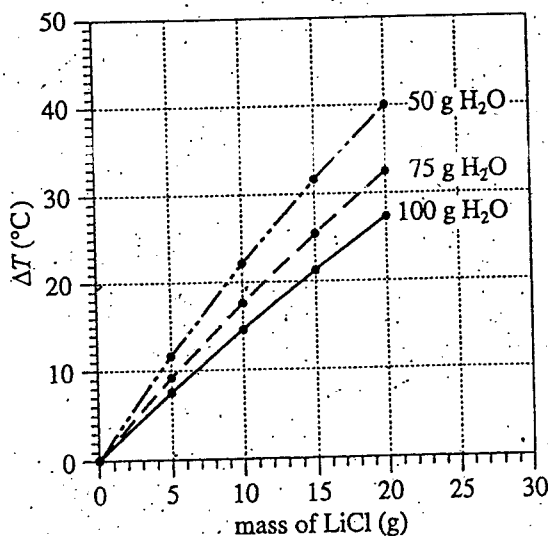


Figure 1

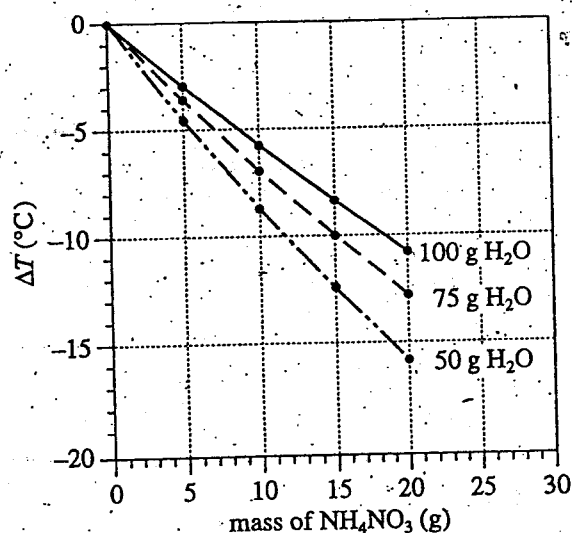


Figure 2

- Based on Figure 1, when 5 g of  $\text{LiCl}$  was added to 50 g of  $\text{H}_2\text{O}$ , the temperature:
  - decreased, because heat was removed from the solution.
  - decreased, because heat was added to the solution.
  - increased, because heat was removed from the solution.
  - increased, because heat was added to the solution.



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2. Consider the trials represented in Figure 1 involving 20 g of LiCl. From trial to trial, as the LiCl concentration in the resulting solutions increased, the  $\Delta T$  that was observed:
- F. increased only.
  - G. increased, then decreased.
  - H. decreased only.
  - J. decreased, then increased.
3. If an additional trial had been done in which 25 g of LiCl had been added to 75 g of  $H_2O$ ,  $\Delta T$  would most likely have been:
- A. less than  $20^\circ C$ .
  - B. between  $20^\circ C$  and  $30^\circ C$ .
  - C. between  $30^\circ C$  and  $40^\circ C$ .
  - D. greater than  $40^\circ C$ .
4. According to Figure 2, when 5 g of  $NH_4NO_3$  was added to 100 g of  $H_2O$ , the temperature of the solution:
- F. decreased, because  $\Delta T$  was positive.
  - G. decreased, because  $\Delta T$  was negative.
  - H. increased, because  $\Delta T$  was positive.
  - J. increased, because  $\Delta T$  was negative.
5. Based on Figures 1 and 2, which of the following combinations of a solute and  $H_2O$  at a known  $T_i$  would produce the greatest *increase* in temperature?
- A. 2 g of LiCl added to 5 g of  $H_2O$ .
  - B. 2 g of LiCl added to 10 g of  $H_2O$ .
  - C. 2 g of  $NH_4NO_3$  added to 5 g of  $H_2O$ .
  - D. 2 g of  $NH_4NO_3$  added to 10 g of  $H_2O$ .

## Passage II

During prophase I of meiosis, homologous chromosomes frequently exchange segments in a process called *crossing over*. As a result, genes on homologous chromosomes recombine, forming new allele combinations along chromosomes (see Figure 1).

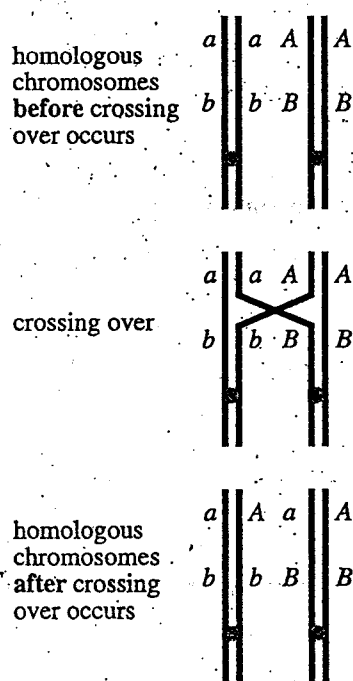


Figure 1

Because the frequency of recombination (RF) increases as the *map distance* (distance along a chromosome, in *map units* [mu]) between 2 genes increases, RF can be used to estimate the map distance between genes on a chromosome. However, as the map distance between 2 genes increases, the probability of multiple crossovers increases. Multiple crossovers decrease the apparent RF between 2 genes, resulting in RF values that underestimate map distance. To compensate for this effect, researchers use a mapping function to better estimate the map distance between 2 genes based on their RF (see Figure 2).

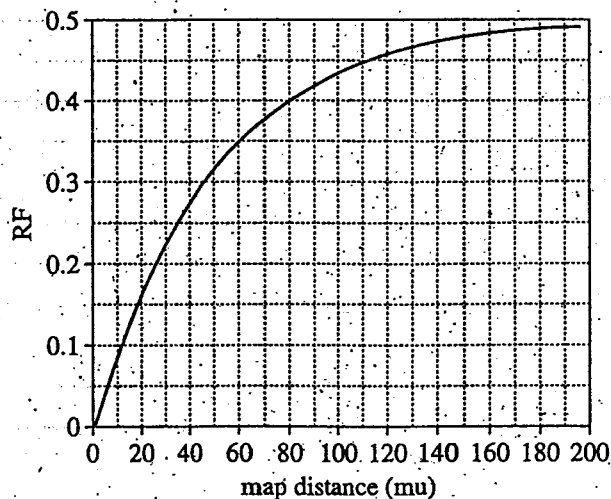


Figure 2

Four researchers performed a series of experiments to determine the RF for various pairs of genes on a chromosome. They then used the mapping function to determine the map distance between each pair. The results appear in Table 1.

Table 1		
Genes	RF	Map distance (mu)
A and B	0.165	20
B and C	0.226	30
A and D	0.122	14

Each of the 4 researchers then proposed a model that is consistent with the results in Table 1. Each model shows how the genes might be located along the chromosome (see Figure 3). Each model correctly assumes the lengths of the genes are short enough that they can be ignored when calculating the map distance between genes.

Researcher	Model
1	D A B C
2	A DB C
3	DC A B
4	C A DB

Figure 3

Later, a fifth researcher working with the same chromosome and the same genes determined that the RF for Genes A and C is 0.091.

4 ○ ○ ○ ○ ○ ○ ○ ○ 4

6. All 4 models agree on the map distance between which of the following pairs of genes?
- F. Genes A and B
  - G. Genes A and C
  - H. Genes B and D
  - J. Genes C and D
7. According to Figure 2, if 2 genes are separated by 70 mu, the RF of those 2 genes is most likely closest to which of the following?
- A. 0.377
  - B. 0.477
  - C. 0.577
  - D. 0.677
8. If Researcher 2's model is correct and an additional gene, Gene G, is 8 mu from Gene B and 14 mu from Gene D, then Gene G is most likely between:
- F. Genes A and B.
  - G. Genes A and D.
  - H. Genes B and C.
  - J. Genes B and D.
9. The result of the mapping experiment performed by the fifth researcher for Genes A and C is consistent with the models proposed by which 2 researchers?
- A. Researchers 1 and 3
  - B. Researchers 1 and 4
  - C. Researchers 2 and 3
  - D. Researchers 3 and 4
10. Based on the information provided, crossing over occurs during the process that leads directly to the formation of which of the following?
- F. Neurons
  - G. Skin cells
  - H. Erythrocytes
  - J. Gametes
11. Which researcher's model proposes that Genes C and D are separated by 64 mu?
- A. Researcher 1's
  - B. Researcher 2's
  - C. Researcher 3's
  - D. Researcher 4's
12. Genes R and T are separated by 10 mu on 1 chromosome. An organism has alleles *R* and *T* on 1 chromosome and alleles *r* and *t* on the homologous chromosome. If a single crossover occurred between these 2 genes as shown in Figure 1, the genotype of Genes R and T for the 2 chromatids involved in the crossover would be:
- F. *Rt* and *rT*.
  - G. *RT* and *rt*.
  - H. *Rr* and *Tt*.
  - J. *RR* and *TT*.

## Passage III

Pore water is water in the pores of subsurface material. Pore water chemistry in 2 wetlands—a *fen* and a *bog*—was studied during a 1990 summer drought and again the next summer, which had normal rainfall. The primary water supplies for fens and bogs are, respectively, groundwater and rainfall. Figure 1 shows the methane ( $\text{CH}_4$ ) gas concentration in the pore water at various depths in the fen and the bog. Figures 2 and 3 show the pore water conductivity (which is directly proportional to the concentration of dissolved ions) and pH at various depths in the fen and the bog, respectively. Also shown are the locations of the water table, the *peat* (partially decomposed plant material) layer, and the mineral soil layer.

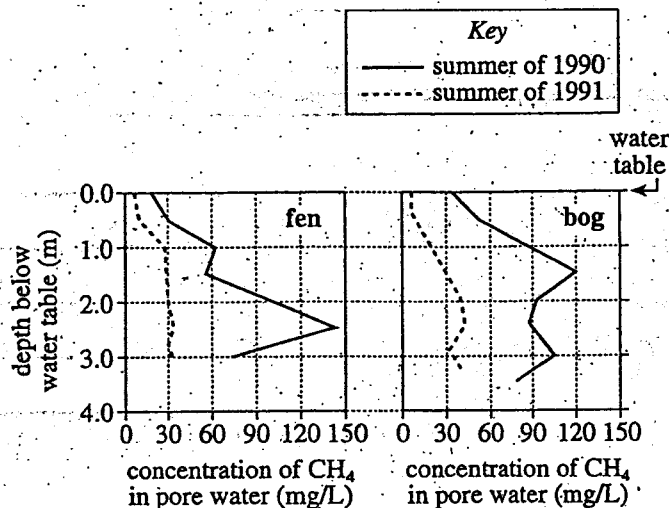
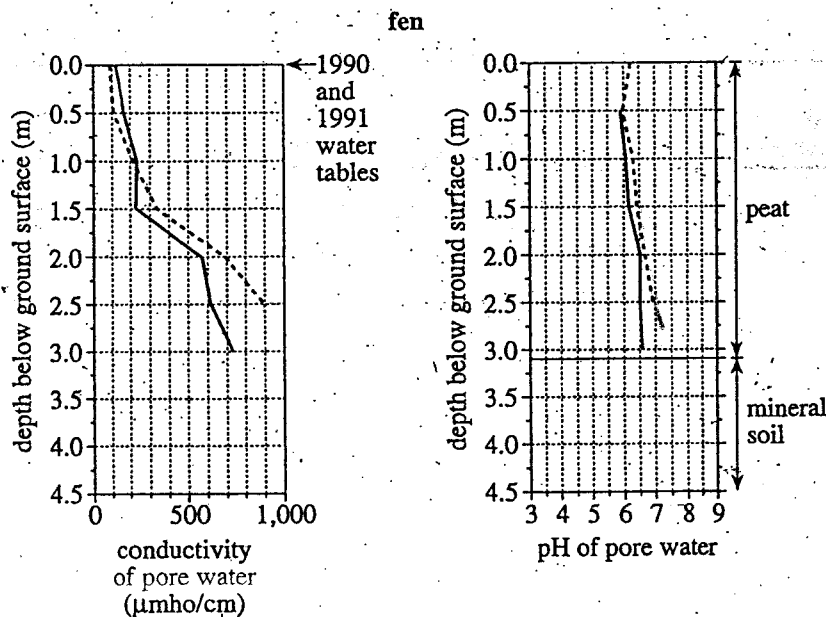
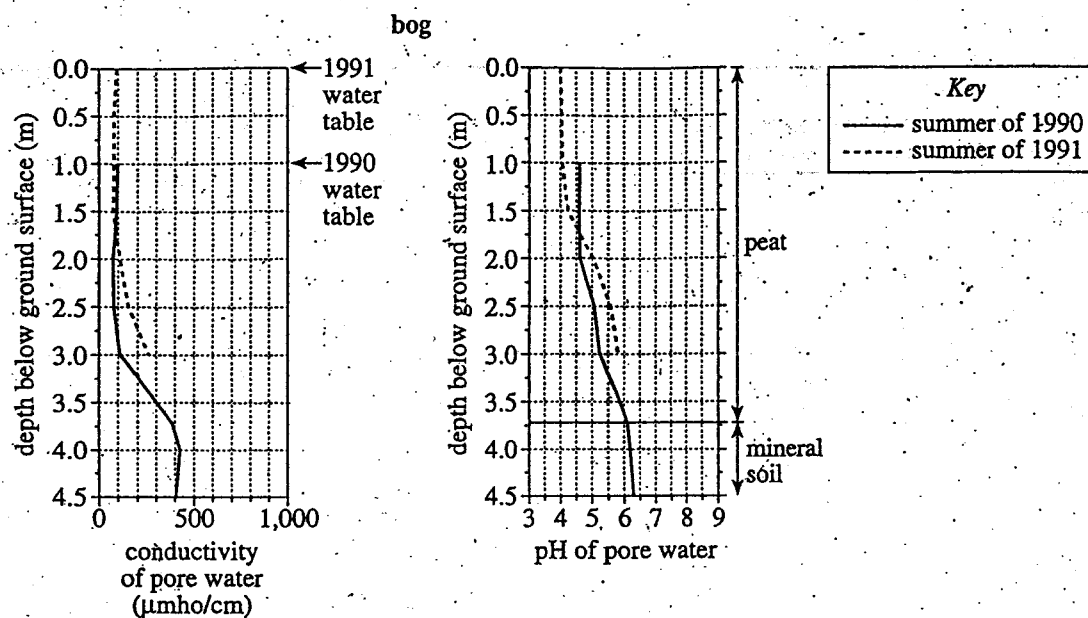


Figure 1



Note: Mineral soil is composed mainly of mineral matter.

Figure 2



Note: Mineral soil is composed mainly of mineral matter.

Figure 3

Figures adapted from Edwin Romanowicz, Donald Siegel, and Paul Glaser, "Hydraulic Reversals and Episodic Methane Emissions During Drought Cycles in Mires." ©1993 by the Geological Society of America.

13. According to Figure 2, the conductivity of fen pore water in 1990 at a depth of 2.5 m was closest to which of the following?
  - A. 350  $\mu\text{mho/cm}$
  - B. 475  $\mu\text{mho/cm}$
  - C. 600  $\mu\text{mho/cm}$
  - D. 725  $\mu\text{mho/cm}$
14. Based on Figure 2, if the pH of pore water in the fen at a depth of 2.7 m had been measured in the summer of 1991, it would most likely have been closest to which of the following?
  - F. 4.0
  - G. 5.5
  - H. 7.0
  - J. 8.5
15. Which of the following is the most likely explanation for the difference in the depth of the bog water table in the 2 years?
  - A. The amount of groundwater discharged to the bog was higher during the drought, and therefore the bog received more water than normal.
  - B. The amount of groundwater discharged to the bog was higher during the drought, and therefore the bog received less water than normal.
  - C. The amount of rainfall received by the bog was higher during the drought, and therefore the bog received more water than normal.
  - D. The amount of rainfall received by the bog was lower during the drought, and therefore the bog received less water than normal.
16. If the data in Figures 2 and 3 are typical of fens and bogs in general, one would most likely make which of the following conclusions about the peat layer in a fen and in a bog?
  - F. The peat layer in both a fen and a bog is completely above the water table at all times.
  - G. The peat layer in both a fen and a bog is completely below the water table at all times.
  - H. The peat layer in a fen is thicker than the peat layer in a bog.
  - J. The peat layer in a fen is thinner than the peat layer in a bog.
17. According to Figure 1, the average concentration of  $\text{CH}_4$  over the depths from 0.0 m to 3.0 m was higher during the summer of:
  - A. normal rainfall than during the summer of drought in both wetlands.
  - B. normal rainfall than during the summer of drought in the fen only.
  - C. drought than during the summer of normal rainfall in both wetlands.
  - D. drought than during the summer of normal rainfall in the bog only.

## Passage IV

Atomic nuclei can be represented by the combination of symbols



where  $Z$  is the number of protons in a nucleus of Element  $\text{X}$ , and  $A$  (equal to  $Z$  plus the number of neutrons) is the mass number of the same nucleus. For example,  ${}^{12}_6\text{C}$  represents a nucleus of carbon containing 6 protons and 6 neutrons;  ${}^{14}_6\text{C}$  represents a nucleus of a different *isotope* (type) of carbon that contains 6 protons and 8 neutrons.

Atomic nuclei undergo 3 types of radioactive decay. Particles emitted during the 3 types of decay are listed in Table 1. Figure 1 shows a sequence of radioactive decays, called the *uranium series*, that begins with the decay of  ${}^{238}_{92}\text{U}$ .

Table 1		
Type of radioactive decay	Particle emitted	Symbol of emitted particle
Alpha	helium nucleus	${}^4_2\text{He}$
Beta	electron	$e^-$
Gamma	gamma ray photon	$\gamma$

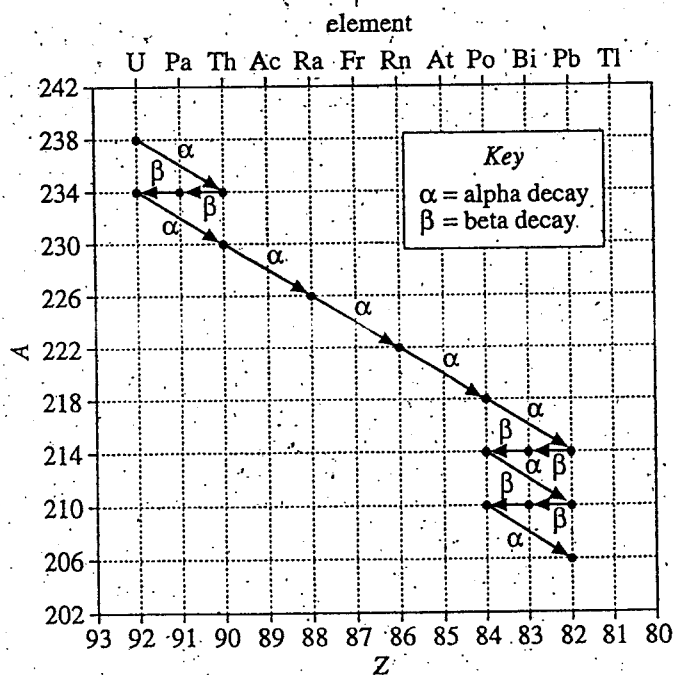


Figure 1

18. Which of the following symbols correctly represents the isotope of radium (Ra) that is part of the radioactive decay sequence plotted in Figure 1?

F.  ${}^{88}_{226}\text{Ra}$   
 G.  ${}^{226}_{88}\text{Ra}$   
 H.  ${}^{88}_{88}\text{Ra}$   
 J.  ${}^{226}_{88}\text{Ra}$

19. How many neutrons, if any, does a nucleus of the isotope of helium listed in Table 1 contain?

A. 0  
 B. 1  
 C. 2  
 D. 3

20. Based on Figure 1, if a nucleus of  ${}^{230}_{90}\text{Th}$  underwent beta decay, which of the following nuclei would be produced?

F.  ${}^{230}_{90}\text{Pa}$   
 G.  ${}^{230}_{91}\text{Pa}$   
 H.  ${}^{230}_{91}\text{Th}$   
 J.  ${}^{231}_{91}\text{Th}$



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21. A sample of spent nuclear reactor fuel contains a mixture of a uranium isotope,  $^{235}_{92}\text{U}$ , and a plutonium isotope,  $^{239}_{94}\text{Pu}$ . Based on Table 1 and Figure 1, if one of the isotopes is produced by the radioactive decay of the other isotope, which of the following best explains how the mixture was formed?

- A.  $^{235}_{92}\text{U}$  underwent alpha decay, producing  $^{239}_{94}\text{Pu}$ .
- B.  $^{239}_{94}\text{Pu}$  underwent alpha decay, producing  $^{235}_{92}\text{U}$ .
- C.  $^{235}_{92}\text{U}$  underwent beta decay, producing  $^{239}_{94}\text{Pu}$ .
- D.  $^{239}_{94}\text{Pu}$  underwent beta decay, producing  $^{235}_{92}\text{U}$ .

22. Suppose the  $^4_2\text{He}$  nucleus emitted during an alpha decay and the  $e^-$  emitted during a beta decay have the same kinetic energy. Which of the 2 particles is moving at the higher speed?

- F. The  $^4_2\text{He}$  nucleus, because it is more massive than the  $e^-$ .
- G. The  $^4_2\text{He}$  nucleus, because it is less massive than the  $e^-$ .
- H. The  $e^-$ , because it is more massive than the  $^4_2\text{He}$  nucleus.
- J. The  $e^-$ , because it is less massive than the  $^4_2\text{He}$  nucleus.



## Passage V

Size exclusion chromatography (SEC) is used to separate the components of a solution of polymer molecules. In SEC a sample solution of polymer molecules is injected into a flow of solvent. The sample is then carried through a column filled with beads that contain microscopic pores (see Figure 1).

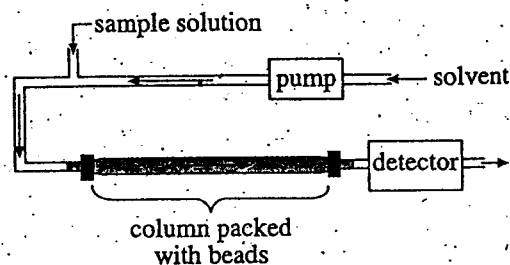


Figure 1

Smaller molecules easily diffuse into the pores. Larger molecules do not as easily diffuse into the pores, or are larger than the pores. Therefore, smaller molecules spend more time in the column than do larger molecules, causing the components of the mixture to separate. As solvent containing a component of the mixture exits the column through the detector, a peak is plotted versus time (starting from injection). The portion of solvent corresponding to a peak is called a *fraction*. The time corresponding to the top of a peak is the fraction's *retention time* (RT). The RT corresponds to the *average molecular mass* (AMM) of the molecules in that fraction. The shape of the peak reflects the distribution of molecular masses of the molecules in the fraction.

## Experiment 1

Polystyrene is a polymer made up of identical sub-units. Five types of polystyrene (P1–P5) were dissolved together in a solvent. The AMM of P1–P5 is given in Table 1. The range of molecular masses for each of P1–P5 was  $\pm 100$  amu of the AMM.

Table 1	
Polystyrene	AMM (amu*)
P1	800
P2	4,000
P3	10,000
P4	50,000
P5	200,000
*amu = atomic mass unit	

A sample of the solution was injected into an SEC apparatus. Each fraction was analyzed as it exited the apparatus (see Figure 2).

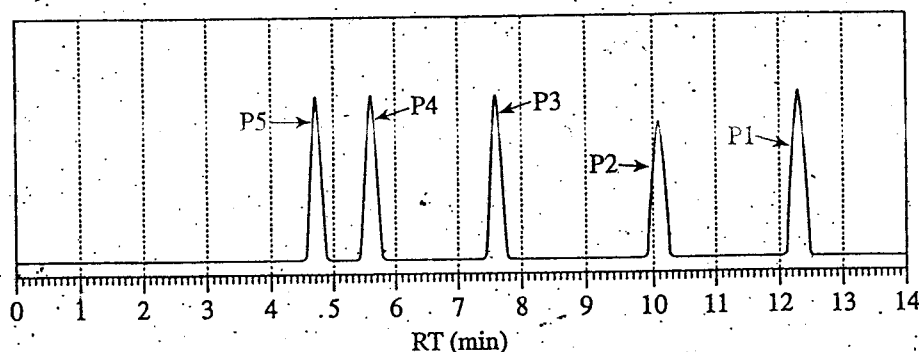


Figure 2

**Experiment 2**

Chemists used 3 different methods to synthesize polystyrenes, forming polystyrene mixtures M1, M2, and M3, respectively. Each of M1–M3 was then analyzed as in Experiment 1 (see Figure 3).

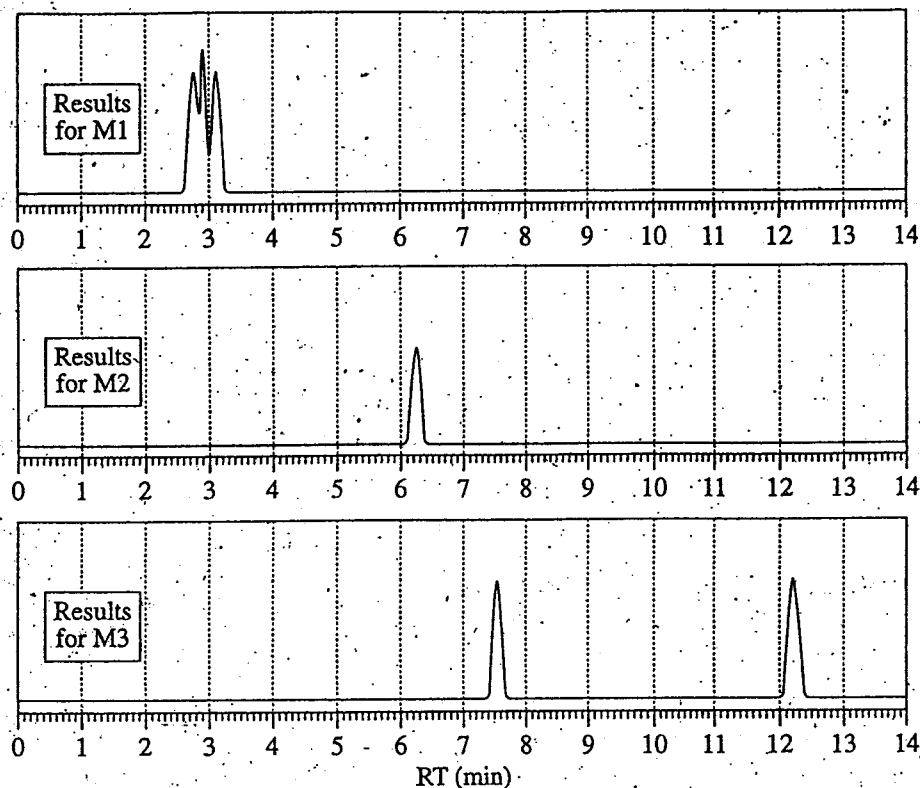


Figure 3

23. Based on the results of Experiments 1 and 2, M3 is most likely which polymer(s) from Experiment 1?
- P1 only
  - A mixture of P1 and P3 only
  - A mixture of P3 and P5 only
  - A mixture of P2, P4, and P5 only
24. In Experiment 1, the molecules of which of the following polymers spent the longest amount of time in the column?
- P1
  - P2
  - P4
  - P5
25. Based on the results of Experiments 1 and 2, which of the following ranks P4, P5, and M2 from smallest AMM to largest AMM?
- P4, P5, M2
  - P5, M2, P4
  - M2, P4, P5
  - M2, P5, P4
26. In Experiment 1, on average, did P3 molecules or P4 molecules more easily diffuse into the pores of the beads while in the column of the SEC apparatus?
- P3 molecules, because they have a larger AMM.
  - P3 molecules, because they have a smaller AMM.
  - P4 molecules, because they have a larger AMM.
  - P4 molecules, because they have a smaller AMM.
27. In which, if any, of the mixtures synthesized for Experiment 2 is the average mass of the molecules in the mixture most likely greater than 200,000 amu?
- M1
  - M2
  - M3
  - Neither M1, M2, nor M3
28. How does the number of molecules in a 1 g sample of P2 compare to the number of molecules in a 1 g sample of P4? The number of P2 molecules is:
- less, because P2 has a larger AMM than does P4.
  - less, because P2 has a smaller AMM than does P4.
  - greater, because P2 has a larger AMM than does P4.
  - greater, because P2 has a smaller AMM than does P4.

## Passage VI

Two studies examined how forest fires would have burned during the late Paleozoic era, when Earth's atmosphere contained an elevated  $O_2$  content of more than 21% by volume.

*Araucaria* tree leaves and *Pinus* tree dowels (wood pieces) and needles, all from modern trees, were used in the studies to most closely model trees in Paleozoic forests.

## Study 1

A 10 mg sample of *Araucaria* leaves was heated at a rate of  $40^\circ C/min$  in an atmosphere containing 21%  $O_2$  by volume. The mass of the sample was measured every 2 sec during heating. These procedures were repeated in a second trial in an atmosphere containing 35%  $O_2$  by volume. Then each trial was repeated using a 10 mg sample of paper instead of *Araucaria* leaves (see Figure 1). The rate of mass loss was directly proportional to the rate of combustion.

## Study 2

In each of several trials, a 75 cm long chamber was filled either with dowels or needles, both from a *Pinus* tree. Each sample of dowels or needles had been dried and then soaked in water to bring it to the desired water content by weight. A mixture of  $O_2$  gas and  $N_2$  gas was continuously supplied to the chamber. The sample was ignited at 1 end of the chamber.

For any trial in which the sample burned completely, the flame spread rate was recorded. Those trials represented conditions under which a forest fire would have burned out of control. A *failed burn* (F) was recorded for any trial in which the fire in the chamber extinguished itself before the sample burned completely (see Table 1).

Table 1					
		Flame spread rate (cm/min) in an atmosphere containing:			
Water content of:		16% $O_2$	21% $O_2$	28% $O_2$	35% $O_2$
Dowels	2%	2.48	2.76	3.92	5.00
	12%	F	1.45	2.49	3.09
	23%	F	F	F	2.73
	61%	F	F	F	F
Needles	2%	18.75	20.69	37.50	39.30
	12%	17.24	19.43	22.61	28.08
	23%	F	15.00	18.22	22.86
	61%	F	F	F	F

Note: %  $O_2$  was by volume.

Figure and table adapted from Richard Wildman et al., "Burning of Forest Materials under Late Paleozoic High Atmospheric Oxygen Levels." ©2004 by the Geological Society of America.

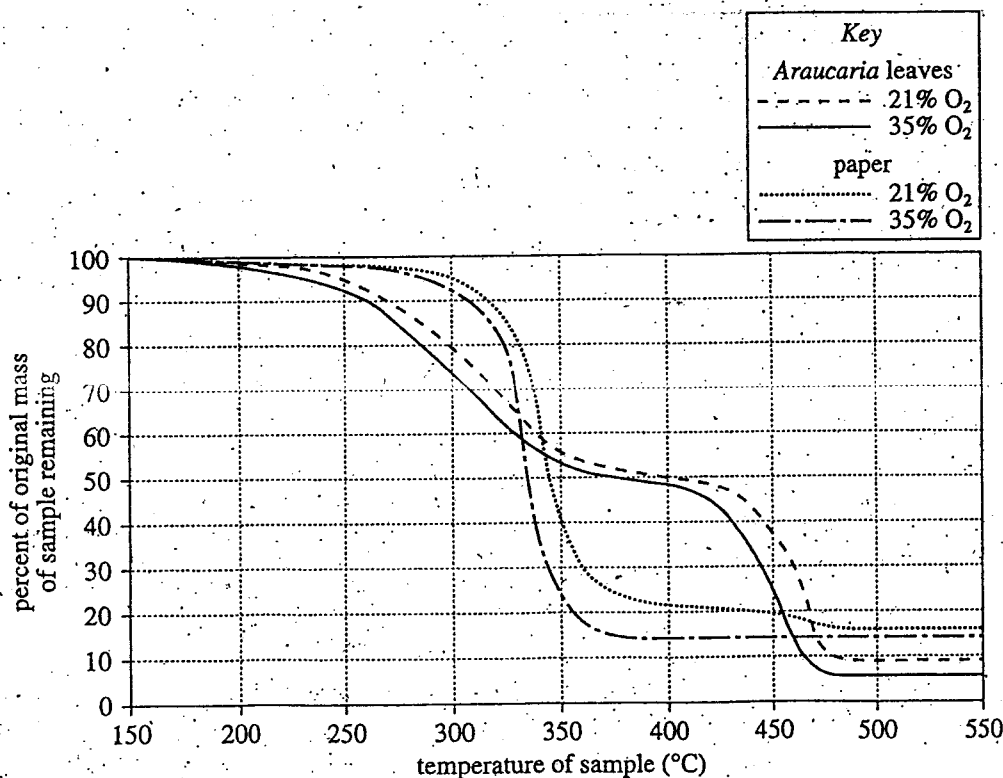


Figure 1

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29. According to the results of Study 2, as  $O_2$  content increased from 16% to 35%, the flame spread rate for dowels having a water content of 2%:
- increased only.
  - increased, then decreased.
  - decreased only.
  - decreased, then increased.
30. According to the results of Study 1, the sample of *Araucaria* leaves heated in an atmosphere containing 35%  $O_2$  lost mass most rapidly over which of the following temperature ranges?
- 275°C to 325°C
  - 325°C to 375°C
  - 375°C to 425°C
  - 425°C to 475°C
31. Suppose that the needles and wood of a type of tree that existed in the late Paleozoic era and closely resembled modern *Pinus* trees had water contents above 65% by weight. Based on Study 2, would a tree of that type have burned completely in an atmosphere containing 28%  $O_2$  by volume and in an atmosphere containing 35%  $O_2$  by volume, respectively?
- |    | 28% $O_2$ | 35% $O_2$ |
|----|-----------|-----------|
| A. | No        | Yes       |
| B. | No        | No        |
| C. | Yes       | No        |
| D. | Yes       | Yes       |
32. Suppose that in an additional trial in Study 2, needles having a water content of 10% by weight had been burned in an atmosphere containing 28%  $O_2$  by volume. Based on the results of Study 2, the flame spread rate recorded for that trial would most likely have been:
- less than 18.22 cm/min.
  - between 18.22 cm/min and 22.61 cm/min.
  - between 22.61 cm/min and 37.50 cm/min.
  - greater than 37.50 cm/min.
33. Consider a Paleozoic forest fire burning out of control in a stand of trees that closely resembled modern *Pinus* trees. Based on the results of Study 2 for an atmosphere containing 28%  $O_2$  and an atmosphere containing 35%  $O_2$ , is it more likely that the *crown fire* (fire spreading through the live foliage of trees) or the *surface fire* (fire spreading through the trees just above the ground) would have spread faster?
- The crown fire, because the flame spread rates for needles were much lower than the corresponding rates for dowels.
  - The crown fire, because the flame spread rates for needles were much higher than the corresponding rates for dowels.
  - The surface fire, because the flame spread rates for needles were much lower than the corresponding rates for dowels.
  - The surface fire, because the flame spread rates for needles were the same as the corresponding rates for dowels.
34. In Study 1, the paper sample heated in an atmosphere containing 21%  $O_2$  had lost approximately what percent of its original mass by the time the temperature reached 350°C?
- 20%
  - 40%
  - 60%
  - 80%

## Passage VII

Students studied the trajectories of a baseball launched under a variety of conditions.

## Study 1

On a flat plain during a windless day, students launched a baseball using the launcher shown in Figure 1.

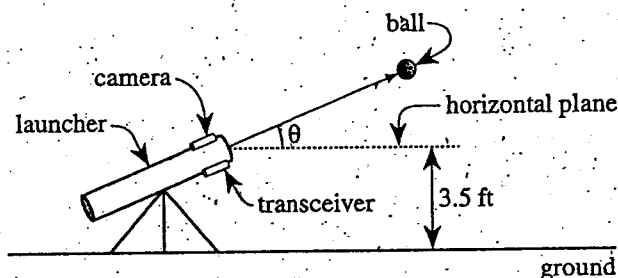


Figure 1

A camera mounted on the launcher always pointed in the direction of the ball's launch. A radar *transceiver* (transmitter-receiver) was also mounted on the launcher.

As the ball moved along its path, Angle- $\theta$ , which is defined in Figure 1, continuously varied. The variation in  $\theta$  was monitored by the camera, which recorded the ball's image in its viewfinder every 0.5 sec after launch until the ball landed. For each recorded image,  $\theta$  was found (see Figure 2).

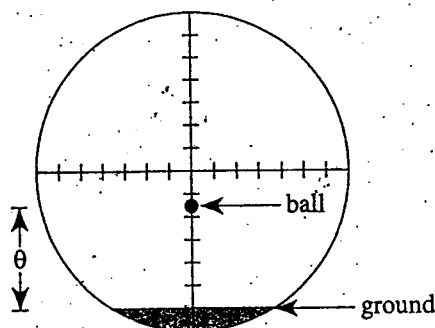


Figure 2

In addition, every 0.5 sec after launch, the transceiver emitted a radar pulse, part of which was reflected back to the transceiver by the ball. The round-trip travel time of each pulse was recorded and then used to determine the distance,  $D$ , between the transceiver and the ball (see Figure 3).

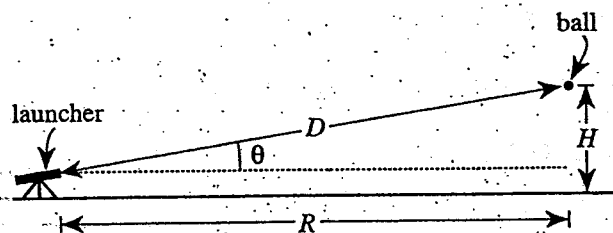


Figure 3

Using  $D$  and  $\theta$ , the students found the ball's height,  $H$ , and distance,  $R$ , at the end of each 0.5 sec interval.  $H$  was plotted versus  $R$ , and a smooth curve was fitted to the data points.

This procedure was followed for launches of the ball at speeds of 80 mph, 90 mph, 100 mph, 110 mph, and 120 mph. For each launch speed, the ball was launched at  $\theta = 35^\circ$ . The curves representing the 5 launch speeds were connected by lines drawn through the data points representing  $H$  and  $R$  for time = 2 sec, 3 sec, 4 sec, and 5 sec after launch (see Figure 4).

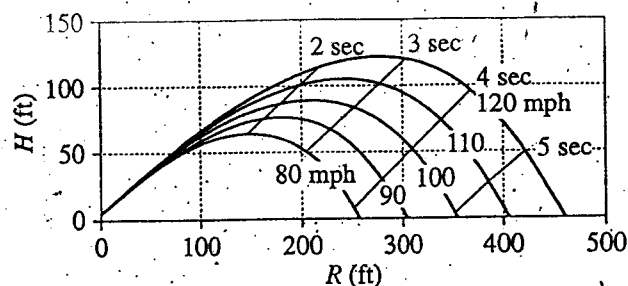


Figure 4

Figure 4 adapted from Robert K. Adair, *The Physics of Baseball*, 3rd ed. ©2002 by Robert K. Adair.



## Study 2

Using a mathematical model, the students calculated  $H$  and  $R$  at 0.5 sec intervals for the same ball launched under the same conditions as in Study 1, except that they assumed that air was absent. The results are plotted in Figure 5.

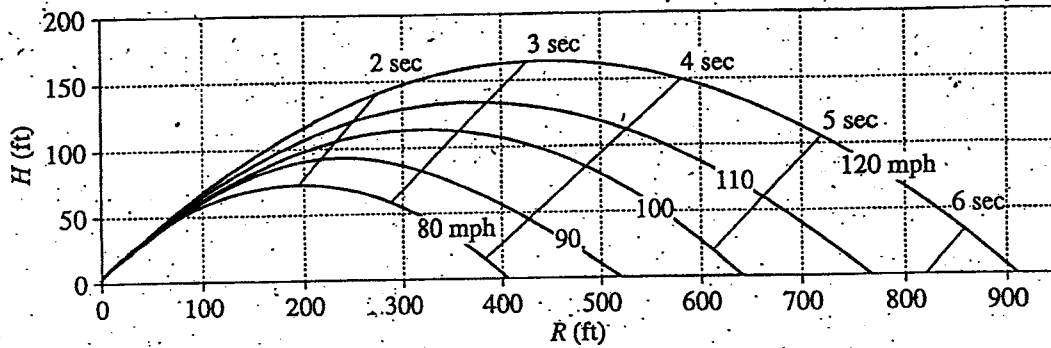


Figure 5

35. Suppose the ball were launched at  $35^\circ$  in the absence of air from a height of 3.5 ft. Based on Figure 5, the ball would land approximately how many feet farther from the launcher if it were launched at 100 mph than if it were launched at 90 mph?
- A. 50 ft  
B. 100 ft  
C. 500 ft  
D. 600 ft
36. While the ball was in flight, how frequently did the camera record the ball's image?
- F. One time per second  
G. Two times per second  
H. Three times per second  
J. Four times per second
37. Fenway Park, home of baseball's Boston Red Sox, has a wall in left field that is 37 ft high. The distance measured along the left field line from home plate to the bottom of the wall is 310 ft. Assume that, on a windless day, a ball identical to the one used in Experiment 1 leaves a bat at an initial height of 3.5 ft above the ground, at an angle of  $35^\circ$  with respect to the horizontal, and flies straight along the left field line. The ball will fly over the wall if the ball leaves the bat at which of the speeds given in Figure 4?
- A. 120 mph only  
B. 110 mph or 120 mph only  
C. 100 mph, 110 mph, or 120 mph only  
D. Any of the speeds given in Figure 4
38. Based on Figure 4, as the launch speed was increased, how did  $H$  and  $R$  at 3 sec after launch vary?
- |    | $H$       | $R$       |
|----|-----------|-----------|
| F. | increased | increased |
| G. | increased | decreased |
| H. | decreased | increased |
| J. | decreased | decreased |
39. Based on Figure 5, if the ball were launched in the absence of air from a height of 3.5 ft at 120 mph and  $\theta = 35^\circ$ , how long would the ball most likely be in flight from the moment it was launched to the moment it landed?
- A. Between 4 sec and 5 sec  
B. Between 5 sec and 6 sec  
C. Between 6 sec and 7 sec  
D. Between 7 sec and 8 sec
40. Based on Figure 3, if  $c$  represents the speed of light, how long did it take each radar pulse to make the round-trip between the transceiver and the ball?
- F.  $2\frac{D}{c}$   
G.  $\frac{R}{c}$   
H.  $2\frac{c}{D}$   
J.  $\frac{c}{R}$

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

Form 67A (December 2008)  
Miami Time

**English**

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

51) B  
52) G  
53) A  
54) H  
55) C  
56) H  
57) B  
58) F  
59) C  
60) F  
61) C  
62) H  
63) B  
64) G  
65) C  
66) H  
67) A  
68) F  
69) B  
70) F  
71) D  
72) J  
73) D  
74) G  
75) D

**Math**

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

51) C  
52) K  
53) E  
54) F  
55) D  
56) F  
57) B  
58) J  
59) A  
60) K

**Reading**

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

**Science**

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



# CrackACT.com

## Explanation of Procedures Used to Obtain Scale Scores from Raw Scores

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

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

**ACT Test 67A** **Your Scale Score**

English \_\_\_\_\_

Mathematics \_\_\_\_\_

Reading \_\_\_\_\_

Science \_\_\_\_\_

**Sum of scores** \_\_\_\_\_

**Composite score (sum ÷ 4)** \_\_\_\_\_

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

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