



# Chapter 28

## Practice Exam 2

\*Make sure to download a bubble sheet for this test via your online Student Tools.



## 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 each underlined part. In most cases, you are to choose the one that correctly 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 correct, choose “NO CHANGE.” In some cases, you will find in the right-hand column a question about the underlined part of the passage. You are to choose the correct answer to the question.

You will also find questions about a section of the passage or 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 correct and blacken 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

## Crocheting Makes a Good Hobby

Crocheting is the art of making fabric by twisting yarn or thread with a hook. Although many associate it by <sup>1</sup>older people,

crocheting can be a fun hobby for people of all ages. <sup>2</sup>Once you start crocheting, you won't be able to put down the hook; you'll have a hobby for life. 3

1. A. NO CHANGE  
B. to  
C. on  
D. with
2. F. NO CHANGE  
G. people of all ages, young and old.  
H. young and old people of all ages.  
J. people of all ages, both young and old people alike.
3. At this point, the author is considering adding the following true statement:  

Irish nuns helped save lives with crocheting when they used it as a way to make a living during the Great Irish Potato Famine of 1846.

Should the writer add this sentence here?  
A. Yes, because it is essential to know when crocheting became internationally prominent and how it did so.  
B. Yes, because the reference to the Great Irish Potato Famine demonstrates that the author is conscious of historical events.  
C. No, because the reference to the Great Irish Potato Famine is not relevant to the main topic of this essay.  
D. No, because many people who left Ireland in 1846 brought crocheting with them to the United States and Australia.

GO ON TO THE NEXT PAGE.



Time-honored and easily taught to all, crocheting is an easy hobby to pick up. Instructional books are readily available, and

once you've learned a few basic stitches. Picking up the more advanced ones is a snap. Once you learn how to crochet, you can

purchase store-bought books that detail crocheting patterns that tell you exactly how to make the projects that interest you. Even if you want to try several projects, the supplies required for

it's completion are minimal; all you need are a crochet hook, yarn, and a pair of scissors. You don't need to worry about making a big investment, either; fifteen dollars will buy you no

fewer than three starter kits!

[1] As you grow more proficient, you can expand your supplies by purchasing hooks of different types to vary the size of your stitches. [2] Crochet hooks are available in all

sizes, ranging, from very small to very large, with everything in between. [3] Some are so big that you need to use two strands of yarn. [4] Other hooks are very tiny, so small that you must use thread. [5] These hooks are suitable for making smaller, more delicate things such as lace doilies, tablecloths, and bedspreads. [6] These hooks make big stitches, so you can finish a project with them very quickly. [7] It is best to start with hooks that are medium in size; these are the easiest to manipulate and require only one strand of yarn. 11

4. F. NO CHANGE  
G. teaches  
H. taughted  
J. teached
5. A. NO CHANGE  
B. stitches; picking  
C. stitches, picking  
D. stitches since picking
6. F. NO CHANGE  
G. buy books and other pamphlets at craft and book stores detailing certain specific patterns  
H. buy pattern books  
J. acquire store-bought pattern books
7. A. NO CHANGE  
B. its  
C. its'  
D. their
8. F. NO CHANGE  
G. fewer then  
H. less than  
J. less then
9. A. NO CHANGE  
B. types;  
C. types:  
D. types,
10. F. NO CHANGE  
G. sizes, ranging  
H. sizes; ranging  
J. sizes ranging,
11. For the sake of the logic and coherence of this paragraph, Sentence 6 should be placed:  
A. where it is now.  
B. after Sentence 1.  
C. after Sentence 3.  
D. after Sentence 7.

**GO ON TO THE NEXT PAGE.**



Because it seems like there are a million hooks to keep track of, crocheting makes a good hobby because it requires only <sup>12</sup> time and patience, not attention or tremendous investment. You can crochet while watching television, listening to music, or visiting with other people. It is fun and relaxing and allows you to express your creative side in an easy way. Also, you have <sup>13</sup> finished a project, you have a cherished keepsake. Whether you

have made an afghan to keep you warm on cold winter nights or a lace tablecloth to add a touch of elegance to your dining room, your creation is sure to be cherished for a long time to come.

12. Given that all the choices are true, which one provides the most effective transition from the preceding paragraph to this one?
- F. NO CHANGE  
 G. Because it can take a long time to finish a project,  
 H. With such a simple and inexpensive set of materials,  
 J. No longer a field dominated primarily by older women,
13. A. NO CHANGE  
 B. finally you  
 C. despite the fact you  
 D. once you
14. F. NO CHANGE  
 G. at  
 H. of  
 J. within

Question 15 asks about the preceding passage as a whole.

15. Suppose the writer's goal had been to write an essay that demonstrates the commercial potential of crocheting. Would this essay successfully accomplish that goal?
- A. Yes, because it gives examples of end products of crocheting and shows the different kinds of materials needed to produce a wide range of products.  
 B. Yes, because it discusses the supplies necessary to create crocheted products, and it shows the usefulness of many of them during the cold winter months.  
 C. No, because it does not mention the market value of crocheted products or how one might go about selling them.  
 D. No, because it describes other industries and hobbies that would be more commercially successful.

## PASSAGE II

### Seurat's Masterpiece

[1] How can I describe the wonder I felt the first time I saw my favorite painting, Georges Seurat's *A Sunday on La Grande Jatte*? [2] I had admired the work for years in art books, but I never thought I saw the actual painting, which was housed in <sup>16</sup> Chicago, many miles from where I lived. [3] I finally got my

16. F. NO CHANGE  
 G. would see  
 H. had seen  
 J. was seeing

**GO ON TO THE NEXT PAGE.**

chance to when I met someone else who loved the painting as  
 much as I did. [4] We both had three days off at the same time,  
 so we decided to make a road trip to Chicago so we could see

the painting in all it's grandeur. [5] We packed our bags,

jumped into the car, and headed on our way toward Chicago. [20]

[1] The first thing that struck me as we entered the room  
 where the painting was displayed; was the size of the painting.  
 [2] A common size for canvases is 24 by 36 inches. [3] It was  
 enormous! [4] It covered a large part of an even larger wall. [5]  
 The painting's size amazed me since it was painted with dots, a  
 technique called pointillism. [6] To create a painting of such  
 magnitude using this technique seemed an almost impossible  
 task. [7] Seurat had done it, though, and had made it look easy! [23]

17. A. NO CHANGE  
 B. at the moment  
 C. just to  
 D. DELETE the underlined portion.

18. F. NO CHANGE  
 G. our  
 H. its  
 J. its'

19. A. NO CHANGE  
 B. jumped into the car, and had headed  
 C. jumped into the car, and head  
 D. had jumped into the car, and headed

20. Upon reviewing this paragraph and noticing that some information has been left out, the writer composes the following sentence, incorporating the information:

Her name was Lisa; she lived in my dorm, and a mutual friend had introduced us to each other, knowing how much both of us loved art.

For the sake of the logic of this paragraph, this sentence should be placed after Sentence:

- F. 2.  
 G. 3.  
 H. 4.  
 J. 5.
21. A. NO CHANGE  
 B. displayed:  
 C. displayed,  
 D. displayed
22. F. NO CHANGE  
 G. task and difficult to complete.  
 H. task, difficult to complete.  
 J. task, overwhelming in its difficulty.

23. Which of the following sentences is LEAST relevant to the development of this paragraph and therefore could be deleted?
- A. Sentence 2  
 B. Sentence 4  
 C. Sentence 5  
 D. Sentence 6

**GO ON TO THE NEXT PAGE.**

Even more impressive, however, was the beauty of the painting. Viewed from a distance, the colors looked muted, capturing the idyllic mood of a summer day in the park.

When I approached the painting, though, its colors exploded into myriad hues, illustrating the artist's skill in combining colors to create a mood. Even the parts of the painting that appeared white from a distance were vibrantly multicolored when viewed up

close. <sup>26</sup> The effect was incredible;

he sat and stared at the painting in wonder for a good portion of <sup>27</sup>

the afternoon. <sup>28</sup>

My friend and I saw many other sights, on our trip to Chicago, but the best part by far was being able to see our favorite work of art. The image is forever imprinted in my mind

24. Given that all of the choices are accurate, which provides the most effective and logical transition from the preceding paragraph to this one?
- F. NO CHANGE  
G. One thing that struck me was  
H. Many art critics have written about  
J. The debate rages on over
25. Which of the following alternatives to the underlined portion would NOT be acceptable?
- A. As I approached the painting, though,  
B. However, as I approached the painting,  
C. I approached the painting, though,  
D. However, when I approached the painting,
26. If the writer were to delete the phrase "from a distance" from the preceding sentence, the paragraph would primarily lose:
- F. an essential point explaining the author's love of the painting.  
G. the first part of the contrast in this sentence, which the author uses to describe viewing the painting.  
H. a further indication of the length of the road trip taken by the author and her friend.  
J. nothing, because the information provided by this phrase is stated more clearly elsewhere in the paragraph.
27. A. NO CHANGE  
B. one  
C. they  
D. we
28. At this point, the writer is considering adding the following true statement:
- The Art Institute of Chicago contains many other famous paintings, among them Edvard Munch's *The Scream* and Grant Wood's *American Gothic*.
- Should the writer make this addition here?
- F. Yes, because it gives additional details essential to understanding the collection at the museum.  
G. Yes, because it demonstrates a contrast between the author's favorite painting and those in this sentence.  
H. No, because it provides information that is not relevant at this point in the paragraph and essay.  
J. No, because it is contradicted by other information presented in this essay.
29. A. NO CHANGE  
B. sights, which  
C. sights;  
D. sights

**GO ON TO THE NEXT PAGE.**

at the museum gift shop, even when I'm not looking at the <sup>30</sup>  
souvenir print I bought.

30. The best placement for the underlined portion would be:
- F. where it is now.
  - G. after the word *image*.
  - H. after the word *looking*.
  - J. after the word *bought* (ending the sentence with a period).

PASSAGE III

The Language of Cats

Many people believe that language is the domain of human beings. However, cats have developed an intricate language not for each other, but for the human beings who <sup>31</sup>

have adopted them as pets. <sup>32</sup>

When communicating with each other, cats' "talk" is a <sup>33</sup>  
complex system of nonverbal signals. In particular, their tails, <sup>33</sup>

rather than any kind of "speech," <sup>34</sup> provide cats' chief means of expression. They also use physical contact to express their feelings. With other cats, cats will use their voices only to express pain. <sup>35</sup>

Next, <sup>36</sup> incredibly, all of that changes when a human walks into the room. Cats use a wide range of vocal expressions when they communicate with a person, from affectionate meows to

31. A. NO CHANGE  
B. developed, an intricate language  
C. developed an intricate language,  
D. developed; an intricate language
32. Which choice would most clearly and effectively express the ownership relationship between humans and cats?  
F. NO CHANGE  
G. like to have cats around.  
H. often have dogs as well.  
J. are naturally inclined to like cats.
33. A. NO CHANGE  
B. a complicated system of nonverbal signals is used by cats to "talk."  
C. cats "talk" with a complex system of nonverbal signals.  
D. "talking" is done by them with a system of complex nonverbal signals.
34. F. NO CHANGE  
G. having provided  
H. has provided  
J. were provided by
35. If the preceding sentence were deleted, the essay would primarily lose:  
A. a redundant point made elsewhere in the essay.  
B. another description of the ways in which cats communicate nonverbally.  
C. an exception to the general trend described in this paragraph.  
D. a brief summary of the information contained in the essay up to this point.
36. F. NO CHANGE  
G. (Do NOT begin new paragraph) Incredibly,  
H. (Begin new paragraph) Next incredibly,  
J. (Begin new paragraph) Incredibly,

GO ON TO THE NEXT PAGE.

menacing hisses. Since cats verbal expressions are not used to

37

communicate with other cats, it is logical and reasonable to conclude that cats developed this “language” expressly to communicate with their human owners.

This fact is demonstrated more clear since observing households that have only one cat. An only cat is usually very vocal, since the only creature around with whom the cat can communicate is its owner. Cats with other feline companions, though, are much quieter. If they want to have a conversation, they need only go to their fellow cats and communicate in their natural way.

Since cats learned to meow for the sole purpose of communicating with human beings, owners should take the time to learn what their different meows mean. If an owner knows, to name just a few examples, which meow means the cat is hungry, which means the cat wants to be petted, and which means the cat wants to have a little “conversation,” the bond between cat and owner will grow deeper.  Certainly, after a time, owners will see that communicating with their pets, not just cats, is every bit as important to forging good relationships

as to communicate with other humans. Once, as an owner, you know that the cat is not just

43

37. A. NO CHANGE  
B. cat’s verbal expressions  
C. cats’ verbal expressions  
D. cats verbal expressions,
38. F. NO CHANGE  
G. logical and well-reasoned  
H. logical to a startling degree  
J. logical
39. A. NO CHANGE  
B. clear when  
C. clearly since  
D. clearly when
40. At this point, the writer is considering adding the following true statement:
- On the other hand, the natural way for most birds to communicate is vocally, by way of the “bird song.”
- Should the writer add this sentence here?
- F. Yes, because it shows that cats are truly unique in communicating nonverbally.  
G. Yes, because it adds a relevant and enlightening detail about another animal.  
H. No, because it basically repeats information given earlier in the essay.  
J. No, because it does not contribute to the development of this paragraph and the essay as a whole.
41. A. NO CHANGE  
B. knows, to,  
C. knows to,  
D. knows to
42. If the writer wanted to emphasize that cats communicate vocally with their owners to express a large number of different emotions in addition to those listed in the previous sentence, which of the following true statements should be added at this point?
- F. Many animals communicate hunger similarly to cats.  
G. Cats will tell their owners when they feel pain, sadness, irritation, or love.  
H. Cats communicate these emotions differently to other cats.  
J. Humans have the easiest time communicating with other mammals.
43. A. NO CHANGE  
B. as being communicative  
C. as communicating  
D. through communicating

**GO ON TO THE NEXT PAGE.**



making senseless noises without any rhyme or reason but is making an attempt to communicate, you can make an effort to communicate back. After all, your cat isn't meowing just for the sake of making noise; however, cats are less communicative than many other animals.

44. F. NO CHANGE  
 G. making senseless noises  
 H. senselessly making noises with no thought involved  
 J. making senseless noises, having no idea what they mean,
45. Which choice would best summarize the main point the essay makes about cats' communication with their human owners?  
 A. NO CHANGE  
 B. rather, there's a good chance your cat is trying to tell you something.  
 C. instead, your cat is probably trying to communicate with other cats by meowing.  
 D. on the other hand, it is better to have more than one cat so they can undergo a natural development.

#### PASSAGE IV

##### Visiting Mackinac Island

Visiting Mackinac (pronounced "Mackinaw") Island is like taking a step back to the past in time. Victorian

houses' and a fort dating back to the War of 1812 surround the historic downtown, where horses and buggies still pull passengers down the road.

The only way to get to Mackinac Island is by boat or private plane, and you may not bring your car. Automobiles are

outlawed on the little, isolated, Michigan, island, so visitors can

see the sights only by horse, carriage, or by riding a bicycle—or on foot. Luckily, the island is small enough that cars are not

necessary, Mackinac measures only a mile and a half in diameter.

46. F. NO CHANGE  
 G. moving in a past-related direction  
 H. going back to the past, not the future,  
 J. stepping back
47. A. NO CHANGE  
 B. house's  
 C. houses  
 D. houses,
48. F. NO CHANGE  
 G. your sweet self over to  
 H. yourself on down to  
 J. over to
49. A. NO CHANGE  
 B. isolated Michigan island  
 C. isolated Michigan island,  
 D. isolated, Michigan, island
50. F. NO CHANGE  
 G. by bicycle  
 H. riding on a bicycle  
 J. bicycle
51. A. NO CHANGE  
 B. necessary, furthermore, Mackinac  
 C. necessary. Mackinac  
 D. necessary Mackinac

**GO ON TO THE NEXT PAGE.**

There are many things to see while visiting Mackinac Island. The majestic Grand Hotel is a popular tourist spot, as are the governor’s mansion and Arch Rock, a towering limestone arch formed naturally by water erosion. <sup>52</sup> Fort Mackinac, where they still set off cannons every hour, is also a popular place to visit. Visible from parts of the island are Mackinac Bridge—the longest suspension bridge ever built—and a picturesque old lighthouse.

Shopping is also a favorite pastime on Mackinac Island. The island’s biggest industry is tourism, <sup>53</sup> For the island’s many

tourists, the most popular item of sale on Mackinac Island is

fudge. The downtown streets are lined with fudge shops, where tourists can watch fudge of all different flavors being made before lining up to buy some for themselves. These fudge shops

are so numerous and abundant that the local residents have even

developed a special nickname for these tourists: I call the tourists “fudgies.”

Apart from sightseeing and shopping, Mackinac Island is a great place to just sit back and relax. In the summer, a gentle lake breeze floats through the air, when it creates a beautiful, temperate climate. It is peaceful to sit in the city park and watch the ferries and private boats float into the harbor. The privacy of

52. If the writer were to delete the phrase “formed naturally by water erosion” (placing a period after the word *arch*), this sentence would primarily lose:
- F. a detail describing the unique formation of the Arch Rock.  
 G. factual information concerning the geological formations of the tourist attractions on Mackinac Island.  
 H. a contrast to the governor’s mansion, which was constructed by human hands.  
 J. nothing; this information is detailed elsewhere in this paragraph.
53. Given that all the following are true, which one, if added here at the end of this sentence, would provide the most effective transition to the topic discussed in the sentence that follows?
- A. so there are many souvenir stores, T-shirt shops, and candy and ice cream parlors.  
 B. so Mackinac Island has not been negatively affected by outsourcing.  
 C. which is a big change from the island’s eighteenth-century use in the fur trade.  
 D. but it’s not a tourist attraction like many others with theme parks and chain restaurants.
54. F. NO CHANGE  
 G. for selling  
 H. for sale  
 J. of selling
55. Which of the following alternatives to the underlined portion would NOT be acceptable?
- A. which  
 B. so  
 C. and  
 D. in which
56. F. NO CHANGE  
 G. abundantly numerous  
 H. numerous  
 J. of an abundance truly numerous
57. A. NO CHANGE  
 B. one calls  
 C. it calls  
 D. they call
58. F. NO CHANGE  
 G. creating  
 H. once it creates  
 J. as if it had created

**GO ON TO THE NEXT PAGE.**

the island's environs certainly don't give<sup>59</sup> it the hustle-bustle quality of a city, but the relaxing atmosphere makes Mackinac Island the perfect place to visit to get away from the hectic pace of everyday life.

59. A. NO CHANGE  
 B. isn't giving  
 C. hasn't given  
 D. doesn't give

Question 60 asks about the preceding passage as a whole.

60. Suppose the writer had intended to write an essay on the difficulty the residents of Mackinac Island have had prohibiting automobile traffic from the historic island. Would this essay have successfully fulfilled that goal?
- F. Yes, because the automobile has become such an essential part of American tourist travel that the residents are clearly threatened.  
 G. Yes, because this essay discusses the fact that automobiles are outlawed and goes on to detail many of the reasons this was possible.  
 H. No, because the essay focuses instead on other aspects of Mackinac Island, mentioning automobiles in only one part of the passage.  
 J. No, because this essay describes the ways the residents of Mackinac Island have sought to bring automobiles back to the island, not to outlaw them.

## PASSAGE V

### Fun with Karaoke

[1]

[1] Karaoke is one of the most popular forms of entertainment in the world. [2] What defies understanding, though, is why so many ordinary people insist on getting up on stage in public, humiliating themselves in front of both their friends; and peers. [3] Whether practiced at home, in a restaurant, or at a party, karaoke is a form of entertainment<sup>61</sup>

that provides<sup>62</sup> people with a great time and a positive feeling. [4] It is understandable that people would enjoy singing in the

61. A. NO CHANGE  
 B. friends and  
 C. friends, and  
 D. friends and,
62. Which of the following alternatives to the underlined portion would NOT be acceptable?
- F. entertainment that can provide  
 G. entertainment, providing  
 H. entertainment, one which provides  
 J. entertainment that having provided

**GO ON TO THE NEXT PAGE.**

privacy of their homes. [5] There are many different ways to respond to this question. 63

[2]

Looking more closely, and you'll see a main reason for karaoke's success is its glitz and glamour. Karaoke provides people with a moment when they are more than just everyday folks—they are stars. Even though their performances may be heard only in dimly lit bars or busy restaurants, but karaoke singers are still performing as if in a true concert with such

concert-hall staples, as microphones, lights, and applause. Even though the singers' voices are not spectacular, the audience

has known that it's all for fun and responds anyway. And in the

end, everyone would like to be a rock star. Karaoke is as close as many people will get to fame and stardom, but this is not the only reason for its enduring popularity.

[3]

There is another, more obvious reason why karaoke is so popular and singing in public is such fun. The average person allows his or her singing to be heard only in the shower or in the car as the radio plays. Karaoke, by contrast, allows the average person the opportunity to share that ordinarily solitary

experience with other people. In lieu of how good or bad their voices are, people can experience the sheer joy of music with

63. For the sake of logic and coherence, Sentence 2 should be placed:

- A. where it is now.
- B. after Sentence 3.
- C. after Sentence 4.
- D. after Sentence 5.

64. F. NO CHANGE

- G. Having looked
- H. To look
- J. Look

65. A. NO CHANGE

- B. restaurants which
- C. restaurants,
- D. restaurants but

66. F. NO CHANGE

- G. staples:
- H. staples
- J. staples;

67. A. NO CHANGE

- B. is knowing
- C. knew
- D. knows

68. Given that all the choices are true, which one would most effectively conclude this paragraph while leading into the main focus of the next paragraph?

- F. NO CHANGE
- G. This is why AudioSynTrac and Numark Electronics were so successful in debuting the first sing-along tapes and equipment back in the 1970s.
- H. Japan's lasting influence on karaoke is obvious all the way down to its name—the Japanese word karaoke translates roughly to “empty orchestra.”
- J. Singing in front of people is more fun for many people than singing in the shower or in the car.

69. A. NO CHANGE

- B. furthermore,
- C. moreover,
- D. as a result,

70. F. NO CHANGE

- G. Regardless of
- H. However
- J. Because of

**GO ON TO THE NEXT PAGE.**

others, <sup>71</sup>whose singing is mostly a private affair as well, through karaoke.

[4]

The effect karaoke has on people may also provide an explanation for its popularity: it helps bring people who are ordinarily shy out of their shells. <sup>72</sup>Karaoke helps them overcome stage fright, build their self-confidence, and conquer

their fears. The singers may feel nervous or silly if they first take <sup>73</sup>the stage, but when the audience breaks out into applause, the singers are sure to feel rewarded.

[5]

Whatever the reason, karaoke continues to grow in popularity. Last year, karaoke made no <sup>74</sup>less than \$7 billion in profit in Japan. Many dismiss it as a fad, but as long as karaoke is fun and leaves people feeling good, it will not disappear.

71. A. NO CHANGE  
B. who  
C. whom  
D. who's
72. If the writer were to delete the clause "who are ordinarily shy" from the preceding sentence, the essay would primarily lose:  
F. a detail that explains why karaoke is so popular in the international community.  
G. a detail meant to indicate that karaoke is popular among those not normally inclined to sing in public.  
H. information that emphasizes the possible psychological benefits of karaoke for the chronically shy.  
J. an indication that karaoke may be used at some future time to help singers overcome stage fright.
73. A. NO CHANGE  
B. when  
C. unless  
D. where
74. F. NO CHANGE  
G. lesser than  
H. fewer then  
J. few than

Question 75 asks about the preceding passage as a whole.

75. Upon reviewing notes for this essay, the writer comes across some information and composes the following sentence incorporating that information:
- While different regions of the United States prefer different artists, the most popular karaoke requests are invariably for country artists, varying from the modern Carrie Underwood to the classic Johnny Cash.
- For the sake of the logic and coherence of this essay, this sentence should be:
- A. placed at the end of Paragraph 3.  
B. placed at the end of Paragraph 4.  
C. placed at the end of Paragraph 5.  
D. NOT added to the essay at all.

**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 darken the corresponding oval on your answer sheet.

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,

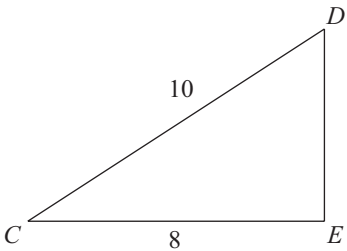
but some of the problems may best be done without using a calculator.

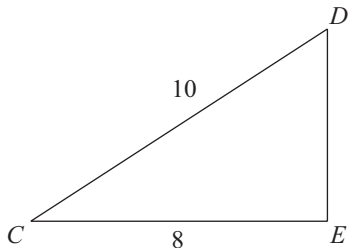
Note: Unless otherwise stated, all of the following should be assumed:

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. Point  $X$  is located at  $-15$  on the real number line. If point  $Y$  is located at  $-11$ , what is the midpoint of line segment  $XY$ ?
  - A.  $-13$
  - B.  $-4$
  - C.  $-2$
  - D.  $2$
  - E.  $13$

**DO YOUR FIGURING HERE.**

2. Given triangle  $CDE$  (shown below) with a right angle at point  $E$ , what is the length of leg  $DE$ ?
 



- F.  $\sqrt{2}$
- G.  $2$
- H.  $6$
- J.  $\sqrt{164}$
- K.  $16$

**GO ON TO THE NEXT PAGE.**



3. Lucy is studying her ant farm. She needs to approximate the number of ants in the population, and she realizes that the number of ants,  $N$ , is close to 50 more than double the volume of the ant farm,  $V$ . Which of the formulas below expresses that approximation?

- A.  $N \approx \frac{1}{2}V + 50$
- B.  $N \approx \frac{1}{2}(V + 50)$
- C.  $N \approx 2V + 50$
- D.  $N \approx 2(V + 50)$
- E.  $N \approx V^2 + 50$

**DO YOUR FIGURING HERE.**

4. Lisa has 5 fiction books and 7 nonfiction books on a table by her front door. As she rushes out the door one day, she takes a book at random. What is the probability that the book she takes is fiction?

- F.  $\frac{1}{5}$
- G.  $\frac{5}{7}$
- H.  $\frac{1}{12}$
- J.  $\frac{5}{12}$
- K.  $\frac{7}{12}$

5. In the spring semester of her math class, Katie's test scores were 108, 81, 79, 99, 85, and 82. What was her average test score in the spring semester?

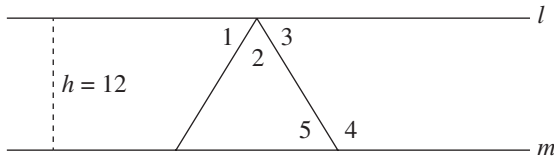
- A. 534
- B. 108
- C. 89
- D. 84
- E. 80

**GO ON TO THE NEXT PAGE.**

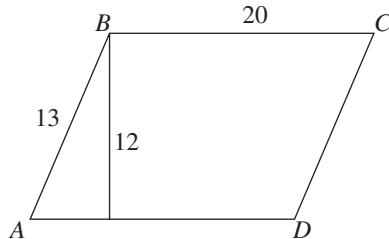


6. Given parallel lines  $l$  and  $m$ , which of the following choices lists a pair of angles that must be congruent?

**DO YOUR FIGURING HERE.**



- F.  $\angle 1$  and  $\angle 2$   
 G.  $\angle 1$  and  $\angle 3$   
 H.  $\angle 2$  and  $\angle 3$   
 J.  $\angle 2$  and  $\angle 5$   
 K.  $\angle 3$  and  $\angle 5$
7. Gregor works as a political intern and receives a monthly paycheck. He spends 20% of his paycheck on rent and deposits the remainder into a savings account. If his deposit is \$3,200, how much does he receive as his monthly pay?
- A. \$ 4,000  
 B. \$ 5,760  
 C. \$ 7,200  
 D. \$ 8,000  
 E. \$17,000
8. Given parallelogram  $ABCD$  below and parallelogram  $EFGH$  (not shown) are similar, which of the following statements must be true about the two shapes?



- F. Their areas are equal.  
 G. Their perimeters are equal.  
 H. Side  $AB$  is congruent to side  $EF$ .  
 J. Diagonal  $AC$  is congruent to diagonal  $EG$ .  
 K. Their corresponding angles are congruent.
9. A size 8 dress that usually sells for \$60 is on sale for 30% off. Victoria has a store credit card that entitles her to an additional 10% off the reduced price of any item in the store. Excluding sales tax, what is the price Victoria pays for the dress?
- A. \$22.20  
 B. \$24.75  
 C. \$34.00  
 D. \$36.00  
 E. \$37.80

**GO ON TO THE NEXT PAGE.**





10. Erin and Amy are playing poker. At a certain point in the game, Erin has 3 more chips than Amy. On the next hand, Erin wins 4 chips from Amy. Now how many more chips does Erin have than Amy?

F. -1  
 G. 4  
 H. 7  
 J. 11  
 K. 14

**DO YOUR FIGURING HERE.**

11. If  $y = 4$ , then  $|1 - y| = ?$

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

12.  $(3a + 2b)(a - b^2)$  is equivalent to:

F.  $4a + b^2$   
 G.  $3a^2 - 2b^3$   
 H.  $3a^2 + 2ab + 2b^3$   
 J.  $3a^2 - 3ab^2 + a^2b^2$   
 K.  $3a^2 - 3ab^2 + 2ab - 2b^3$

13. For all real values of  $y$ ,  $3 - 2(4 - y) = ?$

A.  $-2y - 9$   
 B.  $-2y + 8$   
 C.  $-2y - 1$   
 D.  $2y - 5$   
 E.  $2y + 11$

14. Which of the following is equivalent to  $(y^3)^8$ ?

F.  $y^{11}$   
 G.  $y^{24}$   
 H.  $8y^3$   
 J.  $8y^{11}$   
 K.  $24y$

15. If the first day of the year is a Monday, what is the 260th day?

A. Monday  
 B. Tuesday  
 C. Wednesday  
 D. Thursday  
 E. Friday

**GO ON TO THE NEXT PAGE.**



**DO YOUR FIGURING HERE.**

16. If a square has an area of 64 square units, what is the area of the largest circle that can be inscribed inside the square?

F.  $4\pi$   
G.  $8\pi$   
H.  $16\pi$   
J. 64  
K.  $64\pi$

17. What is the product of the solutions of the equation  $x^2 - 5x - 14 = 0$ ?

A. -14  
B. -2  
C. 0  
D. 5  
E. 7

18. Factoring the polynomial  $x^{12} - 9$  reveals a number of factors for the expression. Which of these is NOT one of the possible factors?

F.  $x^6 + 3$   
G.  $x^{12} - 9$   
H.  $x^3 + \sqrt{3}$   
J.  $x^3 - \sqrt{3}$   
K.  $x - \sqrt{3}$

19. What is the value of  $\frac{2x+4}{3x}$  when  $x = \frac{1}{6}$ ?

A.  $4\frac{1}{3}$   
B. 2  
C.  $\frac{26}{3}$   
D. 12  
E. 24

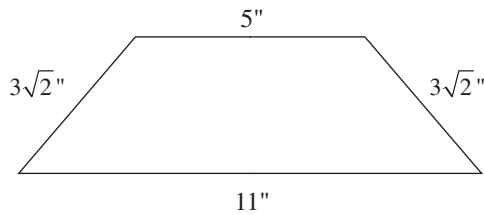
20. If you drive 60 miles at 90 miles an hour, how many minutes will the trip take you?

F. 15  
G. 30  
H. 40  
J. 60  
K. 90

**GO ON TO THE NEXT PAGE.**



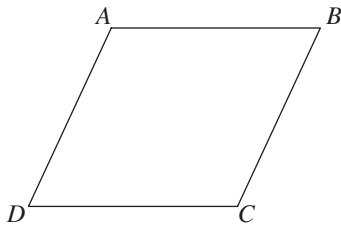
21. The area of a trapezoid is found by multiplying the height by the average of the bases:  $A = \frac{1}{2}h(b_1 + b_2)$ . Given the side measurements below, what is the area, in square inches, of the trapezoid?



**DO YOUR FIGURING HERE.**

- A.  $15\sqrt{2}$   
 B. 22  
 C. 24  
 D.  $24\sqrt{2}$   
 E.  $30\sqrt{2}$
22. If  $x = -\frac{2}{3}$  and  $x = \frac{1}{4}$  are the roots of the quadratic equation  $ax^2 + bx + c = 0$ , then which of the following could represent the two factors of  $ax^2 + bx + c$ ?
- F.  $(3x + 2)$  and  $(4x - 1)$   
 G.  $(3x + 1)$  and  $(4x - 2)$   
 H.  $(3x - 1)$  and  $(4x + 2)$   
 J.  $(3x - 2)$  and  $(4x + 1)$   
 K.  $(3x - 2)$  and  $(4x - 1)$

23. In the rhombus below, diagonal  $AC = 6$  and diagonal  $BD = 8$ . What is the length of each of the four sides?



- A.  $\sqrt{7}$   
 B.  $\sqrt{14}$   
 C. 5  
 D. 7  
 E. 10

**GO ON TO THE NEXT PAGE.**



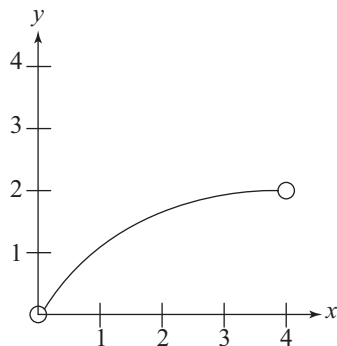
DO YOUR FIGURING HERE.

24. A rectangular rug has an area of 80 square feet, and its width is exactly 2 feet shorter than its length. What is the length, in feet, of the rug?
- F. 8  
G. 10  
H. 16  
J. 18  
K. 36

25. In the standard  $(x,y)$  coordinate plane, a line runs through points  $(1,-5)$  and  $(5,10)$ . Which of the following represents the slope of that line?
- A.  $\frac{4}{15}$   
B.  $\frac{4}{5}$   
C. 1  
D.  $\frac{5}{4}$   
E.  $\frac{15}{4}$

26. The equation of a circle in the standard  $(x,y)$  coordinate plane is given by the equation  $(x + 5)^2 + (y - 5)^2 = 5$ . What is the center of the circle?
- F.  $(-\sqrt{5}, \sqrt{5})$   
G.  $(-5, 5)$   
H.  $(\sqrt{5}, -\sqrt{5})$   
J.  $(5, -5)$   
K.  $(5, 5)$

27. The graph below shows the function  $f(x)$  in the standard  $(x,y)$  coordinate plane. Which of the following choices best describes the *domain* of this function?



- A.  $\{0, 1, 2, 3, 4\}$   
B.  $\{0, 1, 2\}$   
C.  $\{x: 0 < x < 2\}$   
D.  $\{x: 0 < x < 4\}$   
E. All real values of  $x$

GO ON TO THE NEXT PAGE.

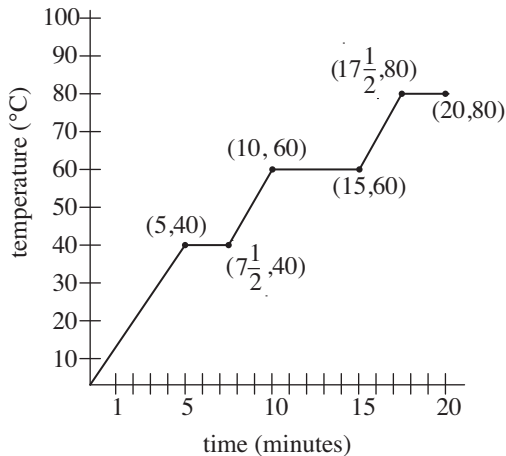


28. Amber decides to graph her office and the nearest coffee shop in the standard  $(x,y)$  plane. If her office is at point  $(-1,-5)$  and the coffee shop is at point  $(3,3)$ , what are the coordinates of the point exactly halfway between those of her office and the shop? (You may assume Amber is able to walk a straight line between them.)

- F.  $(1, -1)$
- G.  $(1, 4)$
- H.  $(2, -1)$
- J.  $(2, 4)$
- K.  $(2, 0)$

**DO YOUR FIGURING HERE.**

29. For a chemistry class, Sanjay is doing an experiment that involves periodically heating a container of liquid. The graph below shows the temperature of the liquid at different times during the experiment. What is the average rate of change of temperature (in degrees Celsius per minute) during the times in which the temperature is increasing?



- A. 4
  - B. 5
  - C. 8
  - D. 10
  - E. 20
30. If  $\frac{a^x}{a^y} = a^5$ , for  $a \neq 0$ , which of the following statements must be true?
- F.  $x \neq 0$  and  $y \neq 0$
  - G.  $x + y = 5$
  - H.  $x - y = 5$
  - J.  $xy = 5$
  - K.  $\frac{x}{y} = 5$

**GO ON TO THE NEXT PAGE.**



31. What is the slope of the line given by the equation  $8 = 3y - 5x$  ?

- A.  $-5$
- B.  $-\frac{5}{3}$
- C.  $-\frac{3}{5}$
- D.  $\frac{3}{5}$
- E.  $\frac{5}{3}$

**DO YOUR FIGURING HERE.**

32. When adding fractions, a useful first step is to find the least common denominator (LCD) of the fractions. What is the LCD for these fractions?

$$\frac{2}{3^2 \times 5}, \frac{13}{5^2 \times 7 \times 11}, \frac{2}{3 \times 11^3}$$

- F.  $3 \times 5 \times 7 \times 11$
- G.  $3^2 \times 5^2 \times 7 \times 11$
- H.  $3^2 \times 5^2 \times 11^3$
- J.  $3^2 \times 5^2 \times 7 \times 11^3$
- K.  $3^3 \times 5^3 \times 7 \times 11^4$

33.  $\frac{1}{4} \times \frac{2}{5} \times \frac{3}{6} \times \frac{4}{7} \times \frac{5}{8} \times \frac{6}{9} \times \frac{7}{10} = ?$

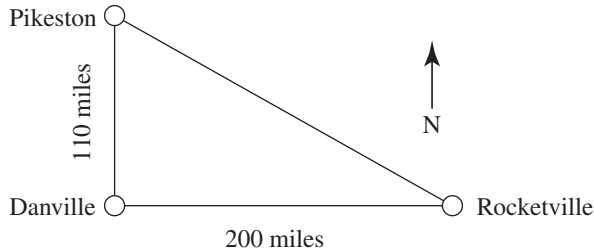
- A.  $\frac{1}{720}$
- B.  $\frac{1}{360}$
- C.  $\frac{1}{120}$
- D.  $\frac{27}{49}$
- E.  $1$

**GO ON TO THE NEXT PAGE.**

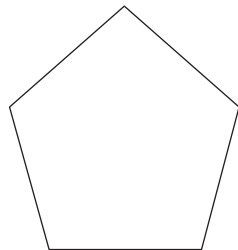


34. Dave is in Pikeston and needs to go to Danville, which is about 110 miles due south of Pikeston. From Danville, he'll head east to Rocketville, about 200 miles from Danville. As he sets out on his trip, a plane takes off from the Pikeston airport and flies directly to Rocketville. Approximately how far, in miles, does the plane fly?

**DO YOUR FIGURING HERE.**



- F. 310  
 G.  $\sqrt{310}$   
 H.  $\sqrt{27,900}$   
 J.  $\sqrt{30,000}$   
 K.  $\sqrt{52,100}$
35. The figure below is a pentagon (5-sided figure). Suppose a second pentagon were overlaid on this pentagon. At most, the two figures could have how many points of intersection?



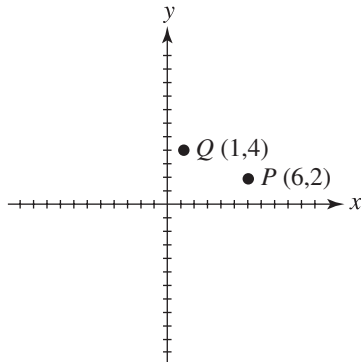
- A. 1  
 B. 2  
 C. 5  
 D. 10  
 E. Infinitely many
36. MicroCorp will hold its annual company picnic next week and will assign planning duties to 3 of its employees. One person selected will reserve a venue, another will arrange catering, and a third will plan activities. There are 10 employees eligible to fulfill these duties, and no employee can be assigned more than one duty. How many different ways are there for duties to be assigned to employees?
- F.  $7^3$   
 G.  $9^3$   
 H.  $10^3$   
 J.  $9 \times 8 \times 7$   
 K.  $10 \times 9 \times 8$

**GO ON TO THE NEXT PAGE.**



37. In the  $(x,y)$  coordinate plane below, points  $P(6,2)$  and  $Q(1,4)$  are two vertices of  $\triangle PQR$ . If  $\angle PQR$  is a right angle, then which of the following could be the coordinates of  $R$ ?

**DO YOUR FIGURING HERE.**



- A.  $(4, -3)$   
 B.  $(3, 0)$   
 C.  $(2, 1)$   
 D.  $(2, 4)$   
 E.  $(3, 9)$

38. If  $y = 0.25(100 - y)$ , then what is the value of  $y$ ?

- F. 200  
 G. 75  
 H. 25  
 J. 20  
 K. 18

39. If  $0^\circ \leq x \leq 180^\circ$  and  $4\cos^2 x = 1$ , then  $x = ?$

- A.  $0^\circ$   
 B.  $60^\circ$   
 C.  $90^\circ$   
 D.  $150^\circ$   
 E.  $180^\circ$

40. Danielle's living room is a rectangle with the dimensions 16 feet by 18 feet. If she partially covers the bare floor with a circular throw rug with a diameter of 12 feet, what is the approximate area of bare floor, in square feet, that remains exposed?

(Note: Assume the rug lies completely flat and does not touch any wall.)

- F. 113  
 G. 144  
 H. 175  
 J. 288  
 K. Cannot be determined without knowing the exact position of the rug

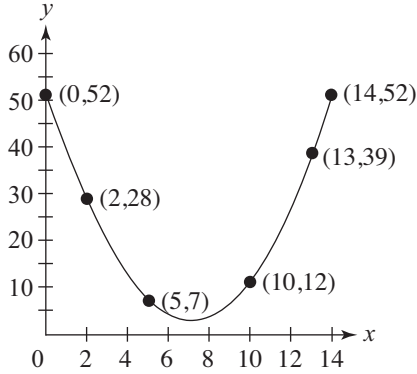
**GO ON TO THE NEXT PAGE.**





41. A portion of a parabola is shown below. Over which of the following intervals is the average rate of change the greatest?

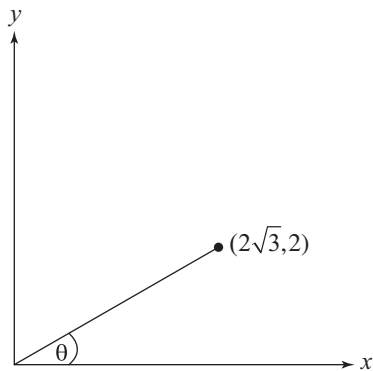
- A.  $0 \leq x \leq 2$
- B.  $2 \leq x \leq 5$
- C.  $5 \leq x \leq 10$
- D.  $10 \leq x \leq 13$
- E.  $13 \leq x \leq 14$



**DO YOUR FIGURING HERE.**

42. In the figure given below, what is  $\sin \theta$  ?

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



**GO ON TO THE NEXT PAGE.**



**DO YOUR FIGURING HERE.**

43. The magnitude of an earthquake on the Richter Scale is determined by the equation  $R = \log\left(\frac{A}{A_0}\right)$ , in which  $A$  is the maximum amplitude measured at a sensor and  $A_0$  is the threshold amplitude, dependent only on the sensor distance from the epicenter. What is the approximate magnitude, on the Richter Scale, of an earthquake with a measured amplitude 3,000 times the value of  $A_0$ ?

- A. 2.5
- B. 3
- C. 3.5
- D. 4
- E. 4.5

44. Set  $P = \{2, 3, 5.5, 6\}$  Set  $Q = \{1, 2, 3, 4\}$

If  $m$  is randomly selected from Set  $P$  and  $n$  is randomly selected from Set  $Q$ , what is the probability that  $mn$  is an even integer?

- F.  $\frac{3}{4}$
- G.  $\frac{11}{16}$
- H.  $\frac{9}{16}$
- J.  $\frac{1}{4}$
- K.  $\frac{3}{16}$

45. Which choice below is the complete solution set of  $|2z - 3| \geq 7$ ?

- A.  $z \geq 5$
- B.  $z \leq -2$  or  $z \geq 5$
- C.  $-5 \leq z \leq 5$
- D.  $z \leq -6$  or  $z \geq 2$
- E.  $z \leq -5$  or  $z \geq 2$

**GO ON TO THE NEXT PAGE.**



46. Which trigonometric function (where defined) is equivalent to

$$\frac{\sin^2 x}{\cos x \tan x} ?$$

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

G.  $\frac{1}{\cos x}$

H.  $\sin x$

J.  $\frac{1}{\sin x}$

K.  $\frac{1}{\sin^2 x}$

**DO YOUR FIGURING HERE.**

47. When  $a \neq b$ ,  $\frac{ax - bx}{4a - 4b} < 0$ . Which of the following describes the complete set of  $x$  values that make this inequality true?

A.  $x = -4$  only

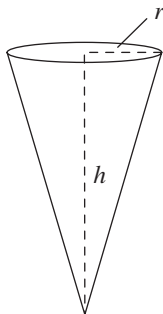
B.  $x = 4$  only

C.  $x = -\frac{1}{4}$  only

D.  $x < 0$

E.  $x > 0$

48. The volume of a cone, which is derived by treating it as a pyramid with infinitely many lateral faces, is given by the formula  $V = \frac{1}{3}\pi r^2 h$ , where  $r$  is the radius of the base, and  $h$  is the height. If the radius is halved and the height is doubled, what will be the ratio of the new volume to the old volume?



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

**GO ON TO THE NEXT PAGE.**



49. Al bikes a trail to the top of a hill and back down. He bikes up the hill in  $m$  minutes, and then returns twice as quickly downhill on the same trail. What is the total time, in hours, that Al spends biking up the hill and back down?

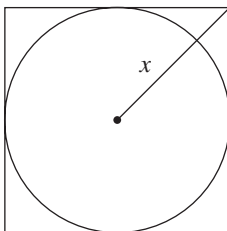
- A.  $\frac{m}{60}$   
 B.  $\frac{m}{40}$   
 C.  $\frac{m}{30}$   
 D.  $\frac{3m}{2}$   
 E.  $2m$

**DO YOUR FIGURING HERE.**

50. A cylindrical cup with an interior radius of 5 centimeters has a cube of ice with side length 3 centimeters inside of it. The cup is then filled with lemonade until the lemonade reaches a height of 9 centimeters. Assuming the ice cube is fully submerged, which of the following expressions gives the volume, in cubic centimeters, of the lemonade poured into the cup?

- F.  $9(10^2)\pi - 3^3$   
 G.  $9(5^2)\pi - 3^3$   
 H.  $3(9^2)\pi - 5^3$   
 J.  $9(3^2)\pi - 5^3$   
 K.  $2(5)(9)\pi - 3^3$

51. A circle is inscribed in a square, as shown below. If  $x$  is the distance from the center of the circle to a vertex of the square, then what is the length of the radius of the circle, in terms of  $x$ ?



- A.  $2x$   
 B.  $x\sqrt{2}$   
 C.  $x$   
 D.  $\frac{x\sqrt{2}}{2}$   
 E. Cannot be determined from the information given

**GO ON TO THE NEXT PAGE.**



DO YOUR FIGURING HERE.

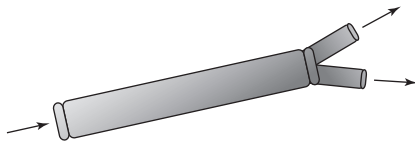
$$52. \begin{bmatrix} 4a & 3 & -1 \\ 2 & 1 & 5 \end{bmatrix} \begin{bmatrix} 2 & 7 \\ 4 & 3 \\ 1 & 5 \end{bmatrix} = \begin{bmatrix} 35 & 88 \\ 13 & 42 \end{bmatrix}$$

What value of  $a$  satisfies the matrix equation above?

- F. 12
- G. 7
- H. 5
- J. 4
- K. 3

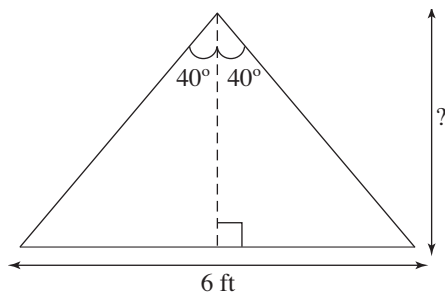
53. A pipe of radius  $4\sqrt{2}$  feet sends water to two smaller pipes of equal size. If the cross-sectional area of each of the smaller pipes is exactly one-fourth that of the larger pipe, what is the radius of one of the smaller pipes?

- A. 2
- B.  $2\pi$
- C.  $2\sqrt{2}$
- D.  $4\sqrt{2}$
- E.  $2\pi\sqrt{2}$



54. The cross-sectional view of a tent is shown below. If the tent is 6 feet wide at its base, then which of the following expressions could be used to calculate the height of the tent, in feet?

- F.  $\frac{3}{\tan 80^\circ}$
- G.  $3 \tan 40^\circ$
- H.  $\frac{3}{\tan 40^\circ}$
- J.  $6 \tan 40^\circ$
- K.  $3 \tan 80^\circ$



GO ON TO THE NEXT PAGE.



55. Which of the following sets has the lowest standard deviation?

- A.  $\{-10, -5, 0, 5, 10\}$
- B.  $\{100, 200, 300, 400, 500\}$
- C.  $\{2, 4, 6, 8, 10\}$
- D.  $\{100, 100, 101, 102, 102\}$
- E.  $\{1, 2, 3, 4, 5\}$

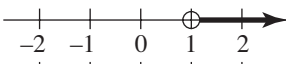
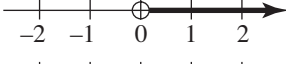
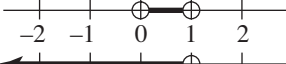


**DO YOUR FIGURING HERE.**

56. For all integer values of  $a$  and  $b$  such that  $a > 0$  and  $b < 0$ , which of the following must also be an integer?

- F.  $3^{a+b}$
- G.  $3^{a-b}$
- H.  $3^{ab}$
- J.  $3^{-a}$
- K.  $3^{\frac{a}{b}}$

57. If  $x$  and  $y$  are real numbers and  $0 < x < y < \frac{y}{x}$ , which of the

following gives the set of all values which  $\frac{y}{x}$  could have?

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

**GO ON TO THE NEXT PAGE.**



58. A circular running track is being built in a fenced-in athletic field 100 feet wide and 150 feet long. If a border of 10 feet is needed between the outside edge of the track and the fence, what is the radius of the largest track that can be built?

F. 40  
G. 45  
H. 65  
J. 90  
K. 110

**DO YOUR FIGURING HERE.**

59. If a sphere is cut by two different planes, dividing it into sections, how many sections is it possible to end up with?

A. 2 only  
B. 2 or 4 only  
C. 3 only  
D. 3 or 4 only  
E. 2, 3, or 4 only

60. For all real values of  $a$  and  $b$ , the equation  $|a - b| = 5$  can be interpreted as “the positive difference of  $a$  and  $b$  is 5.” What is the positive difference between the 2 solutions for  $a$ ?

F.  $b$   
G.  $b + 5$   
H.  $2b$   
J.  $\sqrt{b^2 - 25}$   
K. 10

**END OF TEST 2**  
**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**  
**DO NOT RETURN TO A PREVIOUS TEST.**

## READING TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is accompanied 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

**LITERARY NARRATIVE:** Passage A is adapted from the essay “What Baseball Taught Us” by Richard Brown (©2007 by Richard Brown). Passage B is adapted from the essay “The Major Leagues” by Jack Bryant (©1998 by Jack Bryant).

## Passage A by Richard Brown

April 15, 1947: I happen to be home sick from school, and my grandfather is delighted to have someone to share his anticipation with. He’s been pacing the house all morning, occasionally sitting down but quickly hopping back up, adjusting the TV antennas, cleaning his glasses, flicking an imaginary piece of lint off the television screen. Amidst my mother’s protestations, I am brought out of my stuffy, dark bedroom where I have been confined to fight my fever and propped up on the sofa with four quilts over me, at least three more than I really need. Fever or no, my grandfather wants me to witness history.

Jackie Robinson is making his major league debut for the Brooklyn Dodgers, the first African-American player in the Major League Baseball. I’m not sure what’s more stifling, the quilts, or my grandfather’s tense excitement that has us all on edge. I’m proud that Robinson is playing—there’s been a long build-up to this day, and he has taken people’s prejudice and abuse like a gentleman, never losing his cool. I know he’ll do the same today. I wonder, through my fever and quilts, just what my grandfather thinks will happen.

We were not Dodgers fans before Jackie Robinson. Our team was the Memphis Red Sox, in the Negro League. But now we are watching the small, jerky figures take the field hundreds of miles away in Brooklyn. At first base, number 42, is a black man. My grandfather has finally settled down, staring at the television in disbelief. My mother has tears in her eyes. The Braves are at bat, and Robinson gets the first man out, on a ground ball thrown from third. The crowd cheers. In the bottom of the first inning, he grounds out. I let out a loud groan. My grandfather turns to look at me, his eyes ablaze. He quietly tells my mother to take me back to bed.

Later, I try to apologize to my grandfather, and I blame my outburst on the fever. It’s partly true—I needed to break the tension, which I probably felt more keenly because of my illness, but he doesn’t buy it. *He needs our support, son. Take a cue from the way he’s stood up to his critics, and stand up for him. What matters is how he plays the whole game, not an occasional out.* I realize then that I had been nervous, too. I had expected the impossible—I had wanted him to bat a thousand.

## Passage B by Jack Bryant

Opening Day, 1947—some friends and I cut school and instead made our way to Ebbets Field to see Jackie Robinson make his major league debut. We hadn’t expected to get in; everyone thought the game would be sold out, with crowds overflowing into the streets near the stadium. We just wanted to be part of that crowd. We had been saving up money, just in case, and it paid off. The game was not sold out, and we got in. I hadn’t been to a major league game before, and inside the stadium I felt I was in some utopian society that existed without segregation and racism. The crowd, which was more than half black, cheered as Jackie made the first out of the game at first base. Though he didn’t get a hit in the game, he scored a run after drawing a walk, and got eleven put-outs at first base.

My friends and I were flying high as we left the stadium. If a black man was now playing for the Brooklyn Dodgers, we felt there was nothing we couldn’t do. Later that same season, Larry Doby signed with the Cleveland Indians to become the first African American player in the American league. Change, we thought, was rapidly coming. To a certain extent that was true, but racism and injustice also persisted. Other teams treated Jackie badly, calling him names, threatening to strike if he played, and handling him roughly. When the Dodgers were on the road, he often was not allowed to stay at the hotels where the rest of the team stayed. These injustices weren’t new, but somehow I had thought they would go away when he took the field, that when Branch Rickey had offered him a contract, he was extending an olive branch to all African Americans on behalf of white Americans.

GO ON TO THE NEXT PAGE.



Twenty-one years later, I remembered that day as I grieved the death of Dr. Martin Luther King, Jr., a victim of the struggle for racial equality that was ongoing. I had been so young, and so hopeful, and so hopelessly naïve. At times it felt like nothing had been accomplished in those 21 years. But that isn't entirely true. In baseball, getting a hit three out of every ten at bats is considered a good record. While I wish the struggle for equality were more like golf, in which the professionals hit the ball every time, we have come a long way since that day in 1947. But the season is 162 games long, and we are only part way through it.

Questions 1–3 ask about Passage A.

- The last paragraph of Passage A (lines 31–38) marks a shift in the passage from:
  - the time when baseball was segregated to after African Americans started playing in the major leagues.
  - the narrator seeing things through a fever-induced delirium to his understanding of how he had misinterpreted events.
  - a description of the experience of a historical moment to a lesson learned from that moment.
  - the narrator's grandfather's happy anticipation of an event to his anger at how the event unfolded.
- In Passage A, the narrator's descriptions of Jackie Robinson suggest that he sees him as ultimately:
  - a gentleman and a hero.
  - capable of doing the impossible.
  - a disappointing player.
  - overly excited and tense.
- The narrator of Passage A most nearly suggests that his grandfather is annoyed with him for groaning because:
  - his grandfather believes the narrator shouldn't have criticized Robinson.
  - his grandfather was disappointed that Robinson grounded out but didn't want to say so.
  - the noise disturbed his grandfather's concentration on the game.
  - the narrator was too sick to be out of bed and watching baseball.

Questions 4–7 ask about Passage B.

- The narrator's statement "inside the stadium I felt I was in some utopian society that existed without segregation and racism" (lines 46–48) is most nearly meant to:
  - describe the way people interact with each other inside a baseball stadium.
  - express the narrator's feelings of the momentousness of the occasion.
  - illustrate the way that Jackie Robinson changed society by playing in the major leagues.
  - foreshadow the way the narrator would feel 21 years later.
- Passage B indicates that compared to the narrator's expectation about how Jackie Robinson's appearance in Major League Baseball would affect segregation, its actual effect was:
  - different; the narrator had thought the crowd at the game would be bigger than it was.
  - different; the narrator had thought segregation would quickly disappear.
  - similar; the narrator had thought Robinson was a good choice for the Dodgers.
  - similar; the narrator had thought racism and injustice would last for a long time.
- Based on the passage, the information about Dr. Martin Luther King, Jr. provided in lines 67–69 is most likely included to:
  - show that not all of the narrator's role models were baseball players.
  - provide historical context for the importance of Jackie Robinson's role in baseball.
  - illustrate how little progress the narrator felt had been made in the struggle for racial equality.
  - convey the idea that Jackie Robinson's influence was felt far beyond the world of sports.
- The narrator of Passage B makes a comparison between:
  - the struggle for racial equality and the baseball season.
  - professional golf and major league baseball.
  - tense excitement and bed covers.
  - striking out in baseball and experiencing injustice.

**GO ON TO THE NEXT PAGE.**

Questions 8–10 ask about both passages.

8. Which of the following statements provides the most accurate comparison of the tone of each passage?
- F. Passage A is hopeful and cheery, while Passage B is dreary and pessimistic.
  - G. Passage A is objectively factual, while Passage B is descriptive and detailed.
  - H. Both passages maintain a sense of disappointment throughout.
  - J. Both passages begin with a sense of optimism and end with a sense that expectations had been too high.
9. Compared to the narrator of Passage A, the narrator of Passage B provides more information about:
- A. the play-by-play analysis of Jackie Robinson's first major league game.
  - B. the long-term effects of Jackie Robinson's appearance in the major leagues.
  - C. Jackie Robinson's baseball career before signing with the Dodgers.
  - D. the role of Negro League baseball in the early 20th century.
10. It can reasonably be inferred that after seeing Jackie Robinson play, compared to the narrator of Passage B, the narrator of Passage A felt:
- F. less optimistic about how race relations would change.
  - G. less interested in continuing to follow the Dodgers.
  - H. more disappointed that he hadn't played better.
  - J. more excited about the future for African-American baseball players.

**GO ON TO THE NEXT PAGE.**

## Passage II

**SOCIAL SCIENCE:** This passage is adapted from T. H. Watkins' *The Great Depression* (©1993, Little, Brown and Co.; Blackside Inc.).

One of the most durable and well regarded of all the New Deal's programs came from President Roosevelt himself, who had his own share of inventiveness. If the president cared about the fate of people, he also cared about the fate of trees, having practiced the art of silviculture on his Hyde Park estate with such enthusiasm that on various official forms he was fond of listing his occupation as "tree farmer." It was in early March, 1933, that he proceeded to bring the two concerns together—enlisting young unemployed men in a kind of volunteer "army" to be put to work in the national forests, national parks, and on other federal public lands. When he went to Congress for authorization of the program, he called the new agency the Civilian Corps Reforestation Youth Rehabilitation Movement, but before sinking under the weight of an acronym like CCRYRM, it was soon changed to the Civilian Conservation Corps (known forever after as the CCC). Congress chose not to handle the details itself. It simply authorized the president to create the program and structure it as he saw fit by executive order; it was to last two years. Responsibility was divided up among the Labor Department, which was to screen and select the enrollees, the War Department, which would house and feed them in their nonworking hours, and the Departments of Agriculture and Interior, which would design and supervise projects in regional and national forests, national parks, and other public lands. The men would be paid \$30 a month, anywhere from \$23 to \$25 of it to be sent to their families.

The CCC officially began on April 5, 1933, calling for an enrollment of 250,000 to be housed in 1,468 camps around the country. The cost for the first year was estimated at \$500 million. The men had to be US citizens between the ages of seventeen and twenty-seven (later, twenty-four), out of school, out of work, capable of physical labor, over 60 inches but under 78 inches in height, more than 107 pounds in weight, and had to possess no fewer than "three serviceable natural masticating teeth above and below." They would serve terms of no more than nine months so that as many as possible could be accommodated over the course of time.

Among the earliest enrollees were some veterans who had returned to Washington, setting up camp and demanding payment of their bonuses for service during the war. While making it clear that he opposed the payments on economic grounds, FDR provided tents, showers, mess halls, and latrines, and, waiving the age restriction for them, invited the members of this new Bonus Army to join his new agency. What was more, Eleanor Roosevelt dropped by one rainy day for a visit, slogging through ankle-deep mud to meet and talk with the men. "Hoover sent the army," said one veteran of the previous summer's BEF disaster, "Roosevelt sent his wife." When it became clear that no bonus would be forthcoming, about twenty-five hundred of the men took Roosevelt up on his offer and joined the CCC.

In the summer of 1934, Roosevelt expanded the size of the CCC to 350,000 and would raise it to 500,000 in 1935. Congress continued to reauthorize it faithfully over the next seven years, and by the time it was closed out in 1942, the CCC had put more than three million young "soil soldiers" to work. In the national forests alone they built 3,470 fire towers, installed 65,100 miles of telephone lines, scraped and graded thousands of fire breaks, roads, and trails, and built 97,000 miles of truck trails and roads, spent 4.1 million man-hours fighting fires, and cut down and hauled out millions of diseased trees and planted more than 1.3 billion young trees in the first major reforestation campaign in the country's history. For the National Park Service, they built roads, campgrounds, bridges, and recreation and administration facilities; for the Biological Survey (a predecessor of today's Fish and Wildlife Service), they conducted wildlife surveys and improved wildlife refuge lands; and for the Army Corps of Engineers, they built flood control projects in West Virginia, Vermont, and New York State.

In return, the CCC, at its best, took at least some young men out of the urban tangle of hopelessness where so many resided, introduced them to the intricacies and healing joy of the outdoors, and clothed and fed them better than many had been for years. Moreover, the program taught more than a hundred thousand to read and write, passed out twenty-five thousand eighth-grade diplomas and five thousand high-school diplomas, gave structure and discipline to lives that had experienced little of either, strengthened bodies and minds, and for many provided a dose of self-esteem they had never known.

**GO ON TO THE NEXT PAGE.**

11. The main idea of the passage is that:
- A. the CCC forced unemployed young men to work in the national forests, national parks, and on other federal public lands for no payment or bonus.
  - B. it was only after President Roosevelt created the CCC that veterans had suitable employment during the Great Depression.
  - C. research into the history of the New Deal shows that the idea for the CCC came from Congress.
  - D. among the programs of the New Deal, the CCC employed young men to build public works projects on public lands in return for modest wages, food, clothing, and some education.
12. The main idea of the third paragraph (lines 37–49) is that:
- F. President Hoover had dispatched the army to meet with disgruntled veterans, but President Roosevelt sent his wife, Eleanor, to meet with the Bonus Army.
  - G. when they realized President Roosevelt would not pay the bonus, many veterans abandoned the Bonus Army and accepted his invitation to join the CCC.
  - H. President Roosevelt supplied shelter and food to the veterans before paying the bonus the veterans demanded.
  - J. many of the veterans were above the age requirement of the CCC.
13. As it is used in line 7 to describe President Roosevelt, the term *tree farmer* most nearly means that Roosevelt:
- A. had supported his family by growing trees before he entered politics.
  - B. believed in an agrarian economy over urban industrialization.
  - C. continued his successful business selling trees while in office.
  - D. had a great interest in trees and knew a good deal about them.
14. According to the passage, which of the following was a project the CCC performed for the National Park Service?
- F. Building fire towers
  - G. Building campground facilities
  - H. Installing telephone lines
  - J. Conducting wildlife surveys
15. According to the passage, which of the following statements is true about the CCC?
- A. The agency provided enrollees with academic instruction.
  - B. The agency provided enrollees with urban job training.
  - C. The agency accepted only men with six teeth.
  - D. The agency offered courses in nutrition and self-esteem.
16. Information in the fourth paragraph (lines 50–67) makes it clear that the CCC:
- F. was voluntary and therefore did not pay members anything.
  - G. ran for more years and employed more men than was originally intended.
  - H. employed 4.1 million men.
  - J. battled fires in West Virginia, Vermont, and New York.
17. The passage most strongly suggests that before the 1930s, the national forests:
- A. received no federal support or aid for projects to clear diseased trees.
  - B. included land reserved for wildlife refuges.
  - C. had never undergone a major reforestation campaign.
  - D. experienced more floods than forest fires.
18. According to the passage, when did the CCC change its name?
- F. After President Roosevelt received authorization from Congress
  - G. After Congress protested that CCRYRM was too difficult to say
  - H. In the same year the size expanded to 500,000 men
  - J. After the Bonus Army disbanded
19. The passage states that the same year the CCC was authorized enrollees had to be:
- A. over 78 inches in height.
  - B. in school.
  - C. between the ages of seventeen and twenty-seven.
  - D. between the ages of seventeen and twenty-four.
20. According to the passage, CCC programs in national parks and forests were:
- F. conducted far from where the members were fed and housed.
  - G. under the control of the Departments of Agriculture and the Interior.
  - H. supervised by the Labor Department.
  - J. minimum-wage jobs.

**GO ON TO THE NEXT PAGE.**

## Passage III

**HUMANITIES:** This passage is adapted from John Gattuso, ed., *Native America* (©1993, Houghton Mifflin Co.).

Northwest natives are carvers by tradition, but it was the natives of the far north, in what is now British Columbia and Alaska, who first carved totem poles. The history of these fascinating works is surprisingly brief, for it wasn't until the mid-18th century, when European explorers first encountered these remote tribes, that the unique sculptures began to appear. Although the natives were already expert carvers of canoes, tools, longhouses, and furniture, they lacked the iron tools necessary to fell a massive tree in one piece and carve its entire length.

With the iron axes they got in trade for their baskets, boxes, and pelts, the coastal tribes of the far north could take advantage of the trees that grew so tall and straight in their wet climate. Initially, the poles were made to stand against the front of a house, with figures facing out and a door cut through the base, so all would enter the house through the pole. In this case, the totem pole functioned as a family crest, recounting genealogies, stories, or legends that in some way identified the owner. Towards the end of the 19th century, the poles stood free on the beach or in the village outside the carvers' homes. Some villages were virtual forests of dozens, sometimes hundreds, of poles.

The family that carved the pole gave a potlatch with feasting, games, and much gift-giving. The guests, in return, raised the pole. These gatherings were costly and required a great deal of preparation and participation. The custom frustrated whites trying to "civilize" the Indians, especially missionaries who solved the problem by knocking the poles down. Employers, too, complained that their Indian workers were unreliable when a pole was being carved or a potlatch planned. Eventually, both the Canadian and United States governments banned potlatches, and pole carving nearly died out. The ban was lifted in the 1950s.

The Tlingit, on the southeastern coast of Alaska, and the Haidas and Tsimshian of western Canada are known for their pole carving. On a tour in 1899, a group of Seattle businessmen visited the Tlingit village of Tongas and, finding no one there, took one of the poles. They erected it in Seattle where, at a towering 50 ft., it became one of the city's most distinctive monuments. In 1938, Tlingit carvers copied the pole after the original was destroyed by fire, and it remains in Pioneer Square today.

Poles serve the important purpose of recording the lore of a clan, much as a book would. The top figure on the pole identifies the owner's clan, and succeeding characters (read from top to bottom) tell their stories. Raven, the trickster, might tell the story of how he fooled the Creator into giving him the sun, or Frog might tell how he wooed a human woman. With slight variations between villages, everyone knew these stories, and potlatch guests dramatized them at the pole-raising with masks, drumming, and songs. And so the legends were preserved from one generation to the next.

There is a story behind almost every image on the pole. For example, if an animal had the power to transform itself into other beings, the carver would portray it in all its forms. If Raven were sometimes bird, sometimes human, he would be carved with both wings and limbs, or have a human face with a raven's beak. Other images are used to describe the spirits' special abilities. Eyes are frequently used to suggest acuteness or skill. So, for example, if an eye appears in an animal's ear, it might indicate that that animal has a sharp sense of hearing. And human figures in unexpected places, like an ear or nose, might mean that the animal has great powers.

Learning to read totem poles is like learning to read a language. They speak of history, mythology, social structure, and spirituality. They serve many purposes and continue to be carved by the descendants of the original carvers.

Today, Haida, Tlingit, Tsimshian, Kwakiutl and other native craftsmen carve, predominantly for the tourist trade, small "souvenir" totem poles in wood and black slate (or argillite). They also carve extraordinarily beautiful masks, effigies, boxes, house posts, and fixtures....

21. Which of the following statements best expresses the main idea of the passage?
- A. Many Native American tribes created totem poles with meaningful symbols, but these poles were less important than the canoes carved before the mid-18th century.
  - B. Although the Tlingit village was deserted, the Seattle businessmen who took the totem pole were not right to take it without permission.
  - C. The history of totem pole carving dates back to only the mid-18th century, but these poles have played an important role in Native American culture since that time.
  - D. The ban issued by the Canadian and United States governments against potlatches was lifted in the 1950s, but interest in totem-pole carving had diminished by that time.
22. Which of the following questions is NOT answered in the passage?
- F. In terms of geographical region, which were the first groups to carve totem poles?
  - G. What is the tallest totem pole in North America?
  - H. What is the predominant use of the small totem poles carved today?
  - J. What prevented Native American tribes from carving totem poles before the 18th century?

**GO ON TO THE NEXT PAGE.**

23. The passage suggests that one of the main purposes of totem poles is the way in which they:
- A. demonstrate the artistic skill of the carvers.
  - B. function as landmarks in major North American cities.
  - C. document the history and mythology of various clans.
  - D. complement the festivities of the potlatch.
24. The main function of the sixth paragraph (lines 49–59) is to:
- F. identify the origins of the stories behind every image on a totem pole.
  - G. describe and explain some of the images that might appear on a totem pole.
  - H. contrast the images on the totem poles of the Northwest natives with those of British Columbia and Alaska.
  - J. explain the role of the Raven in Native American mythology.
25. All of the following are used in the passage as illustrations of the role totem poles play in Native American culture EXCEPT the:
- A. function of the top figure on the pole.
  - B. descriptions of the Raven and Frog as characters on the pole.
  - C. reference to the popularity of totem poles in the tourist industries of many tribes.
  - D. placement of the Tlingit totem pole in Seattle’s Pioneer Square.
26. The second paragraph (lines 10–20) establishes all of the following about the totem poles carved by the coastal tribes of the far north EXCEPT that they were:
- F. initially used as the entryways of houses.
  - G. fashioned from tall, straight trees.
  - H. used to identify the owners of the poles.
  - J. produced only by clans with family crests.
27. One of the main points of the fifth paragraph (lines 39–48) is that the various characters on a totem pole are meant to represent:
- A. the owner of the totem pole.
  - B. the lore of the owner’s clan.
  - C. Raven, the trickster, fooling the Creator.
  - D. Frog wooing a human woman.
28. According to the passage, which of the following places is home to the Tlingit?
- F. Seattle
  - G. Western Canada
  - H. Pioneer Square
  - J. Alaska
29. The author most likely includes the information in lines 60–63 to suggest that:
- A. totem poles are notable for reasons beyond physical beauty.
  - B. totem poles have replaced books for Native American tribes.
  - C. Native American tribes have no spoken or written language.
  - D. the descendants of the original carvers of totem poles carve copies of older poles.
30. Which of the following words best describes the attitude of the employers referred to in the third paragraph (lines 21–30) in reaction to potlatches?
- F. Patient
  - G. Accepting
  - H. Irritated
  - J. Civilized

**GO ON TO THE NEXT PAGE.**

## Passage IV

**NATURAL SCIENCE:** This passage is adapted from the article “The Pioneer Mission to Venus” by Janet G. Luhmann, James B. Pollack, and Lawrence Colin (©1994, Scientific American).

Venus is sometimes referred to as the Earth’s “twin” because it resembles the Earth in size and in distance from the sun. Over its 14 years of operation, the National Aeronautics and Space Administration’s *Pioneer Venus* mission revealed that the relation  
5 between the two worlds is more analogous to Dr. Jekyll and Mr. Hyde. The surface of Venus bakes under a dense carbon dioxide atmosphere, the overlying clouds consist of noxious sulfuric acid, and the planet’s lack of a magnetic field exposes the upper atmosphere to the continuous hail of charged particles from the  
10 sun. Our opportunity to explore the hostile Venusian environment came to an abrupt close in October 1992, when the *Pioneer Venus Orbiter* burned up like a meteor in the thick Venusian atmosphere. The craft’s demise marked the end of an era for the U.S. space  
15 program; in the present climate of fiscal austerity, there is no telling when humans will next get a good look at Earth’s nearest planetary neighbor.

The information gleaned by *Pioneer Venus* complements the well-publicized radar images recently sent back by the *Magellan* spacecraft. *Magellan* concentrated on studies of Venus’s surface  
20 geology and interior structure. *Pioneer Venus*, in comparison, gathered data on the composition and dynamics of the planet’s atmosphere and interplanetary surroundings. These findings illustrate how seemingly small differences in physical conditions have sent Venus and the Earth hurtling down very different evo-  
25 lutionary paths. Such knowledge will help scientists intelligently evaluate how human activity may be changing the environment on the Earth.

Well before the arrival of *Pioneer Venus*, astronomers had learned that Venus does not live up to its image as Earth’s near-  
30 twin. Whereas Earth maintains conditions ideal for liquid water and life, Venus’s surface temperature of 450 degrees Celsius is hotter than the melting point of lead. Atmospheric pressure at the ground is some 93 times that at sea level on Earth.

Even aside from the heat and the pressure, the air on Venus  
35 would be utterly unbreathable to humans. The Earth’s atmosphere is about 78 percent nitrogen and 21 percent oxygen. Venus’s much thicker atmosphere, in contrast, is composed almost entirely of carbon dioxide. Nitrogen, the next most abundant gas, makes up only about 3.5 percent of the gas molecules. Both planets  
40 possess about the same amount of gaseous nitrogen, but Venus’s atmosphere contains some 30,000 times as much carbon dioxide as does Earth’s. In fact, Earth does hold a quantity of carbon dioxide comparable to that in the Venusian atmosphere. On Earth, however, the carbon dioxide is locked away in carbonate  
45 rocks, not in gaseous form in the air. The crucial distinction is responsible for many of the drastic environmental differences that exist between the two planets.

The large *Pioneer Venus* atmospheric probe carried a mass spectrometer and gas chromatograph, devices that measured the  
50 exact composition of the atmosphere of Venus. One of the most stunning aspects of the Venusian atmosphere is that it is extremely dry. It possesses only a hundred thousandth as much water as Earth has in its oceans. If all of Venus’s water could somehow be condensed onto the surface, it would make a global puddle  
55 only a couple of centimeters deep.

Unlike Earth, Venus harbors little if any molecular oxygen in its lower atmosphere. The abundant oxygen in Earth’s atmosphere is a by-product of photosynthesis by plants; if not for the activity of living things, Earth’s atmosphere also would be  
60 oxygen poor. The atmosphere of Venus is far richer than Earth’s in sulfur-containing gases, primarily sulfur dioxide. On Earth, rain efficiently removes similar sulfur gases from the atmosphere.

*Pioneer Venus* revealed other ways in which Venus is more primordial than Earth. Venus’s atmosphere contains higher concentrations of inert, or noble, gases—especially neon and isotopes of argon—that have been present since the time the planets were  
65 born. This difference suggests that Venus has held on to a far greater fraction of its earliest atmosphere. Much of Earth’s primitive atmosphere may have been stripped away and lost into space  
70 when our world was struck by a Mars-size body. Many planetary scientists now think the moon formed out of the cloud of debris that resulted from such a gigantic impact.

31. With regard to the possibility of returning to the planet Venus, information presented in the passage makes it clear that the authors are:
- A. cheerful and optimistic.
  - B. sarcastic and contentious.
  - C. doubtful and pragmatic.
  - D. uncertain and withdrawn.
32. Which of the following statements most accurately summarizes how the passage characterizes the state of scientific knowledge about Venus before the *Pioneer* mission?
- F. The scientific community was hesitant to return to Venus after an earlier mission had ended in disaster.
  - G. Scientists saw Earth and Venus as near polar opposites in atmospheric conditions.
  - H. The common belief that Earth and Venus were “twins” had been eroding under the weight of scientific evidence.
  - J. Scientists knew little about the planet Venus because they were more interested in other planets.

**GO ON TO THE NEXT PAGE.**

33. Based on the passage, Earth may have retained less of its early atmosphere than Venus did due to:
- A. the impact that occurred when Earth was struck by Mars.
  - B. a cloud of debris that stripped the atmosphere away.
  - C. rain that removes sulfur gases from the atmosphere.
  - D. a collision between Earth and another massive object.
34. The main point of the second paragraph (lines 17–27) is to:
- F. account for the failure of the *Magellan* mission and to show the superiority of the *Pioneer* mission.
  - G. suggest that information from both the *Magellan* and *Pioneer* missions can bring the scientific community to a deeper understanding of Venus.
  - H. show that the *Magellan* had sent back information regarding physical characteristics while the *Pioneer* had not.
  - J. hypothesize that the findings of the *Pioneer* mission will help scientists to approach problems more intelligently.
35. The passage indicates that if humans were to attempt to live on the planet Venus, survival would not be possible because:
- A. of the mistaken belief that Venus and Earth are “twin” planets.
  - B. carbon dioxide is locked away in bicarbonate rocks, not in gaseous form.
  - C. the atmospheric pressure, heat, and air are not suitable for human life.
  - D. all of the water on Venus is condensed onto the surface.
36. According to the passage, some evidence gained before the *Pioneer Venus* mission suggesting that Earth and Venus are not near-twins stated that:
- F. Venus produces no lead on or underneath its surface.
  - G. Earth was found to be much farther from the sun than was previously thought.
  - H. the atmosphere of Venus contains 78 percent nitrogen and 21 percent oxygen.
  - J. the surface temperature of Venus is 450 degrees Celsius and thus unlivable for humans.
37. As it is used in line 56, the word *harbors* most nearly means:
- A. shelters.
  - B. hides.
  - C. holds.
  - D. cherishes.
38. According to the passage, “primordial” most nearly refers to planets that:
- F. are oxygen-poor due to a lack of activity by living things.
  - G. are not hospitable to humans because they have thick atmospheres and high surface temperatures.
  - H. have preserved many of the characteristics present when the planets were formed.
  - J. have been struck by large bodies which have altered the planets’ atmospheres.
39. It can reasonably be inferred that the “activity of living things” described in line 59 directly refers to organisms on Earth that:
- A. produce oxygen by their own natural processes and influence the contents of Earth’s atmosphere.
  - B. remove sulfur gases from the atmosphere during heavy rainfall.
  - C. lock away carbon dioxide in carbonate rocks and maintain a reserve of the gas.
  - D. could easily live in oppressive atmospheres similar to the atmosphere of Venus.
40. According to the passage, the *Pioneer Venus* mission to Venus involved investigating details relating to the planet’s:
- F. surface geology and interior structure.
  - G. atmosphere as it has been changed by the influence of photosynthesis.
  - H. similarities to the planet Earth.
  - J. atmospheric contents.

**END OF TEST 3**

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





## SCIENCE TEST

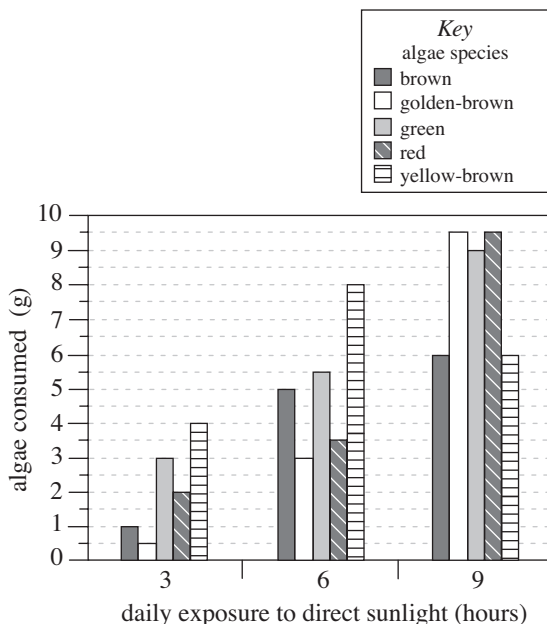
35 Minutes–40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is followed by several questions. After reading a passage, choose the correct 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

The sea snail *Littorina littorea* eats algae as one of its primary food sources. An experiment investigated whether the consumption of algae by *L. littorea* varies with the species of algae or the amount of sunlight exposure of the algae population. Isolated populations of 5 species of algae were introduced to glass tanks containing 1 liter of water and allowed to grow for 30 days. During this time, the populations were exposed to direct sunlight for either 3, 6, or 9 hours each day. The water was filtered out, and the resulting algae samples were allowed to dry completely. Then, 30 grams of each species of algae exposed to 3 hours of sunlight per day were placed in an empty fish tank, 30 grams of each species of algae exposed to 6 hours of sunlight per day were placed into a second tank, and 30 grams of each species of algae exposed to 9 hours of sunlight per day were placed into a third tank. Next, 3 *L. littorea* of similar size, age, and mass were added to each tank. After 2 weeks, the mass of algae consumed, in grams (g), was determined for each species of algae at each length of daily exposure to direct sunlight (see figure).



1. Of the following combinations of species of algae and length of daily direct sunlight exposure, which combination resulted in the greatest mass of algae consumed by *L. littorea* ?

algae species	daily sunlight exposure
A. green	6 hours
B. green	9 hours
C. yellow-brown	6 hours
D. yellow-brown	9 hours

2. Which of the following statements about the effect of sunlight exposure of the algae population on the consumption of algae by *L. littorea* is consistent with the figure? As amount of sunlight exposure increased from 3 hours through 9 hours, the mass of algae consumed by *L. littorea*:
- F. increased for all 5 species of algae.
  - G. decreased for all 5 species of algae.
  - H. initially increased for all 5 species of algae, but then decreased for at least 1 of the 5 species of algae.
  - J. initially decreased for all 5 species of algae, but then increased for at least 1 of the 5 species of algae.

**GO ON TO THE NEXT PAGE.**



3. Based on the passage, would *L. littorea* be classified as an autotroph or a heterotroph?
- A. Heterotroph, because *L. littorea* consumes another organism to obtain its energy.
  - B. Autotroph, because *L. littorea* consumes another organism to obtain its energy.
  - C. Heterotroph, because *L. littorea* produces its own energy from sunlight.
  - D. Autotroph, because *L. littorea* produces its own energy from sunlight.
4. Based on the passage, does the primary food source of *L. littorea* likely contain chlorophyll or hemoglobin?
- F. Hemoglobin; *L. littorea* consumes algae, and algae species use hemoglobin to undergo cellular respiration.
  - G. Hemoglobin; *L. littorea* consumes algae, and algae species use hemoglobin to undergo photosynthesis.
  - H. Chlorophyll; *L. littorea* consumes algae, and algae species use chlorophyll to undergo cellular respiration.
  - J. Chlorophyll; *L. littorea* consumes algae, and algae species use chlorophyll to undergo photosynthesis.
5. Which of the following statements comparing the consumption by *L. littorea* of yellow-brown algae exposed to 3 hours of sunlight per day, yellow-brown algae exposed to 6 hours of sunlight per day, and yellow-brown algae exposed to 9 hours of sunlight per day is supported by the figure?
- A. Less algae exposed to 3 hours of sunlight per day was consumed than algae exposed to 6 hours of sunlight per day, and less algae exposed to 6 hours of sunlight per day was consumed than algae exposed to 9 hours of sunlight per day.
  - B. Less algae exposed to 3 hours of sunlight per day was consumed than algae exposed to 6 hours of sunlight per day, and more algae exposed to 6 hours of sunlight per day was consumed than algae exposed to 9 hours of sunlight per day.
  - C. More algae exposed to 3 hours of sunlight per day was consumed than algae exposed to 6 hours of sunlight per day, and less algae exposed to 6 hours of sunlight per day was consumed than algae exposed to 9 hours of sunlight per day.
  - D. More algae exposed to 3 hours of sunlight per day was consumed than algae exposed to 6 hours of sunlight per day, and more algae exposed to 6 hours of sunlight per day was consumed than algae exposed to 9 hours of sunlight per day.
6. What mass, in *milligrams* (NOT grams), of the brown algae exposed to 6 hours of sunlight per day was consumed by *L. littorea* ?
- F. 5,000 mg
  - G. 6,500 mg
  - H. 50,000 mg
  - J. 65,000 mg

**GO ON TO THE NEXT PAGE.**

**Passage II**

The replication and infectivity of viruses is dependent on their environmental conditions. Viruses can be made harmless by varying these conditions, such as temperature and pH. Acidic solutions have been investigated as surface disinfectants and medications for viral diseases.

Researchers investigated the *acid-mediated inactivation* (the process of being made non-infective through exposure to low pH) of two types of HSV virus, HSV-1 and HSV-2.

*Experiment 1*

The researchers prepared eight petri dishes of a cell culture at a temperature of 25°C and added 10 μL of a solution containing active HSV-1 virions by pipette. The *virion* is the form of HSV-1 that can persist outside of the host body and infect cells. Then, 200 μL of four different buffer solutions, each at a specific pH, was added to each of the petri dishes. After the addition of the buffer solution, 2 of the petri dishes had a pH of 3.5, 2 had a pH of 4, 2 had a pH of 4.5, and 2 had a pH of 5.

For each pH, one of the petri dishes was left to stand for 1 day and one was left to stand for 1 hour. At the end of the assigned time period, each of the virus samples was added to a fresh cell culture and tested for its *relative infectivity* (the number of cells infected by the sampled virus divided by the number of cells infected by an HSV-1 virus that has not been exposed to acid). The results are shown in Table 1.

Virus type	pH	Relative infectivity	
		1 hour	1 day
HSV-1	3.5	0.00	0.00
	4.0	0.45	0.33
	4.5	0.82	0.81
	5.0	0.97	0.94

*Experiment 2*

The researchers repeated the procedure of Experiment 1 with a related type of virus, HSV-2, instead of HSV-1. The results are shown in Table 2.

Virus type	pH	Relative infectivity	
		1 hour	1 day
HSV-2	3.5	0.00	0.00
	4.0	0.18	0.07
	4.5	0.64	0.42
	5.0	0.88	0.88

7. Which of the following statements describes a difference between Experiments 1 and 2?
- A. A different type of HSV virus was tested in Experiment 1 than in Experiment 2.
  - B. A different value of pH was used in Experiment 1 than in Experiment 2.
  - C. Viruses in Experiment 1 were inactivated with an acid, while viruses in Experiment 2 were inactivated with a base.
  - D. Viruses in Experiment 1 were left to stand for 1 hour before being added to a fresh culture, while viruses in Experiment 2 were left to stand for 1 day before being added to a fresh culture.
8. Suppose the researchers had determined the relative infectivity of a virus sample exposed to a pH of 4.3 for 1 hour in Experiment 2. The relative infectivity of the HSV-2 virions in the sample would most likely have been:
- F. 0.00.
  - G. between 0.00 and 0.18.
  - H. between 0.18 and 0.64.
  - J. between 0.64 and 0.88.

**GO ON TO THE NEXT PAGE.**



9. At which 2 pH values was the relative infectivity of HSV-2 virions less for the longer exposure time than for the shorter exposure time?
- 3.5 and 4.0
  - 3.5 and 4.5
  - 4.0 and 4.5
  - 4.5 and 5.0
10. Which of the following questions was NOT addressed by either experiment?
- Does pH affect the relative infectivity of HSV-1 and HSV-2 virions after acid-mediated inactivation?
  - Does time of exposure to acid affect the relative infectivity of HSV-1 and HSV-2 virions after acid-mediated inactivation?
  - Do HSV-1 virions have a greater relative infectivity than HSV-2 virions after acid-mediated inactivation?
  - Does the concentration of HSV-1 and HSV-2 virions in solution affect their relative infectivity after acid-mediated inactivation?
11. After one day of exposure to an acidic solution, which of the 4 samples of HSV-2 virions would have been the LEAST likely to infect chicken egg cells in a cell culture after being added to a petri dish containing the cell culture by pipette?
- The sample exposed to a pH of 3.5
  - The sample exposed to a pH of 4.0
  - The sample exposed to a pH of 4.5
  - The sample exposed to a pH of 5.0
12. Suppose that a researcher wants to weaken a sample of HSV-1 virions without completely inactivating them. Based on the results of Experiment 1, which of the following combinations of pH and exposure time would most likely ensure the lowest relative infectivity of the virions?
- pH 4.0 and 1 hour
  - pH 4.0 and 1 day
  - pH 4.5 and 1 hour
  - pH 4.5 and 1 day
13. Consider the rating system in the table below for the relative infectivity of virions after acid-mediated inactivation.

Rating	Relative infectivity
Fully active	$> 0.8$
Attenuated	$\geq 0.2$ and $\leq 0.8$
Inactivated	$< 0.2$

Based on this table, what is the total number of petri dishes in Experiment 1 that contained inactivated virus samples?

- 2
- 3
- 4
- 5

**GO ON TO THE NEXT PAGE.**

**Passage III**

When an object is hung vertically from the end of a spring, the spring stretches to a point of equilibrium where the upward *spring force* is exactly equal to the downward gravitational force. When a spring is stretched beyond the point of equilibrium, the upward force is greater than the downward force, and the spring bounces back to the equilibrium point.

A group of scientists conducted 2 experiments on spring forces using 3 springs of equal length, diameter, and number of coils made of different combinations of metals—steel, Alloy X, and Alloy Y—having spring constants of 2.5 N/m, 3.0 N/m, and 3.5 N/m, respectively.

*Experiment 1*

The scientists attached a mass onto the end of the spring made of steel and determined the distance the spring stretched from its initial position to reach the point of equilibrium. They then repeated this procedure with identical masses for springs made of Alloy X and Alloy Y (see Figure 1).

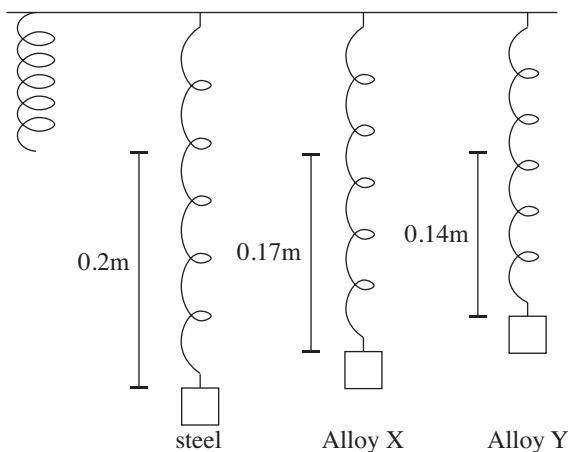


Figure 1

*Experiment 2*

The scientists positioned a cubic mass—either Mass 1, Mass 2, or Mass 3—on top of each spring and allowed the spring to compress to equilibrium. They measured the distance the spring compressed and recorded it as displacement,  $D$ . They then removed the mass and allowed the spring to return to its neutral position (see Figure 2).

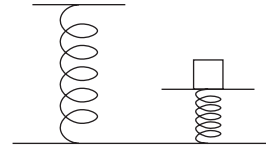


Figure 2

The scientists calculated the spring force exerted by each spring as  $D$  multiplied by the spring constant for that spring. They repeated this procedure to test all 3 masses on all 3 springs. Table 1 lists each mass's length, and  $D$ , in meters (m), as well as the spring force, in N, exerted by each spring.

Mass	Length (cm)	$D$ (m)	Spring Force (N)		
			steel	Alloy X	Alloy Y
1	5.0	0.15	0.38	0.45	0.53
2	10.0	0.15	0.38	0.45	0.53
3	10.0	0.25	0.63	0.75	0.88

14. Based on the results of Experiment 2, as the spring constant of the spring on which Mass 2 was placed decreases, the spring force on Mass 2:

F. decreases only.  
 G. increases only.  
 H. increases and then decreases.  
 J. varied with no general trend.

**GO ON TO THE NEXT PAGE.**



15. In Experiment 1, did the spring made of Alloy X or the spring made of Alloy Y experience more strain on its coils?
- A. Alloy X, because the distance the spring stretched was greater for Alloy X than for Alloy Y.
  - B. Alloy X, because the distance the spring stretched was greater for Alloy Y than for Alloy X.
  - C. Alloy Y, because the distance the spring stretched was greater for Alloy X than for Alloy Y.
  - D. Alloy Y, because the distance the spring stretched was greater for Alloy Y than for Alloy X.
16. Suppose the scientists decide to study whether a mass's shape determines the distance the spring of a certain composition stretches. Which of the following procedural changes should the scientists make to Experiment 1? The scientists should test:
- F. a single mass with multiple springs; the springs should each have the same spring constant.
  - G. multiple masses with a single spring; the masses should have different shapes but the same mass.
  - H. a single mass with multiple springs; the springs should have different spring constants.
  - J. multiple masses with a single spring; the masses should have different masses but the same shape.
17. Based on the results of Experiment 2, for Mass 3, what was the difference between the spring force exerted by the spring made of Alloy X and the spring force exerted by the spring made of Alloy Y?
- A. 0.08 N
  - B. 0.13 N
  - C. 0.25 N
  - D. 0.35 N
18. Suppose that in Experiment 1 the scientists had attached the mass onto the end of a spring with a spring constant of 2.0 N/m. The distance of the stretch would most likely have been:
- F. less than 0.14 m.
  - G. between 0.14 m and 0.17 m.
  - H. between 0.17 m and 0.20 m.
  - J. greater than 0.20 m.
19. Suppose that in Experiment 2 the scientists had tested a mass having the same length as Mass 1 but a smaller displacement than Mass 1. Which of the following statements about the spring force on this mass would be correct? The spring force on this mass from a spring made of:
- A. steel would have been less than 0.38 N.
  - B. Alloy X would have been greater than 0.45 N.
  - C. Alloy Y would have been greater than 0.53 N.
  - D. steel would have been greater than the spring force on this mass from a spring made of Alloy X.
20. Assume that an exercise machine contains two spring hangers to hold counterweights. The first spring on the machine has a spring constant of 15.2 N/m, and the second spring on the machine has a spring constant of 13.1 N/m. Based on the results of Experiment 1, which spring hanger would most likely have the greater distance stretched when a 25 kg mass is hung from it?
- F. The first spring, because the results of Experiment 1 indicate that distance stretched increases as spring constant increases.
  - G. The second spring, because the results of Experiment 1 indicate that distance stretched increases as spring constant increases.
  - H. The first spring, because the results of Experiment 1 indicate that distance stretched increases as spring constant decreases.
  - J. The second spring, because the results of Experiment 1 indicate that distance stretched increases as spring constant decreases.

**GO ON TO THE NEXT PAGE.**

## Passage IV

Chemical compounds that are *hydrophilic* can dissolve in water. When a hydrophilic liquid is mixed with water, the freezing point of the mixture is different from that of each component.

Ethylene glycol is a hydrophilic liquid that is used in antifreeze. To determine the effectiveness of different formulations of antifreeze, a product scientist mixed ethylene glycol and water in different proportions and studied the freezing points of the mixtures.

## Experiment

For each of 7 batches numbered 1–7, the scientist followed the procedure in Steps 1–5:

- Known volumes of distilled water, pure ethylene glycol, or both, were combined in a glass flask at 70°F until the total volume of the liquid in the flask equaled 200 mL.
- The top of the flask was sealed with a cork through which a thermometer was inserted until the thermometer bulb came into contact with the liquid in the flask.
- The flask was placed into a cold bath containing dry ice and acetone.
- When solid appeared in the flask and the temperature stopped changing, the thermometer reading, in degrees Fahrenheit, was recorded as the freezing point (*fp*) of the liquid.
- The *freezing point depression* ( $\Delta fp$ ) was determined using the following formula:

$$\Delta fp = fp - 32$$

The results for each batch are shown in Table 1.

Batch number	Water added (% by volume)	Ethylene glycol added (% by volume)	<i>fp</i> (°F)	$\Delta fp$ (°F)
1	100	0	32	0
2	80	20	19.4	-12.6
3	60	40	-14.8	-46.8
4	50	50	-36.4	-68.4
5	35	65	-61.6	-93.6
6	25	75	-56.2	-88.2
7	0	100	8.6	-23.4

The scientist made a graph of  $\Delta fp$  versus percent by volume of ethylene glycol for each batch and connected the data points with a trendline (see Figure 1).

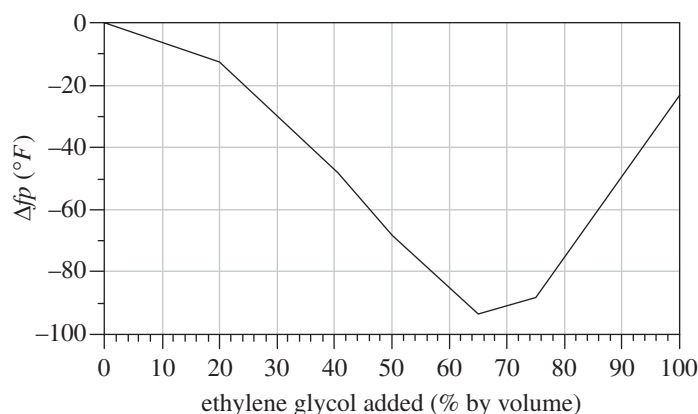


Figure 1

The scientist then identified which batch had the most negative value of  $\Delta fp$ . This batch was identified as the *eutectic mixture*.

- If a batch had been mixed with 55% water by volume and 45% ethylene glycol by volume, *fp* would most likely have been:
  - less than  $-36.4^{\circ}\text{F}$ .
  - between  $-36.4^{\circ}\text{F}$  and  $-14.8^{\circ}\text{F}$ .
  - between  $-14.8^{\circ}\text{F}$  and  $19.4^{\circ}\text{F}$ .
  - greater than  $19.4^{\circ}\text{F}$ .
- Before the experiment, the scientist predicted that *fp* for Batch 7 would be greater than the *fp* for Batch 2. Do the results shown in Table 1 support this prediction?
  - Yes; *fp* for Batch 7 was  $8.6^{\circ}\text{F}$  greater than *fp* for Batch 2.
  - Yes; *fp* for Batch 7 was  $10.8^{\circ}\text{F}$  greater than *fp* for Batch 2.
  - No; *fp* for Batch 7 was  $8.6^{\circ}\text{F}$  less than *fp* for Batch 2.
  - No; *fp* for Batch 7 was  $10.8^{\circ}\text{F}$  less than *fp* for Batch 2.

**GO ON TO THE NEXT PAGE.**



23. For each batch, the *difference* between  $fp$  and  $\Delta fp$  was:
- A. 16.0°F.
  - B. 32.0°F.
  - C. 48.0°F.
  - D. 64.0°F.
24. Consider the batch for which the volume of ethylene glycol was 3 times as great as the volume of water. For this batch,  $fp$  was:
- F. -61.6°F.
  - G. -56.2°F.
  - H. 8.6°F.
  - J. 19.4°F.
25. Suppose a batch had been prepared with 65% water by volume and 35% ethylene glycol by volume. Based on Figure 1,  $\Delta fp$  for this new batch would most likely have been closest to which of the following?
- A. -80°F
  - B. -60°F
  - C. -40°F
  - D. -20°F
26. Which of the following statements best explains why  $\Delta fp$  was 0°F for Batch 1 ? The volume added was 0 mL for one of the components of the:
- F. mixture in the flask, ethylene glycol, so the freezing point was not depressed.
  - G. mixture in the flask, water, so the freezing point was not depressed.
  - H. cold bath, ethylene glycol, so the freezing point was not depressed.
  - J. cold bath, water, so the freezing point was not depressed.
27. Suppose the compound added to the water had been *hydrophobic*. As the hydrophobic compound was added to the water, would the freezing point of the water most likely have decreased or stayed the same?
- A. Decreased, because the compound would have dissolved in water.
  - B. Decreased, because the compound would not have been able to mix with water.
  - C. Stayed the same, because the compound would have dissolved in water.
  - D. Stayed the same, because the compound would not have been able to mix with water.

**GO ON TO THE NEXT PAGE.**



### Passage V

The Earth's oceans contain a mixture of dissolved salts. The *salinity* (concentration of total dissolved salts) of seawater varies by location and affects its physical properties. Figure 1 shows how salt concentration (in percent by mass) affects density, in  $\text{g/cm}^3$ , at  $20^\circ\text{C}$  for seawater and 3 aqueous solutions of pure salts (NaCl, LiCl, and  $\text{NH}_4\text{Cl}$ ).

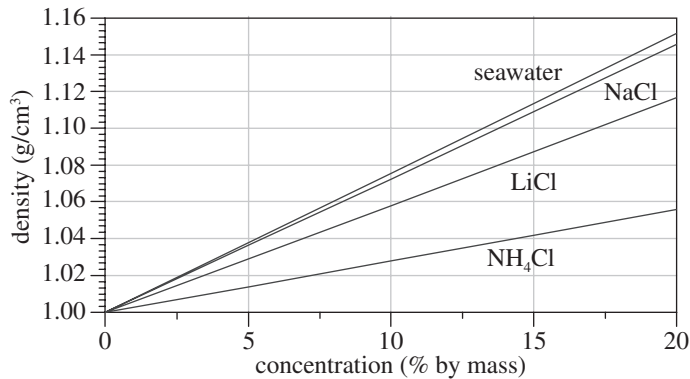


Figure 1

Figure 2 shows how the density of seawater at  $0^\circ\text{C}$  varies with ocean depth at 3 different concentrations of dissolved salt.

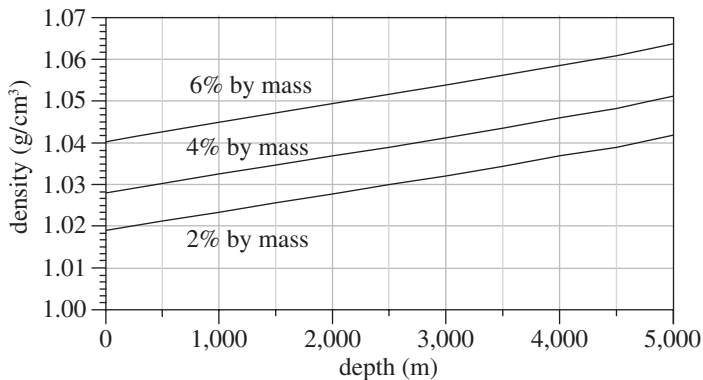


Figure 2

Figure 3 shows how the density of seawater at the surface varies with temperature at 4 different concentrations.

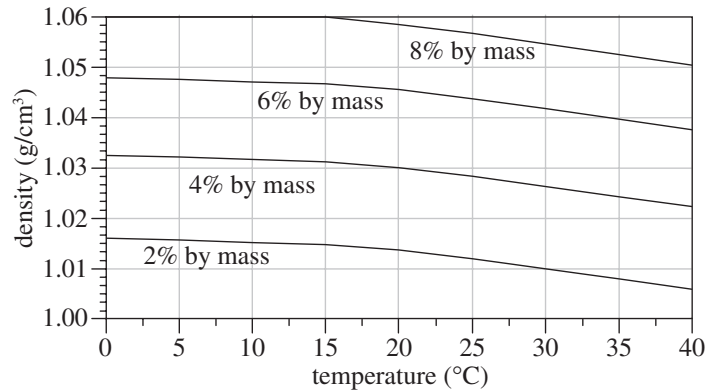


Figure 3

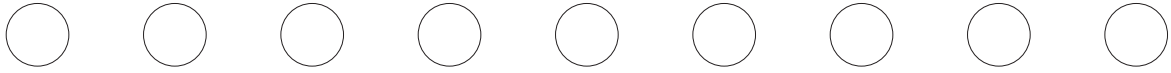
28. According to Figure 2, at 2% by mass of salt, the density of seawater is closest to  $1.03 \text{ g/cm}^3$  at which of the following depths?
- F. 2,000 m  
 G. 2,500 m  
 H. 3,000 m  
 J. 3,500 m
29. Based on Figure 3, at the surface and at 7% by mass of salt, seawater having a density of  $1.045 \text{ g/cm}^3$  would most likely have a temperature that is:
- A. less than  $15^\circ\text{C}$ .  
 B. between  $15^\circ\text{C}$  and  $20^\circ\text{C}$ .  
 C. between  $20^\circ\text{C}$  and  $25^\circ\text{C}$ .  
 D. greater than  $25^\circ\text{C}$ .

**GO ON TO THE NEXT PAGE.**



30. According to Figure 1, at 20°C, the density of NaCl solution and the density of LiCl solution are closest in value at which of the following pairs of concentrations?
- | <u>NaCl</u>     | <u>LiCl</u> |
|-----------------|-------------|
| F. 2.5% by mass | 10% by mass |
| G. 2.5% by mass | 15% by mass |
| H. 7.5% by mass | 10% by mass |
| J. 7.5% by mass | 15% by mass |
31. Based on Figure 1, at 20°C and a concentration of 15% by mass, the density of seawater is approximately how much greater than or less than the density of NH<sub>4</sub>Cl solution?
- A. 0.07 g/cm<sup>3</sup> greater  
B. 0.10 g/cm<sup>3</sup> greater  
C. 0.07 g/cm<sup>3</sup> less  
D. 0.10 g/cm<sup>3</sup> less
32. According to Figure 1, increasing concentration from 5% by mass to 20% by mass has a *lesser* effect on the density of which solution, LiCl or NH<sub>4</sub>Cl?
- F. LiCl; the density increases by about 0.04 g/cm<sup>3</sup>.  
G. LiCl; the density increases by about 0.09 g/cm<sup>3</sup>.  
H. NH<sub>4</sub>Cl; the density increases by about 0.04 g/cm<sup>3</sup>.  
J. NH<sub>4</sub>Cl; the density increases by about 0.09 g/cm<sup>3</sup>.
33. Consider the density of seawater at a depth of 0 m and a salt concentration of 6% by mass, as shown in Figure 2. According to Figure 3, this seawater would have a temperature closest to which of the following?
- A. 5°C  
B. 15°C  
C. 25°C  
D. 35°C

GO ON TO THE NEXT PAGE.



### Passage VI

A solar eclipse occurs when the Sun, Earth, and Moon are all aligned, and the Moon casts a shadow on the Earth. In a *total eclipse*, the Moon completely covers the Sun's disc, whereas in an *annular eclipse* the Moon obscures all but the outer ring of the Sun. For example, Figure 1 shows how all of the solar eclipses occurring between January 2001 and January 2004 appeared when observed from Earth.

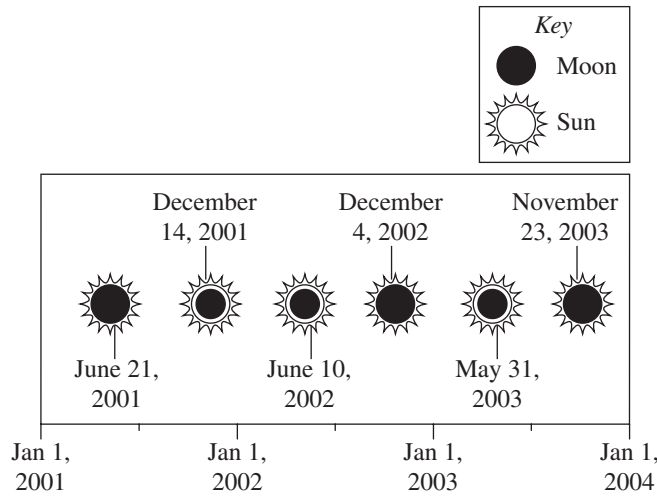


Figure 1

Two theories were presented to explain why solar eclipses sometimes appear as annular rather than total.

#### Theory 1

The Moon orbits the Earth in a circular path in which the Earth is the center. When the Moon passes between the Sun and Earth, it creates a shadow called an *umbra*, in which the entire Sun is obscured from view. Whether the umbra reaches the Earth or not depends on the size of the Sun, which varies over time due to expansion and contraction. In Figure 2, the top image shows an eclipse when the Sun is in a period of contraction, and the bottom image shows an eclipse when the Sun is in a period of expansion.

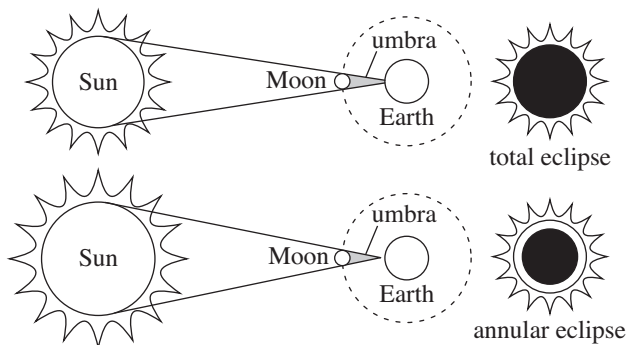


Figure 2

When the Sun is in a period of contraction, the umbra reaches the Earth and a total eclipse is observed. When the Sun is in a period of expansion, the umbra does not quite reach the Earth and an annular eclipse is observed.

#### Theory 2

The Moon orbits the Earth in an elliptical path in which the Earth is the center. In an elliptical path, the Moon is sometimes located closer to or further away from the Earth depending on where it is in its orbit. As a result, the amount of the Sun obscured by the Moon varies depending on how far the Moon is from the Earth. Figure 3 shows where the Moon was located in its orbit around the Earth during two of the solar eclipses labeled in Figure 1. For each eclipse, the reach of the umbra, the shadow in which the Sun is completely obscured, relative to Earth is shown.

There are 2 rules for when a solar eclipse will be annular:

- An eclipse will be total when the Moon is located in the region of its orbit that is a *smaller* distance from the Earth. The umbra will reach all the way to the Earth's surface, leading to a complete obstruction of light from the Sun.
- An eclipse will be annular when the Moon is located in the region of its orbit that is a *greater* distance from Earth. The umbra will not reach all the way to Earth's surface and the outer ring of the Sun will still be visible from the Earth.

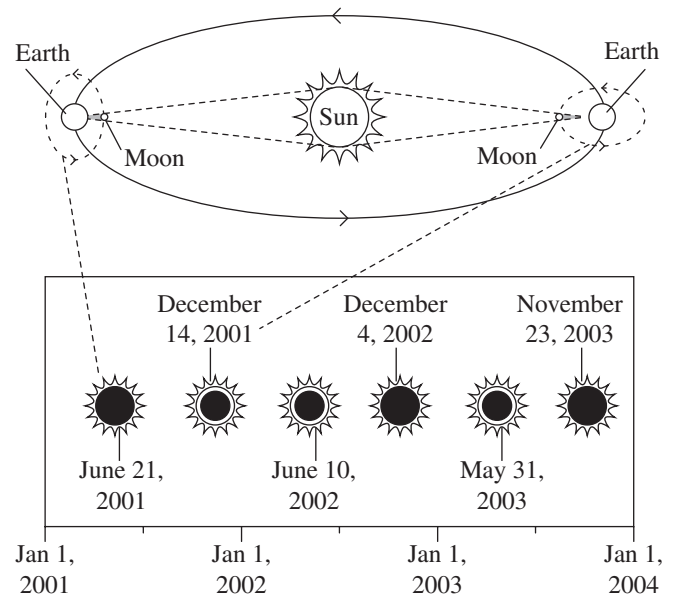


Figure 3

**GO ON TO THE NEXT PAGE.**



34. Which of the following statements best explains a primary difference between the two theories? Theory 1 states that the Moon follows:
- F. an elliptical orbit around the Earth, whereas Theory 2 states that the Moon follows a circular orbit around the Earth.
  - G. an elliptical orbit around the Earth, whereas Theory 2 states that the Moon follows a circular orbit around the Sun.
  - H. a circular orbit around the Earth, whereas Theory 2 states that the Moon follows an elliptical orbit around the Earth.
  - J. a circular orbit around the Earth, whereas Theory 2 states that the Moon follows an elliptical orbit around the Sun.
35. Assuming that Figures 2 and 3 are drawn to scale, which of the figures, if either, implies that the distance between the Moon and Earth is constant over time?
- A. Figure 2 only
  - B. Figure 3 only
  - C. Both Figure 2 and Figure 3
  - D. Neither Figure 2 nor Figure 3
36. Consider the eclipses in 2001 represented in Figures 1 and 3 and also the reason that, according to Theory 2, the amount of the Sun obscured by the Moon varies depending on how far the Moon is from Earth. Is the top portion of Figure 3 consistent with that reason?
- F. No; the Moon is shown as having a circular orbit and as being located closer to the Earth during some points of its orbit and farther from the Earth during other points of its orbit.
  - G. No; the Moon is shown as having an elliptical orbit and as being located closer to the Earth during some points of its orbit and farther from the Earth during other points of its orbit.
  - H. Yes; the Moon is shown as having a circular orbit and as being located closer to the Earth during some points of its orbit and farther from the Earth during other points of its orbit.
  - J. Yes; the Moon is shown as having an elliptical orbit and as being located closer to the Earth during some points of its orbit and farther from the Earth during other points of its orbit.
37. Based on Figure 1, after the eclipse in December of 2001, approximately how many days passed before the next annular eclipse?
- A. 60
  - B. 90
  - C. 180
  - D. 360
38. A proponent of Theory 1 and a proponent of Theory 2 would both be likely to agree with which of the following statements? When an annular eclipse is observed from the Earth, the umbra:
- F. is as long as the distance between the Earth and Moon.
  - G. is not as long as the distance between the Earth and Moon.
  - H. is longer than the umbra during a total eclipse.
  - J. is the same size as the umbra during a total eclipse.
39. Based on Figures 1 and 3, if Theory 2 is correct, which of the following figures could represent the positions of the Sun, Moon, and Earth on May 31, 2003 ?
- A.

C.

B.

D.
40. Can Theory 2 be used to explain why some ocean tides are stronger than others?
- F. Yes, Theory 2 accounts for the varying distance between the Earth and the Sun, whose gravitational field is the primary driver of tides.
  - G. Yes, Theory 2 accounts for the varying distance between the Earth and the Moon, whose gravitational field is the primary driver of tides.
  - H. No, Theory 2 does not account for the varying distance between the Earth and the Sun, whose gravitational field is the primary driver of tides.
  - J. No, Theory 2 does not account for the varying distance between the Earth and the Moon, whose gravitational field is the primary driver of tides.

**END OF TEST 4**

**STOP! DO NOT RETURN TO A PREVIOUS TEST.**

## DIRECTIONS

This is a test of your writing skills. You will have forty (40) minutes to write an essay. Before you begin planning and writing your essay, read the writing prompt carefully to understand exactly what you are being asked to do. Your essay will be evaluated on the evidence it provides of your ability to express judgments by taking a position on the issue in the writing prompt; to maintain a focus on the topic throughout your essay; to develop a position by using logical reasoning and by supporting your ideas; to organize ideas in a logical way; and to use language clearly and effectively according to the conventions of standard written English.

You may use the unlined pages in this test booklet to plan your essay. These pages will not be scored. ***You must write your essay on the lined pages in the answer folder.*** Your writing on those lined pages will be scored. You may not need all the lined pages, but to ensure you have enough room to finish, do NOT skip lines. You may write corrections or additions neatly between the lines of your essay, but do NOT write in the margins of the lined pages. ***Illegible essays cannot be scored, so you must write (or print) clearly.***

If you finish before time is called, you may review your work. Lay your pencil down immediately when time is called.

**DO NOT OPEN THIS BOOK UNTIL YOU ARE TOLD TO DO SO.**

## ACT Assessment Writing Test Prompt

### Population Growth

Since the Industrial Revolution, the growth rate of Earth’s human population has increased dramatically. It took mankind until the 1800s to reach one billion, but only 120 years after that to reach two billion, and less than 40 years after that to reach three billion. We continue to increase our numbers, measuring in at 7.8 billion in 2021. Some express a great deal of concern about this trend, arguing that the increasing population uses more resources than the planet can provide and encourages harmful practices such as deforestation and industrial pollution. Others say that while our population is at higher numbers than ever before and the subsequent problems are very real, the issues are caused less by the actual number of people and more by the unequal distribution of resources.

*Read and carefully consider these perspectives. Each suggests a particular way of thinking about human population growth.*

#### Perspective One

Overpopulation is one of the most serious environmental issues humans face. Our increasing numbers are causing myriad problems from loss of fresh water to extinction of species to lowered life expectancy in developing countries.

#### Perspective Two

The number of people on Earth is not a problem. We have less than 8 billion people, while scientists predict our planet can support up to 10 billion. The real problem is the unequal distribution of resources. A more equitable use of water, land, food, and fuel would eliminate many of the problems we currently face.

#### Perspective Three

Though our population numbers are higher than they’ve ever been, this is not a cause for alarm. Our growth rate is already beginning to slow. As we approach critical mass, that decrease in rate will continue until we’re at “replacement” levels of reproduction, allowing the human race to continue without drastically increasing the overall numbers.

### Essay Task

Write a unified, coherent essay in which you evaluate multiple perspectives on the issues connected with population growth. In your essay, be sure to:

- analyze and evaluate the perspectives given
- state and develop your own perspective on the issue
- explain the relationship between your perspective and those given

Your perspective may be in full agreement with any of the others, in partial agreement, or wholly different. Whatever the case, support your ideas with logical reasoning and detailed, persuasive examples.