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Practice Test 1

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ENGLISH TEST
45 Minutes—75 Questions

Directions: In the following five passages, certain words and phrases are underlined and numbered. In the right-hand column are alternatives for each underlined portion. Select the one that best conveys the idea, creates the most grammatically correct sentence, or is most consistent with the style and tone of the passage. If you decide that the original version is best, select NO CHANGE. You may also find questions that ask about the entire passage or a section of the passage. These questions will correspond to small, numbered boxes in the text. For these questions, decide which choice best accomplishes the purpose set out in the question stem. After you’ve selected the best choice, fill in the corresponding oval on your Answer Grid. For some questions, you’ll need to read the context in order to answer correctly. Be sure to read until you have enough information to determine the correct answer choice.

PASSAGE 1

My Cousin Nicola

My father and his two younger brothers emigrated from Italy to New York in the early 1970s. Only their older sister Lucia, who was already married, remained behind in their small home town, this village lies in the shadow of Mount Vesuvius. Growing up in America, my cousins and I were as close as brothers and sisters, but we hardly knew our family across the Atlantic. When I was a young child, my parents and I went to Italy to visit Aunt Lucia and her family for a week. I first met my cousin Nicola however, I remember that we were not only about the same age, and we also got along

1. A. NO CHANGE
   B. whom
   C. who
   D. she who

2. F. NO CHANGE
   G. town, it can be seen where it
   H. town it
   J. town that

3. A. NO CHANGE
   B. knew
   C. had knew
   D. been known

4. F. NO CHANGE
   G. Nicola, so then
   H. Nicola because
   J. Nicola then.

5. A. NO CHANGE
   B. so
   C. but
   D. then
well. But because I was so young, I remember little else. I hadn’t seen him again up until this last summer.

Nicola decided that he wanted to join the Italian Air Force after finishing high school. Before beginning his service, though, he wanted to travel for a bit. He had never been to America, even though so many of his relatives live here, but he had been to England already. When the rest of the cousins heard the news, they were ecstatic. Most of them had never met Nicola or, like me, hadn’t seen him since we were kids; they were eager to get to know him.

Two weeks later, we picked Nicola up at JFK Airport. Right away, I was surprised by his height. I am the tallest of all the cousins in America, and Nicola was easily a couple of inches taller than me. In addition to our height, he and I had another similarity in common: we were both musicians. The moment I saw the acoustic guitar slung over his shoulder, I knew he and I would get along just fine. None of my American cousins plays an instrument, and I always thought that I was the only musician in the family (even though some relatives have lovely singing voices). I was happy to find out I was wrong.
Throughout that summer, Nicola and I shared the gift of music. We would sing and play our guitars long into the night, only stopping when my mother came downstairs and forced us to quit. We liked many of the same bands, and we taught each other to play our favorite songs. Taught to him as a child before she passed away in Italy, I was taught by him the Italian folk songs of our grandmother more importantly. It was through those songs that I truly connected to the beauty of our ancestry. On the night before Nicola returned to Italy, my father would have thrown a big party for all of the relatives.

Nicola and I played the folk songs of our grandmothers’ country for the American side of our family. When we were done, my Uncle Vittorio had a tear in his eye. Since coming to America so long ago, he had never been able to return to Italy.

12. F. NO CHANGE
   G. Teaching him as a child before she passed away, our grandmother in Italy more importantly taught me many of the Italian folk songs.
   H. Teaching him as a child, more importantly, by our grandmother in Italy, I was taught by him many Italian folk songs.
   J. More importantly, however, he taught me many of the Italian folk songs our grandmother in Italy had taught him as a child before she passed away.

13. A. NO CHANGE
   B. will have thrown
   C. threw
   D. throws

14. F. NO CHANGE
   G. our grandmother’s
   H. our grandmothers’
   J. are grandmother’s

15. Which of the following sentences, if included here, would best conclude the essay as well as maintain the tone established in this paragraph?
   A. In the music and our singing, Nicola and I brought the beautiful country back to Uncle Vittorio.
   B. Uncle Vittorio is the youngest member of his generation of the family, so he probably misses Italy the least.
   C. I had a good time singing in front of an audience.
   D. Nicola is better at playing the guitar than singing.

PASSAGE II

The Handsome Bean

On the ground floor of the apartment building where I live, the Handsome Bean coffee shop is almost always bustling with customers. During the warm months, the shop sets up outdoor tables on the sidewalk, and the chatter of conversation
mixed with the aroma of coffee often floats in through my window to wake me in the mornings. Next to the Handsome Bean is a used bookstore, and the two shops share many of the same customers who are interested in purchasing items. People come to find a book and stay to enjoy a cup of coffee. Across the street from the building is the neighborhood Little League field. The Handsome Bean often sponsors a local team. During the games, the coffee shop offers a discount to parents whose children are competing across the street.

It is a pleasure to have as a neighbor a business that children... And adults enjoy so much.

Over the past few years, I have become friends with Mary, the owner of the shop. The store’s main counter is a century-old antique that Mary bought and restored to its originally conditional, and the photos that adorn the back wall

17. A. NO CHANGE
   B. people who express interest in acquiring items by shopping.
   C. customers who shop for items to purchase or consume.
   D. customers.

18. F. NO CHANGE
   G. had sponsored
   H. was a sponsor of
   J. supported

19. At this point, the writer wants to add a sentence that provides additional detail about the customers who come to the Handsome Bean. Which of the following sentences would best achieve the writer’s purpose?
   A. In addition to this discount, the shop offers all patrons a punch card to receive a tenth coffee for free.
   B. The shop also sells ice cream, so it often gets very crowded with children and parents after the Little League games are over.
   C. The Handsome Bean also provides uniforms for an elementary school soccer team.
   D. The Little League field doesn’t have a concession stand, so the coffee shop doesn’t have much competition for the parents’ business.

20. F. NO CHANGE
   G. children and adults
   H. children and that adults
   J. children. Adults

21. Which choice most effectively leads the reader into the topic of this paragraph?
   A. NO CHANGE
   B. Mary, the shop’s owner, has a great appreciation for history.
   C. The Handsome Bean has only been open for a couple of years, but the owner, Mary, has taken great care to make it look like it has been there for decades.
   D. Before Mary, the shop’s owner, opened the Handsome Bean, the space had been unoccupied for six months.

22. F. NO CHANGE
   G. original conditional,
   H. original condition,
   J. conditionally original,
depicts our town during the 1920s and 1930s. My favorite detail of the shop, however, is the original tin ceiling. One afternoon, while staring at the intricate patterns etched into the tin tiles, I noticed a name camouflaged within the ornate design: Harvey. I pointed it out to Mary, and she said the original owner of the building was named Harvey Wallaby. Her guess was that he had probably written it there more than 70 years ago. That night after the coffee shop had closed, Mary and I etched our names into the ceiling right next to Harvey’s, hoping that our names would similarly be discovered in the far-off future.

On Friday nights, the Handsome Bean has live entertainment, usually in the form of a band or a poetry reading. For a small town coffee shop, the Handsome Bean attracts a good amount of talented musicians and poets. It being that I am amazed by the performances, they transpire within its cozy walls.

[1] The clientele of the coffee shop is as varied as the selection of flavored brews. [2] In the mornings, the Handsome Bean is abuzz with the 9-to-5 crowd stopping in for some java before heading off to work. [3] During the days, the tables are home to local artists lost in their thoughts and cappuccinos. [4] The evening finds the Handsome Bean filled with bleary-eyed college students loading up on caffeine so they can cram all night for their upcoming exams or finishing

23. A. NO CHANGE  
B. depict  
C. has depicted  
D. shows

24. The writer is considering deleting the sentence below from the passage:

   Her guess was that he had probably written it there more than 70 years ago.

   If the writer were to delete this sentence, the essay would primarily lose:

   F. an additional detail about the building that houses the coffee shop.  
   G. an explanation of the action taken by Mary and the writer.  
   H. an emphasis on the original owner’s influence.  
   J. a description of the shop’s interior.

25. A. NO CHANGE  
B. form; of a  
C. form, of a  
D. form of a

26. F. NO CHANGE  
G. better amount  
H. better number  
J. good number

27. A. NO CHANGE  
B. Amazing the performances, it is that I know they  
C. I am amazed by the performances that  
D. Amazing the performances, they

28. F. NO CHANGE  
G. finish  
H. finishes  
J. finalizing
their research papers with looming due dates. [5] Then there’s me, sitting in the corner, maybe talking to Mary or reading the paper, smiling at the thought that the best cup of coffee in town is found right beneath my bedroom window. [6] In the afternoons, a group of high school students who stop by to have an ice cream cone or an egg cream. [30]

PASSAGE III

The paragraphs below may or may not be in the most logical order. A number in brackets appears above each paragraph. At the end of the passage, Question 45 will ask you to determine the most logical place for Paragraph 1.

Mr. Midshipman Marryat

[1]

Born to an upper-class English family in 1792, Marryat had a thirst for naval adventure and exploration very early in his childhood. As a young boy at private school, he tried to run away to sea a number of times. Finally, his exasperated parents at last granted him his wish in 1806; they were enlisted in the British Navy as a midshipman. Marryat had the luck to be assigned to sail upon the frigate HMS Imperiouse under the command of Lord Cochrane. Cochrane, that’s naval exploits

29. A. NO CHANGE  
B. students that  
C. students, and they  
D. students

30. For the sake of logic and coherence, Sentence 6 should be placed:  
F. where it is now  
G. before Sentence 2.  
H. before Sentence 4.  
J. before Sentence 5.

31. A. NO CHANGE  
B. naval, adventure,  
C. naval, adventure  
D. naval adventure;

32. F. NO CHANGE  
G. His exasperated parents  
H. In the end, his exasperated parents  
J. Ultimately, the result was that his exasperated parents

33. A. NO CHANGE  
B. they  
C. he  
D. and he

34. E. NO CHANGE  
G. who’s  
H. whose  
J. who the
are legendary, would later serve as the inspiration for

a number of Marryat’s fictional characters. \[35\]

Unlike most of the other prominently famous authors who
have spun tales of brave British naval officers fighting for
king and country on the high seas, Frederick Marryat actually
served as a captain in the British Royal Navy. While others
could only use their imagination and accounts to describe
what life must have been like for a young man rising through
the ranks from lowly midshipman to all-powerful captain
from historical records, Marryat needed only to dip into the
vast library of adventure stored in his memory.

35. The writer is considering deleting the phrase “a number of.” If the writer decided to delete the phrase, would the meaning of the sentence change?

A. Yes, because without this phrase, the reader would think that all of Marryat’s fictional characters were based on Cochrane.
B. Yes, because without this phrase, the reader would not understand that Marryat used Cochrane as a model for more than one fictional character.
C. No, because this phrase is an example of wordiness that should be eliminated from the sentence.
D. No; although the phrase adds a detail about Marryat’s character, this detail is not essential to the meaning of the sentence.

36. At this point, the writer is considering adding the sentence below:

The well-known writer Patrick O’Brien also modeled his Captain Jack Aubrey after Cochrane.

Should the writer make this addition?

F. Yes, because if readers know that other writers were inspired by Cochrane, they will better understand that Cochrane was an impressive person.
G. Yes, because the added detail provides information about a writer who used a style similar to Marryat’s.
H. No, because the essay doesn’t reveal the relationship between O’Brien and Marryat.
J. No, because the detail distracts from the main focus of the essay.

37. A. NO CHANGE
B. prominent famous
C. prominent
D. prominent and famous

38. The best placement for the underlined portion is:

F. where it is now.
G. after the word “accounts.”
H. after the word “others.”
J. after the word “adventure.”
Marryat’s three years aboard the Imperieuse were filled with experiences that would later serve him well in his writing career. The Imperieuse saw much action off the coast of Spain, where Marryat took part in capturing a Spanish castle and numerous vessels in the Mediterranean. Marryat willingly accepted any chance to distinguish himself in the eyes of his revered captain and literary inspiration, Cochrane. In fact, Marryat once jumped into the turbulent sea to save the life of another midshipman who had fallen overboard. Not only did Marryat have the privilege of knowing first-hand a character as illustrious as Cochrane, but his own bold experiences as a midshipman would also be the basis for his most famous novel, Mr. Midshipman Easy.

As Marryat quickly climbed through the ranks of the Royal Navy, many feats were accomplished by him. These included single-handedly saving his ship during a horrific storm and fighting in a number of sea battles against the United States Navy during the War of 1812.

Marryat earned his greatest acclaim for his novels and short stories during this time, which were published in England while he was at sea. He retired from the navy shortly after being awarded the rank of post captain in 1825 to concentrate...
for writing full-time. Marryat’s thrilling stories of sea adventure still live today because, as the old cliché goes, the best stories are the ones that are true.

PASSAGE IV

The Toughest Task in Sports

[1]

I’ve often heard others make the comment that the hardest single act in all of sports is to hit a major league fastball. I’m not going to deny that hitting a ball traveling at upwards of 95 miles per hour is a daunting task, but I can think of something even tougher than taking a major league at-bat: stopping a crank shot in men’s lacrosse. Football quarterbacks facing oncoming defensive linemen are also in a difficult position.

[2]

[1] Lacrosse that is often referred to as “the fastest sport on two feet,” and with good reason. [2] The game is often brutally, and the best players normally possess a bit of toughness, a bit of

44. F. NO CHANGE
G. at writing
H. on writing
J. in writing of

45. The most logical placement of Paragraph 1 is:
A. where it is now.
B. after Paragraph 2.
C. after Paragraph 3.
D. after Paragraph 4.

46. F. NO CHANGE
G. Also in a challenging position are football quarterbacks facing oncoming defensive linemen.
H. (Football quarterbacks also face a daunting task when they are rushed by defensive linemen.)
J. OMIT the underlined portion.

47. A. NO CHANGE
B. which has been
C. is
D. OMIT the underlined portion.

48. F. NO CHANGE
G. brutal
H. brute
J. brutality

49. A. NO CHANGE
B. toughness;
C. toughness
D. toughness, and,
finesse. As in hockey or soccer, the only thing that stands between the ball and the goal is the goalkeeper. Using sticks known as “crosses” to pass a hard rubber ball back and forth through the air, players on two teams sprint around a field; they then attempted to set up a shot on the opposing team’s goal. Using just his body and his crosse, the keeper must protect the six-foot by six-foot goal from being penetrated by a ball that is less than eight inches in circumference.

This brings me to the heart of my argument. A regulation lacrosse ball is almost an inch narrower than a regulation baseball, with an unstitched, smooth rubber surface. The fastest baseball pitch on record was clocked at 100.9 mph, though only a handful of major league pitchers can approach even the upper nineties in speed. In men’s lacrosse, because the crosse acts as a lever, the fastest “crank shots” on goal, can reach 110 mph. Even at the high school level, crank shots of more than 90 mph made by high school players are not uncommon. Unlike a baseball pitcher throwing his fastball from a fixed position on the mound, a lacrosse player may shoot from anywhere on the field, which is typically grass. This means that a lacrosse goalie may be asked to stop a crank shot from a distance of only six feet away!

To make the goalie’s job even more difficult, a lacrosse player may shoot from over his shoulder, from his side, or drop his stick down and wind up from the ground. On top of that, the

50. F. NO CHANGE
G. they must attempt
H. one then attempts
J. one must attempt

51. The most logical placement of Sentence 3 in Paragraph 2 is:
A. where it is now.
B. after Sentence 1.
C. after Sentence 4.
D. OMITTED, because the paragraph does not discuss hockey or soccer.

52. F. NO CHANGE
G. goal, can,
H. goal can
J. goal can,

53. A. NO CHANGE
B. made by these high school players
C. shot by high school players
D. OMIT the underlined portion

54. F. NO CHANGE
G. field, which is covered with natural turf.
H. field that is covered with grass.
J. field.

55. A. NO CHANGE
B. merely a length of six feet
C. just a mere six feet
D. only six feet

56. Of the following possible replacements for the underlined portion, which would be LEAST acceptable?
F. In addition,
G. On the other hand,
H. Furthermore,
J. What’s more,
best players often employ a variety of fakes, and most have the ability to shoot left-handed or right-handed, depending upon their angle to the goal.

Like hitting a major league fastball, stopping a crank shot in lacrosse is tough. Both of these endeavors, however, require the same set of skills. One must possess superlative athleticism, great hand-eye coordination, and catlike quickness. Above all, you must be fearless.

57. Which choice is the most effective and logical transition from the topic of Paragraph 3 to the topic of Paragraph 4?
A. NO CHANGE
B. The combination of these unknown variables makes stopping a crank shot in lacrosse tougher than hitting a major league fastball.
C. Though baseball is less challenging than lacrosse, both sports require tremendous skill and dedication from athletes.
D. There is little question that stopping a crank shot in lacrosse is among the toughest tasks an athlete can face.

58. F. NO CHANGE
G. requires
H. required
J. would have required

59. A. NO CHANGE
B. one must be
C. they must be
D. he must have been

Question 60 asks about the essay as a whole.

60. Suppose that the writer had wanted to write an essay comparing the strategies used by baseball pitchers and lacrosse goalies. Would this essay fulfill the writer’s goal?
F. Yes, because the writer compares both sports throughout the essay.
G. Yes, because the writer details the challenges that lacrosse goalies face.
H. No, because the writer does not provide any specific details about baseball pitchers.
J. No, because the writer focuses on comparing the difficulty of hitting a ball pitched by a major league pitcher to the difficulty of blocking a crank shot in men’s lacrosse.
PASSAGE V

Thomas Edison, Tinfoil Cylinders, and MP3 Players

[1]

Thomas Edison first recorded sounds on tinfoil cylinders in the 1870s, and since then, formats for recording music have come and gone at a breakneck pace. Innovation in recording music has been constant, and the popularity and lifespan of the newest format have always been transitory at best. Those first tinfoil cylinders, which were hailed as a miracle in their day, quickly progressed to wax cylinders, then hard plastic cylinders and, within a decade, were completely replaced by the next “miracle,” the gramophone disc record.

[2]

The vinyl phonograph record, which sounded, soon better supplanted the gramophone in the 1940s. This new-fangled format dominated the music landscape for the next 30 years, but like its predecessors, it would eventually fall into obsolescence. The vinyl record being no longer mass marketed to the public.

For that matter, neither is its successor, the 8-track cartridge of the 1970s.

[3]

It may seem curious to a 40-year-old man today that the average high-school student is well acquainted with the older vinyl record format, so has never even heard of an 8-track cartridge. DJs and those who mix popular music still

uses and appreciates the vinyl record format cherished by them.

61. A. NO CHANGE
B. formats for recording music have come and gone,
C. formats for recording music, have come and gone
D. formats, for recording music have come and gone

62. The most logical placement for the underlined word would be:
F. where it is now.
G. before the word “vinyl.”
H. after the word “sounded.”
J. before the word “gramophone.”

63. A. NO CHANGE
B. record, having been
C. record is
D. record,

64. F. NO CHANGE
G. yet
H. thus
J. or

65. A. NO CHANGE
B. use and appreciates
C. uses and appreciate
D. use and appreciate

66. F. NO CHANGE
G. record format that they cherish.
H. format for records they play on turntables.
J. record format.
They have kept records from potentially vanishing into oblivion, along with the 8-track and the more recent recording format, the cassette tape.

[4]

That same 40-year-old man witnessed the rise and fall of the cassette tape, so he may not be surprised that many in today’s recording industry view the compact disc as similarly spiraling towards its own doom. For the first time, though it is not the sound quality of the recording that is ushering in the change. Now the driving force is something different the quality of the player itself.

[5]

Lack of portability was one of the drawbacks of the vinyl record and even of the compact disc. In contrast, recently introduced small personal music players, such as the iPod, can have up to an impressive 60 gigabytes worth of storage space. For those who are music lovers, this has completely changed the experience of listening to their favorite songs. Contrasting by the few hours’ worth of songs stored on a single CD, a 60-gigabyte MP3 player can store a month’s worth of uninterrupted music on a machine about the size of an old cassette tape.

67. A. NO CHANGE
B. disappearing into oblivion
C. a disappearance into being oblivious
D. disappearance toward the oblivion

68. F. NO CHANGE
G. time; though
H. time, though,
J. time though,

69. A. NO CHANGE
B. different;
C. different:
D. different,

70. Which sentence makes the most effective beginning for Paragraph 5?
F. NO CHANGE
G. A standard audio compact disc can store only about 700 megabytes worth of digital data, which equates to only a few hours worth of songs.
H. Most music listeners want a format with a great sound that also provides ample storage space for all of their favorite songs.
J. Recording devices have become smaller and smaller over the years, from the unwieldy gramophone to the pocket-sized cassette player.

71. A. NO CHANGE
B. Compared to
C. While
D. In contrast of
It’s no wonder that MP3 players are among the most popular technology purchases for people of all ages.

Has the apex in the climb towards better and better ways to play recorded music been reached? For those who believe it has, history teaches that they are wrong; such a proclamation will surely prove to be shortsighted when the next “miracle” in music arrives.

72. In this paragraph, the writer wants to help readers understand the storage capacity and size of the new personal music players. Which true statement would best help the writer accomplish this goal?
F. NO CHANGE
G. It is not unreasonable to expect that technological improvements will soon allow personal music players to have an even more compact size and store twice as many songs.
H. Experts in the music industry predict that personal music players will quickly replace compact disc players, just as compact disc players so recently replaced vinyl record players.
J. Entire music libraries once confined to the living room wall can now fit into a music lover’s pocket, and be taken and listened to anywhere.

73. Paragraphs 5 and 6 of this essay are written in the third person, using the pronouns those, their, and they. If the writer revised these paragraph using the second-person pronouns you and your, the essay would primarily:
A. gain a sense of urgency by suggesting actions to be taken by the reader.
B. gain a more personal tone by speaking directly to the reader.
C. lose the formal and removed tone that matches the content and purpose of the essay.
D. lose a sense of the author’s knowledge on the subject by personalizing the essay.

74. After reading the essay, the writer realized that some information had been left out. The writer then composed the sentence below to convey that information:
Though the gramophone record’s disc shape proved to have longevity, the gramophone record itself did not.
The most effective and logical placement of this sentence would be before the first sentence of Paragraph:
F. 2.
G. 3.
H. 4.
J. 5.
75. Suppose the writer had set out to write an essay explaining the process of recording sounds in a variety of formats. Does this essay meet that purpose?

A. Yes, because the essay describes the different recording formats used since the 1870s.
B. Yes, because the writer provides specifics about how each new recording format has improved upon earlier formats.
C. No, because the essay discusses a limited number of recording formats.
D. No, because the essay does not discuss the mechanics of how sounds are recorded and played back in different formats.
1. Khristina walked $1\frac{2}{3}$ miles on Sunday and $2\frac{3}{4}$ on Monday. What was the total distance, in miles, that she walked over those two days?

   A. $3\frac{1}{2}$
   B. $3\frac{5}{7}$
   C. $3\frac{11}{12}$
   D. $4\frac{1}{4}$
   E. $4\frac{5}{12}$

2. $2y^3 \cdot 3xy^2 \cdot 6xy^2$ is equivalent to:

   F. $11x^2y^7$
   G. $11x^3y^{12}$
   H. $36x^2y^7$
   J. $36xy^{12}$
   K. $36x^3y^{12}$

3. Ms. Ruppin is a machinist who works 245 days a year and earns a salary of $51,940. She recently took an unpaid day off from work to attend a bridge tournament. The company pays temporary replacements $140 a day. How much less did the company have to pay in salary by paying the replacement instead of Ms. Ruppin that day?

   A. $72$
   B. $113$
   C. $140$
   D. $196$
   E. $212$

Note: Unless otherwise noted, all of the following should be assumed.
1. Illustrative figures are not necessarily drawn to scale.
2. All geometric figures lie in a plane.
3. The term line indicates a straight line.
4. The term average indicates arithmetic mean.
4. On his first four 100-point tests this quarter, a student has earned the following scores: 52, 70, 76, 79. What score must the student earn on the fifth, final 100-point test in order to earn an average test grade of 75 for all five tests?
   
   F. 69  
   G. 70  
   H. 71  
   J. 98  
   K. The student cannot earn an average of 75.

5. Relative humidity is found by dividing the grams of water vapor per cubic meter of air by the maximum possible grams of water vapor per cubic meter of air, then converting to a percentage. If on a given day the air has 6.7 grams of water vapor per cubic meter, and the maximum possible at that temperature is 19.2 grams of water vapor per cubic meter, what is the relative humidity, to the nearest percent?
   
   A. 19%  
   B. 30%  
   C. 35%  
   D. 67%  
   E. 87%

6. A fence completely surrounds a pool that is 30 feet by 10 feet. What is the approximate length, in feet, of the fence?
   
   F. 20 feet  
   G. 40 feet  
   H. 60 feet  
   J. 80 feet  
   K. 160 feet

7. The expression \(w[x - (y + z)]\) is equivalent to:
   
   A. \(wx - wy - wz\)  
   B. \(wx - wy + wz\)  
   C. \(wx - wy - z\)  
   D. \(wx - y + z\)  
   E. \(wx - y - z\)

8. If \(2x - 5 = 7x + 3\), then \(x = ?\)
   
   F. \(-\frac{8}{5}\)  
   G. \(-\frac{5}{8}\)  
   H. \(-\frac{2}{5}\)  
   J. \(\frac{2}{5}\)  
   K. \(\frac{8}{9}\)
9. What two numbers should be placed in the blanks below so that each pair of consecutive numbers has the same difference?
   13, ____, ____, 49
   A. 22, 31
   B. 23, 39
   C. 24, 38
   D. 25, 37
   E. 26, 39

10. If $x$ is a real number such that $x^3 = 729$, then $\sqrt[3]{x} + x^2 =$ ?
    F. 9
    G. 21
    H. 53
    J. 84
    K. 90

11. The formula for the volume of a sphere with radius $r$ is $V = \frac{4}{3} \pi r^3$. If the radius of a spherical ball is $1\frac{1}{3}$ inches, what is its volume to the nearest cubic inch?
    A. 6
    B. 7
    C. 10
    D. 17
    E. 66

12. If a ball is randomly chosen from a bag with exactly 10 purple balls, 10 yellow balls, and 8 green balls, what is the probability that the ball chosen will NOT be green?
    F. $\frac{2}{7}$
    G. $\frac{2}{5}$
    H. $\frac{1}{2}$
    J. $\frac{9}{14}$
    K. $\frac{5}{7}$
13. The number of employees at a company in each division can be shown by the following matrix.

\[
\begin{pmatrix}
30 & 20 & 60 & 10
\end{pmatrix}
\]

The head of recruitment estimates the proportion of current employees who will leave within the next year with the following matrix.

\[
\begin{pmatrix}
0.3 \\
0.5 \\
0.2 \\
0.4
\end{pmatrix}
\]

Given these matrices, what is the head of recruitment’s estimate of the number of current employees in these departments who will leave within the next year?

A. 27  
B. 35  
C. 42  
D. 49  
E. 53

14. What is the average number of students per section in English I?

F. 22  
G. 25  
H. 26  
J. 27  
K. 29
15. The school has 2 computer labs with 30 computers each. There are 3 computers in one lab that are broken, and 5 in the other lab that are broken, all of which are not available to be used by students. For which of the following class periods, if any, are there NOT enough computers available for each English student to use a computer without having to share?

A. Period 2 only  
B. Period 5 only  
C. Period 6 only  
D. Periods 5 and 6 only  
E. None

16. What expression must be in the center cell of the table below so that the sums of each row, each column, and each diagonal are equivalent?

<table>
<thead>
<tr>
<th>-3x</th>
<th>4x</th>
<th>-7x</th>
</tr>
</thead>
<tbody>
<tr>
<td>-6x</td>
<td>?</td>
<td>2x</td>
</tr>
<tr>
<td>3x</td>
<td>-8x</td>
<td>-x</td>
</tr>
</tbody>
</table>

F. -6x  
G. -4x  
H. -2x  
J. 2x  
K. 4x

17. Point Z is to be graphed in a quadrant, not on an axis, in the standard (x,y) coordinate plane, as shown below.

If the x-coordinate and the y-coordinate of point Z have the same sign, then point Z must be located in:

A. Quadrant I only  
B. Quadrant III only  
C. Quadrant I or II only  
D. Quadrant I or III only  
E. Quadrant III or IV only

18. Leila has 5 necklaces, 8 pairs of earrings, and 3 hair clips. How many distinct sets of accessories, each consisting of a necklace, a pair of earrings, and a hair clip, can Leila choose?

F. 16  
G. 55  
H. 64  
J. 120  
K. 360
19. At a factory, 90,000 tons of grain are required to make 150,000 tons of bread. How many tons of grain are required to produce 6,000 tons of bread?
   A. 3,600  
   B. 10,000  
   C. 25,000  
   D. 36,000  
   E. 60,000

20. If a rectangle measures 42 meters by 56 meters, what is the length, in meters, of the diagonal of the rectangle?
   F. 48  
   G. 49  
   H. 70  
   J. 98  
   K. 196

21. For all positive integers \(a, b, \) and \(c\), which of the following is false?
   A. \(\frac{a \cdot b}{c \cdot b} = \frac{a}{c}\)
   B. \(\frac{a \cdot a}{b \cdot b} = \frac{a^2}{b^2}\)
   C. \(\frac{a \cdot b}{b \cdot a} = 1\)
   D. \(\frac{a + b}{b} = \frac{a}{b} + 1\)
   E. \(\frac{a + b}{c + b} = \frac{a}{c} + 1\)

22. What is the slope-intercept form of \(-3x - y + 7 = 0\)?
   F. \(y = 3x - 7\)
   G. \(y = 3x + 7\)
   H. \(y = -7x + 3\)
   J. \(y = -3x - 7\)
   K. \(y = -3x + 7\)

23. Which of the following is a solution to the equation \(x^2 - 16x = 0\)?
   A. 32  
   B. 16  
   C. 8  
   D. 4  
   E. -4
24. For right triangle $\triangle ABC$ below, what is $\tan C$?

F. $\frac{c}{a}$

G. $\frac{c}{b}$

H. $\frac{a}{c}$

J. $\frac{a}{b}$

K. $\frac{b}{a}$

25. A chord 30 centimeters long is 8 centimeters from the center of a circle, as shown below. What is the radius of the circle, to the nearest tenth of a centimeter?

A. 38.0
B. 34.0
C. 31.2
D. 22.8
E. 17.0

26. The velocity, in meters per second, of an object is given by the equation $V = \frac{5}{3}t + 0.05$, where $t$ is the amount of time that has passed, in seconds. After how many seconds will the object be traveling at 0.575 meters per second?

F. 0.28
G. 0.315
H. 0.365
J. 0.525
K. 0.57
27. The city has decided to store an estimated 15,000 cubic yards of sand for later distribution to the city’s beaches. If this sand were spread evenly over the entire soccer field shown below, about how many yards deep would the sand be?

A. Less than 1
B. Between 1 and 2
C. Between 2 and 3
D. Between 3 and 4
E. More than 4

28. The hypotenuse of the right triangle $\Delta ABC$ shown below is 18 feet long. The cosine of $\angle A$ is $\frac{4}{5}$. About how many feet long is $\overline{AC}$?

F. 15.2
G. 14.4
H. 13.9
J. 12.6
K. 10.8
29. The graph below shows the number of beds in each of several hotels, rounded to the nearest 50 beds. According to the graph, what fraction of the beds in these four hotels is at the Bedtime Hotel?

Key = 100 beds

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Number of Beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conf-E</td>
<td>350</td>
</tr>
<tr>
<td>Just Like</td>
<td>150</td>
</tr>
<tr>
<td>Home</td>
<td>250</td>
</tr>
<tr>
<td>Budget</td>
<td>400</td>
</tr>
<tr>
<td>Bedtime</td>
<td>200</td>
</tr>
</tbody>
</table>

A. \(\frac{1}{4}\)
B. \(\frac{1}{3}\)
C. \(\frac{2}{5}\)
D. \(\frac{5}{11}\)
E. \(\frac{1}{2}\)

30. Points B and C lie on \(\overline{AD}\) as shown below. The length of \(\overline{AD}\) is 38 units, \(\overline{AC}\) is 26 units long, and \(\overline{BD}\) is 20 units long. If it can be determined, how many units long is \(\overline{BC}\) ?

F. 6
G. 8
H. 12
J. 18
K. Cannot be determined from the given information

31. What is the \(x\)-coordinate of the point in the standard \((x,y)\) coordinate plane at which the two lines \(y = 4x + 10\) and \(y = 5x + 7\) intersect?

A. 2
B. 3
C. 7
D. 10
E. 22
32. For all pairs of real numbers $V$ and $W$ where $V = 5W + 4$, $W =$ ?

- F. $\frac{V}{5} - 4$
- G. $\frac{V}{5} + 4$
- H. $\frac{V - 4}{5}$
- J. $\frac{V + 4}{5}$
- K. $5V - 4$

33. Parallelogram $FGHI$, with dimensions in centimeters, is shown in the figure below. What is the area of the parallelogram, in square centimeters?

- A. 45
- B. 130
- C. 240
- D. 260
- E. 480

34. If $s = 4 + t$, then $(t - s)^3 =$ ?

- F. $-64$
- G. $-12$
- H. $-1$
- J. 12
- K. 64

35. A zoo has the shape and dimensions in yards given below. The viewing point for the giraffes is halfway between points $B$ and $F$. Which of the following is the location of the viewing point from the entrance at point $A$?

(Note: The zoo’s borders run east/west or north/south.)

- A. 400 yards east and 350 yards north
- B. 400 yards east and 500 yards north
- C. 600 yards east and 350 yards north
- D. 750 yards east and 300 yards north
- E. 750 yards east and 350 yards north
36. The larger of two numbers is six less than triple the smaller one. The sum of four times the larger and twice the smaller is 77. If \( s \) represents the smaller number, which of the following equations determines the correct value for \( x \)?
\[ \text{F. } 2(3x - 6) + 4x = 77 \]
\[ \text{G. } 2(3x + 6) + 4x = 77 \]
\[ \text{H. } (12x - 6) + 2x = 77 \]
\[ \text{J. } 4(3x - 6) + 2x = 77 \]
\[ \text{K. } 4(3x + 6) + 2x = 77 \]

37. A painter leans a 35 foot ladder against a house. The side of the house is perpendicular to the level ground, and the base of the ladder is 15 feet away from the base of the house. To the nearest foot, how far up the house will the ladder reach?
\[ \text{A. } 15 \]
\[ \text{B. } 20 \]
\[ \text{C. } 32 \]
\[ \text{D. } 38 \]
\[ \text{E. } 50 \]

38. A circle of radius 6 inches is inscribed in a square, as shown below. What is the area of the square, in square inches?

\[ \text{F. } 36 \]
\[ \text{G. } 42 \]
\[ \text{H. } 72 \]
\[ \text{J. } 36\pi \]
\[ \text{K. } 144 \]

39. The sides of a triangle are in the ratio of exactly 15:17:20. A second triangle, similar to the first, has a longest side of length 12. To the nearest tenth of a unit, what is the length of the shortest side of the second triangle?
\[ \text{A. } 15.9 \]
\[ \text{B. } 10.2 \]
\[ \text{C. } 9.0 \]
\[ \text{D. } 7.0 \]
\[ \text{E. } \text{Cannot be determined from the given information} \]
40. In the figure below, WXZY is a trapezoid, point X lies on WY, and the angles are as marked. What is the measure of ∠ZXT?

\[ \angle ZXT \]

F. 20°
G. 30°
H. 40°
J. 55°
K. 65°

41. In the figure below, all angles are right angles, and all lengths are in feet. What is the perimeter, in feet, of the figure?

A. 70
B. 76
C. 84
D. 92
E. 104

42. Of 896 seniors at a certain college, approximately \( \frac{1}{3} \) are continuing their studies after graduation, and approximately \( \frac{2}{5} \) of those continuing their studies are going to law school. Which of the following is the best estimate of how many seniors are going to law school?

F. 120
G. 180
H. 240
J. 300
K. 360

43. If \( a \) and \( b \) are positive integers such that the greatest common factor of \( a^4b \) and \( a^2b^3 \) is 75, which of the following is a possible value for \( a \)?

A. 75
B. 25
C. 9
D. 5
E. 3
44. If 135% of a number is 405, what is 80% of the number?
   F. 205
   G. 240
   H. 270
   J. 300
   K. 324

45. What is the distance in the standard (x,y) coordinate plane between the points (2,0) and (0,7) ?
   A. 5
   B. 9
   C. 25
   D. 81
   E. √53

46. The ratio of the radii of two circles is 9:16. What is the ratio of their circumferences?
   F. 3:4
   G. 9:16
   H. 81:256
   J. 9:18π
   K. 16:32π

47. A circle in the standard (x,y) coordinate plane is tangent to the x-axis at 4 and tangent to the y-axis at 4. Which of the following is an equation of the circle?
   A. \(x^2 + y^2 = 4\)
   B. \(x^2 + y^2 = 16\)
   C. \((x-4)^2 + (y-4)^2 = 4\)
   D. \((x-4)^2 + (y-4)^2 = 16\)
   E. \((x+4)^2 + (y+4)^2 = 16\)

48. In complex numbers, where \(i^2 = -1\), \(\frac{(i+1)(i+1)}{(i-1)(i-1)} = ?\)
   F. \(\frac{i+1}{i-1}\)
   G. \(\frac{i}{2}\)
   H. \(\frac{2}{i}\)
   J. 2i
   K. -1

49. Which of the following statements describes the total of the first \(n\) terms of the sequence below?
   \(1, 3, 5, 7, 9, \ldots\)
   A. The total is always equal to 25 regardless of \(n\).
   B. The total is always \(2n\).
   C. The total is always \(3n\).
   D. The total is always equal to \(n^2\).
   E. There is no consistent pattern for the total.
50. In a dance school with 35 students, a poll shows that 12 are studying tap dance and 19 are studying ballet. What is the minimum number of students in the school who are studying both tap dance and ballet?

F. 0
G. 7
H. 9
J. 12
K. 31

51. Which of the following is the solution set for all real numbers \( x \) such that \( x - 2 < x - 5 \)?

A. The empty set
B. The set containing all real numbers
C. The set containing all negative real numbers
D. The set containing all nonnegative real numbers
E. The set containing only zero

52. Hexagons have 9 diagonals, as illustrated below.

How many diagonals does the octagon below have?

F. 8
G. 11
H. 16
J. 20
K. 40

53. Diane wants to draw a circle graph showing the favorite teachers at her school. When she polled her classmates, 25% said Mr. Green, 15% said Ms. Brown, 35% said Mrs. White, 5% said Mr. Black, and the remaining classmates said teachers other than Mr. Green, Ms. Brown, Mrs. White, or Mr. Black. The teachers other than Mr. Green, Ms. Brown, Mrs. White, or Mr. Black will be grouped together in an Other sector. What will be the degree measure of the Other sector?

A. 144°
B. 72°
C. 36°
D. 20°
E. 15°
54. If $\cos \theta = -\frac{12}{13}$ and $\frac{\pi}{2} < \theta < \pi$, then $\tan \theta =$ ?

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

55. Which of the following systems of inequalities is represented by the shaded region of the graph below?

A. $y \geq -\frac{1}{3}x$ and $x \geq 6$  
B. $y \geq -\frac{1}{3}x$ or $x \geq 6$  
C. $y \leq -\frac{1}{3}x$ and $x \geq 6$  
D. $y \leq -\frac{1}{3}x$ or $x \geq 6$  
E. $y \leq -\frac{1}{3}x$ and $x \leq 6$

56. If $f(x) = 1 - x^2$, then $f(x + h) =$ ?

F. $1 - x^2 + h$  
G. $1 - x^2 - h$  
H. $-x^2 - 2xh - h^2$  
J. $1 - x^2 - 2xh - h^2$  
K. $1 - x^2 + 2xh + h^2$
57. Which of the following is the graph, in the standard \((x,y)\) coordinate plane, of \(y = \frac{3x^2 + 2x}{x}\)?

A.  

B.  

C.  

D.  

E.  

DO YOUR FIGURING HERE.
58. A triangle, \( \Delta ABC \), is reflected across the y-axis to create the image \( \Delta A'B'C' \) in the standard \((x,y)\) coordinate plane; for example, \( A \) reflects to \( A' \). The coordinates of point \( A \) are \((v,w)\). What are the coordinates of point \( A' \)?

F. \((v,-w)\)
G. \((-v,w)\)
H. \((-v,-w)\)
J. \((w,v)\)
K. Cannot be determined from the given information

59. If \( a = 6c + 7 \) and \( b = 3 - 2c \), which of the following expresses \( a \) in terms of \( b \)?

A. \( a = \frac{16 - b}{3} \)
B. \( a = \frac{17 - b}{2} \)
C. \( a = 16 - 3b \)
D. \( a = 25 - 12b \)
E. \( a = 6b + 7 \)

60. What is \( \cos \frac{5\pi}{12} \) given that \( \frac{5\pi}{12} = \frac{2\pi}{3} - \frac{\pi}{4} \) and that \( \cos(x - y) = (\cos x)(\cos y) + (\sin x)(\sin y) \)?
(Note: You may use the following table of values.)

\[
\begin{array}{ccc}
\theta & \sin \theta & \cos \theta \\
\frac{\pi}{4} & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} \\
\frac{2\pi}{3} & \frac{\sqrt{3}}{2} & -\frac{1}{2} \\
\frac{5\pi}{6} & \frac{1}{2} & -\frac{\sqrt{3}}{2} \\
\end{array}
\]

F. \( -\frac{\sqrt{3}}{4} \)
G. \( -\frac{\sqrt{3}}{2} \)
H. \( \frac{2 - \sqrt{3}}{4} \)
J. \( \frac{-1 - \sqrt{2}}{2} \)
K. \( \frac{\sqrt{6} - \sqrt{2}}{4} \)
Passage I

PROSE FICTION: This passage is an adapted excerpt from *Tess of the d'Urbervilles*, by Thomas Hardy. In this excerpt, Tess is working as a milkmaid at a dairy, where she has met and finds herself attracted to a gentleman by the name of Angel Clare.

They came downstairs yawning next morning; but skimming and milking were proceeded with as usual, and they went indoors to breakfast. Dairyman Crick was discovered stamping about the house. He had received a letter, in which a customer had complained that the butter had a twang.

"And begad, so 't have!" said the dairyman, who held in his left hand a wooden slice on which a lump of butter was stuck. "Yes—taste for yourself!"

Several of them gathered round him; and Mr. Clare tasted, Tess tasted, also the other indoor milkmaids, one or two of the milking-men, and last of all Mrs. Crick, who came out from the waiting breakfast-table. There certainly was a twang.

The dairyman, who had thrown himself into abstraction to better realize the taste, and so divine the particular species of noxious weed to which it appertained, suddenly exclaimed, "'Tis garlic! and I thought there wasn't a blade left in that meadow!"

Then all the old hands remembered that a certain dry meadow, into which a few of the cows had been admitted of late, had, in years gone by, spoiled the butter in the same way. The dairyman had not recognized the taste at that time, and thought the butter bewitched.

"We must overhaul that meadow," he resumed; "this mustn't continue!"

All having armed themselves with old pointed knives, they went out together. As the inimical plant could only be present in very microscopic dimensions to have escaped ordinary observation, to find it seemed rather a hopeless attempt in the stretch of rich grass before them. However, they formed themselves into line, all assisting, owing to the importance of the search; the dairyman at the upper end with Mr. Clare, who had volunteered to help; then Tess, Marian, Izzy Huett, and Retty; then Bill Lewell, Jonathan, and the married dairy-women—Beck Knibbs, with her woolly black hair and rolling eyes; and flaxen Frances, consumptive from the winter damps of the water-means—who lived in their respective cottages.

With eyes fixed upon the ground, they crept slowly across a strip of the field, returning a little further down in such a manner that, when they should have finished, not a single inch of the pasture would escape falling under the eye of some one of them. It was a most tedious business, not more than half a dozen shoots of garlic being discoverable in the whole field; yet such was the herb's pungency that probably one bite of it by one cow had been sufficient to season the whole dairy's produce for the day.

Differing one from another in natures and moods so greatly as they did, they yet formed, bending, a curiously uniform row—automatic, noiseless. As they crept along, stooping low to discern the plant, a soft yellow gleam was reflected from the buttercups into their shaded faces, giving them an elfish, moonlit aspect, though the sun was pouring upon their backs in all the strength of noon.

Angel Clare, who communistically stuck to his rule of taking part with the rest in everything, glanced up now and then. It was not, of course, by accident that he walked next to Tess.

"Well, how are you?" he murmured.

"Very well, thank you, sir," she replied demurely.

After a moment, she said, "Don't they look pretty?"

"Who?"

"Izzy Huett and Retty."
Tess had moodily decided that either of these maidens would make a good farmer’s wife, and that she ought to recommend them, and obscure her own wretched charms.

“Pretty? Well, yes—they are pretty girls. I have often thought so.”

“Though, poor dears, prettiness won’t last long!”

“Oh no, unfortunately.”

“They are excellent dairywomen.”

“Yes—though not better than you.”

“They skim better than I.”

“Do they?”

Clare remained observing them—not without their observing him.

“She is coloring up,” continued Tess heroically.

“Who?”

“Retty Priddle.”

“Oh! Why is that?”

“Because you are looking at her.”

Self-sacrificing as her mood might be, Tess could not well go further and cry, “Marry one of them, if you really do want a dairywoman and not a lady; and don’t think of marrying me!” She followed Dairyman Crick, and had the mournful satisfaction of seeing that Clare remained behind.

From this day she forced herself to take pains to avoid him—never allowing herself, as formerly, to remain long in his company, even if their juxtaposition were purely accidental. She gave the other three every chance.

1. At the time of the events of the story, Tess is:
   A. reflecting on the qualities required of a good farmer’s wife.
   B. struggling with conflicting feelings for Clare.
   C. frustrated by the tedium of daily life.
   D. excited about securing a romantic interest for one of her friends.

2. It can reasonably be inferred that the characters view the search for garlic shoots as a task that is:
   F. impossibly monotonous and made more complicated by the number of people participating.
   G. relatively simple but made more complicated by the number of people participating.
   H. quite dull but something that demands everyone’s participation.
   J. engaging but something that results in the loss of the dairy’s production for the day.

3. It can reasonably be inferred from the passage that garlic presented such a nuisance to the dairy primarily because of which of its following traits?
   A. Its status as an unsightly weed
   B. Its pungency
   C. Its microscopic size
   D. Its limited presence in the field

4. The passage states that Tess claims Izzy Huett and Retty Priddle are superior to her in all of the following aspects EXCEPT their:
   F. ladylike nature.
   G. skills as dairywomen.
   H. prettiness.
   J. skimming ability.

5. It can reasonably be inferred that Tess views her statements and behavior in her conversation with Clare with a mixture of:
   A. sorrow and regret.
   B. confusion and discomfort.
   C. pride and shame.
   D. resolution and sadness.

6. The passage states that Dairyman Crick became aware of the “twang” in the butter as a result of:
   F. the tasting of the butter by the members of the dairy.
   G. discovering the small garlic plants in the meadow that had caused a similar twang years ago.
   H. a letter directly expressing a customer’s complaint.
   J. an angry customer’s breakfast-time visit to Crick’s house.

7. The distinction the author makes between the characters’ everyday actions and the characters’ actions in the search is that the search:
   A. renders their individual differences less important than their pulling together in the common task.
   B. lets the characters take on an otherworldly aspect that contrasts sharply with their everyday personalities.
   C. makes them more willing to overlook the status differences among the group.
   D. causes them to lose their individual identities.
8. Which of the following statements best describes the way the ninth paragraph (lines 41–50) functions in the passage as a whole?

F. It sets the stage for a transition from discussion of the "twang" to the conversation between Tess and Clare.

G. It contrasts the initial disorder of the dairy to the structure and order that emerges after the search.

H. It emphasizes how the search process transforms the members of the group.

J. It moves the narrative from a discussion of everyday events to an idealization of the surrounding landscape.

9. The statement “She gave the other three every chance” (lines 96–97) functions in the passage to support Tess’ view that:

A. the other milkmaids are not capable of attracting Clare’s attention by themselves.

B. chance plays an important role in matchmaking.

C. Clare would never marry Tess, despite her charms.

D. the other milkmaids are more suitable companions for Clare than she is.

10. The author considers “Marry one of them...don’t think of marrying me!” (lines 88–90) to be a statement that:

F. exposes the high level of competition Tess feels with the other girls.

G. goes beyond the limits of Tess’s commitment to self-sacrifice.

H. reveals feelings Tess has for Clare that she has put fully behind her.

J. demonstrates the strength of Tess’ wish to have Clare leave her alone.

Passage II

SOCIAL STUDIES: This passage is adapted from an entry on the War of 1812 from The Columbia Encyclopedia, Sixth Edition (Copyright © 2004 Columbia University Press).

In 1806, Great Britain instituted a partial blockade of the European coast. The French emperor, Napoleon I, retaliated with a blockade of the British Isles. Napoleon’s Continental System was intended to exclude British goods or goods cleared through Britain from countries under French control. British orders in council threatened the American merchant fleet with confiscation of goods by one side or the other. Although the French subjected American ships to considerable arbitrary treatment, the difficulties with England were more apparent. The conscription of sailors alleged to be British from U.S. vessels was a particularly great source of anti-British feeling.

Despite the infringement of U.S. rights, President Thomas Jefferson hoped to achieve a peaceful settlement with the British. Toward this end, he supported a total embargo on trade in the hope that economic pressure would force the belligerents to negotiate with the United States. The Nonimportation Act of 1806 was followed by the Embargo Act of 1807. Difficulty of enforcement and economic conditions that rendered England and the Continent more or less independent of America made the embargo ineffective, and in 1809, it was replaced by the Nonintercourse Act. This in turn was superseded by Macon’s Bill No. 2. Macon’s Bill repealed the trade restrictions against Britain and France under the condition that if one country withdrew its offensive decrees or orders, nonintercourse would be reimposed with the other.

In reality, it was not so much the infringement of neutral rights that occasioned the actual outbreak of hostilities as the desire of the frontiersmen for free land, which could only be obtained at the expense of the Native Americans and the British. Moreover, the West suspected the British, with some justification, of attempting to prevent American expansion and of encouraging and arming the Native Americans. Matters came to a head after the battle of Tippecanoe in 1811; the radical Western group believed that the British had supported the Native American confederacy, and they dreamed of expelling the British from Canada. Their militancy was supported by Southerners who wished to obtain West Florida from the Spanish, who were allies of Great Britain.

War was declared June 18, 1812. It was not until hostilities had begun that Madison discovered how woefully inadequate American preparations for war were. The rash hopes of the “war hawks,” who expected to take Canada at a blow, were soon dashed. The American force under Gen. William Hull, far from gaining glory, disgracefully surrendered at Detroit to a smaller Canadian force under Isaac Brock. On the Niagara River, an American expedition was repulsed after a successful attack on Queenston Heights, because the militia leader Stephen Van Rensselaer refused to cross the New York state boundary.

The first months of 1814 held gloomy prospects for the Americans. The finances of the government were somewhat restored in 1813, but there was no guarantee of future supplies. New England, never sympathetic with the war, now became openly hostile, and the question of secession was taken up by the Hartford Convention. Moreover, with Napoleon checked in Europe, Britain could devote more time and effort to the war in America.
In July 1814, the American forces along the Niagara River, now under Gen. Jacob Brown, maintained their own in engagements at Chippawa and Lundy’s Lane. Shortly afterward, Sir George Prevost led a large army into New York down the west side of Lake Champlain and seriously threatened the Hudson Valley. But when his accompanying fleet was defeated near Plattsburgh by Capt. Thomas Macdonough, he was forced to retreat to Canada. In August, a British expedition to Chesapeake Bay won an easy victory at Bladensburg and took Washington, burning the Capitol and the White House. The victorious British, however, were halted at Fort McHenry before Baltimore.

The final action of the war took place after the signing of the treaty, when Andrew Jackson decisively defeated the British at New Orleans on January 8, 1815. This victory, although it came after the technical end of the war, was important in restoring American confidence. The peace treaty failed to deal with the matters of neutral rights and conscription that were the visible causes of the conflict, but the war did quicken the growth of American nationalism.

11. It can be reasonably inferred from the passage that the Americans:
A. bravely won an undisputed victory in the face of mounting adversity.
B. were barely saved from certain defeat at the hands of Andrew Jackson at New Orleans.
C. could not have withstood another such conflict immediately following the War of 1812.
D. were in reality ill prepared to assert their rights and desires against the British in the early 1800s.

12. Details in the passage suggest that the author believes that the conflict between the British and the Americans:
F. was a sham started by the Americans to help Napoleon conquer the Continent.
G. began as a result of the British drive to acquire more territory.
H. arose from the opposing and antagonistic goals of two growing nations.
J. detracted from the welfare of Native Americans.

13. It can reasonably be inferred that one of the functions of the first sentence of paragraph three (lines 30–34) is to:
A. indicate the overrepresentation of the interests of frontiersmen in Washington.
B. introduce the author’s assertion that each nation held some blame in starting the war.
C. explain why the British are primarily responsible for the War of 1812.
D. foreshadow the downfall of the arrogant “war hawks.”

14. Which of the following statements best captures the reasoning of the Americans in passing legislation in reaction to the French and British?
F. The legislation represented an emphatically hostile reaction to the policies of the Europeans.
G. American legislators grudgingly acquiesced to the will of the British and French.
H. The Americans attempted several legislative solutions before resorting to physical conflict.
J. The legislation attempted to pit the British and French against each other for American benefit.

15. The function of Paragraph 4 (lines 45–56) in relation to the passage as a whole is to:
A. foreshadow the ineffectiveness of the peace treaties signed when the war ended.
B. introduce the ensuing difficulties suffered by the Americans.
C. describe how smaller, better trained forces can defeat larger armies.
D. introduce General William Hull as an important figure in history.

16. In describing the defeat of the British at New Orleans (lines 78–83), the author implies that:
F. the War of 1812 had detracted from America’s self-confidence.
G. the victory catapulted Andrew Jackson to lasting fame.
H. wars do not always end when participating countries agree to end them.
J. the reasons behind warfare will not always be addressed by a treaty.

17. The use of the phrase “arbitrary treatment” (lines 9–10) to describe the actions of the French toward the Americans indicates the author’s belief that:
A. the French treatment of American interests was mostly justified.
B. the French were secretly helping the Americans.
C. the British were more consciously antagonistic to American interests.
D. conscription may not have violated Americans’ rights.

18. According to Paragraph 3 (lines 30–44), one of the reasons for the outbreak of the War of 1812 was:
F. conflict over territorial expansion.
G. the British maltreatment of Native Americans.
H. deteriorating relations with the Spanish, who were allied with Britain.
J. conscription of American sailors into the British and French navies.
Passage III

HUMANITIES: This passage is adapted from an article found on Wikipedia.com.

Born in Edinburgh in 1771, the young Walter Scott survived a childhood bout of polio that would leave him lame in his right leg for the rest of his life. After studying law at Edinburgh University, he followed in his father’s footsteps and became a lawyer in his native Scotland. Beginning at age 25, he started dabbling in writing, first translating works from German, then moving on to poetry. In between these two phases of his literary career, he published a three-volume set of collected Scottish ballads, The Minstrelsy of the Scottish Border. This was the first sign of his interest in Scotland and history in his writings.

After Scott had founded a printing press, his poetry, beginning with The Lay of the Last Minstrel in 1805, brought him great fame. He published a number of other poems over the next ten years, including in 1810 the popular Lady of the Lake, portions of which (translated into German) were set to music by Franz Schubert. Another work from this time period, Marmion, produced some of his most quoted (and most often misattributed) lines, such as

Oh! what a tangled web we weave
When first we practise to deceive!

When Scott’s press became embroiled in financial difficulties, Scott set out, in 1814, to write a successful (and profitable) work. The result was Waverley, a novel that did not name its author. It was a tale of the last Jacobite rebellion in the United Kingdom, the “Forty-Five,” and the novel met with considerable success. There followed a large number of novels in the next five years, each in the same general vein. Mindful of his reputation as a poet, he maintained the anonymity he had begun with Waverley, always publishing the novels under a name such as “Author of Waverley” or attributed as “Tales of...” with no author. Even when it was clear that there would be no harm in coming out into the open, he maintained the façade, apparently out of a sense of fun. During this time, the nickname “The Wizard of the North” was popularly applied to the mysterious best-selling writer. His identity as the author of the novels was widely rumored, and in 1815 Scott was given the honour of dining with George, Prince Regent, who wanted to meet “the author of Waverley.”

In 1820, Scott broke away from writing about Scotland with Ivanhoe, a historical romance set in twelfth-century England. It too was a runaway success and, as he did with his first novel, he unleashed a slew of books along the same lines. As his fame grew during this phase of his career, he was granted the title of Baronet, becoming Sir Walter Scott. At this time he organized the visit of King George IV to Scotland, and when the King visited Edinburgh in 1822, the spectacular pageantry Scott had concocted to portray the King as a rather tubby reincarnation of Bonnie Prince Charlie made tartans and kilts fashionable and turned them into symbols of national identity.

Beginning in 1825, Scott fell into dire financial straits again, and his company nearly collapsed. That he was the author of his novels became general knowledge at this time as well. Rather than declare bankruptcy he placed his home, Abbotsford House, and income into a trust belonging to his creditors, and proceeded to write his way out of debt. He kept up his prodigious output of fiction (as well as producing a biography of Napoleon Bonaparte) through 1831. By then his health was failing, and he died at Abbotsford in 1832. Though not in the clear by then, his novels continued to sell, and he made good his debts from beyond the grave. He was buried in Dryburgh Abbey; nearby, fittingly, a large statue can be found of William Wallace—one of Scotland’s great historical figures.

Scott was responsible for two major trends that carry on to this day. First, he popularized the historical novel; an enormous number of imitators (and imitators of imitators) would appear in the nineteenth century. It is a measure of Scott’s influence that Edinburgh’s central railway station, opened in 1854, is called Waverley Station. Second, his Scottish novels rehabilitated Highland culture after years in the shadows following the Jacobite rebellions.
Scott was also responsible, through a series of pseudonymous letters published in the *Edinburgh Weekly News* in 1826, for retaining the right of Scottish banks to issue their own banknotes, which is reflected to this day by his continued appearance on the front of all notes issued by the Bank of Scotland.

21. The main idea of the passage is that:
   A. historical novels can be very successful in rehabilitating a country’s culture.
   B. Sir Walter Scott’s writings achieved both financial success and cultural impact.
   C. Scott became known more for his financial failures than for his literary talents.
   D. the success of Scott’s novels was largely due to the anonymity of the author.

22. According to the passage, Walter Scott turned to writing novels because:
   F. his childhood bout with polio made it difficult for him to continue working as a lawyer.
   G. his printing press business was being sued over copyright violations.
   H. his three-volume set of Scottish ballads did not sell well.
   J. his printing press business was losing money.

23. According to the author, Scott published *Waverly* anonymously because:
   A. he didn’t want to damage his reputation as a lawyer.
   B. he had fun watching people try to determine who the author was.
   C. his novels sold faster without an author’s name on them.
   D. he was afraid writing fiction would take away from his reputation as a poet.

24. The author would most likely describe Scott’s effect on how Scotland was viewed as:
   F. damaging, since Scott degraded Scottish culture by popularizing tartans and kilts.
   G. unimportant, since Scott’s novels were no more than popular fiction.
   H. ground-breaking, since Scott was the first to write serious analyses of Scottish history.
   J. positive, since Scott made Scottish culture acceptable again after years of neglect.

25. Based on the passage, it is reasonable to assume that Scott’s reputation after his death:
   A. remained favorable.
   B. waned because there were no more of his novels being published.
   C. declined because he died without paying all of his debts.
   D. was debased because of all his imitators.

26. The author describes how Scott influenced Scotland’s right to continue issuing its own banknotes in order to:
   F. show a way in which Scott helped overcome his own financial difficulties.
   G. establish the level of Scott’s influence with the Prince Regent.
   H. emphasize Scott’s continued impact on his native country.
   J. point out a way for the reader to find out what Scott looked like.

27. The author most likely uses “fittingly” (line 69) when describing the presence of a statue of William Wallace near Scott’s grave in Dryburgh Abbey because:
   A. Scott’s first major novel was about the achievements of William Wallace.
   B. Scott wrote novels about Scottish history and Wallace is a famous historical figure from Scotland.
   C. Scott was a very religious man and deserved to be buried in an abbey.
   D. Wallace was an avid fan of Scott’s poetry.

28. The passage suggests that the author’s attitude toward Sir Walter Scott is:
   F. restrained and skeptical.
   G. derisive and contemptuous.
   H. interested and appreciative.
   J. passionate and envious.

29. Based on the fifth paragraph (lines 57–71), it is reasonable to infer that Sir Walter Scott’s attitude toward his debts was:
   A. irresponsible, since he left them to be taken care of after his death.
   B. resentful, for he believed that they were caused by his partners.
   C. impatient, because he became annoyed that his creditors hounded him so.
   D. accepting, since he acknowledged his responsibility and tried to pay them back.
30. The author’s use of “dabbling” in line 6 suggests that:

F. Scott sought to establish himself in a field in which he had little experience.

G. the financial losses eventually suffered by Scott’s printing press began with this activity.

H. Scott’s inexperience led to the poor quality of his literary work.

J. Scott’s initial work led to his interest in Scottish history.

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Passage IV

NATURAL SCIENCE: The following is adapted from Wikipedia articles titled “Lemur” and “Ring-tailed Lemur.”

Lemurs are part of a suborder of primates known as prosimians, and make up the infraorder Lemuriformes. This type of primate was the evolutionary predecessor of monkeys and apes (simians). The term “lemur” is derived from the Latin word *lemures*, which means “spirits of the night.” This likely refers to many lemurs’ nocturnal behavior and their large, reflective eyes. It is generically used for the members of the four lemuriform families, but it is also the genus of one of the lemuriform species. The two flying lemur species are not lemurs, nor are they even primates.

Lemurs are found naturally only on the island of Madagascar and some smaller surrounding islands, including the Comoros (where it is likely they were introduced by humans). While they were displaced in the rest of the world by monkeys, apes, and other primates, the lemurs were safe from competition on Madagascar and differentiated into a number of species. These range in size from the tiny 30-gram pygmy mouse lemur to the 10-kilogram indri. The larger species have all become extinct since humans settled on Madagascar, and since the early twentieth century the largest lemurs reach about seven kilograms. Typically, the smaller lemurs are active at night (nocturnal), while the larger ones are active during the day (diurnal).

All lemurs are endangered species, due mainly to habitat destruction (deforestation) and hunting. Although conservation efforts are underway, options are limited because of the lemurs’ limited range and because Madagascar is desperately poor. Currently, there are approximately 32 living lemur species.

The ring-tailed lemur is a relatively large prosimian, belonging to the family Lemuridae. Ring-tailed lemurs are the only species within the genus *Lemur* and are found only on the island of Madagascar. Although threatened by habitat destruction and therefore listed as vulnerable by the IUCN Red List, ring-tailed lemurs are the most populous lemur species in zoos worldwide; they reproduce readily in captivity.

Mostly grey with white underparts, ring-tailed lemurs have slender frames; their narrow faces are white with black lozenge-shaped patches around the eyes and black vulpine muzzles. The lemurs’ trademark, their long, bushy tails, are ringed in black and white. Like all lemurs, ring-tailed lemurs have hind limbs longer than their forelimbs; their palms and soles are padded with soft, leathery skin and their fingers are slender and dextrous. On the second toe of their hind limbs, ring-tailed lemurs have claws specialized for grooming purposes.

The very young animals have blue eyes while the eyes of all adults are a striking yellow. Adults may reach a body length of 46 centimeters (18 inches) and a weight of 5.5 kilograms (12 pounds). Their tails are longer than their bodies, at up to 56 centimeters (22 inches) in length.

Found in the southwest of Madagascar and ranging farther into highland areas than any other lemur, ring-tailed lemurs inhabit deciduous forests with grass floors or forests along riverbanks (gallery forests); some may also inhabit dry, open brush where few trees grow. Ring-tailed lemurs are thought to require primary forest (that is, forests that have remained undisturbed by human activity) in order to survive; such forests are now being cleared at a troubling rate.

While primarily frugivores (fruit-eating), ring-tailed lemurs will also eat leaves, seeds, and the odd insect. Ring-tailed lemurs are diurnal and primarily arboreal animals, forming troops of up to 25 individuals. Social hierarchies are determined by sex, with a distinct hierarchy for each gender; females tend to dominate the troop, while males will alternate between troops. Lemurs claim a sizable territory, which does not overlap with those of other troops; up to 5.6 kilometers (3.5 miles) of this territory may be covered in a single day’s foraging.

Both vocal and olfactory signals are important in ring-tailed lemurs’ communication: 15 distinct vocalizations are used. A fatty substance is exuded from the lemurs’ glands, which the lemurs run their tails through; this scent is used by both sexes to mark territory and to challenge would-be rivals amongst males. The males vigorously wave their tails high in the air in an attempt to overpower the scent of others.

The breeding season runs from April to June, with the female fertile period lasting for only a day. Gestation lasts for about 146 days, resulting in a litter of either one or two. The young lemurs begin to eat solid food after two months and are fully weaned after five months.
31. According to the passage, lemurs survived on the island of Madagascar because:
   A. their large, reflective eyes allowed them to move around at night when predators were asleep.
   B. their ability to mark their territory by scent gave them adequate territory for foraging.
   C. monkeys, apes and other primates were not a threat to them on Madagascar.
   D. their strong social hierarchy allowed them to band together for safety.

32. According to the passage, the social organization of the ring-tailed lemur:
   F. places females at the top of the hierarchy.
   G. functions to ensure adequate food supplies.
   H. has followed the same structure since antiquity.
   J. is notable for its equality of the sexes.

33. The main purpose of the passage is to:
   A. propose a means of preventing the extinction of lemurs.
   B. compare different species of lemurs.
   C. provide information regarding the ring-tailed lemur.
   D. argue that the lemur should not have been introduced into the Comoros Islands.

34. According to the passage, why are ring-tails the most populous species of lemurs in zoos?
   F. They inhabit deciduous forests, which make the lemurs’ capture relatively easy.
   G. They have no difficulty giving birth in a zoo environment.
   H. Their attractive appearance makes them popular with patrons.
   J. Their eating preferences are easily accommodated.

35. The passage suggests that the rate at which primary forests are being cleared is “troubling” (line 63) because:
   A. it is causing significant soil erosion in the lemurs’ primary habitat.
   B. valuable hardwoods are being destroyed.
   C. lemurs’ predators inhabit the cleared area.
   D. lemurs need to live in primary forests to survive.

36. All of the following are given as ways in which ring-tailed lemurs use olfactory signals EXCEPT:
   F. to put male challengers on notice.
   G. to mask the scent of other lemurs.
   H. to signify group identification.
   J. to mark their territory.

37. According to the passage, which of the following describes a characteristic of the infraorder Lemuriformes?
   A. They are nocturnal.
   B. They evolved before monkeys and apes did.
   C. They include two species of flying lemurs.
   D. They are found only on Madagascar.

38. Which of the following can reasonably be inferred from information in the second paragraph (lines 12–25)?
   F. The pygmy mouse lemur is diurnal.
   G. The larger species of lemur were hunted for their fur.
   H. The indri lemur is extinct.
   J. Lemurs are descended from monkeys.

39. The primary purpose of the seventh paragraph (lines 55–63) is to:
   A. distinguish between nocturnal and diurnal lemurs.
   B. explain the demise of primary forests.
   C. describe the lemur’s habitat.
   D. argue that lemurs inhabit only forested areas.

40. Which of the following questions is NOT answered by the passage?
   F. Will conservationists be able to prevent the extinction of lemurs?
   G. Why did lemurs survive on Madagascar?
   H. How many offspring can a female lemur produce per year?
   J. What makes up the lemur’s diet?
Passage I

Engineers designing a new rail system wished to study the effectiveness of a new kind of air brake versus the dynamic (engine) brakes currently used in certain high-speed trains. To do so, they conducted a series of trials to measure $N$, a train’s total stopping distance. $N$ is the distance a train travels from the time its engineer first reacts to a stop signal until the train comes to a complete stop. The train with air brakes was first accelerated to an initial speed of 15 m/sec. The data was compared to existing braking data for trains with dynamic brakes also stopped from an initial speed of 15 m/sec.

For the air brakes, the engineers measured two components; $L$ is the distance the train traveled during the engineer’s average reaction time of 0.8 sec, and $M$ is the average distance traveled once the air brakes were engaged. The existing braking data for dynamic brakes were calculated using the formula $N = \frac{(\text{train length in m})^2}{160 \text{ m}}$. Table 1 lists $L$, $M$, and $N$ for various train lengths, where $N$ was computed for both air and dynamic brakes. Figure 1 contains graphs of $N$ versus train length for air and dynamic brakes.

### Table 1

<table>
<thead>
<tr>
<th>Train length (cars)</th>
<th>Train length (m)</th>
<th>Air brakes</th>
<th>Dynamic brakes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$L$ (m)</td>
<td>$M$ (m)</td>
<td>$N$ (m)</td>
</tr>
<tr>
<td>10</td>
<td>120</td>
<td>12</td>
<td>196</td>
</tr>
<tr>
<td>20</td>
<td>240</td>
<td>12</td>
<td>392</td>
</tr>
<tr>
<td>30</td>
<td>360</td>
<td>12</td>
<td>588</td>
</tr>
<tr>
<td>40</td>
<td>480</td>
<td>12</td>
<td>784</td>
</tr>
</tbody>
</table>

1. Compared to $M$ for a train length of 20 cars, $M$ for a train length of 40 cars is:
   A. $\frac{1}{4}$ as great.
   B. $\frac{1}{2}$ as great.
   C. 2 times as great.
   D. 4 times as great.

2. For the air brakes, $N$ equals:
   F. $L - M$.
   G. $L + M$.
   H. $L \div M$.
   J. $L \times M$.

3. According to Figure 1, the two kinds of brakes yield the same value for $N$ when the train length is closest to:
   A. 10 cars.
   B. 25 cars.
   C. 35 cars.
   D. 40 cars.
4. A train of length 10 cars was traveling at 15 m/sec when its engineer spotted an automobile stalled on the tracks ahead and immediately engaged the train’s brakes. It took the engineer 12 sec from the time he spotted the automobile until he brought the train to a complete stop. If the train had dynamic brakes, how far did it travel during the 12 sec interval?
   F. 90 m
   G. 360 m
   H. 810 m
   J. 1440 m

5. Based on Table 1 or Figure 1, for a train with air brakes of length 50 cars and having an initial speed of 15 m/sec, $N$ will be:
   A. less than 400 m
   B. between 450 m and 600 m
   C. between 600 and 800 m
   D. greater than 800 m
Passage II

Blood samples of equal volumes were collected from five students on one day immediately after waking in the morning and one hour after a breakfast of pancakes and syrup with orange juice. The samples were then analyzed. Tables 1 and 2 show the color, mass, and sugar concentration of the blood samples taken before and after breakfast, respectively. Sugar concentration was calculated in milligrams per deciliter (mg/dL) as follows:

\[
\text{sugar concentration (mg/dL)} = \frac{\text{mass of sugars (mg)}}{\text{volume of blood (dL)}}
\]

The normal range for blood sugar concentration is 90 mg/dL–120 mg/dL.

6. Based on the information presented, which of the following blood samples most likely had the highest water content per milliliter?
   F. The before breakfast blood sample from Student A
   G. The before breakfast blood sample from Student B
   H. The after breakfast blood sample from Student C
   J. The after breakfast blood sample from Student D

7. Do the data in Tables 1 and 2 support the conclusion that as the mass of a given volume of blood decreases, blood color darkens?
   A. Yes, because blood samples with the lowest masses had lower color values.
   B. Yes, because blood samples with the lowest masses had higher color values.
   C. No, because blood samples with the lowest masses had lower color values.
   D. No, because blood samples with the lowest masses had higher color values.

8. Based on the results provided, as the sugar concentration of a given volume of blood increases, the mass of that volume of blood:
   F. increases, then decreases.
   G. decreases, then increases.
   H. increases only.
   J. decreases only.

9. One of the five students had a common cold on the day the blood samples were collected. Given that the sugar concentration of blood tends to increase during periods of illness, the student with a cold was most likely:
   A. Student A.
   B. Student B.
   C. Student C.
   D. Student D.

10. A volume of 0.5 mL from which of the following blood samples would weigh the most?
    F. The before breakfast blood sample from Student B
    G. The before breakfast blood sample from Student D
    H. The after breakfast blood sample from Student C
    J. The after breakfast blood sample from Student E

---

**Table 1**

<table>
<thead>
<tr>
<th>Student</th>
<th>Color*</th>
<th>Mass (g)</th>
<th>Sugar concentration (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>9</td>
<td>1.067</td>
<td>116</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>1.049</td>
<td>93</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>1.051</td>
<td>94</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>1.058</td>
<td>108</td>
</tr>
<tr>
<td>E</td>
<td>7</td>
<td>1.064</td>
<td>112</td>
</tr>
</tbody>
</table>

*Note: Color values were assigned according to the following scale: 0 = pale red; 10 = dark red

**Table 2**

<table>
<thead>
<tr>
<th>Student</th>
<th>Color*</th>
<th>Mass (g)</th>
<th>Sugar concentration (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8</td>
<td>1.069</td>
<td>119</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
<td>1.051</td>
<td>96</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>1.055</td>
<td>102</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>1.060</td>
<td>110</td>
</tr>
<tr>
<td>E</td>
<td>7</td>
<td>1.066</td>
<td>115</td>
</tr>
</tbody>
</table>

*Note: Color values were assigned according to the following scale: 0 = pale red; 10 = dark red
Passage III

The following experiments were performed to study the effects of adding various amounts of a solute (a substance that is dissolved in a solution) on the boiling points and freezing points of two different solvents (substances that dissolve other substances). The two solvents, isopropyl alcohol (IPA) and acetone, boil at 108°C and 56°C, respectively, and freeze at -88°C and -95°C, respectively, at standard atmospheric pressure.

Experiment 1

A student dissolved 0.05 moles of potassium chloride (KCl) in 200 g of IPA. Each mole of KCl produces 2 moles of solute particles (1 mole of potassium ions and 1 mole of chloride ions in solution). After the KCl dissolved, the boiling point of the solution was determined. This procedure was repeated dissolving different amounts of KCl in IPA and acetone. The results are shown in Table 1.

<table>
<thead>
<tr>
<th>Solution</th>
<th>Solvent</th>
<th>Amount of KCl added (moles)</th>
<th>Boiling point (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IPA</td>
<td>0.05</td>
<td>109.5</td>
</tr>
<tr>
<td>2</td>
<td>IPA</td>
<td>0.1</td>
<td>111.2</td>
</tr>
<tr>
<td>3</td>
<td>IPA</td>
<td>0.2</td>
<td>114.4</td>
</tr>
<tr>
<td>4</td>
<td>IPA</td>
<td>0.4</td>
<td>119.7</td>
</tr>
<tr>
<td>5</td>
<td>acetone</td>
<td>0.05</td>
<td>56.4</td>
</tr>
<tr>
<td>6</td>
<td>acetone</td>
<td>0.1</td>
<td>56.8</td>
</tr>
<tr>
<td>7</td>
<td>acetone</td>
<td>0.2</td>
<td>57.9</td>
</tr>
<tr>
<td>8</td>
<td>acetone</td>
<td>0.4</td>
<td>59.2</td>
</tr>
</tbody>
</table>

Note: Boiling points were measured at standard atmospheric pressure.

Experiment 2

A student dissolved 0.05 moles of KCl in 200 g of IPA. After the KCl dissolved, the freezing point of the solution was determined. The procedure was repeated using various amounts of KCl in IPA and acetone. The results are shown in Table 2.

<table>
<thead>
<tr>
<th>Solution</th>
<th>Amount of KCl added (moles)</th>
<th>Freezing point (°C)</th>
</tr>
</thead>
<tbody>
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Note: Freezing points were measured at standard atmospheric pressure.

11. A solution containing 200 g of IPA and an unknown amount of KCl freezes at -93.0°C. Based on the results of Experiment 2, the number of moles of KCl dissolved in the solution is closest to:
   A. 0.4.
   B. 0.5.
   C. 0.6.
   D. 0.7.

12. Which of the following factors was NOT directly controlled by the student in Experiment 2?
   F. The substance added to the IPA
   G. The amount of IPA used
   H. The amount of solute added to the IPA
   J. The freezing points of the IPA solutions

13. From the results of Experiment 2, which of the following statements most accurately reflects the effect of the number of solute particles dissolved in IPA on the freezing point of a solution?
   A. The number of solute particles produced does not affect the freezing point.
   B. The more solute particles that are present, the higher the freezing point is.
   C. The more solute particles that are present, the lower the freezing point is.
   D. No hypothesis can be made because only one solute was tested.

14. According to the results of Experiments 1 and 2, which of the following conclusions can be made about the changes in the boiling point and freezing point of IPA solutions when 0.4 moles of KCl are added to 200 g of IPA? The boiling point is:
   F. raised more than the freezing point is lowered.
   G. raised less than the freezing point is raised.
   H. lowered more than the freezing point is lowered.
   J. lowered less than the freezing point is raised.

15. Based on the results of Experiment 1, as the number of potassium particles and chloride particles in 200 g of IPA increases, the boiling point of the solution:
   A. increased only.
   B. decreased only.
   C. increased, then decreased.
   D. remained the same.

16. MgCl₂ produces 3 moles of solute particles per mole when dissolved. Experiment 1 was repeated using a solution containing 200 g of IPA and 0.2 moles MgCl₂. Assuming that MgCl₂ has the same effect on the boiling point of IPA as does KCl per particle produced when dissolved, the boiling point of the solution would most likely be:
   F. between 109.5°C and 111.2°C.
   G. between 111.2°C and 114.4°C.
   H. between 114.4°C and 119.7°C.
   J. above 119.7°C.
Passage IV

The study of carbon isotopes present in an archeological sample can help us closely approximate the age of the sample. The ratio of the isotopes $^{14}$C and $^{12}$C in a sample of formerly living tissue such as skeletal remains is compared to the $^{14}$C/$^{12}$C ratio in a sample of air from Earth’s biosphere. The biosphere is the layer of the atmosphere closest to Earth’s surface, where living organisms constantly exchange levels of carbon isotopes with the environment. The comparison of a sample’s ratio to that of the biosphere is called the $C$-14 index ($\delta^{14}$C). The $\delta^{14}$C is calculated using the following formula:

$$\delta^{14}\text{C} = \frac{(^{14}\text{C})_{\text{biosphere}} - (^{14}\text{C})_{\text{sample}}}{(^{14}\text{C})_{\text{biosphere}}} \times 100$$

Scientists conducted 3 studies to examine the $\delta^{14}$C of human remains excavated from tombs in Mexico and Africa and learn about the ancient civilizations that once existed there.

Study 1

Human remains from 10 different tombs throughout Mexico were examined and the average $\delta^{14}$C was calculated for each tomb. Figure 1 shows a comparison between the calculated values of $\delta^{14}$C and the ages of the remains as determined by other methods.

![Figure 1](image1)

Study 2

The remains from one of the largest tombs from Mexico in Study 1 were organized according to the depth beneath the surface from which they were excavated. Since layers of soil and rock were deposited at a known rate at this location, each depth corresponded to a different sample age. In total, 20 m of earth represented the last 4,000 years of soil and rock accumulation. The calculated values of $\delta^{14}$C for samples taken from different depths are shown in Figure 2.

![Figure 2](image2)

Study 3

The procedures of Study 2 were repeated for samples excavated from a large tomb in Africa. The past 4,000 years of soil and rock accumulation was represented by 40 m of depth. The calculated values of $\delta^{14}$C for the samples are shown in Figure 3.

![Figure 3](image3)

17. According to Study 1, average $\delta^{14}$C values for the samples from Mexico were closest for which of the following pairs of tombs?

A. Tomb 2 and Tomb 3
B. Tomb 4 and Tomb 5
C. Tomb 5 and Tomb 10
D. Tomb 6 and Tomb 9

18. According to Study 1, which of the following best describes the relationship between the average $\delta^{14}$C and the ages of the samples from Mexico? As the ages of the samples increased, the average $\delta^{14}$C of the samples:

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

GO ON TO THE NEXT PAGE
19. Which of the following statements best describes why Mexico and Africa were chosen as locations for these studies? These locations had to have:
   A. sample ages greater than 2,000 years for all tomb sites.
   B. tombs over which a significant amount of soil and rock was deposited over the last 4,000 years.
   C. several sites at which little soil and rock was deposited over the last 4,000 years.
   D. large areas of undeveloped land.

20. According to Study 2, a sample excavated from a depth of 25 m under the surface in Mexico most likely had a δ¹⁴C value that was:
   F. less than 30.
   G. between 30 and 40.
   H. between 40 and 50.
   J. greater than 50.

21. According to Studies 2 and 3, 4,000 years of soil and rock accumulation was represented by 20 m of earth in Mexico and 40 m of earth in Africa. Which of the following statements best explains why the relationships between time and depth were different? The average rate of soil and rock accumulation over that time period in Africa:
   A. was less than the rate in Mexico.
   B. was the same as the rate in Mexico.
   C. was greater than the rate in Mexico.
   D. could not be determined in comparison with the rate in Mexico.

22. According to the information provided, a sample that has a calculated δ¹⁴C of zero must have a ¹⁴C/¹²C ratio that compares in which of the following ways to the ¹⁴C/¹²C ratio of the biosphere? The sample’s ¹⁴C/¹²C ratio is:
   F. 1/4 of the ¹⁴C/¹²C ratio of the biosphere.
   G. 1/2 of the ¹⁴C/¹²C ratio of the biosphere.
   H. the same as the ¹⁴C/¹²C ratio of the biosphere.
   J. twice as large as the ¹⁴C/¹²C ratio of the biosphere.
Passage V

Scientists discuss two possible events that may have caused the extinction of dinosaurs approximately 65 million years ago.

Scientist 1

The extinction of the dinosaurs was caused by a meteorite of about 10 km in diameter that struck Earth at a location along what is now the northwestern coast of the Yucatan Peninsula in Mexico. The initial impact incinerated everything on Earth’s surface within a radius of approximately 500 km from the point of impact. The resulting shock wave set massive fires and generated tidal waves that caused destruction across much larger distances.

Also, trillions of tons of debris were thrown into the air, blocking light from the sun and causing a significant decrease in global temperatures. The worldwide fires and the large amounts of CO₂ they released later resulted in an equally significant increase in temperatures and chemical reactions leading to downpours of acid rain.

Scientist 2

The extinction of the dinosaurs was caused by an extended period of widespread volcanic activity. Volcanic eruptions around the world introduced large amounts of soot into the atmosphere, causing dramatic climatic changes. Combined with the excess CO₂ released by fires ignited by lava flows, the soot and the change in climate resulted in the production of acid rain. The atmosphere and the sources of food and water became too toxic for the dinosaurs.

The volcanoes also expelled huge amounts of sulfates (SO₄) into the atmosphere, and the mixing of sulfates with water vapor caused more acid rain. Also, SO₄ in the atmosphere led to a breakdown of the ozone layer, allowing high levels of ultraviolet radiation to reach the surface.

23. Which of the following statements best explains why Scientist 1 mentioned acid rain?
   A. Acid rain is beneficial to many living things.
   B. Acid rain is harmful to many living things.
   C. Acid rain helps create CO₂ in the atmosphere.
   D. Acid rain results in fires.

24. Sulfates in the atmosphere help to reflect solar radiation back into space, resulting in a reduction of Earth’s surface temperature. Based on the information provided, this fact would most likely weaken the viewpoint(s) of:
   F. Scientist 1.
   G. Scientist 2.
   H. both Scientist 1 and Scientist 2.
   J. neither Scientist 1 nor Scientist 2.

25. Scientist 2 would most likely agree that the ozone layer present in today’s atmosphere is maintained, at least in part, by:
   A. frequent meteor showers.
   B. periodically active volcanoes.
   C. the high level of CO₂ in the atmosphere.
   D. the low level of SO₄ in the atmosphere.

26. Both scientists would most likely agree that worldwide climate changes occurred partially as a result of:
   F. the impact of a meteorite.
   G. acid rain.
   H. the presence of high levels of CO₂ in the atmosphere.
   J. the presence of high levels of SO₄ in the atmosphere.

27. According to the information provided, radioactive dating of fragments of the meteorite described by Scientist 1 would show the fragments to be about how many million years old?
   A. 2
   B. 10
   C. 50
   D. 65
28. Sulfates are produced in large amounts by a variety of industrial processes. Scientist 2 would most likely predict that in an area of many SO₄-producing industries, if the industries were to alter their processes such that sulfates were no longer produced, the climatic effect in that area would be an increase in the:

F. average pH of rainfall.
G. amount of rainfall.
H. average temperature.
J. amount of ultraviolet radiation reaching Earth’s surface.

29. Inorganic sulfates are rocks containing sulfates like barium sulfate (BaSO₄) that are formed when minerals combine with sulfates in a high-temperature environment. If scientists found large amounts of inorganic sulfates that had formed about 65 million years ago, this discovery would most likely support the viewpoint(s) of:

A. Scientist 1.
B. Scientist 2.
C. both Scientist 1 and Scientist 2.
D. neither Scientist 1 nor Scientist 2.
Passage VI

Under certain conditions, mixtures of hydrogen and chlorine will form hydrochloric acid (HCl). In their chemistry class, students performed the following experiments to study how HCl forms.

Experiment 1

A clear, thick-walled gas syringe was filled with 20 mL of hydrogen gas (H₂) and 20 mL of chlorine gas (Cl₂), as shown in Figure 1.

The syringe plunger was then locked into place, and the syringe was covered in a black cloth. After a few minutes, the cloth was removed and an ultraviolet light bulb was flashed to briefly illuminate the gas from close range. A reaction occurred, forming droplets of HCl. The plunger was then released, and the final volume of gas was recorded after the system was allowed to adjust to room temperature. The composition of the remaining gas, if any, was analyzed. The procedure was repeated with different gas volumes, and the results were recorded in Table 1.

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Since equal numbers of different gas molecules are known to occupy equal volumes at the same pressure and temperature, the students proposed the following equation:

\[ H₂ + Cl₂ \rightarrow 2 \text{HCl} \]

Experiment 2

As shown in Figure 2, streams of silicon tetrachloride (SiCl₄) and hydrogen (H₂) gases were allowed to mix in a high-temperature furnace, producing HCl vapor and solid Si. The vapor was released into a cooler chamber, where it condensed to form liquid HCl.

The changes in mass of the contents of the furnace and condensing chamber were used to calculate the mass of SiCl₄ reacted and the mass of HCl formed. It was determined that 4 molecules of HCl were produced for every 1 molecule of SiCl₄ reacted:

\[ \text{SiCl}_4 + 2 \text{H}_2 \rightarrow \text{Si} + 4 \text{HCl} \]
30. When sodium hydroxide (NaOH) and HCl are combined, both compounds decompose, and sodium chloride (NaCl) and H₂O are formed. Which of the following correctly represents this reaction?
F. NaCl + H₂O → NaOH + HCl
G. NaCl + 2 H₂O → NaOH + HCl
H. NaOH + HCl → NaCl + H₂O
J. NaOH + HCl → NaCl + 2 H₂O

31. In Trial 5 of Experiment 1, immediately after the reaction began but before the syringe plunger was released, one would predict that, compared to the pressure in the syringe before the flash, the pressure in the syringe after the flash was:
A. lower, because the total amount of gas increased.
B. lower, because the total amount of gas decreased.
C. higher, because the total amount of gas increased.
D. higher, because the total amount of gas decreased.

32. If 10 mL of H₂ and 20 mL of Cl₂ were reacted using the procedure from Experiment 1, the final volume of Cl₂ would most likely be:
F. 0 mL
G. 5 mL
H. 10 mL
J. 20 mL

33. In Experiment 1, which of the following assumptions about the chemical reactions were made before the final measurements were taken?
A. Each reaction had run to completion.
B. Excess Cl₂ must be present for HCl to form.
C. HCl vapor is not absorbed by solid Si.
D. SiCl₄ and H₂ will only react when heated.

34. When oxygen gas (O₂) is reacted with H₂ under certain conditions, the following reaction occurs:
2 H₂ + O₂ → 2 H₂O

Based on the results of Experiment 1, if 10 mL of O₂ were completely reacted with 25 mL of H₂ at the same pressure and temperature, what volume of H₂ would remain unreacted?
F. 0 mL
G. 5 mL
H. 10 mL
J. 15 mL

35. Which of the following events would NOT cause an error in interpreting the results of Experiment 2?
A. Other reactions occurring between SiCl₄ and H₂ that produced different products
B. HCl condensing before it reached the condensing chamber
C. Using SiCl₄ contaminated with nonreactive impurities
D. Using H₂ contaminated with reactive impurities
Passage VII

A wooden box was held in place on a plastic track a distance, \(d_0\), from one end of the track, which was inclined at an angle, \(\theta\), above the floor, as shown in Figure 1.

![Figure 1](image1)

When the box was released it slid down the plane, as shown in Figure 2.

![Figure 2](image2)

The slide time was the time required for the leading face of the box to reach the end of the track. The slide time is graphed in Figure 3 for a fixed \(\theta\) and various \(d_0\) on the surfaces of Neptune, Earth, and Mercury. The slide time is graphed in Figure 4 for \(d_0 = 60\) cm and various \(\theta\) on the same three surfaces. The acceleration due to gravity at these surfaces is shown in Table 1.

<table>
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<tr>
<th>Planet</th>
<th>Acceleration due to gravity at surface of planet (m/sec^2)</th>
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</thead>
<tbody>
<tr>
<td>Neptune</td>
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</tr>
<tr>
<td>Earth</td>
<td>9.8</td>
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<tr>
<td>Mercury</td>
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</table>

![Figure 3](image3)

![Figure 4](image4)
36. Based on Figure 3, if \( d_0 \) were 25 cm, the slide time on Mercury would be closest to:
   F. 0.3 sec.
   G. 0.4 sec.
   H. 0.6 sec.
   J. 1.1 sec.

37. According to Figure 4, the box with \( d_0 = 60 \) cm will have a slide time on Mercury of 1.2 sec if \( \theta \) is approximately:
   A. 27°.
   B. 30°.
   C. 38°.
   D. 51°.

38. After the box traveled a distance, \( x \), down the track, the distance from the leading face of the box to the end of the track equaled:
   F. \( d_0 - x \).
   G. \( d_0 + x \).
   H. \( d_0 \).
   J. \( x \).

39. Suppose the box represented in Figure 4 has a 0.8 sec slide time at Mercury’s surface. For the same box released from the same \( d_0 \) to have a 0.8 sec slide time at Earth’s surface, \( \theta \) at Earth’s surface would have to be approximately:
   A. 23° greater than at Mercury’s surface.
   B. 23° less than at Mercury’s surface.
   C. 17° greater than at Mercury’s surface.
   D. 17° less than at Mercury’s surface.

40. The acceleration due to gravity on the surface of the planet Jupiter is approximately 24.9 m/sec². Based on Figure 3, a box’s slide time, calculated for Jupiter’s surface and a given \( \theta \), would be:
   F. less than its slide time at Neptune’s surface.
   G. greater than its slide time at Neptune’s surface, and less than its slide time at Earth’s surface.
   H. greater than its slide time at Earth’s surface, and less than its slide time at Mercury’s surface.
   J. greater than its slide time at Mercury’s surface.
DIRECTIONS: This essay is designed to evaluate your writing skills. You will have 30 minutes to complete your essay. When you are told to begin, turn the page and carefully read the prompt. The prompt will describe a hypothetical situation that a high school student might face. You will be asked to take and support a position regarding this situation. Your essay will be scored on a number of factors. These include knowledge and use of correct English, understanding of the question posed by the prompt, ability to take a position on the issue, ability to support that position, organization, focus, and logical reasoning.

You may use the blank pages in the back of this test booklet to plan your essay, but only material written on the four lined pages in your Answer Grid will be scored. Do NOT skip lines or write in the margins. If you want to delete something, draw a single line through it. If you need to add something, write it neatly between the lines and use a caret (^) to indicate where it should go. Essays that are illegible will not receive a score. If your handwriting is difficult to read, consider printing your essay.

When time is called, you must stop writing and put your pencil down immediately.
Extracurricular activities such as sports or arts are offered at most high schools. However, funding for these activities is not always equal, and sometimes one type of activity is sacrificed in favor of another due to limited budgets. Proponents of dedicating funding to sports claim that sporting events attract a large number of spectators to help generate income and support for the school and that students who play sports stay healthy and fit. Proponents of dedicating funding to arts claim that visual and performing arts programs are accessible to a wider array of students and that studies have shown links between creativity and high academic achievement. In your opinion, should high schools allocate more funding to extracurricular sports or arts programs?

In your essay, take a position on this issue. You may write about either of the two points of view given, or you may present a different point of view on this question. Use specific reasons and examples to support your position.
Use this page to *plan* your essay.
Your work on this page will *not* be scored.

If you need more space to plan,
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- **Day**
- **Year**

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**KAPLAN**

Test Prep and Admissions

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