

Student's First Name (please print) \_\_\_\_\_

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**PART 1 ENGLISH LANGUAGE ARTS**

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**PART 2 MATHEMATICS**

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# SAMPLE TEST, FORM B

## PART 1 — ENGLISH LANGUAGE ARTS

*Suggested Time — 90 Minutes*

57 QUESTIONS

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### REVISING/EDITING

QUESTIONS 1–20

#### IMPORTANT NOTE

The Revising/Editing section (Questions 1-20) is in two parts: Part A and Part B.

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#### REVISING/EDITING Part A

**DIRECTIONS:** Read and answer each of the following questions. You will be asked to recognize and correct errors in sentences or short paragraphs. Mark the **best** answer for each question.

1. Read this paragraph.

(1) In September 2016, the National Museum of African American History and Culture opened, as part of the Smithsonian Institution, the museum is already the Smithsonian’s third most popular site. (2) Experts say that they expect this newest Smithsonian facility to welcome nearly 4 million visitors a year. (3) The museum features more than 30,000 objects, including Muhammad Ali’s boxing gloves and a dress sewn by Rosa Parks. (4) A commemorative copy of the Emancipation Proclamation, which was written in 1863 during the presidency of Abraham Lincoln, is also available for viewing at the museum.

Which sentence should be revised to correct a run-on?

- A. sentence 1
- B. sentence 2
- C. sentence 3
- D. sentence 4

2. Read this sentence.

To promote their club, a bake sale will be sponsored by members of the debate team on Wednesday.

How should this sentence be revised?

- E. To promote their club, on Wednesday a bake sale will be sponsored by members of the debate team.
  - F. On Wednesday to promote their club, a bake sale will be sponsored by members of the debate team.
  - G. To promote their club, members of the debate team will sponsor a bake sale on Wednesday.
  - H. Members of the debate team, on Wednesday to promote their club, will sponsor a bake sale.
3. Read this paragraph.

(1) Devon spent several hours preparing for an upcoming audition. (2) First, he did vocal exercises to practice his diction and projection. (3) Then, he studies the text of the monologue to better understand the emotions and motivations of the character he plans to portray. (4) Finally, he recited his monologue in front of a mirror many times, making slight adjustments and improvements to his performance each time.

Which sentence should be revised to correct an inappropriate shift in verb tense?

- A. sentence 1
- B. sentence 2
- C. sentence 3
- D. sentence 4

4. Read this sentence.

The Colosseum in Rome, Italy which is considered one of the New Seven Wonders of the World, is the largest amphitheater ever built and could hold more than 50,000 spectators.

Which edit should be made to correct this sentence?

- E. delete the comma after *Rome*
- F. insert a comma after *Italy*
- G. delete the comma after *World*
- H. insert a comma after *built*

5. Read this sentence.

The engineers tried some other things in the hope of finding a more effective insulation for the compartment.

What is the most precise revision for the words *The engineers tried some other things*?

- A. The engineers did experiments with several new materials
- B. The engineers tested foam and fiberglass
- C. The engineers did tests with two new materials
- D. The engineers worked with foam and fiberglass

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## REVISING/EDITING Part B

**DIRECTIONS:** Read the passage below and answer the questions following it. You will be asked to improve the writing quality of the passage and to correct errors so that the passage follows the conventions of standard written English. You may reread the passage if you need to. Mark the **best** answer for each question.

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### The Local Library

(1) According to a 2015 survey, more than two-thirds of Americans own a smartphone, which means that obtaining information or communicating with people is easier than ever before. (2) With the swipe of a finger or the tap of an icon, people have instant access to articles, blogs, news, and social networking websites. (3) Even with all these immediate sources, one of the best resources also happens to be one of the oldest. (4) The public library is a great place for people to get information.

(5) The public library serves a truly critical role in promoting community. (6) There has been an explosion of digital media in recent years. (7) This now allows people in different places to communicate almost instantaneously. (8) And yet many people complain of feeling more isolated and alone than ever before. (9) The library stands in a unique position to help community members meet this universal need for human connection and companionship.

(10) Furthermore, libraries offer free assistance, training programs, and Internet access to all people. (11) A student who does not have a computer at home can research and type a paper for school. (12) An unemployed adult without access to the Internet can make use of library resources to find job opportunities. (13) A library's selection of materials, known as its collection, can include classic novels, reference books, magazines, periodicals, CDs, and DVDs. (14) The stuff that is found at the library can help people get a lot done.

(15) Public libraries also offer a variety of resources to community members. (16) One important resource is the local librarian, who does far more than check out books and collect fines. (17) Other library resources include free or low-cost tutoring and training programs. (18) Additionally, lectures, book groups, and town meetings promote critical thinking and community engagement. (19) A typical librarian holds a master's degree and can help library patrons navigate through the flood of information available in print or on the Internet.

(20) The hallmark of a public library is that its materials and services are accessible to all. (21) The library connects people to a network of information and resources and is an important part of a community.

6. Which sentence should replace sentence 4 to best introduce the main claim of the passage?
- E. The public library is a valuable resource that all members of a community should use.
  - F. Going to the public library to gather information can be a valuable learning experience.
  - G. The resources available at a public library are most useful for students.
  - H. A public library offers many services to those who are interested in improving their communities.

7. What is the best way to combine sentences 6 and 7 to clarify the relationship between ideas?
- A. There has been an explosion of digital media in recent years, since people in different places can now communicate almost instantaneously.
  - B. There has been an explosion of digital media in recent years, although it now allows people in different places to communicate almost instantaneously.
  - C. In addition to the explosion of digital media in recent years, people in different places can communicate almost instantaneously.
  - D. With the explosion of digital media in recent years, people in different places can now communicate almost instantaneously.
8. Which sentence can best follow and support sentence 9?
- E. Libraries, which have been around for centuries and are found throughout the world today, help preserve the history of a community.
  - F. The public library is often used as a place for community leaders and organizers to host community events, such as hearings or town halls.
  - G. Libraries rely on a combination of local, state, and federal dollars to provide the kinds of services and programs that community members have come to expect.
  - H. At a public library, people can interact with others through a variety of programs, including teen book clubs, toddler story times, and senior-citizen exercise classes.
9. Which transition word or phrase should be added to the beginning of sentence 12?
- A. For example
  - B. Similarly
  - C. Indeed
  - D. As a result
10. Which revision of sentence 14 best maintains the formal style established in the passage?
- E. The resources available at the library can help people accomplish many tasks.
  - F. All the materials you can get at the library can help you do many different tasks.
  - G. Everything in the library can help people work on a lot of different things.
  - H. The resources you can find at the library can help you do whatever you need to do.
11. Where should sentence 19 be moved to improve the organization of the fourth paragraph (sentences 15–19)?
- A. to the beginning of the paragraph (before sentence 15)
  - B. between sentences 15 and 16
  - C. between sentences 16 and 17
  - D. between sentences 17 and 18

12. Which sentence is irrelevant to the argument presented in the passage and should be deleted?
- E. sentence 3
  - F. sentence 11
  - G. sentence 13
  - H. sentence 20
13. Which concluding sentence should be added after sentence 21 to support the argument presented in the passage?
- A. Finally, patrons of the public library can grow in both their interpersonal life and their level of community engagement.
  - B. Clearly, it is in the best interest of community members to maintain, support, and use their public library.
  - C. After all, the public library has been a part of American communities since the first one was founded in 1833.
  - D. In the end, community leaders must work together to find ways to generate more involvement in public library events.

## Moving Through Mountains

(1) An age-old proverb says that necessity is the mother of invention. (2) Centuries of human ingenuity in the face of obstacles prove this to be true. (3) For many years the Swiss Alps, a mountain range spanning southern Switzerland and northern Italy, were such an obstacle. (4) Roads and railways had to navigate around the mountains or through winding tunnels inside the mountains. (5) Transportation of people and goods was difficult and time consuming. (6) In 2016 these burdens were eased with the completion of the Gotthard Base Tunnel.

(7) Construction of the high-speed railway tunnel began in 1996. (8) The tunnel was created through the use of tunnel-boring machines, which are giant drills with a rotating head. (9) Each of the tunnel-boring machines used during the construction of the tunnel was about the length of four football fields arranged end-to-end. (10) During the seventeen-year construction period, 28 million tons of rock were removed, enough to rebuild the Great Pyramid at Giza five times. (11) This massive construction project is reported to have cost \$12 billion. (12) After that, 4 million cubic meters of concrete, or enough concrete to build eighty-four Empire State Buildings, were used to construct and support the tunnel.

(13) By 2020 the high-speed railway will carry more than 250 freight trains and fifty-five passenger trains a day, with most traveling at speeds of around 100 to 125 miles an hour. (14) It will be faster for people to travel between northern and southern Europe. (15) The travel time between the European cities of Zurich, Switzerland, and Milan, Italy, will be reduced by an hour. (16) Many European leaders compare the Gotthard Base Tunnel to the Channel Tunnel, a 33-mile underwater tunnel that connects the United Kingdom and France. (17) While there is no roadway in the Channel Tunnel, people can drive their cars onto special trains that will carry vehicles through to the other side.

(18) The Gotthard Base Tunnel project was successful, so now there is renewed interest in solving other problems associated with traveling to and from certain places. (19) Just as traffic congestion in major cities led to the construction of underground local transportation, natural formations, such as mountain ranges, have also sent people underground for faster, easier, and cheaper methods of transportation across larger areas.

14. What is the best way to combine sentences 4 and 5 to clarify the relationship between ideas?
- E. Roads and railways had to navigate around the mountains or through winding tunnels inside the mountains, making the transportation of people and goods difficult and time consuming.
  - F. Even though roads and railways had to navigate around the mountains or through winding tunnels inside the mountains, the transportation of people and goods was difficult and time consuming.
  - G. Roads and railways had to navigate around the mountains or through winding tunnels inside the mountains, emphasizing that the transportation of people and goods was difficult and time consuming.
  - H. Roads and railways had to navigate around the mountains or through winding tunnels inside the mountains, since the transportation of people and goods was difficult and time consuming.



15. Which sentence should follow sentence 6 to most clearly introduce the topic of the passage?
- A. The Gotthard Base Tunnel was approved by Swiss voters in 1992 and was funded by tolls, fuel taxes, and government loans.
  - B. Leaders from several European countries attended the opening ceremonies for the Gotthard Base Tunnel.
  - C. The Gotthard Base Tunnel is the world's longest and deepest railway tunnel, stretching 35.5 miles straight through the base of the Swiss Alps.
  - D. The construction of the Gotthard Base Tunnel continues to help reduce the number of freight trucks on the roadways.
16. Which sentence could be added to follow and support sentence 8?
- E. The tunnel-boring machine is helpful to tunnel builders in the modern era and has been an improvement over dynamite.
  - F. These enormous tunnel-boring machines function somewhat like a cheese grater, grinding slowly through rock and stone.
  - G. Engineers had considered making a tunnel under the mountains for many years, but it was impossible to do without modern tunnel-boring machines.
  - H. Different types of tunnel-boring machines are used depending on the geology of the area where the tunnel is being created.
17. Where should sentence 12 be moved to improve the organization of the second paragraph (sentences 7–12)?
- A. to the beginning of the paragraph (before sentence 7)
  - B. between sentences 7 and 8
  - C. between sentences 9 and 10
  - D. between sentences 10 and 11
18. Which transition word or phrase should be added to the beginning of sentence 15?
- E. Even so
  - F. Additionally
  - G. For example
  - H. Therefore

19. Which sentence is irrelevant to the topic presented in the passage and should be removed?
- A. sentence 3
  - B. sentence 11
  - C. sentence 13
  - D. sentence 17
20. Which concluding sentence should be added after sentence 19 to support the topic presented in the passage?
- E. There is proof that underground tunnels like the Gotthard Base Tunnel are beneficial to the economy of the surrounding areas.
  - F. The Gotthard Base Tunnel is an extraordinary example of how human ingenuity and persistence can overcome great obstacles.
  - G. The completion of the Gotthard Base Tunnel shows that people can work together to achieve important goals.
  - H. The Swiss government is confident that the economic impact of the Gotthard Base Tunnel will be worth its construction cost.

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# READING COMPREHENSION

## QUESTIONS 21–57

**DIRECTIONS:** Read the passage below and answer the questions following it. Base your answers **on information contained only in the passage**. You may reread a passage if you need to. Mark the **best** answer for each question.

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On Monday evening, September 26, 1960, seventy million Americans turned on their TV sets to view the first televised political debate in a campaign for the presidency of the United States. As of that date, it was by far the largest number ever to witness a political discussion. The novelty of the event drew even those with little or no interest in politics.

10 The candidates, Republican Vice President Richard M. Nixon and Democratic Senator John F. Kennedy, had agreed to face each other and the nation in four one-hour sessions that the press dubbed the “Great Debates.” Many expected Vice President Nixon to win the debates easily. He was ahead in the newspaper polls, he was an experienced public speaker, and he had served as vice president for nearly

20 eight years. Senator Kennedy was less well-known and, at forty-three, was the youngest man ever to run for president. Throughout the presidential race, his opponents criticized him for his relative youth and inexperience.

25 By mutual agreement, the first session was limited to domestic issues within the United States. Each candidate was given eight minutes to make his opening remarks. During the remainder of the hour, the candidates took turns responding to questions posed by selected reporters. Both Kennedy and Nixon dealt with the issues calmly and carefully. Viewers who expected to see a free-for-all were disappointed. The way

35 the two men appeared on the television screen, however, may have been as important as what they said. Kennedy looked at the

camera while answering questions, appearing to speak directly to his viewers and give them straight answers. Nixon was recovering from a severe bout of influenza, and he appeared tense and tired. He looked at the reporters who asked the questions instead of at the camera, giving some viewers the impression that he avoided eye contact with his audience and thus suggesting that he was not trustworthy. Most commentators agreed that Kennedy gained from the encounter: many viewers who had previously thought he lacked the maturity necessary to be president were won over by his charm, poise, and confident manner.

While far fewer people watched the three later sessions, much discussion ensued regarding the influence of the Great Debates on the outcome of the 1960 presidential election. Some feared that the better TV performer was bound to come across as being the better candidate. “Is this a good way to judge a person’s ability to serve as president of the United States?” they asked.

Kennedy ultimately won the election, but it was by the narrowest popular vote margin in more than eighty years. Some observers concluded that, had the Great Debates been broadcast on radio and not on television, Nixon would have won.

21. Which of the following best tells what this passage is about?
- A. the reasons Nixon was expected to defeat Kennedy in the 1960 election
  - B. the discussion of domestic issues in the 1960 presidential debates
  - C. the events related to the first televised presidential debate
  - D. the qualifications of Nixon and Kennedy for the role of president
22. Which of the following would have been the most likely result if the candidates had **not** debated on television in 1960?
- E. Kennedy would have won the election anyway.
  - F. Nixon would have had a better chance of winning the election.
  - G. The election results would have been much closer.
  - H. The debates would not have become a tradition.
23. Which of the following did critics in 1960 think could be an undesirable consequence of televised presidential debates?
- A. Candidates who are less well-known would have to debate experienced politicians.
  - B. Candidates might have difficulty overcoming the pressure of being on live television.
  - C. Candidates would be evaluated based on their performance rather than their positions.
  - D. Candidates would need to participate in multiple televised debates to fully cover important issues.
24. How did Kennedy benefit from the debates?
- E. He was able to prove that he knew more about domestic issues than Nixon did.
  - F. He was able to display favorable personal characteristics despite his inexperience.
  - G. He was able to show that he had a more positive relationship with reporters than Nixon did.
  - H. He was able to persuade viewers to agree with his positions on domestic issues.
25. What evidence does the author provide to support the last sentence of the passage?
- A. Kennedy and Nixon drew much smaller audiences for their later debates.
  - B. Kennedy and Nixon responded to questions calmly and carefully.
  - C. Nixon participated in the debate despite having been recently ill.
  - D. Nixon was more experienced and well-known than Kennedy.
26. Why did people who were not normally interested in politics tune in to the first of the Great Debates?
- E. Vice President Nixon was a popular politician.
  - F. Television had never before been used in this way.
  - G. They had heard that Kennedy was young and charismatic.
  - H. They wanted to see whether the newspaper polls were correct.

If you have ever watched someone fall on the ice, you've seen slipperiness at work. But have you wondered what makes ice slippery, or why skates or skis glide across ice so easily? The answer might seem obvious: ice is smooth. Yet smoothness in itself does not explain slipperiness. Imagine, for example, skating on a smooth surface of glass or sheet metal.

Surprisingly, scientists do not fully understand why ice is slippery. Past explanations of slipperiness have focused on friction and pressure. According to the friction theory, a skate blade rubs across the ice, causing friction. The friction produces heat, melting the ice and creating a slippery, microscopically thin layer of water for the skate to glide on. The friction theory, however, cannot explain why ice is slippery even when someone stands completely motionless, creating no friction.

The pressure theory claims that pressure from a skate blade melts the ice surface, creating a slippery layer of water. The water refreezes when the pressure is lifted. Science textbooks typically cite this explanation, but many scientists disagree, claiming that the pressure effect is not great enough to melt the ice. Nor can the pressure theory explain why someone wearing flat-bottomed shoes—which have a greater surface area than skate blades and thus exert less pressure per square inch—can glide across the ice or even go sprawling.

During the 1990s, another theory found acceptance: the thin top layer of ice is liquid,

or liquid-like, regardless of friction or pressure. This notion was first proposed more than 150 years ago by physicist Michael Faraday. Faraday's simple experiment illustrates this property: two ice cubes held against each other will fuse together. This happens, Faraday explained, because liquid on the cubes' surfaces freezes solid when the surfaces make contact.

Faraday's hypothesis was overlooked, in part because scientists did not have the means to detect molecular structures. However, technological advances during recent decades have allowed scientists to measure the thin layer on the surface of ice. For example, in 1996, a chemist at Lawrence Berkeley Laboratory shot electrons at an ice surface and recorded how they rebounded. The data suggested that the ice surface remained liquid-like, even at temperatures far below freezing. Scientists speculate that water molecules on the ice surface are always in motion because there is nothing above them to hold them in place. The vibration creates a slippery layer of molecules. According to this interpretation of the Lawrence Berkeley Laboratory experiments, the molecules move only up and down; if they also moved side to side, they would constitute a true liquid. Thus it could be said that people are skating on wildly vibrating molecules!

The phenomenon of a slippery, liquid-like surface is not limited to ice, although ice is the most common example. Lead crystals and even diamond crystals, which are made of carbon, also show this property under certain temperature and pressure conditions.

27. Which of the following best tells what this passage is about?
- A. the circumstances that allow ice to melt
  - B. the theories behind what makes ice slippery
  - C. the discoveries of Michael Faraday
  - D. the processes of freezing and melting
28. What is the most likely reason that the author mentions lead and diamond crystals in the last paragraph?
- E. to point out that solids other than ice have slippery surfaces
  - F. to suggest that ice, lead, and diamonds are composed of the same materials
  - G. to cast doubt on Faraday's theory of slipperiness
  - H. to illustrate the effects of temperature and pressure on slipperiness
29. According to Faraday, why do two ice cubes fuse when held together?
- A. Friction causes the surfaces of the ice to melt and refreeze.
  - B. The applied pressure forces the surfaces of the cubes to stick to each other.
  - C. Liquid layers on the surfaces freeze together when the surfaces make contact.
  - D. The liquid layers on the surfaces of the ice are perfectly smooth.
30. What is the most likely reason that the author mentions the 1996 experiment at Lawrence Berkeley Laboratory?
- E. to provide evidence about the surface of ice
  - F. to illustrate that studying ice molecules is difficult
  - G. to show how experiments on ice are inconclusive
  - H. to explain why ice cubes freeze together
31. According to researchers at the Lawrence Berkeley Laboratory, why is the surface of ice liquid-like rather than a true liquid?
- A. because electrons rebound from the ice surface
  - B. because the ice surface molecules vibrate only up and down
  - C. because the ice surface is a different temperature
  - D. because the ice surface is under pressure
32. According to the passage, which of the following undermines the friction theory of slipperiness?
- E. a person wearing flat-bottomed shoes gliding across an icy surface
  - F. two ice cubes fusing together
  - G. electrons bouncing off the surface of ice
  - H. a person sliding while standing immobile on an icy surface
33. The author includes details about the pressure theory in the third paragraph in order to
- A. highlight that there are different ideas regarding this theory about the slipperiness of ice.
  - B. describe the most recently accepted theory for the slipperiness of ice.
  - C. emphasize that this theory has been tested by scientists who study the slipperiness of ice.
  - D. show that there is scientific support for a plausible theory about the slipperiness of ice.

One of the books that has done the most to alert the world to the dangers of environmental degradation was George Perkins Marsh's *Man and Nature*. Its message—that Western society was in the process of causing irreparable harm to the environment—greatly influenced ecologists during the beginning of the modern environmentalist movement in the 1960s. Marsh was not, however, part of this movement. Surprisingly, *Man and Nature* was first published in 1864.

Marsh first observed the environmentally destructive effects of human activities while growing up in Vermont in the early nineteenth century. The heavy demand for firewood had depleted the forests, and extensive sheep grazing had stripped the land. The result was flooding and soil erosion. Furthermore, streams were fouled by wastes dumped from numerous mills and dye houses.

Much later in his life, after careers in law, business, farming, and politics, Marsh served as ambassador to Italy. There he noticed land abuse similar to what he had seen in Vermont. Overgrazing and forest mismanagement had rendered desolate areas that had been productive farmland since the days of the Roman Empire. Marsh attributed this to what he called “man’s ignorant disregard for the laws of nature.”

In Italy, Marsh began to organize his observations and theories. He wrote in a way intended to educate readers about the impact of industrial and agricultural practices on the environment. In *Man and Nature*, he evaluated the important relationships between animals and plants, discussed forestry practices in great detail, and analyzed the ways natural water supplies are affected by human use.

*Man and Nature* challenged the popular belief that nature could heal any damage that people inflict upon it. Marsh argued that

people may use and enjoy, but not destroy, the riches of the earth.

Furthermore, he asserted that everything in nature is significant and that even the tiniest organism affects the fragile environmental balance. His belief that drastic alteration of this balance would be dangerous is now accepted as a fundamental principle of modern environmental science.

Although he pointed out environmental damage caused by irresponsible human activities, Marsh did not oppose every human alteration to the environment. To him, the goal was proper management, not a return to wilderness conditions. People should consider the consequences of their actions, he wrote, and become “co-worker[s] with nature.” Marsh praised the Suez Canal, the human-made waterway between the Mediterranean Sea and the Gulf of Aden, as “the greatest and most truly cosmopolite physical improvement ever undertaken by man.” He believed that the advantages of the canal—improved transportation and commerce—would outweigh any environmental damage. Yet he also warned of possible unintended consequences, such as destructive plants and animals spreading from one body of water to the other.

Marsh was considered a radical thinker during his lifetime. By the late nineteenth century, however, his writings, along with those of John Muir, Henry David Thoreau, and others, had inspired what became known as the conservation movement. The conservationists of that time sought to educate the public that wilderness areas were worth preserving, and they were responsible for creating the National Park Service and the National Forest Service.

- 34.** Which statement best describes the central idea of the passage?
- E.** Marsh’s experience growing up on a farm allowed him to witness firsthand how human demands on nature can lead to problems, and as an adult he wrote one of the first books about conservation.
  - F.** Marsh challenged the notion that nature could repair the damage people cause to it, but he also supported human-made modifications to nature that improve transportation and commerce.
  - G.** Marsh’s ideas about the environment were considered radical in his lifetime, but they later gained popularity during the environmental movement in the twentieth century.
  - H.** Marsh was a radical thinker who believed that people’s actions could dramatically affect nature, and his writings are considered foundational to the conservation movement.
- 35.** Marsh believed that the people of his time caused harm to the environment mostly because
- A.** they assumed future generations would solve any environmental problems.
  - B.** they thought industrial progress was more important than protecting nature.
  - C.** they were unwilling to change farming and waste-disposal practices.
  - D.** they lacked knowledge of nature and natural processes.
- 36.** What is the most likely reason the author uses the word “surprisingly” in line 11?
- E.** to argue that Marsh’s ideas are more applicable in the present than they were during his lifetime
  - F.** to show that Marsh introduced ideas a century before they became widely accepted
  - G.** to emphasize that Marsh was unaware that his ideas would help begin a conservation movement
  - H.** to prove that there would be fewer issues with the environment today if people had accepted Marsh’s ideas earlier
- 37.** Which evidence supports the idea that Marsh’s theories about nature were accurate?
- A.** the details about Marsh’s observations of environmental degradation
  - B.** the details about how Marsh’s writing inspired a conservation movement
  - C.** the details about how Marsh’s ideas are essential to modern environmental science
  - D.** the details about Marsh’s opinion on human alterations to the environment



- 38.** Which detail about Marsh provides support for the author's statement in lines 55–58?
- E.** his reputation as a radical thinker
  - F.** his contribution to the conservation movement
  - G.** his experience working as an ambassador
  - H.** his approval of beneficial human-made projects in nature

- 39.** Which of Marsh's ideas most influenced the environmental movement of the 1960s?
- A.** Some human alterations to the environment are necessary.
  - B.** People lack an understanding of the environment.
  - C.** Human activities could damage the environment.
  - D.** Environmental degradation has been occurring for many years.

Anyone who has watched TV news coverage of a hurricane has seen how destructive wind energy can be. But the power of the wind can also be put to constructive use. From  
5 sailboats to old-fashioned windmills to high-tech wind turbines, people have devised ways to harness wind energy for thousands of years.

The first known attempt to use wind power was the sailboat. Ancient shipbuilders understood how to use forces like lift and momentum, even if they could not explain those forces scientifically. The principles behind sailing led to the development of the  
15 windmill. The first known windmills originated in Persia, an area that is now Iran, as early as A.D. 500. They were created to help with the demanding chores of grinding grain and pumping water. By the tenth  
20 century, windmills were used throughout central Asia; they were used in China as early as the thirteenth century.

In Europe, windmills came into widespread use during the twelfth century. As in other  
25 parts of the world, they were used for milling grain and pumping water. Windmills replaced the water wheel, which was turned by the movement of running water over paddles mounted around a wheel. The windmill was  
30 more adaptable and efficient than the water wheel and quickly became popular. For example, Holland, famous for its windmills, used the machines to pump seawater away from low-lying coastal bogs. This allowed the  
35 Dutch to reclaim large areas of land from the sea. Windmills eventually became sophisticated enough for use in a broad range

of work, from sawmills and drainage pumping to processing goods, such as dyes,  
40 tobacco, cocoa, and spices.

In the 1700s, as steam engines gained in popularity, the use of wind machines for many types of work declined. However, windmills still played an essential role in  
45 pumping water on farms throughout the American West and Midwest. Between 1850 and 1970, over six million small windmills were installed on American farms for watering livestock and meeting other water  
50 needs. In many remote areas even today, livestock production would be impossible without the use of windmills to provide water.

Beginning in the late nineteenth century,  
55 windmills were adapted to generate electricity. During the 1930s and '40s, thin-bladed windmills provided electricity for hundreds of thousands of farms across the United States. By the 1950s, however, power  
60 lines connected almost every household in America to a central power source, such as a utility company. After that, there was little need for wind turbines until the energy crisis of the 1970s. At that time, interest in wind  
65 turbines was renewed due to rising energy costs and concern about the future availability of fossil fuels, such as oil, coal, and natural gas. The last several decades have seen the development of "wind farms,"  
70 clusters of wind turbines that generate electricity. Efficient, clean, and fairly inexpensive to operate, wind farms may prove to be as important in the future as earlier windmills were in the past.

40. Which of the following best tells what this passage is about?
- E. the ways people have harnessed wind power throughout history
  - F. reasons for developing wind farms to generate electricity
  - G. how windmills are used in the United States
  - H. why windmills were modified to generate electricity
41. What evidence best supports the idea that windmills were important resources in the western United States?
- A. the details about the development and use of wind farms
  - B. the details about how windmills provided water for farms and livestock
  - C. the details about the role of wind energy during the energy crisis of the 1970s
  - D. the details about how steam engines influenced the use of windmills
42. The author describes the tasks windmills were used for in lines 36–40 in order to
- E. emphasize that windmills served a variety of purposes.
  - F. highlight that windmills are more efficient than water wheels.
  - G. emphasize that windmills were used for many years.
  - H. convey that some countries used windmills more than other countries.
43. Why were fewer American farms dependent on wind machines for electrical power after the 1950s?
- A. The energy crisis had prompted interest in other fuel sources.
  - B. Coal and natural gas could generate more power than wind turbines.
  - C. Centralized power systems connected most places.
  - D. Wind farms had reduced the need for individual windmills.
44. Which of the following best expresses the author’s opinion regarding the future use of wind energy?
- E. Wind farming methods are unlikely to increase electrical output.
  - F. Wind farms will most likely be used to provide energy in rural areas.
  - G. Wind farming output will likely supplement other sources of energy.
  - H. Wind farms may become an important source of electricity.
45. According to the passage, the people of Holland most notably used windmills to
- A. pump water to remote locations.
  - B. turn bogs into usable land.
  - C. make the country famous.
  - D. process a variety of goods.

Archaeologists first succeeded in using tree-ring dating while excavating ancient Pueblo Native American villages in the southwestern United States during the 1920s. At that time, no one knew when the villages had been occupied, or for how long, but the logs used in the buildings provided a clue. Scientists had long known that trees add a new growth ring to their circumferences during each growing season. Drought or early frost results in little growth and narrow rings. Good growing years result in wide rings. Archaeologists knew that by matching identical patterns of wide and narrow rings in sections of two different logs, they could determine which log was older. For example, a log with a certain pattern of rings near its outside edge would indicate a specific series of good and bad growing seasons. This log would have been cut down before a log of comparable size that shows the identical pattern near its center.

But how could these ring patterns help determine the actual dates for the abandoned Pueblo villages? Archaeologists had already used the ring patterns of trees with overlapping lifetimes to establish a tree-ring chronology for the southwestern United States that went back to A.D. 1260. That work had been done in a Hopi village called Oraibi. Oraibi had been continuously inhabited since before the arrival of the first Spanish explorers in 1540.

That same team of archaeologists also developed a relative, or floating, chronology for the abandoned Pueblo villages by matching up the ring patterns of the various

logs used in the buildings. With this floating chronology, the archaeologists could tell which logs were older and which were more recent. None could be precisely dated, since no log had a pattern of tree rings that matched any part of the established chronology. It was clear from this evidence, however, that the buildings must have been constructed before 1260.

Finally, continued excavations turned up a “key” beam. The outer ring pattern of the key beam overlapped the earliest rings in the established chronology. Furthermore, its inner ring pattern matched the pattern formed by the most recent rings of the floating chronology. Thus, the chronology for the abandoned Pueblo villages could be known with certainty. Counting backward from the present, the archaeologists estimated that the villages had been occupied between 900 and 1300.

The tree rings also suggested why the villages had been abandoned. The rings for the years 1276 to 1299 were very thin, indicating a severe drought that lasted for twenty-three years. Most likely the villagers had left their homes to search for a more hospitable climate.

46. Which of the following best tells what this passage is about?
- E. how variations in weather conditions affect tree growth
  - F. recent breakthroughs in understanding Native American cultures
  - G. why the Pueblo villages were abandoned
  - H. how tree-ring dating can establish the age of archaeological findings
47. What was the importance of the key beam described in the fourth paragraph?
- A. It proved that trees of the same age would have identical tree-ring patterns.
  - B. It helped archaeologists determine why the villages had been built at that time.
  - C. It revealed a new floating chronology for archaeologists to investigate.
  - D. It connected the floating chronology to the established chronology.
48. The author explains the causes of wide and narrow tree rings in lines 8–13 in order to
- E. emphasize that tree-ring dating is highly accurate.
  - F. highlight how tree rings help determine past weather patterns.
  - G. emphasize that a tree's ring patterns grow in a unique way.
  - H. highlight the importance of studying tree rings.
49. Which evidence best supports the idea that tree-ring dating helped archaeologists understand why the Pueblo villages were abandoned?
- A. the details about the Hopi village Oraibi
  - B. the details about the twenty-three-year drought
  - C. the details about the discovery of the Pueblo villages
  - D. the details about the floating chronology
50. Why did the archaeologists conclude that the buildings in the abandoned Pueblo villages were constructed before A.D. 1260?
- E. The logs in the Pueblo buildings did not share any ring patterns with the established chronology from the Hopi village.
  - F. The logs in the Pueblo buildings had fewer rings than the logs from the buildings in the Hopi village.
  - G. The Pueblo villages were abandoned before the Hopi village was established.
  - H. The Pueblo villages and the Hopi village were constructed from logs of similar size.
51. Why did archaeologists compare the logs from buildings in the abandoned Pueblo villages with logs from the Hopi village?
- A. to find the oldest and most recent logs used in the Pueblo villages
  - B. to find evidence that would help explain what caused people to leave the Pueblo villages
  - C. to find a log from the Pueblo villages that had tree rings that matched logs from the Hopi village
  - D. to find evidence that the Pueblo villages were constructed before the Hopi village

The decade that began with the stock market crash in 1929 and ended with the declaration of war in Europe in 1939 was a turning point for art in the United States. Rejecting  
5 European trends, such as abstract art, American painters searched for a style that was distinctly American. It was a time of great social change—a society based on rural and small-town life was rapidly being  
10 replaced by a society focused on city life and values. Although members of various groups are all referred to as “American Scene” painters, different groups painted their images of the United States in very different  
15 ways.

One group, sometimes called the Regionalists, included Thomas Hart Benton, Grant Wood, and John Steuart Curry, all from the Midwest. Their art was intensely  
20 patriotic and frequently glorified an older, simpler United States. Their subject matter included church steeples, New England fishing villages, and Midwestern cornfields. Grant Wood’s most famous canvas is probably  
25 *American Gothic*, which shows a stiff and proper farm couple, the husband holding a pitchfork. The Regionalists were often muralists as well, painting local scenes on walls of state capitols and other public  
30 buildings. Enormously popular during the 1930s, Regionalist art is still treasured by many as a fond memory of times gone by.

While the Regionalists remembered the past, other American Scene artists painted the  
35 drab realities of the contemporary urban environment, testifying to its loneliness and anonymity. The Urban Realists, including

Reginald Marsh, Isabel Bishop, and the Soyer brothers, were associated with the Art  
40 Students League in New York. These painters showed the high price paid by individual men and women struggling to survive the Depression. The names of some of their works illustrate the style: *Office Girls*,  
45 *Waiting*, *The Bowery*. For various reasons, their work has been largely forgotten today.

Edward Hopper was an artist who was associated with the American Scene but otherwise escaped further classification. Like  
50 the Urban Realists, he painted the tired dinginess of the urban streets during the Depression. Yet Hopper often found beauty in the midst of the city’s monotony. For example, one of Hopper’s best-known paintings,  
55 *Nighthawks*, shows several people sitting like robots in a brightly lit coffee shop at night, each apparently unaware of the others. Hopper was not interested in a return to the past. He presented what he saw without  
60 apology or sentimentality.

The American Scene art movement of the 1930s was characterized by realistic  
65 paintings that expressed the traditions and interests of people in the United States at that time. Because the paintings presented common images and mirrored the lives of many people, the general public readily identified with the subjects of the paintings. With the onset of World War II, a new spirit  
70 of internationalism swept through the art of the United States, and the American Scene painters became out of date. Although the movement did not last, it had reflected its own time with profound understanding.

52. Why did ordinary people in the 1930s identify with the art of the American Scene painters?
- E. The artists were primarily concerned with painting farm life.
  - F. People appreciated the beauty reflected in the paintings.
  - G. People wanted paintings to show social and cultural change.
  - H. The paintings reflected the times in ways that were familiar to most viewers.
53. Which of the following subjects would an Urban Realist painter be most likely to represent?
- A. a scene with factory workers going home from work
  - B. a scene with children playing games in a street
  - C. a scene of a bustling European city
  - D. a scene showing the stores along the main street in a city
54. Hopper's paintings contrast with the work of the Urban Realist painters by
- E. showing the ugliness of a city environment.
  - F. illustrating the move toward an international style.
  - G. revealing the ways that dull urban life can include beauty.
  - H. focusing on the portrayal of people rather than on the setting.
55. How does the fourth paragraph contribute to the passage?
- A. It describes the end of the American Scene movement.
  - B. It highlights Edward Hopper as a unique American Scene painter.
  - C. It explains why Edward Hopper's work has been forgotten.
  - D. It contrasts the American Scene and Urban Realist styles.
56. The author uses the phrase "without apology" (lines 59–60) to explain that Hopper did not think he needed to justify
- E. how he portrayed his subjects.
  - F. painting scenes of real places.
  - G. why his paintings became popular.
  - H. the classification of his art style.
57. What is the most likely reason that Regionalist art has retained some of its popularity while Urban Realist art has not?
- A. Regionalist art depicts modern life as well as life in the past, while Urban Realist art depicts only the past.
  - B. Regionalist art more accurately portrays the time in which it was painted than Urban Realist art does.
  - C. Regionalist art shows American life as people wish to remember it, while Urban Realist art does not.
  - D. Regionalist art depicts Americans overcoming the Depression, while Urban Realist art depicts life during World War II.

# PART 2 — MATHEMATICS

*Suggested Time — 90 Minutes*

57 QUESTIONS

## IMPORTANT NOTES

- (1) Formulas and definitions of mathematical terms and symbols are **not** provided.
- (2) Diagrams other than graphs are **not** necessarily drawn to scale. Do not assume any relationship in a diagram unless it is specifically stated or can be figured out from the information given.
- (3) Assume that a diagram is in one plane unless the problem specifically states that it is not.
- (4) Graphs are drawn to scale. Unless stated otherwise, you can assume relationships according to appearance. For example, (on a graph) lines that appear to be parallel can be assumed to be parallel; likewise for concurrent lines, straight lines, collinear points, right angles, etc.
- (5) Reduce all fractions to lowest terms.

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## GRID-IN PROBLEMS

QUESTIONS 58–62

**DIRECTIONS:** Solve each problem. On the answer sheet, write your answer in the boxes at the top of the grid. Start on the left side of each grid. Print only one number or symbol in each box. **DO NOT LEAVE A BOX BLANK IN THE MIDDLE OF AN ANSWER.** Under each box, fill in the circle that matches the number or symbol you wrote above. **DO NOT FILL IN A CIRCLE UNDER AN UNUSED BOX.**

58. How many 5-digit numbers can be created using the digits 2, 3, 5, 7, and 8 without repeating any digits within that 5-digit number?

60.  $|(-6) - (-5) + 4.2| - |3 - 9.6| =$

---

59.

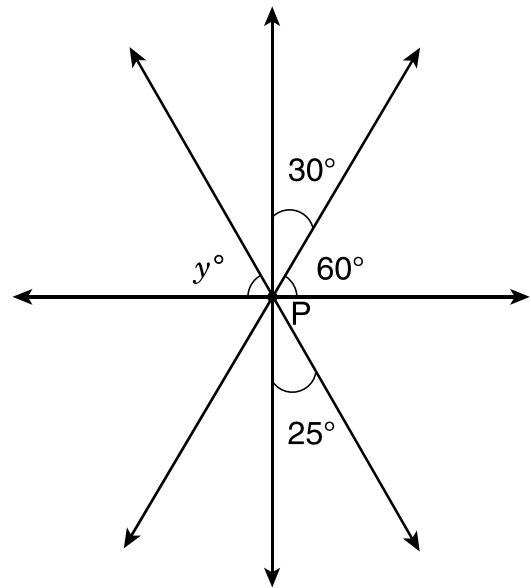
$$\frac{147-x}{12} = 12$$

What is the value of  $x$  in the equation shown above?



61. Tyler has completed 60 pages in his French workbook. This is 20% of the total number of pages in the workbook. How many pages are in the workbook?

62.



Four straight lines intersect at point P as shown above. What is the value of  $y$ ?

# MULTIPLE CHOICE PROBLEMS

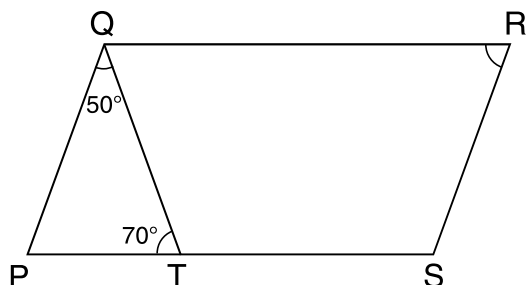
## QUESTIONS 63–114

**DIRECTIONS:** Solve each problem. Select the **best** answer from the choices given. Mark the letter of your answer on the answer sheet. You can do your figuring in the test booklet or on paper provided by the proctor. **DO NOT MAKE ANY MARKS ON YOUR ANSWER SHEET OTHER THAN FILLING IN YOUR ANSWER CHOICES.**

63. If  $x = 9$  and  $y = -7$ , what is the value of  $x(x - 2y)$ ?

A. 18  
B. 45  
C. 144  
D. 207

- 64.



In the figure above, PQRS is a parallelogram. The measure of  $\angle PQT$  is  $50^\circ$ , and the measure of  $\angle PTQ$  is  $70^\circ$ . What is the measure of  $\angle QRS$ ?

E.  $60^\circ$   
F.  $70^\circ$   
G.  $80^\circ$   
H.  $120^\circ$

65. 
$$M = 3N = \frac{P}{4} = Q + 5 = \frac{R}{7} > 0$$

Based on the statement above, which variable has the **greatest** value?

A.  $M$   
B.  $N$   
C.  $P$   
D.  $R$

66. A roofing contractor uses shingles at a rate of 3 bundles for every 96 square feet of roof covered. At this rate, how many bundles of shingles will he need in order to cover a roof that is 416 square feet?

E. 5  
F. 12  
G. 13  
H. 14

67. To make party invitations, Macie could buy a package of paper for \$10.50, or she could buy  $x$  individual sheets of the same paper for \$0.15 each. What is the largest value of  $x$  that would make buying the individual sheets **less** expensive than buying the package?

A. 60  
B. 65  
C. 69  
D. 70

68. At 1:00 p.m. one day, the temperature was 8 degrees above zero. During the rest of the day, the temperature fell 3 degrees per hour. What was the temperature at 7:00 p.m. that day?

- E.  $-13^{\circ}$
- F.  $-10^{\circ}$
- G.  $-7^{\circ}$
- H.  $5^{\circ}$

69. A bag contains 75 marbles that are red, blue, or green. The ratio of red to blue marbles is 15:7, and the ratio of blue to green marbles is 7:3. If 2 blue marbles are removed and replaced with 2 green marbles, what will be the new ratio of red to green marbles?

- A. 3:1
- B. 5:1
- C. 7:5
- D. 45:11

70.

DESSERT CHOICES

Dessert	Number of Times Ordered
Cookies	42
Pie	23
Cake	47
Ice Cream	48

The table above shows the number of times that different desserts were ordered at a restaurant. Based on this information, what is the probability of a customer ordering ice cream as a dessert?

- E. 25%
- F. 30%
- G. 40%
- H. 48%

71. What is the least common multiple of 24, 6, and 18?

- A. 36
- B. 48
- C. 72
- D. 144

72. One day, the Early Bird Restaurant used 15 dozen eggs for 200 breakfast customers. At this rate, approximately how many dozen eggs are needed for 300 breakfast customers?

- E. 20
- F. 23
- G. 25
- H. 30

73. A cooler contains three types of beverages: 5 bottles of apple juice, 3 bottles of grape juice, and 6 bottles of fruit punch. What is the probability that a bottle chosen at random from this cooler is **not** apple juice?

- A.  $\frac{1}{9}$
- B.  $\frac{5}{14}$
- C.  $\frac{9}{14}$
- D.  $\frac{2}{3}$

74. A large circular dinner plate has a radius of 20 centimeters. A smaller circular plate with a circumference of  $20\pi$  centimeters is placed in the center of the larger dinner plate. What is the area of the part of the larger dinner plate that is not covered by the smaller plate?

- E.  $20\pi$  sq cm
- F.  $100\pi$  sq cm
- G.  $200\pi$  sq cm
- H.  $300\pi$  sq cm

75.

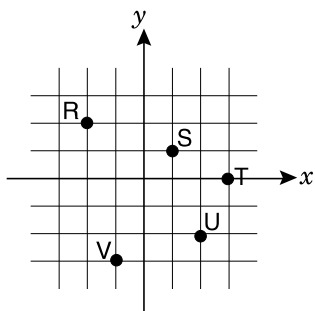
PRICES FOR AD SPACE

Space	Price
$\frac{1}{4}$	200
$\frac{1}{2}$	350
full page	600

The table above shows prices for newspaper advertising. A store purchased  $\frac{1}{4}$  pages,  $\frac{1}{2}$  pages, and full pages of space in equal numbers for a total of \$11,500. What is the total amount of page space the store purchased?

- A.  $1\frac{3}{4}$  pages
- B. 10 pages
- C.  $16\frac{1}{2}$  pages
- D.  $17\frac{1}{2}$  pages

76.



For which point on the graph above is the value of the  $y$ -coordinate greater than the value of the  $x$ -coordinate?

- E. R
- F. T
- G. U
- H. V

77. If  $\frac{36}{y} = 4x$ , what is the value of  $x$  when  $y = 3$ ?

- A. 3
- B. 4
- C. 9
- D. 12

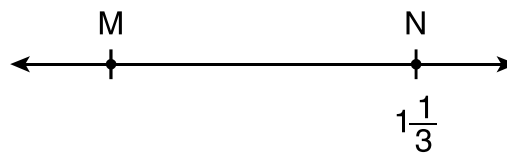
78. Points X, Y, and Z are on a straight line, and Y is between X and Z. Length  $\overline{YZ} = \frac{3}{5}\overline{XY}$ , and length  $\overline{XY} = 20$  centimeters. What is the length of  $\overline{XZ}$ ?

- E. 12 cm
- F. 24 cm
- G. 30 cm
- H. 32 cm

79. Bryana bought  $1\frac{3}{4}$  yards of cloth at \$8.00 per yard. If there was an 8% sales tax, what was the total cost of the cloth?

- A. \$12.96
- B. \$14.08
- C. \$15.12
- D. \$16.08

80.



On the number line above,  $MN = 5\frac{5}{6}$ . What is the position of point M?

- E.  $-7\frac{1}{6}$
- F.  $-4\frac{1}{2}$
- G.  $4\frac{1}{2}$
- H.  $7\frac{1}{6}$

81. A United States presidential coin is made from an alloy of four metals—copper, zinc, manganese, and nickel—with weights in the ratio of 177:12:7:4, respectively. The coin weighs a total of 8 grams. What is the weight of the zinc in this coin?

- A. 0.28 g
- B. 0.48 g
- C. 0.96 g
- D. 48 g

---

**82.** Jack scored an average of 15 points per game in his first 3 basketball games. In his 4th game, he scored 27 points. What is his average score for the first 4 games?

- E.** 15
- F.** 17
- G.** 18
- H.** 21

---

**83.** A cylindrical oil drum can hold 4,320 liters when it is completely full. Currently, the drum is  $\frac{1}{3}$  full of oil. How many **kiloliters** of oil need to be added in order to fill the drum completely?

- A.** 1.44 kL
- B.** 2.88 kL
- C.** 4.32 kL
- D.** 14.10 kL

---

**84.** Nicole's age now is three times Carmen's age. If Carmen will be 17 in two years, how old was Nicole 5 years ago?

- E.** 38 yr
- F.** 40 yr
- G.** 45 yr
- H.** 50 yr

---

**85.** A chemical decays in such a way that the amount left at the end of each week is 20% less than the amount at the beginning of that same week. What percent of the original amount is left after two weeks?

- A.** 40%
- B.** 60%
- C.** 64%
- D.** 80%

---

**86.** If  $w - 1$  is an odd integer, which one of the following **must** be an even integer?

- E.**  $w + 1$
- F.**  $2w - 1$
- G.**  $2w - 2$
- H.**  $2w + 1$

---

**87.** Three students stand at the starting line of a running track and begin running laps at the same time. Ann completes 1 lap every 2 minutes, Jack completes 1 lap every 3 minutes, and Lee completes 1 lap every 4 minutes. How many laps does Ann complete before all three runners are once again at the starting line at the same time?

- A.** 4
- B.** 6
- C.** 12
- D.** 20

---

**88.** Simplify this expression:

$$4(7 - 3x) - (5 - x)$$

- E.**  $23 - 4x$
- F.**  $23 - 11x$
- G.**  $28 - 4x$
- H.**  $28 - 12x$

89.

PET SURVEY

Number of Pets	Number of Students
0	12
1	16
2	7
3 or more	5

Amy surveyed students at her school about the number of pets they have. What is the probability that a student who participated in the survey has at least 2 pets?

- A.  $\frac{7}{40}$
- B.  $\frac{1}{12}$
- C.  $\frac{1}{8}$
- D.  $\frac{3}{10}$

90. A large container is partially filled with  $n$  liters of water. Ito adds 10 liters of water to the container, making it 60% full. If Ito adds 6 more liters of water, the container will be 75% full. What is the value of  $n$ ?

- E. 14
- F. 15
- G. 26
- H. 30

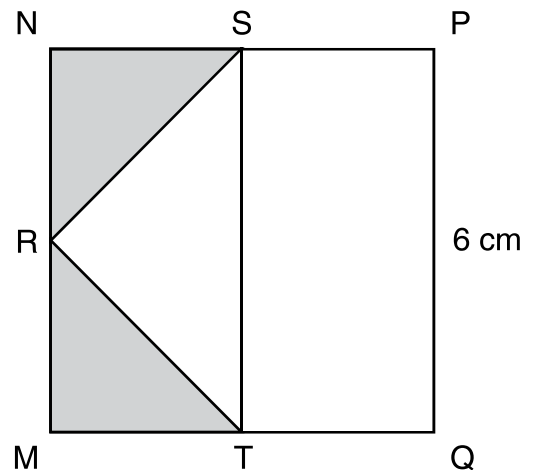
91.

$$5x^3 + 3x + 9 + \frac{1}{x^2}$$

If  $x = 10$ , what is the value of the expression above?

- A. 2,539.01
- B. 5,039.01
- C. 5,039.1
- D. 5,139

92.



R, S, and T are midpoints of the sides of square MNPQ, as shown above. What is the sum of the areas of the shaded triangles?

- E. 9 sq cm
- F. 12 sq cm
- G. 18 sq cm
- H. 36 sq cm

93. The Chens spend \$5 of every \$8 they earn on planned expenses. If the family earns \$29,600 in one year, how much will they spend on planned expenses that year?

- A. \$1,850
- B. \$3,700
- C. \$5,920
- D. \$18,500

94. A pizza shop offers a choice of 3 sizes (small, medium, and large) and 7 different toppings. Different pizzas can be created by changing the size and/or the choice of toppings. If Cody wants to order a pizza with exactly 2 different toppings, how many different pizzas can he create?
- E. 6  
F. 21  
G. 63  
H. 126

95.

SURVEY OF CATS PER FAMILY

Number of Cats	Number of Families
0	15
1	42
2	35
3 or more	8

The table above shows the number of cats per family in 100 households in the Blaine neighborhood. By what **percentage** is the number of families with 1 cat greater than the number of families with 2 cats?

- A. 7%  
B. 10%  
C. 17%  
D. 20%

96. A wooden box has a square base. The height of this box is 3 times the length of one side of the base. If one side of the base is 3 feet long, what is the volume of this box?
- E. 9 cu ft  
F. 27 cu ft  
G. 36 cu ft  
H. 81 cu ft

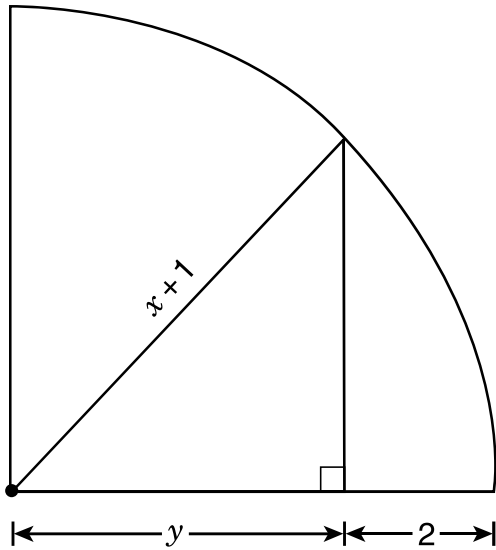
97. On a bike trip, Rajiv traveled 65 kilometers in 5 hours, while Shaina traveled 72 kilometers in 4 hours. How much less was Rajiv's mean speed, in kilometers per hour (kph), than Shaina's?
- A. 1 kph  
B. 5 kph  
C. 7 kph  
D. 9 kph

98. Points P, Q, R, and S represent  $-3$ ,  $-1$ ,  $0$ , and  $2$ , respectively, on a number line. How many units is the midpoint of  $\overline{PQ}$  from the midpoint of  $\overline{RS}$ ?
- E. 1  
F. 2  
G. 3  
H. 4

99. There are 1,000 cubic centimeters in 1 liter, and 1,000 cubic millimeters in 1 milliliter. How many cubic millimeters are there in 1,000 cubic centimeters?
- A. 1,000  
B. 10,000  
C. 100,000  
D. 1,000,000



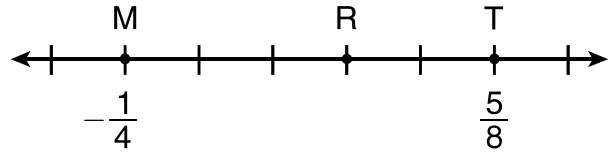
100.



In the quarter circle above, what is  $y$  in terms of  $x$ ?

- E.  $x - 1$
- F.  $x + 1$
- G.  $\frac{x+1}{2}$
- H.  $\sqrt{\frac{(x+1)^2}{2}}$

101.



The hash marks on the number line above are evenly spaced. What is the coordinate of point R?

- A.  $\frac{7}{40}$
- B.  $\frac{9}{40}$
- C.  $\frac{11}{40}$
- D.  $\frac{21}{40}$

102. Phan chose an Internet service that charges \$18.00 per month plus \$0.024 per minute. Deion chose an Internet service that charges \$30.00 per month for unlimited usage. At the end of the month, Phan's and Deion's charges were identical. For how many minutes did Phan use the Internet service that month?

- E. 50 min
- F. 60 min
- G. 100 min
- H. 500 min

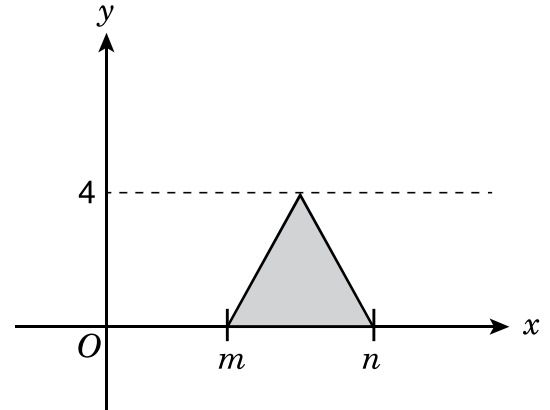
103. In a sample of 50 cars at a local dealership, there are 12 red cars and 10 cars with backup cameras. Of the 12 red cars, 4 have backup cameras. If a car is selected at random from the given sample, what is the probability that **both** of the following are true: the car is **not** red and does **not** have a backup camera?

- A.  $\frac{3}{5}$
- B.  $\frac{16}{25}$
- C.  $\frac{19}{25}$
- D.  $\frac{4}{5}$

104. The decimal 0.06 can be written as the fraction  $\frac{x}{50}$ . What is the value of  $x$ ?

- E. 3
- F. 6
- G. 12
- H. 30

105.



What is the area of the shaded triangle shown above?

- A.  $m + n$
- B.  $n - m$
- C.  $2(n - m)$
- D.  $4(n - m)$

106.

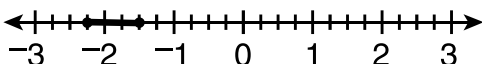
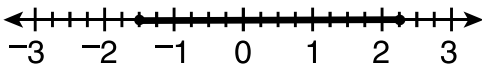
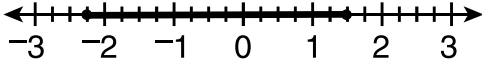
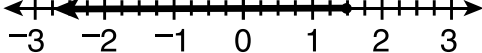
ANIMAL CARDS

Number of Cards	Picture on Card
8	cat
6	dog
5	bird
4	fish
1	horse

The cards in the table above are mixed in a box. Which animal pictured on a card has exactly a 1 in 4 chance of being picked at random from the box?

- E. cat
- F. dog
- G. fish
- H. horse

107. Which number line below shows the solution set for  $2x - 2 \leq y \leq 4x + 10$  when  $y = 1$ ?

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

108. 
$$\frac{14}{21} = \frac{p}{7}$$

In the equation above, what is the value of  $p$ ?

- E.  $\frac{2}{3}$
- F. 3
- G.  $\frac{14}{3}$
- H. 14

109. A ball is selected at random from a box that contains 7 black balls, 14 green balls, and 21 red balls. What is the probability that the ball selected is black?

- A.  $\frac{1}{6}$
- B.  $\frac{1}{5}$
- C.  $\frac{1}{3}$
- D.  $\frac{5}{6}$

110. At North High School, a survey asked two questions, Question A and Question B. For each question, students could answer either “yes” or “no.” Of the 800 students who responded to the survey, 720 answered “yes” to Question A, and 640 answered “yes” to Question B. What is the **least** possible number of these students who could have answered “yes” to **both** questions?

- E. 80
- F. 160
- G. 560
- H. 640

---

**111.** Raoul is at least 3 years older than Vahn. Which of the following inequalities gives the relationship between Raoul's age ( $r$ ) and Vahn's age ( $v$ )?

- A.  $r - v \geq 3$
- B.  $r - v \leq 3$
- C.  $3 - v \leq r$
- D.  $3 - r \leq v$

---

**112.**                    1 sind = 5.6 ricks  
                             1 sind = 12.88 dalts

Using the conversion above, how many dalts are equal to 1 rick?

- E. 0.43 dalt
- F. 2.30 dalts
- G. 7.28 dalts
- H. 18.48 dalts

**113.** There are now  $x$  cans stacked on a shelf that holds 36 cans when full. If 4 of these cans were removed, the shelf would be half full. What is the value of  $x$ ?

- A. 14
- B. 16
- C. 18
- D. 22

---

**114.** Carlos tossed a paper cup in the air 50 times and found that the probability of it landing on its side was 72%. If he tosses the cup in the air 150 **more** times, what is the total number of times he can expect the cup to land on its side?

- E. 72
- F. 108
- G. 144
- H. 158

THIS IS THE END OF THE TEST.  
IF TIME REMAINS, YOU MAY CHECK  
YOUR ANSWERS. BE SURE THAT THERE  
ARE NO STRAY MARKS, PARTIALLY  
FILLED ANSWER CIRCLES, OR  
INCOMPLETE ERASURES ON YOUR  
ANSWER SHEET. ■

**110. (G)** None of the 80 students ( $800 - 720$ ) who answered “no” to Question A ( $800 - 720$ ) could have answered “yes” to both questions. Therefore, the least possible number of students who could have answered “yes” to both questions, can be found by subtracting the 80 who answered “no” to Question A from the 640 who answered “yes” to Question B or  $640 - 80 = 560$ .

**111. (A)** Raoul is at least 3 years older than Vahn, which can be written as

$$r \geq v + 3$$

Rewrite this inequality to match the answer options:

$$r - v \geq 3$$

**112. (F)** Since 5.6 ricks and 12.88 dalts are both equal to 1 sind, then  $5.6 \text{ ricks} = 12.88 \text{ dalts}$ . To calculate the number of dalts ( $d$ ) in 1 rick, set up a proportion:

$$\frac{5.6}{12.88} = \frac{1}{d}$$

$$5.6d = 12.88$$

$$d = 2.3$$

**113. (D)** The shelf, when full, holds 36 cans. When the shelf is half full, it holds 18 cans.

$$x - 4 = 18$$

$$x = 22$$

**114. (G)** The probability of the cup landing on its side is 72%. Carlos tossed the cup a total of 200 times ( $50 + 150$ ). The number of times the cup lands on its side is 72% of 200:  
 $0.72 \times 200 = 144$ .

### Answer Key for Sample Form B

1. A	13. B	25. D	37. C	49. B	61. 300	73. C	85. C	97. B	109. A
2. G	14. E	26. F	38. H	50. E	62. 65	74. H	86. G	98. G	110. G
3. C	15. C	27. B	39. C	51. C	63. D	75. D	87. B	99. D	111. A
4. F	16. F	28. E	40. E	52. H	64. E	76. E	88. F	100. E	112. F
5. B	17. D	29. C	41. B	53. A	65. D	77. A	89. D	101. C	113. D
6. E	18. G	30. E	42. E	54. G	66. G	78. H	90. E	102. H	114. G
7. D	19. D	31. B	43. C	55. B	67. C	79. C	91. B	103. B	
8. H	20. F	32. H	44. H	56. E	68. F	80. F	92. E	104. E	
9. B	21. C	33. A	45. B	57. C	69. D	81. B	93. D	105. C	
10. E	22. F	34. H	46. H	58. 120	70. F	82. G	94. G	106. F	
11. C	23. C	35. D	47. D	59. 3	71. C	83. B	95. D	107. C	
12. G	24. F	36. F	48. F	60. -3.4	72. F	84. F	96. H	108. G	