GRADE 8

B

NEW YORK CITY PUBLIC SCHOOLS

2019 Specialized High Schools

ADMISSIONS TEST

GENERAL DIRECTIONS

Identifying Information

Turn to Side 1 of the answer sheet. **Line 1** says, "I am well enough to take this test and complete it. I understand that once I break the seal of the test booklet, I may not be eligible for a make-up test. I am a New York City resident and a Grade 8 student taking a Grade 8 test. I understand that a student who is not a New York City resident, who takes the test more than once in a given school year, or who takes the test at the wrong grade level will be disqualified from acceptance to any of the Specialized High Schools." Sign your name in the space following the word "signature." Do not print your name. **Notify the proctor immediately if you are ill or should not be taking this test. Do not sign the statement or begin the test. Return your answer sheet to the proctor.**

On **Line 2**, print today's date, using the numbers of the month, the day, and the year. On **Line 3**, print your birth date with the number of the month first, then the number of the day, then the last two digits of the year. For example, a birth date of March 1, 2005, would be 3-1-05.

In **Grid 4**, print the letters of your first name, or as many as will fit, in the boxes. Write your name exactly as you did on the application. If you have a middle initial, print it in the box labeled "MI." Then print the letters of your last name, or as much as will fit, in the boxes provided. Below each box, fill in the circle that contains the same letter as the box. If there is a space or a hyphen in your name, fill in the circle under the appropriate blank or hyphen.

Make **dark marks** that **completely fill the circles.** If you change a mark, be sure to erase the first mark completely.

Grid 5 is for your choice of Specialized High Schools. If Grid 5 is not marked correctly, your admission to a Specialized High School will be affected because your admission is based on the score you achieve and the order in which you rank your school preferences in this grid. The school choices indicated on your answer sheet are final. Therefore, carefully copy the order in which you ranked the schools on your Test Ticket onto Grid 5.

Fill in one and only one circle for each school for which you wish to be considered. You may make as few as one or as many as eight choices. To increase your chances of being assigned to one of the Specialized High Schools, you are encouraged to make more than one choice. You **must** fill in a first choice school. Do not fill in a school more than once. Do not fill in the same school for each choice. Fill in only one circle in a row and only one circle in a column.

Grid 6 asks for your date of birth. Print the first three letters of the month in the first box, the number of the day in the next box, and the year in the last box. Then fill in the corresponding circles.

In **Grid 7:**

1. Print the name of the school where you are now enrolled in the space at the top of the grid.
2. In the boxes marked "SCHOOL CODE," print the six-digit code that identifies your school and fill in the circle under the corresponding number or letter for each digit of the school code. (You can find your school code on your Test Ticket. If it is not there, tell the proctor, and the proctor will get the school code for you.)
3. If you attend a private or parochial school, fill in the circle marked "P."

Grid 8 is labeled "STUDENT ID NUMBER." All test-takers should print their student ID number in Grid 8. The student ID number is found on your Test Ticket. In the boxes, print your nine-digit student ID number. Below each box, fill in the circle containing the same number as in the box.

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UNTIL YOU ARE TOLD TO DO SO

TURN YOUR BOOKLET OVER TO THE BACK COVER

START SHSAT PREP

GENERAL DIRECTIONS, continued

Identifying Information, continued

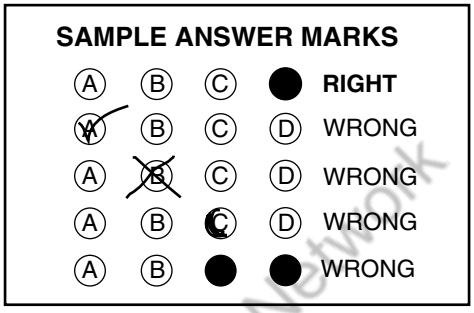
Grid 9 is labeled "BOOKLET LETTER AND NUMBER." In most cases, Grid 9 is already filled in for you. If it is not, copy the letter and numbers shown in the upper-right corner of your test booklet into the boxes. Below each box, fill in the circle containing the same letter or number as the box.

Now review Side 1 to make sure you have completed all lines and grids correctly. Review each column to see that the filled-in circles correspond to the letters or numbers in the boxes above them.

Turn your answer sheet to Side 2. Print your test booklet letter and numbers, and your name, first name **first**, in the spaces provided.

Marking Your Answers

Mark each of your answers on the answer sheet in the row of circles corresponding to the question number printed in the test booklet. Use only a Number 2 pencil. If you change an answer, be sure to erase it completely. Be careful to avoid making any stray pencil marks on your answer sheet. Each question has only one correct answer. If you mark more than one circle in any answer row, that question will be scored as incorrect. See the example of correct and incorrect answer marks below.



You can use your test booklet or the provided scrap paper to take notes or solve questions; however your answers must be recorded on the answer sheet in order to be counted. You will not be able to mark your answers on the answer sheet after time is up, and answers left in the test booklet will not be scored.

DO NOT MAKE ANY MARKS ON YOUR ANSWER SHEET OTHER THAN FILLING IN YOUR ANSWER CHOICES.

Planning Your Time

You have 180 minutes to complete the entire test. How you allot the time between the English Language Arts and Mathematics sections is up to you. **If you begin with the English Language Arts section, you may go on to the Mathematics section as soon as you are ready. Likewise, if you begin with the Mathematics section, you may go on to the English Language Arts section as soon as you are ready.** If you complete the test before the allotted time (180 minutes) is over, you may go back to review questions in either section.

Be sure to read the directions for each section carefully. Each question has only one correct answer. Choose the best answer for each question. When you finish a question, go on to the next, until you have completed the last question. Your score is determined by the number of questions you answer correctly. **Answer every question, even if you may not be certain which answer is correct.** Don't spend too much time on a difficult question. Come back to it later if you have time. If time remains, you should check your answers.

Students must stay for the entire test session.

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START SHSAT PREP

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SAMPLE TEST, FORM B
PART 1 — ENGLISH LANGUAGE ARTS

57 QUESTIONS

REVISING/EDITING

QUESTIONS 1–9

IMPORTANT NOTE

The Revising/Editing section (Questions 1-9) is in two parts: Part A and Part B.

REVISING/EDITING Part A

DIRECTIONS: Read and answer the following questions. You will be asked to recognize and correct errors so that the sentences or short paragraphs follow the conventions of standard written English. You may write in your test booklet as needed to take notes. You should re-read relevant parts of the sentences or paragraphs, while being mindful of time, before marking the best answer for each question.

1. Read this paragraph.

> (1) The blobfish, a creature that certainly resembles its name, is an unusual fish whose body is mostly composed of pink gelatinous flesh. (2) Because it has very few muscles and its density is close to that of water, the blobfish spends its life floating slightly above the ocean floor. (3) It must wait patiently for whatever edible matter might float by its mouth. (4) The blobfish's downturned mouth, slimy skin, and pale coloring caused them to be voted the World's Ugliest Animal in 2013.

Which sentence contains an error in its construction and should be revised?

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

2. Read this paragraph.

> (1) Both Italian gelato and American ice cream are delightful treats to have on a hot summer day, but many people wonder: what is the difference between the two? (2) To start with, the butterfat content is much higher in ice cream than it is in gelato, making the Italian treat a wiser decision for people looking to make healthier choices. (3) Additionally, the mixing process, which adds less air to the frozen treat, makes gelato denser than ice cream. (4) Finally, gelato is served 10 to 15 degrees warmer than ice cream, which enhances the texture and flavor of the gelato, and allow it to melt more quickly.

Which revisions correct the errors in the paragraph?

E. Sentence 1: Delete the colon after ***wonder*** AND change ***is*** to **are**.

F. Sentence 2: Delete the comma after ***with*** AND change ***it is*** to **they are**.

G. Sentence 3: Delete the comma after ***process*** AND change ***makes*** to **make**.

H. Sentence 4: Delete the comma after ***gelato*** AND change ***allow*** to **allows**.

3. Read this paragraph.

> In 1967 Katherine Switzer signed up for the Boston Marathon using her first and middle initials instead of her full name, at that time, only men were permitted to officially register and receive a number for the legendary race. Once officials realized a woman was attempting to run in the race, they made efforts to remove her from the competition. Switzer prevailed and finished in just over four hours, paving the way for the official rule change that allowed for the inclusion of women. In 2017, to mark the fiftieth anniversary of this pioneering event, a seventy-year-old Switzer repeated her run, wearing the number 261, the same number she had worn in that first run in 1967.

Which revision corrects the error in sentence structure in the paragraph?

A. name. At

B. race. They

C. hours. Paving

D. 261. The

START SHSAT PREP

REVISING/EDITING Part B

DIRECTIONS: Read the text below and answer the questions following it. You will be asked to improve the writing quality of the text and to correct errors so that the text follows the conventions of standard written English. You should re-read relevant parts of the text, while being mindful of time, before marking the best answer for each question.

Martial Arts for the Mind and Body

(1) The martial arts blend a series of physical movements with strategic mental discipline so that practitioners can defend themselves, physically defeat an opponent, or both. (2) Historians are unsure of exactly when and where martial arts were first used. (3) Martial arts have been practiced by several different societies for many centuries. (4) Martial arts such as karate, kung fu, tae kwon do, and judo are still taught and practiced as methods of self-defense, but they offer students more than that. (5) The study of martial arts can provide students with a way to enhance their mental discipline as well as their physical fitness.

(6) Discipline, focus, and respect are important qualities for everyone to have. (7) However, for most people these qualities are not innate; they must be learned and practiced. (8) The study of martial arts can provide an opportunity to develop these skills. (9) Students are rewarded for their dedication by passing tests and advancing to higher levels. (10) For example, in a typical tae kwon do class, students learn discipline by diligently practicing moves, improve focus by listening carefully, and demonstrate respect by bowing to the instructor and following directions.

(11) For teenagers, martial arts classes provide a safe and structured environment for gaining physical skills, building confidence, and enjoying a sense of community. (12) A lot of teens go through hard situations as they try to do well in school and in life. (13) A karate class can provide teens with a physical outlet for stress while also challenging them mentally. (14) Participating in a martial arts program also helps children and teens focus on self-improvement rather than on competition. (15) Progressing through levels of achievement involves mastering more physically demanding techniques. (16) It requires students to take responsibility and be accountable for achieving set goals. (17) Students gain confidence and experience companionship with other students who are progressing through the ranks.

(18) Adults who practice martial arts can experience many of the same benefits that younger people do, but perhaps the greatest of these is health and fitness. (19) Adult martial arts students often see changes in their body within weeks of beginning a program.

(20) For people interested in studying a martial art, there are many ways to learn and practice. (21) In addition to private studios, community recreation centers often offer low-cost or free martial arts classes. (22) There are even online videos that introduce students to the basic concepts. (23) People should study martial arts.

4. What is the best way to combine sentences 2 and 3?

E. Historians, who are unsure of exactly when and where martial arts were first used, know that martial arts have been practiced by several different societies for many centuries.

F. While historians are unsure of exactly when and where martial arts were first used, they do know that martial arts have been practiced by several different societies for many centuries.

G. Because historians know that martial arts have been practiced by several different societies for many centuries, they are unsure of exactly when and where martial arts were first used.

H. Martial arts have been practiced by several different societies for many centuries, and historians are unsure of exactly when and where martial arts were first used.

5. Where should sentence 10 be moved to improve the organization of the second paragraph (sentences 6–10)?

A. to the beginning of the paragraph (before sentence 6)

B. between sentences 6 and 7

C. between sentences 7 and 8

D. between sentences 8 and 9

6. Which revision of sentence 12 best maintains the formal style established in the passage?

E. A lot of teens have to put up with difficult things while trying to do well in school and in life.

F. Many teenagers deal with tough situations as they try to stay on top of their studies and do well in life.

G. Many teenagers encounter challenges as they work to succeed both academically and personally.

H. A lot of teens face problems as they work to keep up with their schoolwork and find personal success.

7. Which transitional phrase should be added to the beginning of sentence 17?

A. Over time

B. In fact

C. Even so

D. For instance

START SHSAT PREP

READING COMPREHENSION

QUESTIONS 10–57

DIRECTIONS: Read each of the following six texts, and answer the related questions. You may write in your test booklet as needed to take notes. You should re-read relevant parts of each text, while being mindful of time, before marking the best answer for each question. Base your answers only on the content within the text.

CONTINUE ON TO THE NEXT PAGE ►

The Best Laid Plans of Ravens

1 In Edgar Allan Poe's poem "The Raven," a raven visits a lonely man's home and responds to the man's pleading questions with only the word "nevermore." The poem's narrator interprets the word as a prediction of doom for his future. A talking, prophetic raven may seem to be the wild imaginings of the poet, but a new study published in the journal *Science* hints that one particular idea behind the poem might not be as far-fetched as it seems. For most of human history, people assumed that animals do not understand the passage of time in the same way people do. Some people believed that animals might remember events from the past and that instinct might drive them to make preparations in order to guarantee survival, but most people did not think that animals had the ability to plan. At Lund University in Sweden, researchers argue that ravens may be able to think ahead and even plan for the future.

2 It can be difficult to test an animal's ability to plan because human observers must be certain they are not mistaking instinctual behavior for intentional planning. For example, many animals hoard food so that they will not run out later, but scientists who study animals would not call hoarding a decision to plan for the future. This action is merely instinctual. Cognitive scientists argue that in order for an animal's behavior to qualify as preparing for the future, the animal must use specific decision-making skills to solve a problem.

3 To avoid mistaking instinctual behavior for evidence of decision-making, the Lund University researchers designed two experiments to test ravens' ability to plan. Ravens belong to the corvid family, a group of birds known for their intelligence. A study in 2007 showed that corvids have the tendency to save only certain types of food, which suggests that they are planning for the future rather than acting on instinct. In order to investigate that theory, the researchers had to design experiments that would achieve results that could not be explained by an instinctual behavior of food hoarding. Therefore, the ravens were taught two behaviors that they do not normally perform in the wild.

4 For the first experiment, the researchers showed the birds how to use a small stone to open a box and get treats. Once the ravens learned the behavior, the researchers presented the birds with four stones. Only one stone was the right size to open the box. The birds learned to select that stone and set it aside until the researchers presented the box. The second experiment involved bartering. A researcher would trade the ravens a large treat for a bottle cap. Later, the researchers presented the ravens with a group of items, including small treats and the bottle cap. The ravens chose the bottle cap over the treats and waited for the original researcher to trade with them again so that they could get more treats. In both experiments, the ravens waited patiently for up to seventeen hours for the researcher to return.

5 The results of these experiments are exciting, but more evidence needs to be gathered before scientists can fully conclude that ravens can plan for the future. Some scientists argue that the ravens might be choosing the stone and bottle cap because the ravens have been trained to do so, not necessarily because the ravens are thinking ahead. Regardless, like other recent advances in animal science, these experiments show that ravens could be much smarter than first believed, and scientists now believe that ravens do actually think about their own future.

START SHSAT PREP

10. How does paragraph 1 introduce the ideas that ravens may perceive time and plan for the future?

E. It mentions a poem that considers whether a raven can see the future and then discusses why people have traditionally doubted that ravens have the ability to plan.

F. It references a poem about a raven that seems to have insight into the future and then mentions new information that suggests ravens have the ability to plan.

G. It mentions a poem that led people to believe that ravens are aware of the future and then explains why scientists want to study ravens' ability to plan.

H. It references a poem about a raven that predicts the future and then describes the importance of differentiating ravens' instincts from their ability to plan.

11. Read these sentences from paragraph 2.

> **For example, many animals hoard food so that they will not run out later, but scientists who study animals would not call hoarding a decision to plan for the future. This action is merely instinctual.**

Which statement describes the effect of the phrase "merely instinctual" in the passage?

A. It implies that animals are skilled at finding and saving food for later consumption.

B. It conveys that many animals will usually prioritize gathering food over other activities.

C. It suggests that animals often store more food than they will be able to consume.

D. It emphasizes that many animals collect food automatically rather than with true intention.

12. Read this sentence from paragraph 1.

> **At Lund University in Sweden, researchers argue that ravens may be able to think ahead and even plan for the future.**

Which sentence from paragraph 4 provides support for this argument?

E. "Once the ravens learned the behavior, the researchers presented the birds with four stones."

F. "A researcher would trade the ravens a large treat for a bottle cap."

G. "Later, the researchers presented the ravens with a group of items, including small treats and the bottle cap."

H. "The ravens chose the bottle cap over the treats and waited for the original researcher to trade with them again so that they could get more treats."

START SHSAT PREP

13. In the first experiment described in paragraph 4, which of the ravens' behaviors provides the strongest evidence for the claim that the birds are capable of planning?

A. They accepted treats from the unlocked box.

B. They set aside the stones that would unlock the box.

C. They learned which stone could open the box.

D. They waited for researchers to bring the box.

14. Read this sentence from paragraph 4.

> **In both experiments, the ravens waited patiently for up to seventeen hours for the researcher to return.**

How does this sentence fit into the overall structure of the passage and contribute to the development of ideas?

E. It concludes the description of the experiments, supporting the idea that ravens can make decisions for the future.

F. It establishes the timeline required in experiments designed to determine learned behaviors in ravens.

G. It reveals how the ravens solved the problems posed in the experiments, proving that ravens have the ability to plan ahead.

H. It indicates that hoarding food is both an instinctual and a learned behavior among ravens.

15. With which statement would the author of the passage most likely agree?

A. Scientists are unlikely to be able to conduct an experiment that can genuinely distinguish between instinctual and learned behaviors in animals.

B. Scientists should continue researching to find more evidence to support the idea that some animals show signs of advanced intelligence.

C. Scientists should be careful about making conclusions about animal intelligence based on experiments that rely on training animals.

D. Scientists can confirm data on whether animals have the ability to plan by performing experiments on additional species known for their intelligence.

If you have ever watched someone fall on 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, [illegible] even when a skater is motionless, creating no friction.

The pressure theory holds that pressure from a skate blade lowers the ice's melting point, 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 froze solid when the surfaces made 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 allow scientists to measure the thin layer on the surface of the 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 [illegible] liquid, which is why [illegible] liquid. Thus it could be said that people are [illegible] molecules!

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

45. Which of the following best tells what this passage is about?

A. why ice surfaces are liquid-like
B. how ice changes from a solid to a liquid
C. answers to the question of what makes ice slippery
D. the discoveries of Michael Faraday
E. the processes of freezing and melting

CONTINUE ON TO THE NEXT PAGE ►

Located underground near Geneva, Switzerland, the Large Hadron Collider (LHC) helps scientists study and understand how the smallest particles of matter interact with one another. The LHC propels atomic particle beams along a 17-mile-long ring.

Looking for the Smallest Spark of Everything

There are the things the world is made of,
things we can see and feel, and then
there are the things even smaller, things that seem
to exist only when we are looking right at them.

So beneath the level of molecules are atoms,
and beneath the level of atoms, we find
protons, electrons, neutrons; and beneath that—
what, exactly? Because we are talking about
everything here: your fingernail,
the candy at the back of your mouth,
the coffee your teacher drank this morning,
your little sister, and the stuffed dog
she used to carry around with her everywhere.
And everywhere.

Everything and everywhere
are made up of the same stuff, whatever
it is. How do we find it? We can listen for it
in the wavelengths from deep space,
talking back to us from unimaginable
distances. Or we can build long,
deep circular tunnels beneath the surface
of this Earth and race particles
(like racing cars, only very tiny cars
flashing along at close to the speed of light)
until everything we think we know
bangs against everything else we know.

And there, in the explosion, in the darkness,
briefly incandescent, they appear:
the quarks, the leptons, and the bosons;
the baryons and the mesons. Their names
sound like dinosaurs or maybe bands
playing terrible music in someone's garage.

The one thing we know for sure
is that they spin. This is how gravity
enters our world, how our world is held
both together and apart, what keeps
together the pencil in your hand right now
as well as separate from, say,
Jupiter. They spin, and it is only down there

in the darkness—in the vast garage
where physicists jot down
what they can, whatever seems most real—
that they let us perceive their wild dancing,
combusting to the music they make.

18. Read lines 5–8 from the poem.

> **So beneath the level of molecules are atoms,**
> **and beneath the level of atoms, we find**
> **protons, electrons, neutrons; and beneath that—**
> **what, exactly?**

The lines help develop a central idea of the poem by revealing the speaker's

E. interest in determining how the parts of matter work together.

F. curiosity about what makes up matter.

G. desire to prove that particles make up matter.

H. questions about what tools are needed to study matter.

19. The break between the second stanza (lines 5–14) and the third stanza (lines 15–26) serves as a transition from

A. identifying common physical objects to explaining how the particles that make up all physical things are observed.

B. suggesting that the visible world is made up of simple materials to revealing why invisible materials make the world complicated.

C. discussing the methods used to study particles in space to describing how matter is researched on Earth.

D. describing an environment that feels comfortable to characterizing an environment that seems unstable.

20. The main purpose of the comparison in lines 23–24 of the poem is to show

E. that the particles' size makes them difficult to see.

F. how the particles move within the tunnel.

G. that the particles have a familiar shape.

H. how the particles can be seen only in darkness.

START SHSAT PREP

21. Read lines 25–26 from the poem.

> **until everything we think we know**
> **bangs against everything else we know.**

The lines help develop a central idea in the poem by suggesting that

A. creative methods for researching particles are frequently being invented.
B. ongoing research continues to add to our knowledge of particles.
C. our understanding of particles is limited by the equipment available to study them.
D. competing theories about particles provoke scientific debate.

22. Read lines 27–28 from the poem.

> **And there, in the explosion, in the darkness,**
> **briefly incandescent, they appear:**

The imagery in the lines reveals that the speaker

E. envies the physicists who research colliding particles.
F. has personally observed colliding particles.
G. admires the powerful reactions that occur when particles collide.
H. has a simplistic understanding of how particles collide.

23. Read lines 30–32 from the poem.

> **Their names**
> **sound like dinosaurs or maybe bands**
> **playing terrible music in someone's garage.**

The speaker refers to familiar objects and events in the lines most likely to

A. explain confusing information in simple terms to help the reader understand more about the topic.
B. demonstrate how scientific ideas can be explained by describing situations that many people are familiar with.
C. emphasize that the process being used to research particles is still in the early stages of development.
D. suggest that the scientific language used to describe particles seems silly by making a humorous comparison.

In this excerpt, published in 1914, author and professor Dallas Lore Sharp describes a summer cattle roundup in Oregon. The heat and dust had been relentless for three days. The cowboys were exhausted, and the cattle were restless. The ranch boss, Wade, had led the drive to a watering place, only to find it empty.

Excerpt from "The Spirit of the Herd"

by Dallas Lore Sharp

1 Along with the wagon had come the fresh horses—one of them being Peroxide Jim, a supple, powerful, clean-limbed buckskin, a horse, I think, that had as fine and intelligent an animal-face as any creature I ever saw. Wade had been saving this horse for emergency work. And why should he not have been saved fresh for just such a need as this? Are there not superior horses as well as superior men—a Peroxide Jim to complement a Wade?

2 The horse knew the cattle business and knew his rider perfectly; and though there was nothing like sentiment about the boss of the P Ranch riders, his faith in Peroxide Jim was complete. . . .

3 The desert, where the herd was camped, was one of the highest of a series of tablelands,[1] or benches; it lay as level as a floor, rimmed by sheer rock, from which there was a drop to the bench of sage below. The herd when overtaken by the dusk had been headed for a pass descending to the next lower bench, but was now halted within a mile of the rim rock on the east, where there was a perpendicular fall of about three hundred feet. . . .

4 In the taut silence of the stirless desert night, with the tension of the herd at the snapping-point, any quick, unwonted sight or sound would stampede them. The sneezing of a horse, the flare of a match, would be enough to send the whole four thousand headlong—blind, frenzied, trampling—till spent and scattered over the plain.

5 And so, as he rode, Wade began to sing. The rider ahead of him took up the air and passed it on until, above the stepping stir of the hoofs rose the faint voices of the men, and all the herd was bound about by the slow plaintive measures of some old song. It was not to soothe their savage breasts that the riders sang to the cattle, but rather to preempt the dreaded silence, to relieve the tension, and so to prevent the shock of any sudden startling noise.

6 So they sang and rode and the night wore on to one o'clock, when Wade, coming up on the rim-rock side, felt a cool breeze fan his face, and caught a breath of fresh, moist wind with the taste of water in it.

7 He checked his horse instantly, listening as the wind swept past him over the cattle. But they must already have smelled it, for they had ceased their milling, the whole herd standing motionless, the indistinct forms close to him in the dark showing their bald faces lifted to drink the sweet wet breath that came over the rim. Then they started on again, but faster, and with a rumbling now from their hoarse throats that tightened Wade's grip on the reins.

8 The sound seemed to come out of the earth, a low, rumbling mumble, as dark as the night and as wide as the plain, a thick, inarticulate bellow that stood every rider stiff in his stirrups. . . .

[1] **tablelands:** plateaus, flat areas of land sharply elevated from the surrounding area

9 Then the breeze caught the dust and carried it back from the gray-coated, ghostly shapes, and Wade saw that the animals were still moving in a circle. He must keep them going. He touched his horse to ride on with them, when across the black sky flashed a vivid streak of lightning.

10 There was a snort from the steers, a quick clap of horns and hoofs from far within the herd, a tremor of the plain, a roar, a surging mass—and Wade was riding the flank of a wild stampede. Before him, behind him, beside him, pressing hard upon his horse, galloped the frenzied steers, and beyond them a multitude borne on, and bearing him on, by the heave of the galloping herd.

11 Wade was riding for his life. He knew it. His horse knew it. He was riding to turn the herd, too, back from the rim, as the horse also knew. The cattle were after water—water-mad—ready to go over the precipice to get it, carrying horse and rider with them. Wade was the only rider between the herd and the rim. It was black as death. He could see nothing in the sage, could scarcely discern the pounding, panting shadows at his side. He knew that he was being borne toward the rim, how fast he could not tell, but he knew by the swish of the brush against his tapaderos[2] and the plunging of the horse that the ground was growing stonier, that they were nearing the rocks.

12 To outrun the herd was his only chance for life. If he could come up with the leaders he might not only escape, but even stand a chance of heading them off upon the plain and saving the herd. There were cattle still ahead of him; how many, what part of them all, he could not make out in the dark. But the horse knew. The reins hung on his straight neck, where his rider had dropped them, as, yelling and firing over the wild herd, he had given this horse the race to win, to lose.

13 They were riding the rim. Close on their left bore down the flank of the herd, and on their right, under their very feet, was a precipice, so close that they felt its blackness—its three hundred feet of fall! . . .

14 . . . Then Wade found himself racing neck and neck with a big white steer, which the horse, with marvelous instinct, seemed to pick out from a bunch, and to cling to, forcing him gradually ahead, till, cutting him free from the bunch entirely, he bore him off into the swishing sage.

15 The steers coming on close behind followed their leader, and in, after them, swung others. The tide was turning from the rim. More and more were veering, and within a short time the whole herd, bearing off from the cliffs, was pounding over the open plains.

16 Whose race was it? It was Peroxide Jim's, according to Wade, for not by word or by touch of hand or knee had the horse been directed in the run. From the flash of the lightning the horse had taken the bit, had covered an indescribably perilous path at top speed, had outrun the herd and turned it from the edge of the rim rock, without a false step or a tremor of fear.

From "The Spirit of the Herd" by Dallas Lore Sharp—Public Domain

[2]**tapaderos:** leather covers for stirrups

START SHSAT PREP

27. Which sentence from the excerpt best explains why Wade reserved Peroxide Jim for "emergency work" (paragraph 1)?

A. "Along with the wagon had come the fresh horses—one of them being Peroxide Jim, a supple, powerful, clean-limbed buckskin, a horse, I think, that had as fine and intelligent an animal-face as any creature I ever saw. " (paragraph 1)

B. "Before him, behind him, beside him, pressing hard upon his horse, galloped the frenzied steers, and beyond them a multitude borne on, and bearing him on, by the heave of the galloping herd." (paragraph 10)

C. "He knew that he was being borne toward the rim, how fast he could not tell, but he knew by the swish of the brush against his tapaderos and the plunging of the horse that the ground was growing stonier, that they were nearing the rocks." (paragraph 11)

D. "From the flash of the lightning the horse had taken the bit, had covered an indescribably perilous path at top speed, had outrun the herd and turned it from the edge of the rim rock, without a false step or a tremor of fear." (paragraph 16)

28. Paragraphs 1–2 contribute to the development of the central idea of the excerpt by

E. revealing the respect Wade had for his horse.

F. emphasizing Wade's high expectations of his horse and himself.

G. indicating that Wade and his horse understood the cattle business.

H. demonstrating Wade's ability to gauge a horse's competence.

29. How does paragraph 3 convey the effect of the setting on the cattle drive?

A. It shows how the growing darkness created challenges for the riders in getting the herd to move.

B. It describes how the changing elevation contributed to the dangerousness of the environment.

C. It describes how the desert created a feeling of isolation that caused the riders and the cattle to feel uncomfortable.

D. It shows how the steep terrain made it difficult for the cattle to keep moving forward.

30. Which sentence from the excerpt best reveals the mood on the drive before the lightning struck?

E. "The herd when overtaken by the dusk had been headed for a pass descending to the next lower bench, but was now halted within a mile of the rim rock on the east, where there was a perpendicular fall of about three hundred feet." (paragraph 3)

F. "It was not to soothe their savage breasts that the riders sang to the cattle, but rather to preempt the dreaded silence, to relieve the tension, and so to prevent the shock of any sudden startling noise." (paragraph 5)

G. "So they sang and rode and the night wore on to one o'clock, when Wade, coming up on the rim-rock side, felt a cool breeze fan his face, and caught a breath of fresh, moist wind with the taste of water in it." (paragraph 6)

H. "Then the breeze caught the dust and carried it back from the gray-coated, ghostly shapes, and Wade saw that the animals were still moving in a circle." (paragraph 9)

31. How does paragraph 9 fit into the overall structure of the excerpt?

A. It hints at the change in the setting that caused Wade to suddenly become alert.

B. It creates a false sense of calm that shows how unprepared the men were for what was about to happen.

C. It indicates that Wade was a skillful leader in unpredictable circumstances.

D. It presents the incident that caused the main conflict Wade and Peroxide Jim addressed.

32. Read these sentences from the excerpt.

He was riding to turn the herd, too, back from the rim, as the horse also knew. (paragraph 11)

It was Peroxide Jim's, according to Wade, for not by word or by touch of hand or knee had the horse been directed in the run. (paragraph 16)

How do these sentences develop a central idea in the excerpt?

E. They suggest that Wade would have been unable to save the herd without Peroxide Jim.

F. They imply that Wade spent many hours training Peroxide Jim to herd cattle.

G. They show that Peroxide Jim was able to understand a situation and take action.

H. They indicate that Peroxide Jim was unafraid of the dangers presented by the stampede and the cliff.

START SHSAT PREP

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, [illegible]

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 froze solid when the surfaces made 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 allow scientists to measure the thin layer on the surface of the 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 [illegible] 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, made of carbon, also show this property under certain temperature and pressure conditions.

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45. Which of the following best tells what this passage is about?

- **A.** why ice surfaces are liquid-like
- **B.** how ice changes from a solid to a liquid
- **C.** answers to the question of what makes ice slippery
- **D.** the discoveries of Michael Faraday
- **E.** the processes of freezing and melting

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A Memory Revolution

1 A high school senior logs on to a computer at the library to double-check the application due date listed on a college admissions website. Nearby, a librarian helps a group of biology students use a database to search for recent studies about mammals. In the past few decades, the Internet has become an integral component of daily life for many people. The seemingly limitless power of search engines made the Internet search extremely common, and today people increasingly rely on the Internet's vast accumulation of sources to access all types of information. Scientists are beginning to examine how this reliance is modifying the strategies people use to store and prioritize information in their mind.

A Dependable and Valuable Asset

2 Psychologist Benjamin Storm from the University of California, Santa Cruz, and researchers Sean Stone and Aaron Benjamin devised an experiment to study students' tendency to depend on the Internet for facts. To begin, the scientists divided sixty participants into multiple groups, including an "Internet" group and a "memory" group, and placed them in front of computers. The Internet group was required to use the search engine Google to answer eight challenging trivia questions. In contrast, participants in the memory group were permitted to use only their personal knowledge to answer the questions. In the second round, the researchers administered notably easier questions. This time, they allowed each group the option of using Google as they answered. Their results showed that 83 percent of the Internet group continued to consult Google in the second round, while only 63 percent of the memory group chose to do so.

3 People's growing inclination to rely on the Internet in order to retrieve information, particularly facts and figures, is called cognitive offloading. Canadian researcher Evan F. Risko and British researcher Sam Gilbert, who have written extensively about the topic, say a similar process has been taking place for centuries. In the past, people used resources like encyclopedias to assist their memories; however, today the Internet, serving as a vast extended memory, allows people to digitally access and retrieve much larger volumes of information. Consequently, people's minds are free for other cognitive feats, such as connecting data, learning new information, or solving problems.

Filing Information Away

4 The use of the Internet also appears to be modifying the strategies people use to store information in their mind. Researchers Betsy Sparrow from Columbia University, Jenny Liu from the University of Wisconsin-Madison, and Daniel Wegner from Harvard University conducted several studies to discover how people efficiently manage their information intake.

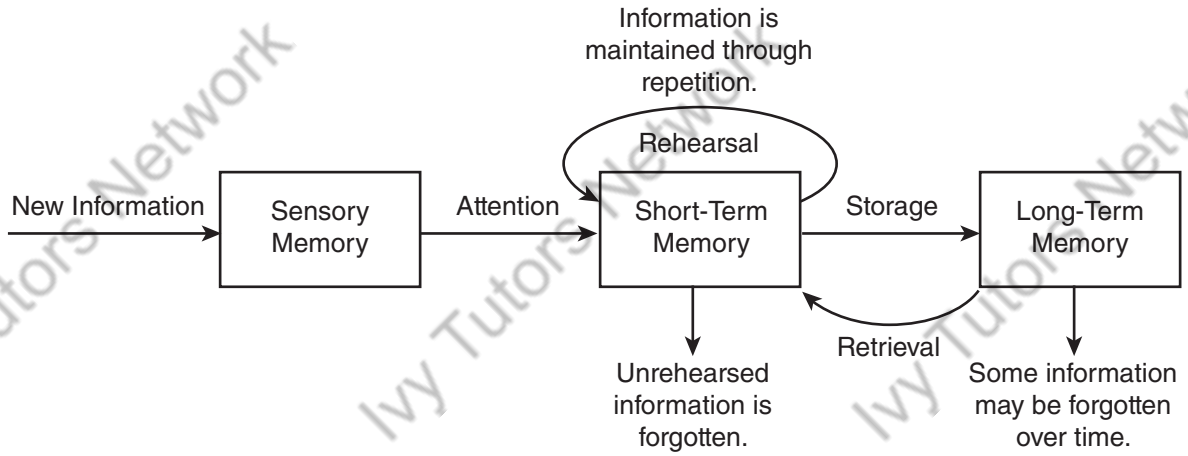
5 To begin, the researchers examined how people evaluate which information deserves their effort to remember. For this experiment, participants read forty trivia facts, such as "An ostrich's eye is bigger than its brain," and typed the statements into a computer file. Half the participants had been previously told the file would be saved, while half believed it would be erased. Next, the participants wrote down every fact they could recall. Those who believed the information would be erased and no longer available could recall 40 percent more facts than those who thought the information would be saved.

6 In another experiment, the same researchers tested the ability of study participants to remember where to access information. For this trial, participants read and typed trivia statements, which they

saved in folders with generic names such as "Facts" and "Items." After spending ten minutes writing down all the facts they could recall from memory, participants were asked which folder contained a particular fact based on a keyword. For example, "Which folder has the fact about ostriches?" Overall, participants recalled the information's location more often than the content itself, correctly identifying 49 percent of the folders for specific facts while remembering only 23 percent of the actual trivia. The researchers concluded that our memory is adapting to the Internet age by prioritizing where to locate information even when the specific details are forgotten. According to Sparrow, the Internet has become an important form of transactive memory, an external source of the recollections and associative networks that constitute memory.

7 As the Internet's resources continue to expand our "external" memory, some question whether the process may cause people to depend too heavily on technology. However, Steven Pinker, a professor of psychology at Harvard University, says, "Knowledge is increasing exponentially; human brainpower and waking hours are not. Fortunately, the Internet and information technologies are helping us manage, search and retrieve our collective intellectual output at different scales, from Twitter and previews to e-books and online encyclopedias. Far from making us stupid, these technologies are the only things that will keep us smart."

HOW MEMORY WORKS



35. Which sentence from the passage suggests that using Internet search engines may lead people to rely less on their own ability to recall information?

A. "In the past few decades, the Internet has become an integral component of daily life for many people." (paragraph 1)

B. "The Internet group was required to use the search engine Google to answer eight challenging trivia questions." (paragraph 2)

C. "Their results showed that 83 percent of the Internet group continued to consult Google in the second round, while only 63 percent of the memory group chose to do so." (paragraph 2)

D. "In the past, people used resources like encyclopedias to assist their memories; however, today the Internet, serving as a vast extended memory, allows people to digitally access and retrieve much larger volumes of information." (paragraph 3)

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36. The details in paragraph 3 about cognitive offloading convey a central idea of the passage by

E. suggesting that reliance on the Internet for information is inevitable.

F. demonstrating how the methods used to store and find information have changed over time.

G. explaining how encyclopedias and the Internet are similar sources of information.

H. implying that more information can be understood now than ever before.

37. How do the details about the experiment described in paragraph 5 convey a central idea of the passage?

A. They suggest that the act of repeating information by typing it on a keyboard may improve a person's memory.

B. They explain that a person will forget information faster if the information is considered unimportant.

C. They indicate that a person may start to forget details when the amount of information becomes overwhelming.

D. They suggest that memory is affected by whether a person expects to have access to the information in the future.

38. The study described in paragraph 6 influenced researchers' ideas about memory in the digital age by

E. highlighting instances when organizing detailed information made it easier to remember.

F. confirming that keywords can be remembered more easily than large amounts of information.

G. identifying a shift in focus from remembering specific information to knowing where to find it.

H. emphasizing that remembering a basic idea is more important than storing detailed information.

39. Which evidence from the passage is most relevant to the claim in paragraph 7 that " 'far from making us stupid, these technologies are the only things that will keep us smart' "?

A. the revelation that most people opted to use the Internet to answer relatively easy trivia questions rather than relying on their own brainpower (paragraph 2)

B. the assertion that the storage of information on the Internet frees people to focus on higher-order tasks such as problem solving (paragraph 3)

C. the connection between how people organize information in their mind and their ability to recall that information (paragraph 5)

D. the description of transactive memory as an expansive external source that people can use to store information (paragraph 6)

START SHSAT PREP

40. Read this sentence from paragraph 7.

> **As the Internet's resources continue to expand our "external" memory, some question whether the process may cause people to depend too heavily on technology.**

How does the sentence contribute to the structure and development of ideas in the passage?

E. It presents a claim about the risks of relying on the Internet that prompted the research described in paragraphs 2 and 6.

F. It contrasts a disadvantage of relying on the Internet with the benefits of Internet use that are described in paragraphs 2 and 6.

G. It signals a shift from a neutral viewpoint in paragraphs 2 and 6 to a presentation of an argument and a counterargument.

H. It introduces a counterargument and marks a transition from an optimistic tone in paragraphs 2 and 6 to a cautious tone as the counterargument is developed.

41. The effect of the Internet on a person's memory is illustrated in the passage through the presentation of studies that

A. examine how the use of search engines changes the way people evaluate and store information for future access.

B. highlight the difference between the capacity of the Internet and the ability of the human brain to locate information.

C. compare the type of information that can be obtained from the Internet with the type of information that is stored in the human brain.

D. emphasize the ease of obtaining information through search engines rather than recalling it from memory.

42. How does the diagram provide additional support for the topic presented in the passage?

E. It reveals why human brains must adapt to obtaining information from the Internet as opposed to other sources.

F. It indicates how people can use the Internet to help improve their long-term recollection of information.

G. It shows how study participants' brains distinguished between important and unimportant details.

H. It depicts the idea that repetition and rehearsal are necessary to recall information when tools such as search engines are unavailable.

START SHSAT PREP

The Great Serpent Mound, located in Adams County, Ohio, is a human-made mound of earth that researchers believe was created between 300 B.C. and A.D. 1100 by an indigenous culture.

Serpent Mound

Ohio, 1846

Brush Creek stood low when the museum men came
with their measuring tapes and sketchbooks.
    It was winter. Fringed with ice,
    the creek doubled back on itself
as if it had forgotten something.
    Pa was in Cincinnati, or else on his way home,
        so Ma told me to lead the men
        into the marshy low grounds. It being winter,
            there was little underbrush to speak of—
            in the summer there would have been
        briars, poison ivy, biting flies. I listened
for the *swish* of a beaver's heavy tail,
        the chitter of a chickadee, or the cry of a hawk,
        but the winter silence of the creek pressed
        down on all of us like a weight.
The humps in the ground were all but
invisible until you were right up on them. The figure
was even less obvious: the sinuous body,
        the tail coiled three times around,
        and at the other end, the mouth wide open.
            In the summer the creek bottom was crowded
            with so much life that you could trip over
                the ridges of earth before you saw
                anything at all. In winter you could climb
                a tree and get some idea of the whole thing:
            the serpent's body undulating, slithering
silently across the ancient
        earth. At the mouth end, there was an oval mound
        as if the snake were about to swallow an egg—
as snakes sometimes did in our rickety
henhouse—my Pa always said, or
as if swallowing the sun, one of the museum
    men suggested, taking notes with his quill pen,
    an old-style inkhorn slung at his side.
    I liked that: swallowing the sun,
        just the sort of thing a snake might do,
        might want to do. When, later, I told my sister Ruth,
            she disagreed. It is singing to the sun,
            she insisted. That is why its mouth
        is wide open. She said, "Sometimes I think
I hear it on summer nights. Not swallowing, singing."

START SHSAT PREP

43. Lines 1–2 contribute to the development of ideas in the poem by

A. suggesting that the men are too busy with their work to talk to the speaker.
B. helping establish the reason for the men's visit and purposeful behavior.
C. hinting that the men have hidden motives for studying the mound.
D. indicating why the speaker is fascinated by the men and wants to help them.

44. What impact do the words "*swish*," "chitter," and "cry" in lines 12–13 have in the poem?

E. They illustrate how lively the mound's surroundings are during the summer.
F. They show how the mound disrupts natural life in the marsh.
G. They indicate the variety of wildlife found in the area around the mound.
H. They suggest that the speaker prefers the mound's appearance in winter.

45. Which lines reveal how the setting affects the speaker and the men from the museum?

A. "so Ma told me to lead the men / into the marshy low grounds." (lines 7–8)
B. "It being winter, / there was little underbrush to speak of—" (lines 8–9)
C. "but the winter silence of the creek pressed / down on all of us like a weight." (lines 14–15)
D. "The humps in the ground were all but / invisible until you were right up on them." (lines 16–17)

46. What impact do the phrases "all but / invisible" and "even less obvious" in lines 16–18 have on the meaning of the poem?

E. They indicate that viewing the full size and shape of the mound is difficult.
F. They suggest that the location of the mound is unknown to most people.
G. They imply that the speaker wants the location of the mound to remain a secret.
H. They reveal that the speaker is unfamiliar with the significance of the mound.

47. Read line 28 from the poem.

At the mouth end, there was an oval mound

How does the line contribute to the development of ideas in the poem?

A. It describes a feature of the mound that the men from the museum need to document.
B. It introduces a comparison of the body of the mound with the head of the mound.
C. It introduces a feature of the mound that has a different meaning to different people.
D. It describes a part of the mound that is difficult to see from far away.

START SHSAT PREP

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 froze solid when the surfaces made 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 allow scientists to measure the thin layer on the surface of the 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 up and down. If molecules also moved side to side, they would constitute a true liquid. Thus it could be said that people are skating on 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, made of carbon, also show this property under certain temperature and pressure conditions.

45. Which of the following best tells what this passage is about?

A. why ice surfaces are liquid-like
B. how ice changes from a solid to a liquid
C. answers to the question of what makes ice slippery
D. the discoveries of Michael Faraday
E. the processes of freezing and melting

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The pressure theory holds that pressure from a skate blade melts the ice surface, creating a slippery layer of water. The water refreezes when the pressure is lifted. Some 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.

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Massachusetts: Lowell National Historical Park

1 During the first half of the 19th century, Lowell, Massachusetts, quickly transformed itself from a farm town to a bustling industrial city. In time, Lowell became a model of industry, gaining global recognition for its state-of-the-art technology, innovative canal and dam system, mill architecture, boardinghouses, churches, and ethnic neighborhoods. Young Yankee[1] women, immigrant families, and European tourists all flocked to Lowell to find work at one of the many textile mills, or visit the industrious city that was becoming a popular tourist destination. As one Scottish traveler observed during his visit to America, "Niagara[2] and Lowell are the two objects I will longest remember in my American journey, the one the glory of American scenery, the other of American industry." Today, Lowell National Historical Park welcomes visitors to enjoy the sights of Lowell and learn about the history of one of America's most significant industrial cities.

2 The Boston merchants who founded Lowell in 1821 and named it after Francis Cabot Lowell chose to locate the town along Massachusetts's Merrimack River to take advantage of the kinetic energy offered by the Pawtucket waterfalls. Over six miles of canals powered the waterwheels of Lowell's mills, whose massive five- and six-story brick buildings dominated the city's landscape. . . . The most recognized of these buildings are the Lowell Manufacturing Company chartered in 1821, the Suffolk or Wannalancit Mill completed around the 1880s, the Boott Mill Company established in 1835, and the Boott Mill Boardinghouse that opened in 1838. By the 1850s, 40 textile mills employing over 10,000 workers stretched for about a mile along the river. . . .

3 The city's female workforce was significant in the history of Lowell. From the early to mid-1800s, women left the constricted lifestyle of small rural towns and rural areas for independent industrial city life. Most were young single Yankee girls, who were tired of the limited opportunities offered by their domestic work.[3] Women found that Lowell's mills offered monthly wages for their services and provided them room and board. Although these women gained economic independence in Lowell, the mill boardinghouse keepers constantly supervised their social activities, for which they hardly had any time, considering their daily 12- to 14-hour work schedules. At the end of the day, the factory bell signaled the "mill girls" to return to their boardinghouses. They were expected to adhere to the strict code of conduct respecting curfew and attending church.

4 Yankee "mill girls" continued to dominate the Lowell workforce until the 1840s, when the city began to find it difficult to compete with the growing industrial development in other New England communities. As profits fell, the mill industry cut wages. These wage cuts, deteriorating working conditions, and long workdays led the "mill girls" to protest and organize strikes. When their demands went unheard, the women left Lowell, and immigrant groups replaced them in the workforce. Despite the low wages and unhealthy work conditions, immigrants were eager to find work.

5 The immigrants replacing the Yankee "mill girls" during the 1840s were predominantly Irish Catholics, who traveled to America during the Great Potato Famine. Although Lowell received an influx of Irish families during this time, the Irish were a part of the city's history from its birth, and before the "mill girls" arrived, they built Lowell's historic canals, mills, and boardinghouses. Initially,

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[1]**Yankee:** native to New England

[2]**Niagra:** a town in northwestern New York State well known as the location of Niagara Falls, a series of waterfalls on the Canadian border

[3]**domestic work:** household duties like cooking and cleaning

Lowell's Protestant community was slow to welcome Irish immigrants, but the hostility between Yankee Protestants and Irish Catholics eventually disappeared. Irish immigrants dominated the industrial scene until the Civil War, when other immigrant groups began to work in the city mills.

6 Like the Irish, the French-Canadians, Greeks, Poles, Portuguese, Russian Jews, and Armenians who came to work in Lowell's mills faced long work hours, low wages, and poor living conditions in the city's crowded tenements. By the time Lowell's industry declined, the city had become an ethnic melting pot, where each group claimed its own distinct neighborhood, like the Irish immigrants' "New Dublin" or "Acre," and the French-Canadians' "Little Canada." The city officially began to close down its mills in the 1920s and '30s after Lowell's outdated mills could no longer compete against the state-of-the-art cotton mills in other communities and working conditions continued to decline as Lowell's companies stopped reinvesting in their mills. . . . Despite a brief resurgence during World War II, the city shut down its last surviving mill by the mid-1950s.

From "Massachusetts: Lowell National Historical Park"—Public Domain/National Park Service

51. Read this sentence from paragraph 1.

> **As one Scottish traveler observed during his visit to America, "Niagara and Lowell are the two objects I will longest remember in my American journey, the one the glory of American scenery, the other of American industry."**

The author most likely includes the quotation from the Scottish traveler in order to

A. suggest that people around the world saw the direct contribution of nature and industry to the United States.

B. compare the natural and industrial attractions in the United States at that time.

C. convey the idea that the United States offered both natural and industrial attractions.

D. imply that the natural resources in the United States contributed to the development of industry.

52. Which sentence from paragraph 2 best supports the idea that Lowell became "a bustling industrial city" (paragraph 1)?

E. "The Boston merchants who founded Lowell in 1821 and named it after Francis Cabot Lowell chose to locate the town along Massachusetts's Merrimack River to take advantage of the kinetic energy offered by the Pawtucket waterfalls."

F. "Over six miles of canals powered the waterwheels of Lowell's mills, whose massive five- and six-story brick buildings dominated the city's landscape."

G. "The most recognized of these buildings are the Lowell Manufacturing Company chartered in 1821, the Suffolk or Wannalancit Mill completed around the 1880s, the Boott Mill Company established in 1835, and the Boott Mill Boardinghouse that opened in 1838."

H. "By the 1850s, 40 textile mills employing over 10,000 workers stretched for about a mile along the river."

START SHSAT PREP

53. Read this sentence from paragraph 3.

> **From the early to mid-1800s, women left the constricted lifestyle of small rural towns and rural areas for independent industrial city life.**

Which statement best describes how the sentence fits into the overall structure of the passage?

A. It provides a transition from a description of the mills to a description of the workforce in those mills.

B. It indicates a shift in tone from positive and hopeful to negative and dissatisfied with working conditions at the mill.

C. It presents the circumstances that led many women to leave their hometown and move to the city for work.

D. It begins a comparison of the mill workforce between the mid-1800s and the late 1800s.

54. Which sentence best summarizes the mill girls' time as the dominant workforce in Lowell?

E. The mill girls were eager to leave their domestic duties and small towns behind, so they went to work in the mills of Lowell.

F. Originally, the mill girls were satisfied to work in Lowell, but as they left their jobs at the Lowell mills, immigrants arrived to fill the empty positions.

G. Young women left home to work in the Lowell mills, but the mill girls soon became dissatisfied with the working conditions and rigid boardinghouse rules.

H. The mill girls embraced city life when they came to work in Lowell's mills, but when the working conditions became unfavorable and the mill girls' protests went unanswered, they left.

55. Read this sentence from paragraph 5.

> **Although Lowell received an influx of Irish families during this time, the Irish were a part of the city's history from its birth, and before the "mill girls" arrived, they built Lowell's historic canals, mills, and boardinghouses.**

How does this sentence contribute to the development of ideas in the passage?

A. It implies that Lowell was founded by early Irish immigrants.

B. It emphasizes the important role Irish immigrants played in Lowell's history.

C. It suggests that the new Irish immigrants were readily accepted into the community.

D. It highlights the working relationship between the mill girls and the new Irish immigrants.

START SHSAT PREP

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 [illegible]

The pressure theory claims that pressure from a skate [illegible] creating a [illegible] 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 froze solid when the surfaces made 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 allow scientists to measure the thin layer on the surface of the 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. [illegible]

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

45. Which of the following best tells what this passage is about?

- **A.** why ice surfaces are liquid-like
- **B.** how ice changes from a solid to a liquid
- **C.** answers to the question of what makes ice slippery
- **D.** the discoveries of Michael Faraday
- **E.** the processes of freezing and melting

CONTINUE ON TO THE NEXT PAGE ▶

PART 2 — MATHEMATICS

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 determined from the information given.

(3) Assume that a diagram is in one plane unless the question specifically states that it is not.

(4) Graphs are drawn to scale. Unless stated otherwise, you can assume relationships according to appearance. For example, lines on a graph that appear to be parallel can be assumed to be parallel. This is also true for concurrent lines, straight lines, collinear points, right angles, etc.

(5) Reduce (simplify) all fractions to lowest terms.

CONTINUE ON TO THE NEXT PAGE ►

GRID-IN QUESTIONS

QUESTIONS 58–62

DIRECTIONS: Solve each question. 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. 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. DO NOT LEAVE A BOX BLANK IN THE MIDDLE OF AN ANSWER.**

58.

LAST YEAR'S
TOTAL SALES

Vehicles	Number
Four-door cars	5,850
Two-door cars	2,250
Trucks	900
Total	**9,000**

The table above shows the number of each type of vehicle sold at a dealership last year. If 1,000 vehicles will be sold next month, what is the best estimate (based on last year's sales) of the number of two-door cars that will be sold?

59. In a scale drawing of a rectangular garden, the length is 15 inches and the width is 9 inches. In the drawing, 2 inches represents 3 yards. What is the width of the actual garden, in yards?

60. A kindergarten teacher has 72 crayons, 60 pencils, and 84 sheets of paper to distribute to the children in her class. If each child receives an equal number of each item and there are no items remaining, what is the greatest possible number of children in the class?

61. Mr. Smith opened a retirement account with a deposit of $900. This account earns 5% simple interest annually. How many years will it take for his $900 deposit to earn $360 interest?

62. Solve the equation for x:

$$\frac{(21)(14)x}{(49)(48)} = 0.875$$

START SHSAT PREP

MULTIPLE CHOICE QUESTIONS

QUESTIONS 63–114

DIRECTIONS: Solve each question. Select the best answer from the choices given. Mark the letter of your answer on the answer sheet. When you are solving questions, you can write in the test booklet or on the scrap paper given to you.

63. Two glasses can hold the same amount of liquid. Glass A is $\frac{1}{2}$ filled, and Glass B is $\frac{1}{3}$ filled. If the liquid in Glass B is poured into Glass A, what fraction of Glass A will then be filled?

A. $\frac{5}{6}$

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

C. $\frac{3}{4}$

D. $\frac{1}{5}$

64. On Fran's map, 2 centimeters represents 3 kilometers. The points on this map that represent Fran's home and Bryant State Park are 4.5 centimeters apart. How many kilometers apart are Fran's home and Bryant State Park, to the nearest kilometer?

E. 3
F. 5
G. 7
H. 9

65. Solve for x in terms of y if $2x + 4 = y$.

A. $x = \frac{y - 4}{2}$

B. $x = 2(y + 4)$

C. $x = \frac{y + 4}{2}$

D. $x = 2(4 - y)$

66. Bryan completed a 100-meter race in 11.74 seconds. Luis completed the same race in 11.69 seconds. What was the difference between their times, expressed as a fraction of a second?

E. $\frac{1}{20}$

F. $\frac{1}{10}$

G. $\frac{3}{20}$

H. $\frac{1}{5}$

67. A recipe uses $\frac{1}{4}$ teaspoon of salt and $2\frac{1}{2}$ teaspoons of sugar. What is the ratio of salt to sugar in this recipe?

A. 1:20
B. 1:10
C. 1:5
D. 1:4

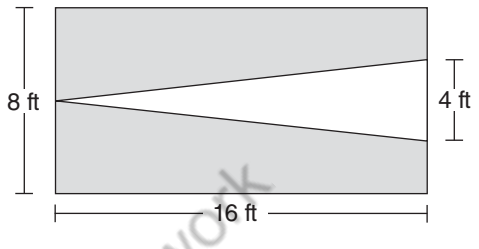
START SHSAT PREP

74. $m \cdot t = 72$

For the equation above, what is the sum of the values of m when $t = 1$, when $t = 2$, and when $t = 3$?

E. 12
F. 72
G. 132
H. 135

75.



The diagram above shows a rectangle with an inscribed triangle. The triangle's vertex and base touch the sides of the rectangle as shown. What is the total area of the shaded portion?

A. 32 sq ft
B. 64 sq ft
C. 96 sq ft
D. 128 sq ft

76. Orange juice costs \$2 per gallon, and grapefruit juice costs \$3 per gallon. A recent shipment of equal amounts of the two types of juice costs a total of \$250. How many gallons of orange juice are in the shipment?

E. 50
F. 62.5
G. 100
H. 125

77. Five consecutive numbers have a sum of 110. What is the **least** of these consecutive numbers?

A. 11
B. 18
C. 20
D. 22

78.

$$-mn$$
$$(-m)(-n)$$
$$|mn|$$
$$|-mn|$$
$$|(-m)(-n)|$$

If m and n are positive integers, how many of the five expressions above are equivalent to mn?

E. 1
F. 2
G. 3
H. 4

79. $\dfrac{5^4 \times 5^6}{5^2} =$

A. 5^8
B. 5^{10}
C. 5^{12}
D. 5^{22}

START SHSAT PREP

80.

FRUIT SOLD AT
STORE XYZ

Fruit	Number Sold
Apples	8
Bananas	6
Cherries	12
Oranges	6
Peaches	?
Total	**50**

Peaches made up what percentage of the total number of pieces of fruit sold at Store XYZ, according to the table above?

E. 18%
F. 28%
G. 36%
H. 64%

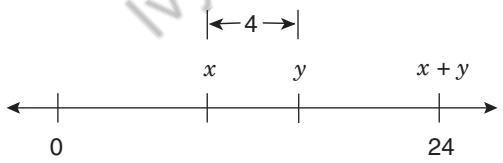
81. Carpenters laid a layer of insulation 6 **inches** thick to cover a rectangular attic floor that was 32 feet long and 20 feet wide. What was the volume, in cubic feet, of the insulation used to cover the floor?

A. 160
B. 320
C. 640
D. 3,840

82. The town of Waterville covers an area of 50 square miles. In 2005, its population was 84,000. In 2006, its population had decreased so that the average population per square mile was equal to 1,500. What was the total decrease in population from 2005 to 2006?

E. 7,500
F. 8,400
G. 9,000
H. 9,200

83.



According to the number line above, what is the value of y?

A. 4
B. 12
C. 14
D. 20

84. $N = \{6, 7, \ldots, 21, 22\}$

Set L (not shown) is a list of 25 consecutive integers. The median of the integers in set N above is equal to the least integer in set L. What is the median of the integers in set L?

E. 25
F. 26
G. 27
H. 28

85. The sum of the numbers x, y, and z is 40. The ratio of x to y is 1:2, and the ratio of y to z is 2:5. What is the value of y?

A. 2
B. 4
C. 8
D. 10

START SHSAT PREP

86. Which number could be the sum of 4 consecutive integers?

E. -12

F. -10

G. -8

H. -4

87.

PRICE OF A VIDEO GAME AT VARIOUS STORES

Price of Video Game	Number of Stores
$10.99	5
$11.99	2
$12.99	1
$13.99	4

The table above shows the price of a certain video game at 12 different stores. What is the median price of this video game?

A. $10.99
B. $11.49
C. $11.99
D. $12.32

88. If $xy = 30$, what is the value of $10 \div x$ in terms of y?

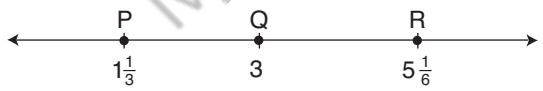
E. $\frac{1}{10}y$

F. $\frac{1}{3}y$

G. $3y$

H. $10y$

89.



On the number line above, how many units longer is $\overline{QR}$ than $\overline{PQ}$?

A. $\frac{1}{6}$

B. $\frac{1}{2}$

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

D. 3

90.

The distance from W to X is 70% of the distance from W to Y. If the distance from X to Y is 15 miles, what is the distance, in miles, from W to X?

E. 10.5
F. 35
G. 45
H. 50

91. There are 3 different highways from City W to City X, 4 different highways from City X to City Y, and 3 different highways from City Y to City Z. How many different routes are there for a trip from City W to City X to City Y to City Z?

A. 10
B. 12
C. 24
D. 36

START SHSAT PREP

92. In Center City, the ratio of people to dogs is 4:1, and the ratio of dogs to cats is 3:2. What is the ratio of people to cats?

E. 2:1
F. 7:3
G. 6:1
H. 12:1

93. The side length of square S is shorter than the side length of square T by 1 centimeter. The area of square S is 9 square centimeters. What is the difference, in square centimeters, between the area of square T and the area of square S?

A. 3
B. 7
C. 8
D. 10

94. If x is an odd number, what is the sum of x and the next 2 odd numbers greater than x?

E. $x + 4$
F. $2x + 6$
G. $3x + 3$
H. $3x + 6$

95. How is $\frac{1}{x} - \frac{1}{2x}$ written as a single fraction? (Assume $x \neq 0$.)

A. $\frac{1}{2x}$
B. $\frac{1}{3x}$
C. $-\frac{1}{x}$
D. $-\frac{1}{2x}$

96. In a certain competition, 1 person finished in first place, 5 people tied for second place, 10 people tied for third place, and the other 4,984 people did not place. What percentage of the people in the competition placed first, second, or third altogether?

E. 0.0032%
F. 0.032%
G. 0.32%
H. 3.2%

97. Angle A and angle B are complementary. If the measure of angle B is three times as great as the measure of angle A, what is the measure of angle B?

A. 45°
B. 67.5°
C. 75°
D. 135°

98. The height of a tree in 2013 is 300% of the height it was in 2003. By what percentage did its height increase over this ten-year period?

E. $33\frac{1}{3}\%$
F. 100%
G. 200%
H. 300%

99. 1 gallon = 16 cups
1 cup = 8 fluid ounces

If 1 gallon = 2^x fluid ounces, what is the value of x?

A. 4
B. 7
C. 8
D. 64

START SHSAT PREP

100. A certain square puzzle has an area of 64 square inches, and a cubic block has a volume of 64 cubic inches. What is the ratio of the length of a side of the puzzle to the length of a side of the block?

E. 1:3
F. 1:2
G. 2:3
H. 2:1

101. In a certain class, Rosa will take a total of 4 tests. She has already taken 2 of the tests and earned scores of 81 and 83. What is the **least** possible score Rosa can earn on the third test and still be able to finish the class with an average score of 85 on all 4 tests? (Assume that test scores can range from 0 to 100.)

A. 76
B. 82
C. 88
D. 90

102. The Barnes family and the Ramirez family each have a pizza of equal size. The first pizza is cut into 18 equal slices, and the second pizza is cut into 15 equal slices. If the Barnes family eats 11 slices from the first pizza, what is the greatest number of whole slices from the second pizza that the Ramirez family can eat without eating a greater percentage of a pizza than the Barnes family ate?

E. 6
F. 7
G. 8
H. 9

103. $0^3 + 4^0 + 2^{-1} + (-1)^2$

What is the value of the expression above, in decimal form?

A. 0
B. 0.5
C. 1.5
D. 2.5

104. A company wants to study 6 brands of soap by comparing each brand with every other brand. If each comparison costs $2,000, how much will the company spend altogether?

E. $13,000
F. $20,000
G. $30,000
H. $60,000

105. What number is halfway between $\frac{1}{20}$ and $\frac{1}{10}$ on a number line?

A. $\frac{1}{5}$
B. $\frac{2}{15}$
C. $\frac{1}{30}$
D. $\frac{3}{40}$

106. A rectangular swimming pool of uniform depth is 20 yards long and 14 yards wide. If the water is 6 **feet** deep, what is the volume of water in the pool, in cubic yards?

E. 40
F. 286
G. 560
H. 1,680

START SHSAT PREP

107. $\{3, 4, 5, 6, 7\}$

A student made a list of all possible products of 2 **different** numbers in the set above. What fraction of the products are odd?

A. $\frac{3}{20}$

B. $\frac{3}{10}$

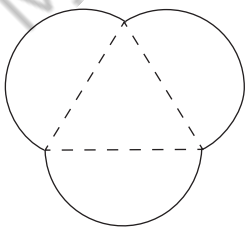
C. $\frac{1}{2}$

D. $\frac{3}{5}$

108. A number, n, is divided by 25. If the quotient is 10 with a remainder of 5, what is the quotient expressed as a decimal?

E. 10.20
F. 10.25
G. 10.50
H. 10.75

109.



The garden design shown above is created in the shape of three semicircles whose diameters lie on the sides of an equilateral triangle. If each diameter is 2 meters long, what is the perimeter of the garden, in meters?

A. 6

B. 12

C. 3π

D. 6π

110. Micha is playing a game with five cards numbered 1 through 5. He will place the cards in a bag and draw one card at random three times, replacing the card each time. To win a prize, he must draw the number 5 all three times. What is the probability he will draw the number 5 all three times?

E. $\frac{1}{125}$

F. $\frac{3}{125}$

G. $\frac{1}{15}$

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

START SHSAT PREP