GRADE 8

B

repeats removed

The New York City Department of Education

2023 **Specialized High School Admissions Test**

GENERAL DIRECTIONS

Student Name: _____

Identifying Information

Turn to Side 1 of the answer sheet.

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.

Line 1: Read the statement and sign your name in the space following the word "signature." Do not print your name.

Line 2: Print today's date, using the numbers of the month, the day, and the year.

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.

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: Carefully copy the order in which you ranked the specialized high schools on your Test Ticket onto Grid 5. 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.

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: Complete the grid with 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.

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: Print your student ID number in Grid 8. You can find your student ID number 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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TURN YOUR BOOKLET OVER TO THE BACK COVER.

TAP TO START SHSAT PREP

Identifying Information, continued

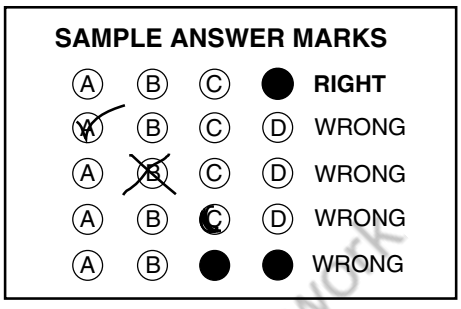
Grid 9: In most cases, Grid 9 is already filled in for you. If it is not, copy the letter and numbers shown in the upper-right corner of your test booklet into the boxes. Below each box, fill in the circle containing the same letter or number as the box.

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.



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.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

B

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PART 1 — ENGLISH LANGUAGE ARTS

57 QUESTIONS

REVISING/EDITING

QUESTIONS 1-10 (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 reread relevant parts of the sentences or paragraphs, while being mindful of time, before marking the **best** answer for each question.

1. Which pair of revisions needs to be made in 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.

A. Sentence 1: Delete the colon after ***wonder*** AND change ***is*** to **are**.
B. Sentence 2: Delete the comma after ***with*** AND change ***it is*** to **they are**.
C. Sentence 3: Delete the comma after ***process*** AND change ***makes*** to **make**.
D. Sentence 4: Delete the comma after ***gelato*** AND change ***allow*** to **allows**.

2. What is the **best** way to combine the sentences?

(1) Scientists now believe that Jupiter may have as many as seventy- nine moons.
(2) One of Jupiter's moons is named Io.
(3) Io has the greatest number of active volcanoes in the solar system.

E. Io, which is one of Jupiter's moons, has the greatest number of active volcanoes in the solar system, and scientists now believe that Jupiter may have as many as seventy- nine moons.
F. Scientists now believe that Jupiter may have as many as seventy- nine moons, and one of them is named Io, which has the greatest number of active volcanoes in the solar system.
G. Scientists now believe that Jupiter may have as many as seventy- nine moons, including one named Io, which has the greatest number of active volcanoes in the solar system.
H. Io, a moon with the greatest number of active volcanoes in the solar system, is one of Jupiter's moons, and scientists now believe that Jupiter may have as many as seventy-nine moons.

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

(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.

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

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 reread relevant parts of the text, while being mindful of time, before marking the **best** answer for each question.

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, making the transportation of people and goods difficult and time consuming. (5) In 2016 these burdens were eased with the completion of the Gotthard Base Tunnel.

(6) Construction of the high-speed railway tunnel began in 1996. (7) The tunnel was created through the use of tunnel-boring machines, which are giant drills with a flat rotating head called a cutter head. (8) 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. (9) During the seventeen- year construction period, 28 million tons of rock were removed, enough to rebuild the Great Pyramid of Giza five times. (10) This massive construction project is reported to have cost $12 billion.
(11) 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.
(12) In a few years, the high- speed railway will carry more than 250 freight trains and 55 passenger trains a day, with most traveling at speeds of around 100 to 125 miles per hour. (13) It will be faster for people to travel between northern and southern Europe. (14) The travel time between the European cities of Zurich, Switzerland, and Milan, Italy, will be reduced by an hour. (15) Many European leaders compare the Gotthard Base Tunnel to the Channel Tunnel, a 33- mile underwater tunnel that connects the United Kingdom and France. (16) 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.
(17) 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. (18) There is renewed interest in constructing innovative methods of transportation that will help eliminate problems associated with traveling to and from certain areas.

5. Which sentence should be added after sentence 5 to introduce the main topic of the passage?

A. The construction of 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, a Swiss 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 Gotthard Base Tunnel continues to help reduce the number of freight trucks on the roadways in the Swiss Alps.

6. Which sentence should be added to follow and support sentence 7?

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, with the cutter head 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 cutter heads are used with tunnel- boring machines depending on the geology of the area where the tunnel is being created.

7. Where should sentence 11 be moved in order to improve the organization of the second paragraph (sentences 6–11)?

A. to the beginning of the paragraph (before sentence 6)
B. between sentences 6 and 7
C. between sentences 8 and 9
D. between sentences 9 and 10

8. Which sentence presents information that shifts away from the main topic of the third paragraph (sentences 12–16) and should be removed?

E. sentence 13
F. sentence 14
G. sentence 15
H. sentence 16

9. Which transition phrase should be added to the beginning of sentence 18?

A. Although the Gotthard Base Tunnel is mainly for freight trains,
B. With the Gotthard Base Tunnel taking ten years to complete,
C. Because of the successful completion of the Gotthard Base Tunnel,
D. As the number of trains using the Gotthard Base Tunnel increases,

10. Which concluding sentence should be added after sentence 18 to support the topic presented in the passage?

E. There is proof that underground tunnels such as the Gotthard Base Tunnel are beneficial to the economy of the surrounding area.
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.

READING COMPREHENSION

QUESTIONS 11–57

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 reread 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 TO THE NEXT PAGE ▶

Excerpt from "The World Has an E-Waste Problem"

by Alana Semuels

1 As a tech-hungry nation . . . gets ready to upgrade to the next generation of lightning- fast 5G devices, there is a surprising environmental cost to be reckoned with: a fresh mountain of obsolete[1] gadgets. About 6 million pounds of discarded electronics are already processed monthly at recycling giant ERI's Fresno plant. Pallets[2] of once beloved but now outdated devices . . . arrive here daily. Workers with hammers hack at the bulkiest devices, while others remove dangerous components like lithium- ion batteries. The scene is like a twisted . . . movie, with doomed gadgets riding an unrelenting conveyor belt into a machine that shreds them into piles of copper, aluminum and steel.

2 "In our society, we always have to have the new, best product," said Aaron Blum, the co- founder and chief operating officer of ERI, on a tour of the facility. Americans spent $71 billion on telephone and communication equipment in 2017, nearly five times what they spent in 2010 even when adjusted for inflation, according to the Bureau of Economic Analysis. . . . When we buy something new, we get rid of what's old. That cycle of consumption has made electronics waste the world's fastest- growing solid-waste stream.

3 That stream is expected to turn into a torrent[3] as the world upgrades to 5G, the next big step in wireless technology. 5G promises faster speeds and other benefits. But experts say it will also result in a dramatic increase in e-waste, as millions of smartphones, modems and other gadgets incompatible with 5G networks are made obsolete. "I don't think people understand the magnitude of the transition," says ERI co- founder and executive chairman John Shegerian. "This is bigger than the change of black- and-white to color, bigger than analog to digital, by many multitudes."

4 . . . Less than a quarter of all U.S. electronic waste is recycled, according to a United Nations estimate. The rest is incinerated or ends up in landfills. That's bad news, as e- waste can contain harmful materials like mercury and beryllium that pose environmental risks.

5 Part of the problem is regulatory. Only 19 states have laws banning electronics from the regular trash. In states without such rules, like Nevada, electronics often end up in garbage and recycling bins, said Jeremy Walters, a community- relations manager for waste collector Republic Services. Environmental concerns aside, compacting flammable lithium- ion batteries with paper recycling can be dangerous; recycling centers have reported an uptick in fires.

6 Even when e-waste rules exist, it's left up to consumers to handle their old devices properly. But recycling them can be a pain. Rather than just drop a used phone in a bin outside their homes, lots of people have to take their electronics to a store, which may pay them for it but could also charge them to get rid of it. Many consumers, paralyzed by the hassle or put off by the expense,

[1] **obsolete:** outdated and no longer useful

[2] **Pallets:** wooden platforms used to store or transport materials in a warehouse

[3] **torrent:** an outpouring

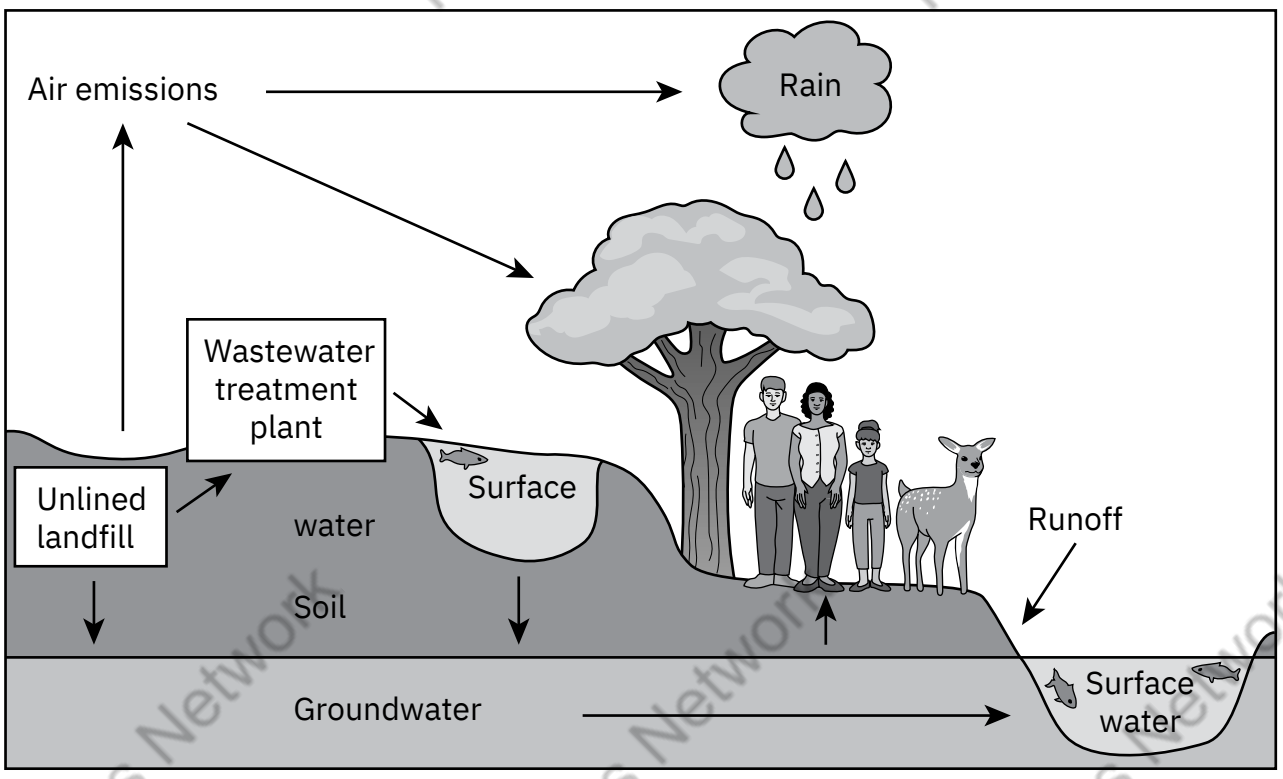
simply throw their devices into the trash or stash them in a drawer, hoping they'll just disappear. "We don't necessarily have the measures to make sure people aren't throwing it away," Walters said.

7 One solution is to make electronics last as long as they once did. At ERI's facility, Shegerian showed TIME [magazine] dozens of televisions from the 1970s and 1980s that stopped working only recently. Yet instead, technology companies are speeding the pace of obsolescence. Most smartphone batteries can't be easily replaced when they stop holding a charge, new laptops don't accept old cables, and software companies push upgrades that won't run on old devices. "Our products today don't last as long as they used to, and it's a strategy by manufacturers to force us into shorter and shorter upgrade cycles," said Kyle Wiens, the founder of iFixit, which publishes do-it-yourself repair guides. . . .

8 Some environmental groups say multibillion-dollar companies . . . should pick up the cost of recycling the devices they sell. Lawmakers in parts of Europe and Canada and in some U.S. states have passed so-called Extended Producer Responsibility (EPR) laws, which require manufacturers to establish and fund systems to recycle or collect obsolete products. . . .

9 . . . Some companies are increasing their recycling efforts on their own, whether for the economic benefit or the public relations boost.

ENVIRONMENTAL IMPACTS OF PERSISTENT BIOACCUMULATIVE TOXIC CHEMICALS IN ELECTRONIC DEVICES



Electronics such as smartphones, computers, cameras, and large appliances contain toxins like lead, chromium, zinc, nickel, mercury, beryllium, and cadmium. These substances are bioaccumulative, which means that they accumulate over time in living organisms.

11. Read this sentence from paragraph 1.

The scene is like a twisted . . . movie, with doomed gadgets riding an unrelenting conveyor belt into a machine that shreds them into piles of copper, aluminum and steel.

The words "twisted," "doomed," and "unrelenting" **most** affect the sentence by

A. emphasizing that discarded devices are condemned to an unfortunate fate.
B. expressing a sense of desperation about the amount of waste from discarded devices.
C. implying that discarded devices are often disposed of in an inappropriate manner.
D. suggesting a feeling of doubt about solving the problem of discarded devices.

15. What is the role of paragraphs 7–9in the organization of the excerpt?

A. They emphasize the contrast between successful and unsuccessful efforts to regulate electronic waste.
B. They suggest that the electronic devices that were manufactured in the past created less pollution.
C. They imply that manufacturers are willing to comply with regulations that protect the environment.
D. They shift the focus from a discussion of individual behavior to a discussion of corporate responsibility.

16. The idea that e-waste regulations can be ineffective is conveyed in the excerpt through

E. a statistic indicating that only a few states have chosen to adopt e- waste regulations.
F. an observation about typical consumer behavior in response to e- waste regulations.
G. an acknowledgment that electronics stores sometimes profit from e- waste regulations.
H. a comment that manufacturers are making an effort to recycle even without e- waste regulations.

17. How does the diagram after paragraph 9 **most** support the claim made in paragraph 4?

A. The diagram suggests that people send large amounts of recyclable e- waste to landfills.
B. The diagram emphasizes that toxic chemicals in e- waste can easily spread from landfills.
C. The diagram implies that most landfills are poorly designed to accommodate e-waste.
D. The diagram shows that water sources near landfills are endangered by e- waste.

The narrator's summer job is collecting marine specimens in Puget Sound, Washington. In this excerpt, he is looking for specimens in the mudflats before daybreak. Mudflats, or flats, are coastal landforms created when sediment and silt from tides are deposited as the tides recede.

Excerpt from *The Highest Tide*

by Jim Lynch

1 I rounded the oyster beds, to the far side. . . . It was low tide by then, and I saw the water hesitating at its apex, neither leaving nor returning, patiently waiting for the gravitational gears to shift. Dozens of anxious clams started squirting in unison like they did whenever vibrating grains of sand warned them predators were approaching. I stopped and waited with them, to actually see the moment when the tide started returning with its invisible buffet of plankton for the clams, oysters, mussels and other filter feeders. It was right then, ankle deep in the Sound, feet numbing, eyes relaxed, that I saw the nudibranch.[1]

2 In all my time on the flats I'd never seen one before. I'd read about them, sure. I'd handled them at aquariums but never in the wild, and I'd never even seen a photo of one this stunning. It was just three inches long but with dozens of fluorescent, orange- tipped hornlike plumes jutting from the back of its see- through body that appeared to be lit from within.

3 Nudibranchs are often called the butterflies of the sea, but even that understates their dazzle. Almost everything else in the northern Pacific is dressed to blend with pale surroundings. Nudibranchs don't bother, in part because they taste so lousy they don't need camouflage to survive. But also, I decided right then, because their beauty is so startling it earns them a free pass, the same way everyday life brakes for peacocks, parade floats. . . .

4 The dark mudflats loomed like wet, flattened dunes stretching deep into Skookumchuck Bay in front of our house. From a distance, they looked too barren to support sea life. Up close, they still did, unless you knew where to find the hearty clams, worms and tiny creatures that flourish in mud. . . . I'm not sure why I decided to take a look. It was still an hour before sunrise, and I knew exactly what the bars[2] looked like in the moonlight, but for some reason, I couldn't resist.

5 I heard it long before I saw it. It was an exhale, a release of sorts, and I instantly wondered if a whale was stranded again. We had a young minke[3] stuck out there two summers prior, and it made similar noises until the tide rose high enough for rescuers to help free it. . . . I looked for a hulking silhouette but couldn't find one. I waited, but there were no more sounds. Still, I went toward what I thought I'd heard, avoiding stepping into the mud until I had to. I knew the flats well enough to know I could get stuck just about anywhere. The general rule was you didn't venture out past the shells and gravel with an incoming tide. I sank up to my knees twice, and numbing water filled my boots.

[1] **nudibranch:** type of sea slug

[2] **bars:** sandbars

[3] **minke:** species of small whale

6 . . . I kept stepping toward the one sound I'd heard, a growing part of me hoping I'd find nothing at all. When I stopped to rest and yank up my socks, my headlamp crossed it. My first thought? A giant octopus.

7 Puget Sound has some of the biggest octopi in the world. They often balloon to a hundred pounds. Even the great Jacques Cousteau[4] himself came to study them. But when I saw the long tubular shape of its upper body and the tangle of tentacles below it, I knew it was more than an octopus. I came closer, within fifty feet, close enough to see its large cylindrical siphon[5] quiver. I couldn't tell if it was making any sounds at that point, because it was impossible to hear anything over the blood in my ears. . . .

8 The creature's body came to a triangular point above narrow fins that lay flat on the mud like wings, but it was hard to be sure exactly where it all began or ended, or how long its tentacles truly were, because I was afraid to pry my eyes off its jumble of arms for more than half a second. I didn't know whether I was within reach, and its arms were as big around as my ankle and lined with suckers the size of half- dollars. If they even twitched I would have run. So, I was looking at it and not looking at it while my heart spangled my vision. I saw fragments, pieces, and tried to fuse them in my mind but couldn't be certain of the whole. I knew what it had to be, but I wouldn't allow myself to even think the two words. Then I gradually realized the dark shiny disc in the middle of the rubbery mass was too perfectly round to be mud or a reflection.

9 It was too late to smother my scream. Its eye was the size of a hubcap.[6]

[4] **Jacques Cousteau:** renowned French oceanographer

[5] **siphon:** tube- like organ that is used for drawing in or removing fluids

[6] **hubcap:** removable cap over the end of a wheel axle

18. In paragraph 3, the phrase "the butterflies of the sea" conveys the idea that

E. nudibranchs do not have to work as hard as other animals to survive in the ocean.
F. nudibranchs have colorful features that make them stand out.
G. nudibranchs are delicate and have trouble adapting to their environment.
H. nudibranchs are rare and difficult to find in the ocean.

19. Read these sentences from paragraph 4.

I'm not sure why I decided to take a look. It was still an hour before sunrise, and I knew exactly what the bars looked like in the moonlight, but for some reason, I couldn't resist.

The sentences contribute to the overall structure of the excerpt by

A. introducing the mysterious creature that the narrator discovers.
B. indicating a shift from the narrator recalling the past to the narrator reflecting on the present.
C. establishing a struggle with fear that the narrator must overcome.
D. building tension through indicating that the narrator is going to see something unexpected.

20. Which sentence from paragraph 5 supports the idea that the narrator is taking a risk?

E. "It was an exhale, a release of sorts, and I instantly wondered if a whale was stranded again."
F. "I looked for a hulking silhouette but couldn't find one."
G. "I waited, but there were no more sounds."
H. "I knew the flats well enough to know I could get stuck just about anywhere."

21. Read this sentence from paragraph 6.

I kept stepping toward the one sound I'd heard, a growing part of me hoping I'd find nothing at all.

How do the narrator's actions develop a central idea of the excerpt?

A. The narrator's concern about the origin of the noise shows dedication to helping preserve sea life in the mudflats.
B. The narrator's curiosity about the sea life in the mudflats outweighs any fear about the situation.
C. The narrator's knowledge about a variety of sea life encourages a search for more specimens to study.
D. The narrator's eagerness about new specimens of sea life outweighs the reality that the area is an unlikely place to find them.

Going Solar in China

1 In the Anhui province of China, 166,000 floating solar panels are strung together atop the rippling surface of a lake. It is the largest solar- power farm in the world, an immense blanket of renewable energy strong enough to power 15,000 homes.

2 The floating solar-power farm, which harvests the sun's rays for power, was first conceived by the Sungrow Power Supply Company after heavy rains flooded a collapsed coal mine and created a lake. Sang Dajie, a former coal miner from the area, is now an electrician for the farm, which occupies the original mine site where he used to work. Now, instead of working under the dangerous conditions at the mine, he spends his days maintaining the solar panels on the water. "The coal mine," says Dajie, "was very hot and the air was bad. . . . But here I feel safe. The new energy is safe." People in China rely primarily on the burning of coal in massive power plants to create electricity. While the burning of fossil fuels, like coal, is a reliable source of energy, the process releases massive amounts of carbon dioxide into the atmosphere, creating air pollution and harming Earth. Solar power, on the other hand, is clean and safe for the environment.

3 Solar panels are typically placed on rooftops or in open fields, but experts in China determined that the newly formed lake was a great spot for the solar- power farm. Solar-power farms over water are efficient because the water keeps the panels cool. A water- based solar-power farm can potentially generate more power than one based on land. Additionally, with the solar-p ower farm on the lake, the land in the surrounding area remains available for farming, which is another source of income for Anhui residents.

4 Originally, China displayed minimal interest in solar energy. The use of solar energy was limited primarily to rural areas that had no access to a power grid. Without access to other means of electricity, people in these areas used solar panels as an alternative to lighting candles and kerosene lamps. China began to manufacture solar panels for other countries in the late 1990s when the German government offered its people financial incentives for installing solar panels. The heightened demand for solar panels was instantaneous, and Chinese businesses were quick to seize the opportunity. Soon the governments of Spain and Italy also offered incentives for using solar technology, and Chinese manufacturers were ready for the increased demand.

5 Between 2008 and 2013, China improved its manufacturing technology and processes so much that it effectively lowered the worldwide cost of using solar energy by 80 percent, further increasing demand. However, a point came when Chinese manufacturers had become so efficient at producing solar- power equipment that they outpaced the demand. The manufacturers were producing two solar panels for every one solar panel they sold. In order to make manufacturing a profitable industry again, the Chinese government offered its own financial incentives to Chinese citizens for using solar energy. Now, projects like the floating solar- power farm are putting those surplus panels to use, in addition to providing jobs and cleaner energy.

6 A second solar-power farm has already been constructed near the massive one in Anhui as part of a government initiative to build more low- emission power plants. The goal is to meet 20 percent of the country's energy needs with renewable, clean energy sources by the year 2030.

7 As Sang Dajie puts it, "I'm glad we are reusing this area to create a better future." China's dedication to increasing its production of renewable energy through solar power demonstrates that patience, time, and flexibility can result in transformation.

25. The phrases “166,000 floating solar panels are strung together atop the rippling surface of a lake” and “an immense blanket of renewable energy” in paragraph 1 convey that the solar-power farm

A. produces the maximum amount of energy possible for its size.
B. meets and exceeds the energy needs of the area.
C. blends in with the surrounding landscape.
D. produces a large amount of energy and is in an unusual location.

26. The author includes the statements from Dajie in paragraphs 2 and 7 **most likely** to

E. prove that the solar-energy industry benefits the economy of China by providing jobs.
F. provide the reasons why traditional energy sources are being replaced with solar-power farms.
G. highlight how replacing fossil fuels with solar energy offers more than just financial benefits.
H. argue that additional solar-p ower farms should be built in the Anhui province.

27. How does paragraph 2 contribute to the development of ideas in the article?

A. It explains the series of events that led a former coal miner to become an electrician at a solar- power farm.
B. It provides details on how a shift from coal mining to collecting solar power can improve conditions for energy workers and the environment.
C. It describes the reasons a company chose to transform a lake created by a collapsed coal mine into a solar- power farm that floats on the water.
D. It presents an overview of how a collapsed coal mine became a productive floating solar-power farm over several years.

Excerpt from “How Exercise Could Help You Learn a New Language”

by Gretchen Reynolds

1 Many scientists suspect that exercise alters the biology of the brain in ways that make it more malleable and receptive to new information, a process that scientists refer to as plasticity.
2 But many questions have remained unanswered about movement and learning, including whether exercise is most beneficial before, during or after instruction and how much and what types of exercise might be best.

3 So for a new study, which was published recently in *PLOS One*, researchers in China and Italy decided to home in on language learning and the adult brain.

4 Language learning is interesting. As young children, almost all of us picked up our first language easily. We didn’t have to be formally taught; we simply absorbed words and concepts.
5 But by early adulthood, the brain generally begins to lose some of its innate language capability. It displays less plasticity in areas of the brain related to language. As a result, for most of us, it becomes harder to learn a second language after childhood.

6 To see what effects exercise might have on this process, the researchers first recruited 40 college- age Chinese men and women who were trying to learn English. The students had some facility with this second language but were far from proficient.

7 The researchers then divided the students into two groups. Those in one group would continue to learn English as they had before, primarily while seated in rote vocabulary-memorization sessions.

8 The others would supplement these sessions with exercise.

9 Specifically, the students would ride exercise bikes at a gentle pace (about 60 percent of their maximum aerobic capacity) beginning 20 minutes before the start of the lessons and continuing throughout the 15 minutes or so of instruction.

10 Both groups learned their new vocabulary by watching words projected onto large screens, together with comparable pictures, such as “apple” and a Red Delicious. They were shown 40 words per session, with the sequence repeated several times.

11 Afterward, the students all rested briefly and then completed a vocabulary quiz, using computer keys to note as quickly as possible whether a word was with its correct picture. They also responded to sentences using the new words, marking whether the sentences were accurate or, in the case of “The apple is a dentist,” nonsensical. Most linguists[1] feel that understanding sentences shows greater mastery of a new language than does simple vocabulary improvement.

12 The students completed eight vocabulary sessions over the course of two months.

[1] **linguists:** scientists who study language

13 And at the end of each lesson, the students who had ridden bikes performed better on the subsequent vocabulary tests than did the students who sat still.

14 They also became more proficient at recognizing proper sentences than the sedentary students, although that difference did not emerge until after several weeks of instruction.

15 Perhaps most interesting, the gains in vocabulary and comprehension lingered longest for the cyclists. When the researchers asked the students to return to the lab for a final round of testing a month after the lessons— without practicing in the meantime—the cyclists remembered words and understood them in sentences more accurately than did the students who had not moved.

16 "The results suggest that physical activity during learning improves that learning," says Simone Sulpizio, a professor of psychology and linguistics at the University Vita- Salute San Raffaele in Milan, Italy, and a study co- author.

17 These improvements extend beyond simply aiding in memorization, she added. The exercise also deepened language learners' grasp of how to use their newly acquired words.

18 This study involved college students performing relatively light exercise, though, and cannot tell us whether other people completing other types of exercise would achieve the same results.

19 It also offers no clues about what is occurring inside the brain that might be contributing to the benefits of the exercise. But many past studies have shown that exercise prompts the release of multiple neurochemicals in the brain that increase the number of new brain cells and the connections between neurons, Dr. Sulpizio says. These effects improve the brain's plasticity and augment the ability to learn.

20 From a real-world standpoint, the study's implications might seem at first to be impractical. Few classrooms are equipped with stationary bicycles. But specialized equipment is probably unnecessary, Dr. Sulpizio says.

21 "We are not suggesting that schools or teachers buy lots of bicycles," she says. "A simpler take-home message may be that instruction should be flanked by physical activity."

33. How does the author's use of comparison in paragraphs 4 and 5 contribute to the development of ideas in the excerpt?

A. It identifies why many adults are never able to learn a second language.
B. It demonstrates why the study of adult language learning tries to include physical activity.
C. It highlights why more is known about language learning in children than about language learning in adults.
D. It explains why adults were the subjects of the study rather than children.

34. Read this sentence from paragraph 6.

To see what effects exercise might have on this process, the researchers first recruited 40 college-a ge Chinese men and women who were trying to learn English.

Which statement describes the function of the sentence in the overall structure of the excerpt?

E. It indicates a shift from describing the results of the study to describing the process.
F. It introduces the aspect of the research that was most critical to determining the results.
G. It marks the change from explaining why the study was conducted to explaining how the study was conducted.
H. It shows how questions were raised that could be addressed in further research.

35. In the study described in the excerpt, researchers asked English learners to assess the sense of words in context because that task is

A. better at determining the capability learners have of language than simple vocabulary recall.
B. consistent with the way earlier research was conducted on adult language learners.
C. a better way for learners to absorb the meaning of individual vocabulary words.
D. more difficult for learners to perform after an extended period of time has passed.

36. Which evidence from the excerpt is **most** relevant to the author's claim that there are many unanswered questions about the relationship between movement and learning?

E. the method of the study using one type of exercise and people from one age group
F. the statement from Dr. Sulpizio explaining past studies on neurochemicals in the brain
G. the finding of the study that exercise helps people recall information over a long period of time
H. the statement from Dr. Sulpizio describing how the results of the study can be applied

37. Read these sentences from paragraph 17.

These improvements extend beyond simply aiding in memorization, she added. The exercise also deepened language learners' grasp of how to use their newly acquired words.

Which sentence from the excerpt **best** explains why Dr. Sulpizio feels confident in the conclusion stated in these sentences?

A. "They were shown 40 words per session, with the sequence repeated several times." (paragraph 10)
B. "They also responded to sentences using the new words, marking whether the sentences were accurate or, in the case of 'The apple is a dentist,' nonsensical." (paragraph 11)
C. "And at the end of each lesson, the students who had ridden bikes performed better on the subsequent vocabulary tests than did the students who sat still." (paragraph 13)
D. "They also became more proficient at recognizing proper sentences than the sedentary students, although that difference did not emerge until after several weeks of instruction." (paragraph 14)

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
40 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.

40. Read lines 5–8from 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.

41. 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.

42. 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.

43. 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.

44. 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.

45. 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.

46. Read lines 36–39 from the poem.

both together and apart, what keeps
together the pencil in your hand right now
as well as separate from, say,
Jupiter.

The poet includes these lines **most likely** to emphasize that

E. it is important for physicists to continue their research about particles.
F. these particles have a powerful effect on everything.
G. the discoveries about particles provide little information.
H. the study of particles and the study of objects in space are similar.

Is It Time for Term Limits?

1 In 1799, when George Washington's supporters asked him to consider serving a third term as president of the United States, he declared, "Prudence on my part must arrest any attempt at the well meant, but mistaken views of my friends, to introduce me again into the Chair of Government." Even though some of his contemporaries advocated for a lifetime appointment for presidents, Washington thought that government officials should not seek to gain unfair power. Only one president has been elected to four terms: Franklin Delano Roosevelt. He was elected to a third term in 1940 and a fourth in 1944 due to the challenges of the Great Depression and World War!II.This departure from the rule worried some, and on March!21,!1947,Congress passed the Twenty-Second Amendment to the Constitution, legally limiting the office of president to two four-yearterms.

2 Presidential terms are clearly limited in the Constitution, but for people serving in Congress, this is not the case. Currently, members of the House of Representatives, who serve two-yearterms, and Senators, who serve six-yearterms, can run for reelection an unlimited number of times. Because of the possibility of unlimited reelections, many people are beginning to believe that limiting congressional terms would benefit our government. Modern surveys conducted by multiple firms consistently show that American citizens of a variety of backgrounds and political leanings approve of the idea of setting term limits for members of Congress.

3 American citizens are not the only supporters of term limits for Congress. Even some members of Congress themselves have spoken out in support of this change. Former Senator Joe Lieberman, upon his retirement, suggested that Congress "might be healthier and less partisan**1**and less rigid if it turned over more often, and term limits are one way to do that." Michael Olson and Jon Rogowski state in their article "Legislative Term Limits and Polarization" that "proponents of term limits argue that limiting the number of terms legislators can serve in office would reduce the level of partisan conflict, encourage compromise and cooperation, and improve the quality of representation."

4 Experienced politicians certainly can build on years of knowledge, but term limit supporters point out that career politicians may base key decisions on their own personal long-term goals. In the article "Term Limitations and the Myth of the Citizen-Legislator," author Elizabeth Garrett states that "under term limits, a careerist needs to move up the political opportunity structure to remain in elected office, but the probability of unimpeded upward movement decreases as the number of available positions that are perceived as advancements decline."

5 While challenging the career politician's path is seen as a benefit to term limit supporters, there is a possibility that a Congress mostly composed of newcomers could severely affect policy making. Experienced politicians have a deep knowledge of congressional processes, and in addition, politicians who have served together for extended periods have a chance to develop trusting relationships, even across party lines. Molly Reynolds, a congressional expert for the Brookings Institution, says that members who are restricted by term limits "have neither the time nor the incentive to develop the relevant expertise they need to be good at their jobs. If members don't have that expertise themselves, they're more likely to rely on outsiders, including lobbyists, to replace that expertise."

6 In fact, first-time politicians' susceptibilities to lobbyists, or groups seeking to influence legislators, have actually been put to the test on the state level. In 2006, the National Conference of State Legislators Study revealed that term limits may increase the influence of lobbyists. In the 1990s, more

---

1 partisan: showing a strong and sometimes blind adherence to a particular political party

than twenty states implemented term limits within their state governments. The inexperienced state lawmakers began depending on special-interest groups for their expertise on issues. In the end, many people believed that implementing term limits in the state legislature caused problems, and since then, six states have repealed the limits.

7 Additionally, those who oppose term limits maintain that the turnover rate in Congress is sufficient. Thomas E. Mann, Senior Fellow in governance studies at the Brookings Institution, notes that every decade, new members replace at least half the members of the House and the Senate, due to retirement or elections. Still, the average length of time in office has mushroomed. For example, the 65th Congress (1917–1919)had an average service time of 5.3!yearsfor members of the House of Representatives and 5.7!yearsfor Senate members. The 114th Congress (2015–2017)had an average of 8.8!yearsfor members of the House and 9.7!yearsfor senators.

8 Should Congress pass a constitutional amendment to institute congressional term limits? Perhaps one day people will have a chance to vote on the issue.

PERCENTAGE OF REPRESENTATIVES AND SENATORS REELECTED

	Year	Percentage Reelected
House of Representatives Total seats: 435	1950	83.2
	1978	82.3
	1998	90.8
	2016	87.4

	Year	Percentage Reelected
Senate Total seats: 100	1950	68.8
	1978	60.0
	1998	89.7
	2016	93.1

ER02131903_4

49. What is the best summary of the discussion of congressional term policy outlined in paragraph!2?

A. While all members of Congress can be reelected an unlimited number of times, members of the House of Representatives and of the Senate serve different term lengths; this inequity has become troubling to many American citizens in recent years.

B. The discrepancy between the president having term limits and members of Congress having unlimited terms has come to seem like a governmental flaw to many American citizens, and this flaw could be remedied by imposing congressional term limits.

C. Support for congressional term limits is increasing, as shown by recent surveys indicating that American citizens of different backgrounds and political beliefs are beginning to favor implementation of term limits for members of Congress.

D. While the Constitution sets a term limit for the office of president, no such limit exists for members of Congress; however, recent surveys show that many American citizens are now in favor of term limits for members of Congress.

ER02131901_3

50. Which sentence from the passage supports the idea that congressional term limits would "benefit our government" (paragraph!2)?

E. "Currently, members of the House of Representatives, who serve two-year terms, and Senators, who serve six-year terms, can run for reelection an unlimited number of times." (paragraph!2)

F. "Modern surveys conducted by multiple firms consistently show that American citizens of a variety of backgrounds and political leanings approve of the idea of setting term limits for members of Congress." (paragraph!2)

G. "Former Senator Joe Lieberman, upon his retirement, suggested that Congress 'might be healthier and less partisan and less rigid if it turned over more often, and term limits are one way to do that.'!"(paragraph!3)

H. "Thomas E. Mann, Senior Fellow in governance studies at the Brookings Institution, notes that every decade, new members replace at least half the members of the House and the Senate, due to retirement or elections." (paragraph!7)

ER02131902_1

51. The quotations in paragraph 3 convey a central idea of the passage by

A. emphasizing some of the possible effects term limits would have on how Congress functions.

B. showing that both politicians and law experts have strong opinions about congressional term limits.

C. suggesting that citizens defer to career politicians and law experts on issues such as congressional term limits.

D. implying that term limits would affect the ways that members of Congress campaign and vote.

ER02131909_4

52. Read this sentence from paragraph!5.

> While challenging the career politician's path is seen as a benefit to term limit supporters, there is a possibility that a Congress mostly composed of newcomers could severely affect policy making.

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

E.It provides evidence for the idea that term limits are controversial.

F.It summarizes the consequences of having term limits.

G.It begins to explore the effects of instituting term limits.

H.It shifts from the arguments for to the arguments against term limits.

ER02131906_3

53. According to paragraph 5, serving more terms improves politicians' effectiveness by

A.motivating them to learn the congressional processes necessary to create legislation.

B.encouraging them to collaborate with politicians of the opposing party in order to pass legislation.

C.allowing them to gain expertise and develop strong political relationships.

D.enabling them to create new policies while fostering their own careers.

ER02131905_1

54. According to the passage, why would setting term limits for members of Congress potentially increase the influence of special-interest groups?

E.Term limits would lead to a greater number of new representatives who rely on guidance and support from special-interest groups early in their terms.

F.Term limits would create a situation in which special-interest groups have to work more closely with the new representatives who replace experienced representatives.

G.Term limits would force experienced representatives out of their seats and bring in new representatives who focus on the agendas of special-interest groups.

H.Term limits would result in both new and experienced representatives looking to special-interest groups in order to influence decisions made in legislature.

ER02131904_2

55. The author of the passage develops the idea that congressional term limits might have negative effects mainly by

A.describing the amount of time it takes for new representatives to build connections with experienced representatives.

B.explaining why members of Congress need experience in order to govern well.

C.illustrating the various ways lobbyists seek to influence the decisions of new members of Congress.

D.revealing the statistics on the turnover rates for representatives.

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.

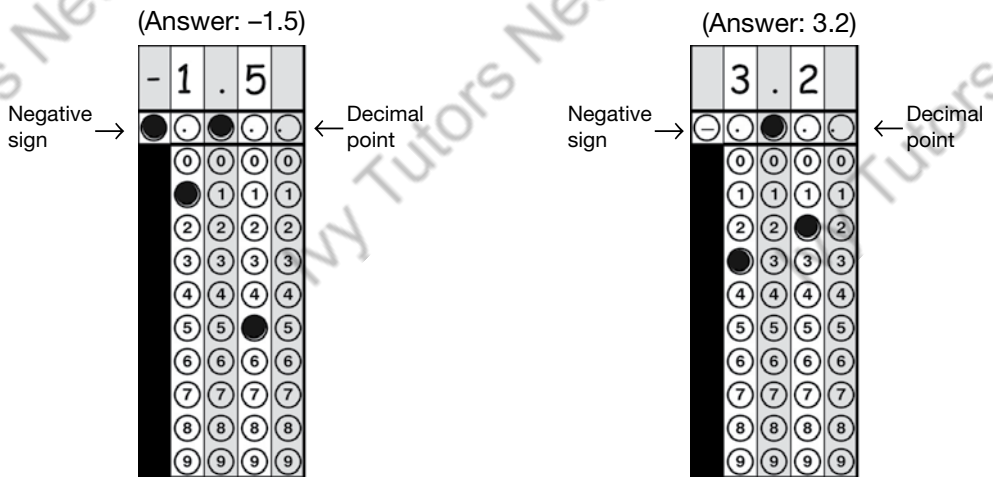
(5) Reduce (simplify) all fractions to lowest terms.

GRID-IN QUESTION NOTES

(1) For each grid-in question, write your answer at the top of the grid.

(2) Begin recording your answer in the columns on the far left.

(3) Fill in the circle under the box that matches the number or symbol you wrote. Leave the negative sign bubble blank if your answer is positive.



CONTINUE TO THE NEXT PAGE ►

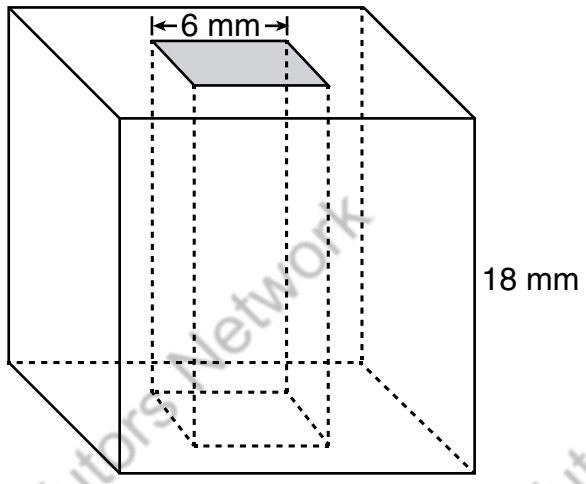
Grid-In Questions

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. 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.



Beth makes a bead in the shape of a cube with side length 18 millimeters. She cuts a hole in the shape of a square prism out of the center of the cube so that the bead will fit on a string. The base of the square prism has a side length of 6 millimeters. After the hole is cut out, what is the volume of the bead in cubic millimeters?

59. The table shows the proportional relationship between x cups of oatmeal and y ounces of raisins in a bread recipe.

BREAD RECIPE

Cups of Oatmeal (x)	Ounces of Raisins (y)
2	1.0
3	1.5
6	3.0

What is the constant of proportionality of the number of ounces of raisins to the number of cups of oatmeal?

60. Kelly had 7.3 grams of sugar. She used 2.7 grams in her coffee. How many grams of sugar does she have left?

Multiple Choice Questions

Questions 63–114

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

63. What is the prime factorization of 3,575?

A. $5 \cdot 11 \cdot 13$

B. $5^2 \cdot 11 \cdot 13$

C. $5 \cdot 715$

D. $5^2 \cdot 143$

64. If $\frac{x + 2y}{5} = 3y$, what is the value of x in terms of y?

E. $\frac{7y}{5}$

F. $\frac{13y}{5}$

G. 13

H. $13y$

65. What is the value of z in $\frac{x}{10} + \frac{y - x}{5} = \frac{z}{10}$?

A. 1

B. 5

C. y

D. $2y - x$

66. Two sets, R and S, are described below. The sum of the elements in set R equals the sum of the elements in set S.

$$R = \{5, x, 3, 8\}$$
$$S = \{6, y, 4, 1\}$$

What is the value of $x - y$?

E. -7

F. -5

G. 5

H. 7

67. If $x = \frac{1}{4}$, what is the value of $\frac{2}{2 - x}$?

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

B. $\frac{8}{9}$

C. $1\frac{1}{7}$

D. $3\frac{1}{2}$

68. The cost of shipping a package is \$12, plus \$2 for each additional pound over 3 pounds. Which expression represents the total cost, in dollars, of shipping a package that weighs p pounds? Assume that $p \geq 3$.

E. $12 + 2(p + 3)$

F. $12 + 2(p - 3)$

G. $14p + 3$

H. $14p - 3$

69. Julie is at a clothing store. She wants to buy a bag for \$18.75 and some T-shirts for \$9.25 each. She can spend no more than \$50.00. Which inequality can be used to find the number of T-shirts, x, Julie can purchase?

A. $9.25 + 18.75x \leq 50.00$

B. $9.25 + 18.75x \geq 50.00$

C. $18.75 + 9.25x \leq 50.00$

D. $18.75 + 9.25x \geq 50.00$

70. $2x + 11 > 3x + 9$

For what values of x is the above inequality true?

E. $x < 2$

F. $x > 2$

G. $x < 20$

H. $x > 20$

75. $\frac{1}{11} + \frac{1}{22} + \frac{1}{33}$

What is the value of the expression shown above?

A. $\frac{1}{22}$

B. $\frac{1}{11}$

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

D. $\frac{3}{22}$

---

76. At Midville High School, 64 students are members of either the orchestra or the choir, or both. Of these students, 38 are members of the orchestra, and 46 are members of the choir. What fraction of the total is the number of students who are members of **both** the orchestra and the choir?

E. $\frac{16}{21}$

F. $\frac{10}{19}$

G. $\frac{10}{23}$

H. $\frac{5}{16}$

---

77. Which of the following decimals is equivalent to $1\frac{2}{3} + 2\frac{4}{9}$?

A. $3.\overline{1}$

B. $3.\overline{6}$

C. $4.\overline{1}$

D. $4.\overline{9}$

---

78. The decimal 0.4 can be written as the fraction $\frac{x}{25}$. What is the value of x?

E. 0.016

F. 0.16

G. 10

H. 16

---

79. What is the value of $\frac{-9(-4)^2 + 36(-4) + 304}{-4}$?

A. -76

B. -4

C. 4

D. 148

80. Maxie borrowed $7.75 from her mother, $11.00 from her father, and $4.50 from her brother to purchase a video game. Her grandmother gave her $25.00 as a gift. How much money will Maxie have left or still owe if she uses the money her grandmother gave her to pay back the money she borrowed?

E. Maxie will still owe $2.25.
F. Maxie will still owe $1.75.
G. Maxie will have $1.75 left.
H. Maxie will have $2.25 left.

81. Seth grows strawberries in his garden.

- He picked $2\frac{1}{2}$ cups of strawberries on Monday.
- He picked 4 cups of strawberries on Tuesday.
- He ate $\frac{3}{4}$ cup of strawberries for breakfast each day on Wednesday, Thursday, and Friday.

How many cups of strawberries did Seth have left?

A. $3\frac{1}{2}$

B. $4\frac{1}{4}$

C. 6

D. 9

82. Which situation involves quantities that combine to equal zero?

E. receiving $5 as a gift and then giving $5 to a friend

F. buying a book for $10 and then buying lunch for $10

G. getting on an elevator at the ground floor, rising 3 floors, and then rising 3 more floors

H. starting in a cave 20 feet below the ground, climbing up 20 feet, and then climbing up 20 feet more

83.

$$\frac{\left(\frac{2}{3} - \frac{4}{5} \times \frac{1}{3}\right)}{\left(\frac{5}{3} + \frac{1}{4} \div \frac{3}{4}\right)} =$$

A. $-\frac{2}{115}$

B. $-\frac{1}{45}$

C. $\frac{2}{9}$

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

84. An athlete runs $\frac{1}{8}$ kilometer in $\frac{3}{4}$ minute. At this rate, how many kilometers would the athlete run in 1 minute?

E. $\frac{3}{32}$

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

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

H. 6

85. A bus trip takes 9 hours if the mean speed is 50 miles per hour. How many hours would this trip take if the mean speed was 45 miles per hour?

A. 8

B. 10

C. 12

D. 14

86. A birdseed mixture is $\frac{2}{5}$ sunflower seeds. The cost of the sunflower seeds is $0.10 per ounce. At this rate, what is the cost of the sunflower seeds in 25 pounds of this birdseed? (Note: 1 lb = 16 oz.)

E. $10.00
F. $16.00
G. $40.00
H. $160.00

87. A robot moves forward at the rate of 9 steps every 6 seconds. If each step is x feet long, what must x be in order for the robot to travel exactly 270 feet per minute?

A. 3
B. 5
C. 27
D. 30

88. There were 36 people at Emily's party. If each person at the party drank 2 cups of juice, how many **gallons** of juice did they drink altogether?

Note: 1 gallon = 4 quarts;
1 quart = 4 cups.

E. $2\frac{1}{4}$

F. $4\frac{1}{2}$

G. 9

H. 72

89. A student reads $\frac{1}{12}$ of a book in $\frac{1}{3}$ hour. What fraction of the book can the student read in 1 hour?

A. $\frac{1}{36}$

B. $\frac{1}{4}$

C. $\frac{5}{12}$

D. $\frac{12}{3}$

93. A box contains an unknown number of green marbles. An experimenter adds 100 red marbles to the box, mixes the marbles thoroughly, and then draws out 10 marbles at random. Assume that this sample is representative of the proportion in the box. If there are 2 red marbles and 8 green marbles in this sample, approximately how many green marbles are in the box?

A. 80
B. 300
C. 400
D. 500

94. A car costing $24,000 is subject to a sales tax of 8%. If Bindu made a $10,000 down payment on this car, what is the total amount she has left to pay?

E. $14,000
F. $15,620
G. $15,920
H. $25,920

95.

WINTER TEMPERATURES IN CHICAGO

Day	1	2	3	4	5	6	7
Temperature (°F)	17	7	2	4	−3	−5	1

The table above shows temperatures for a one-week period during the winter in Chicago. What is the range of temperatures shown in the table?

A. 12
B. 17
C. 22
D. 27

99. At any given time, one person out of every 20 people has the common cold. Assume that the common cold can be caused by any one of 200 different viruses, each of which is equally likely to cause the cold. One of these 200 viruses is cold virus V144. What is the probability that a randomly selected person is suffering from a cold caused by virus V144?

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

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

C. $\frac{1}{200}$

D. $\frac{1}{4{,}000}$

100. Karl has one red spinner and one blue spinner. Each spinner is divided into 4 equal sections, numbered 1 through 4. He spins each spinner once and writes down the number that each lands on. What is the probability that the two numbers, when multiplied together, will have 4 as a product?

E. $\frac{1}{16}$

F. $\frac{3}{16}$

G. $\frac{4}{7}$

H. $\frac{7}{16}$

101. Melissa has a bag of marbles that are all the same size. The bag contains three red (R) marbles, three green (G) marbles, and two white (W) marbles. For an experiment, she will take two marbles out of the bag without looking. Which list shows the sample space for Melissa's experiment?

A. R, G, W
B. RG, RW, GW
C. R, R, R, G, G, G, W, W
D. RR, RG, RW, GG, GW, WW

102. A graph shows the relationship between the number of gallons of water, y, that has been added to a tank and the number of hours, x, that water has been added to the tank at a constant rate. What does the ordered pair (3, 24) represent?

E. Three gallons of water was added in 24 hours.

F. Three gallons of water was added per hour.

G. Twenty-four gallons of water was added in 3 hours.

H. Twenty-four gallons of water was added per hour.

103. The table shows the probabilities of a hockey team scoring different numbers of goals in a game.

HOCKEY GOAL PROBABILITIES

Number of Goals	Probability
0	0.16
1	0.21
2	0.29
3	0.21
4	0.09
5	0.04

What is the probability that the team will score three or more goals in the next game?

A. 0.13

B. 0.21

C. 0.34

D. 0.50

108. A clothing store buys shirts for a cost of m dollars each. To determine the selling price of the shirts, the manager increases the purchase cost by 55%. Which expression represents the selling price of each shirt?

E. $0.45m$

F. $0.55m$

G. $1.55m$

H. $m + 0.55$

109. A farmer has 100 apples and will eat 2 apples per day. Is there a proportional relationship between the number of apples remaining and the number of days that have passed?

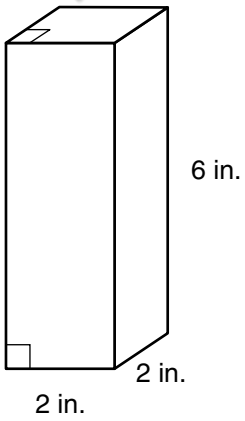
A. no, because the relationship does not include 99 as a number of apples

B. no, because the ordered pair (0, 0) is not part of the relationship

C. yes, because all the values in the relationship are even

D. yes, because the number of apples is decreasing at a constant rate

110.



What shape will result from a horizontal slice of the figure above?

E. a square that has 2-inch sides

F. a triangle that has 2-inch sides

G. a rectangle that has a 2-inch side and a 6-inch side

H. a triangle that has one 2-inch side and two 6-inch sides

111. Anise has a piece of cloth measuring 45 inches by 75 inches. She wants to cut it into squares of equal size, without any cloth left over. What is the **greatest** possible side length, in inches, of one of those squares?

A. 3

B. 5

C. 15

D. 45

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