



NSCAS NEBRASKA STUDENT-CENTERED
ASSESSMENT SYSTEM

English

**NSCAS General Grade 8
English Language Arts,
Mathematics, and Science
Practice Test**

NSCAS General Practice Test Grade 8

Student's Name:

Nebraska Department of Education 2026



Grade 8
General
English Language Arts

Directions:

On the following pages of your practice test booklet are questions for the Grade 8 *Nebraska Student-Centered Assessment System (NSCAS) General English Language Arts* practice test.

Read these directions carefully before beginning the test.

This practice test will include several different types of questions. Some questions are based on a passage. Multiple choice questions will ask you to select an answer from among four choices. Multiple select questions will ask you to select multiple correct answers from among five or more answer choices. For some questions, there may be two parts, Part A and Part B, where each part has a multiple choice or multiple select question. Some questions will ask you to construct an answer by following the directions given.

For all questions:

- Read each question carefully and choose the best answer.
- You may use scratch paper to make notes.
- Be sure to answer ALL the questions.

The items on this page are not passage-based.

★ 1. Read the beginning of Myla's paragraph.

Movies based on books are hugely popular these days, especially for teenagers. It can be exciting to see the characters from a favorite book come to life on the big screen. However, not all teens appreciate or even like the movie versions of their favorite books.

What kind of information could Myla include in the paragraph to BEST support the topic?

- A. quotes from teens who go to a lot of movies
- B. the names of movies that will be released soon
- C. a list of popular books that would make good movies
- D. reasons why some teens dislike movies based on books

★ 2. Select the word in each pair that provides the BEST transition.

The tenure of Franklin D. Roosevelt was full of challenges and conflict, all of which he faced head on to become one of the greatest presidents in American history. First elected in the midst of the Great Depression, Roosevelt was able to pull the country out of economic devastation. (**Then, Additionally**) came the onset of World War II, a battle he was not able to avoid. Roosevelt's policies (**therefore, ultimately**) led to peace and prosperous times for the country.

Read the passage.

Feeling Like Home

- 1 The plane landed on the tarmac at the airport after an uneventful flight from San Juan. As they taxied to the gate, Mateo looked out the window at the strange landscape. He soaked it in, both eager and nervous to see his new home.
- 2 Uncle Damien met them at the baggage claim area and drove them to what was now home. The street in Queens where Uncle Damien parked was adjacent to the elevated train tracks. Mateo thought they only had subways in New York City, but as was obvious by looking at this overhead train system, he was wrong. As they got out of the car, the train rumbled and shook the earth as it careened past the station. Mateo thought to himself, “How are we ever going to sleep at night to this? It’s certainly nothing like the soothing sound of the ocean.”
- 3 Luckily for them, Uncle Damien had offered them a place to stay. His apartment had two small bedrooms and a rather large living room where Uncle Damien had set up a big curtain to separate it into two sections.
- 4 “That side is where you two will bunk.” He pointed to the bunk beds on one side of the curtain and motioned for Mateo and his younger brother Pedro to put down their bags. “Then, Ferdinand and Maria, this is your room,” he showed Mama and Papa to the apartment’s larger bedroom.
- 5 That night after they were settled, Uncle Damien showed them around the neighborhood. Tall brick buildings lined both sides of the street. Underneath the elevated train were shops, restaurants, and street vendors selling their wares. Mateo did have to admit that some of this did feel familiar—the smell of the food, the goods sold by the vendors, the music trailing out the apartment windows, all felt like home.
- 6 “Just about everyone who lives in this area came from Puerto Rico, or their families did,” Uncle Damien explained as they ate at one of Uncle Damien’s favorite Puerto Rican restaurants just a few doors down from their building. “In fact, some people like to call this Little San Juan. You can find Little Colombia, Little India, Little Santiago, Little Italy, Chinatown, and all kinds of other micro-neighborhoods in New York City. It is a fascinating place. I think you’ll grow to love it.” Mateo listened **skeptically**.
- 7 As Mateo tried to go to sleep on the bottom bunk later that night, he felt miserable. After one plane flight, everything in his life was new. Questions flew through his mind: How would he ever fit in here? Would the people here be nice to him? Would he be able to make any friends? It was so different. There was no ocean, no palm trees, no sandy beaches.

- 8 The next morning seemed to come in a flash, and Mateo hardly even felt like he slept at all. The train, the noise, the anxiety of the move—it had all taken its toll on any kind of restful sleep that Mateo could hope for. At least there was one constant in Mateo’s life: Mama always made breakfast every morning, no matter what.
- 9 “You look nice, Mateo,” Mama said as Mateo walked into the kitchen in his best clothes for school. “You nervous about today?”
- 10 “A little,” Mateo replied, not wanting to worry his mama. “I think it’ll be okay,” he said boldly, trying to convince himself more than anything else. He grabbed a plate and dished up a serving of tortilla Española and fried plantains.
- 11 Mateo trudged to school through the thick crowds of commuters, and before he knew it, he was walking into the two-story brick building on the corner of Jackson and 9th. As he walked down the hall of his new high school, he felt **apprehensive**. It wasn’t anything like his school back home, but how could it be?
- 12 After stopping by the office, Mateo leaned against a wall and looked down at his schedule. As he did, he heard two students walk past speaking Spanish in a Puerto Rican accent Mateo instantly recognized. Mateo spun around and called out a greeting to the students in Spanish. One nodded and the other gave a quick smile and wave. Mateo was thrilled to see them walk into the classroom where he was headed.
- 13 Even in this very different place, Mateo sensed he could someday feel at home. This new world had begun looking better already.

3. In paragraph 6, what does Uncle Damien’s description MOST emphasize about New York City?
- A. It attracts many tourists.
 - B. It has a large population.
 - C. It is a place of diverse cultures.
 - D. It is as beautiful as other cities.
4. Which quotation BEST shows that Mateo feels a sense of longing for his old home?
- A. Mateo thought they only had subways in New York City . . .
 - B. Mateo did have to admit that some of this did feel familiar . . .
 - C. After one plane flight, everything in his life was new.
 - D. There was no ocean, no palm trees, no sandy beaches.
5. What does **skeptically** mean as it is used in paragraph 6?
- A. angrily
 - B. doubtfully
 - C. excitedly
 - D. fearfully

6. Why does Mama MOST LIKELY make breakfast in the morning?
- A. to keep herself busy in her new home
 - B. to let Mateo experience something familiar
 - C. to give Mateo energy for the long walk to school
 - D. to help the family know what life in New York will be like
7. What does **apprehensive** mean as it is used in paragraph 11?
- A. confused
 - B. excited
 - C. nervous
 - D. relieved
8. Which sentence BEST states the theme of the passage?
- A. Sharing new experiences can bring families closer together.
 - B. Large cities can offer unique opportunities for personal growth.
 - C. Without close family connections, it is easy to lose a sense of community.
 - D. Though moving can be difficult, it is possible to find belonging in a new place.

The item on this page is not passage-based.

- ★ 9. **Ariannah is writing a research report about the American Revolution. Read the paragraph from her report.**

The American colonists were originally proud to be citizens of England. However, the large distance between the Colonies and the British government made them feel very far removed from England. When King George imposed several new taxes on the colonists, the gap widened. When American colonists decided to boycott British goods, the king sent British soldiers to the Colonies to keep the colonists in line. After the colonists carried out the Boston Tea Party, the king further angered them by passing a series of taxes and laws that became known as the Intolerable Acts. The colonists had had enough. They declared their desire for independence, and the start of the American Revolution soon followed.

Ariannah wants to add a sentence to the beginning of the paragraph. Which sentence would be the BEST introduction for the paragraph?

- A. The American Revolution started in 1775.
- B. Many different events led to the start of the American Revolution.
- C. The Boston Tea Party was an important episode in the American Revolution.
- D. The American Revolution is also known as the American War of Independence.

The item on this page is not passage-based.

- ★ 10. **Bowen is writing about Isaac Newton. Read the paragraph from a source he found.**

Although aircraft are modern inventions, the principles that explain how they operate were first expressed more than 300 years ago. Sir Isaac Newton, who was merely 23 at the time, proposed his theories of gravitation in 1666. Then, in 1686, his laws of motion helped scientists understand how force, velocity, and momentum change and interact. Though developed in the 17th century, Newton's laws are applied to aerodynamics, from airplanes to rockets.

Bowen wrote these sentences for his essay. Which sentence should he revise because it plagiarizes the source?

- A. Between 1666 and 1686, Sir Isaac Newton proposed laws and theories that impact modern sciences, like aerodynamics.
- B. Sir Isaac Newton's laws of motion, which were presented in 1686, concern force and velocity and relate to aerodynamics.
- C. Modern science benefits from the laws first expressed more than 300 years ago by Newton, who was merely 23 at the time.
- D. Although he never encountered an airplane or a rocket, Sir Isaac Newton developed theories that influence modern science.

Read the passage.

Ashfall Fossil Beds

- 1 In 1971, a paleontologist¹ made an important discovery in Nebraska. He found the fossil skeleton of a baby rhinoceros in a ravine. This discovery would have a large impact on science. Today, people can get a glimpse of this astounding discovery at Ashfall Fossil Beds State Historical Park.

Formation of the Fossil Beds

- 2 The region's climate was different millions of years ago compared to the climate of today. Air temperatures were warmer, and the air was more humid. Due to the climate, the plants and animals that **inhabited** the region were also different from those found there today. The climate, plants, and animals of Nebraska changed slowly over time. An **epic** event that occurred long ago saved a record of the prehistoric era.
- 3 Many scientists believe that there was a tremendous volcanic eruption in the region millions of years ago. The eruption released large amounts of ash into the atmosphere which spread into the air for thousands of miles before falling back to Earth. Animals inhaled the ash over a period of weeks and died. The remains of the animals and geographic features became buried in a layer of volcanic matter. The skeletons of entire creatures were protected and preserved in this volcanic ash. Over the years, they were fossilized.

Features of Ashfall Fossil Beds

- 4 Ashfall fossil beds are one location where many fossil skeletons have been discovered. Fossils are common and have been found all over the world. Ashfall fossil beds, however, are one of the few places where entire fossil skeletons have been found.
- 5 In 1991, Ashfall Fossil Beds became a Nebraska state historical park. This was an important step in an effort to protect and preserve the fossil beds. Scientists can continue their study of the fossils without the threat of land development.
- 6 The park also offers visitors an opportunity to see what wildlife existed in the region millions of years ago. It is a fascinating place where visitors can see fossilized remains of camels, giant turtles, saber-toothed deer, rhinoceros, and many other animals. The fact that there are so many complete, well-preserved fossils also makes the park an important scientific site.

Working at the Park

- 7** Ashfall fossil beds are a unique phenomenon. The location continues to be studied, even forty years after its discovery. More than 200 fossilized skeletons of twelve prehistoric species have been uncovered. Each fossil is carefully recorded and mapped in an effort to keep track of past and current finds. New discoveries are made every year.
- 8** The Hubbard Rhino Barn is a large building that houses and protects areas being studied. It is named after the huge number of rhinoceros fossils discovered at the site. Students from the University of Nebraska gain field experience by working there.

Touring the Park

- 9** Ashfall Fossil Beds State Historical Park is located in northeastern Nebraska. The park covers 360 acres of rangeland in Antelope County. Visitors to the park can enjoy hiking and picnicking. Trails throughout the park provide many scenic views of the valley and a glimpse of the region's geological features. The trails also allow people to view the wildlife and plants that are present today in the region.
- 10** At the Rhino Barn, visitors can observe paleontologists at work. A goal of the facility is to spark wonder in children and adults. For anyone with an interest in prehistoric life, fossils, or paleontology, a trip to Ashfall Fossil Beds State Historical Park would be time well spent.

¹paleontologist—a person who studies fossil remains

11. According to the passage, how are the fossils in Ashfall Fossil Beds connected to the ancient volcanic eruption?
- A. The eruption attracted scientists to the area, and those scientists eventually discovered the fossils.
 - B. The eruption caused the air to be warmer and more humid, creating ideal conditions for the formation of fossils.
 - C. The eruption released ash that killed animals and covered the remains, and those remains eventually became fossils.
 - D. The eruption exposed areas of the land where fossils were located, allowing them to be discovered and studied many years later.
12. What is the meaning of the root **-hab-** in the word **inhabited**?
- A. to bite
 - B. to live
 - C. to move
 - D. to protect
13. Which sentence from the passage BEST expresses how the author feels about the park?
- A. Many scientists believe that there was a tremendous volcanic eruption in the region millions of years ago.
 - B. Scientists can continue their study of the fossils without the threat of land development.
 - C. Visitors to the park can enjoy hiking and picnicking.
 - D. For anyone with an interest in prehistoric life, fossils, or paleontology, a trip to Ashfall Fossil Beds State Historical Park would be time well spent.

14. Read the sentence from paragraph 1.

“This discovery would have a large impact on science.”

Which **two** sentences from the passage BEST support this claim?

- A. The climate, plants, and animals of Nebraska changed slowly over time.
- B. The eruption released large amounts of ash into the atmosphere which spread into the air for thousands of miles before falling back to Earth.
- C. Ashfall fossil beds, however, are one of the few places where entire fossil skeletons have been found.
- D. In 1991, Ashfall Fossil Beds became a Nebraska state historical park.
- E. More than 200 fossilized skeletons of twelve prehistoric species have been uncovered.

15. **This question has two parts. Answer Part A, and then answer Part B.**

Part A

In paragraph 2, what is the meaning of the word **epic**?

- A. expected
- B. major
- C. temporary
- D. usual

Part B

Which words from paragraphs 2 and 3 BEST support the answer to Part A?

- A. Due to the climate . . .
- B. . . . occurred long ago . . .
- C. . . . tremendous volcanic eruption . . .
- D. . . . falling back to Earth.

16. **Read the sentence from paragraph 7.**

“The location continues to be studied, even forty years after its discovery.”

What idea does the sentence emphasize?

- A. how popular the park is for visitors
- B. how significant the park is as a scientific site
- C. how much scientists learn by working in the park
- D. how difficult it is to uncover the fossils in the park

17. Why does the author describe the trails in the park in paragraph 9?
- A. to highlight a feature that visitors can enjoy
 - B. to support the idea that the park is a unique place
 - C. to explain how the scientists access the fossil beds
 - D. to describe the places where the fossils are located
18. Which **two** sentences from the passage express the central ideas?
- A. Today, people can get a glimpse of this astounding discovery at Ashfall Fossil Beds State Historical Park.
 - B. The region's climate was different millions of years ago compared to the climate of today.
 - C. Fossils are common and have been found all over the world.
 - D. The fact that there are so many complete, well-preserved fossils also makes the park an important scientific site.
 - E. The Hubbard Rhino Barn is a large building that houses and protects areas being studied.

The items on this page are not passage-based.

- ★ 19. **Tae is writing about Earth Day 2018. Read his first paragraph.**

Since 1970, people have celebrated Earth Day on April 22. People around the world are involved in Earth Day activities each year, organized by the group earthday.org. Every Earth Day has a theme. In 2018, earthday.org decided to focus on stopping plastic pollution.

Tae wants to add a sentence to the end of the paragraph to provide a focus for the essay. Which sentence would BEST complete the paragraph?

- A. The group earthday.org is also known as the Earth Day Network.
- B. One of the organizers of the first Earth Day returned to help plan Earth Day 1990.
- C. I do my part to reduce plastic pollution by recycling plastic instead of throwing it away.
- D. They knew that educating people about the harms of plastic pollution would be one way to achieve this goal.

- ★ 20. These sentences are from a story Jess is writing.

Which sentence should Jess revise because it is a run-on?

- A. After realizing his math homework was due tomorrow morning, Jackson decided to stay home to work on it instead of going to the park to play soccer.
- B. Once he finished his homework, Jackson discovered that he still had time to play soccer in the back yard before dark.
- C. Jackson kicked the ball around by himself for a while, but two kids from next door eventually came over and joined the game.
- D. The game finished when it was too dark to see the ball, everyone was tired and hungry and ready to go inside anyway.



Grade 8
General
Mathematics

Directions:

On the following pages of your practice test booklet are questions for the Grade 8 *Nebraska Student-Centered Assessment System (NSCAS) General Mathematics* practice test.

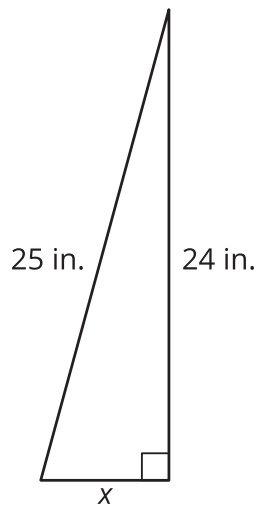
Read these directions carefully before beginning the test.

This practice test will include several different types of questions. Multiple choice questions will ask you to select an answer from among four choices. Multiple select questions will ask you to select multiple correct answers from among five or more answer choices. For some questions, there may be two parts, Part A and Part B, where each part has a multiple choice or multiple select question. Some questions will ask you to construct an answer by following the directions given.

For all questions:

- Read each question carefully and choose the best answer.
- You may use scratch paper to solve the problems.
- The Mathematics Reference Sheet is provided in the back of the test booklet. You may refer to this page at any time during the test.
- Be sure to answer ALL the questions.

1. Aaron sells jackets online. He adds \$4.75 per jacket onto every purchase for shipping. He collected a total of \$188.75 selling 5 jackets. Which equation could be used to calculate the sale price, j , of each jacket?
- A. $5(j + 4.75) = 188.75$
- B. $5j + 4.75 = 188.75$
- C. $5(4.75) + j = 188.75$
- D. $(5 + 4.75)j = 188.75$
2. **Use the figure below to answer the question.**



Using the Pythagorean theorem, what is the value of x ?

- A. 1 inch
- B. 7 inches
- C. 41 inches
- D. 49 inches

3. This question has two parts. Answer Part A, and then answer Part B.

Part A

Which equation has exactly one solution?

- A. $3x + 4 = 5x + 4$
- B. $6x + 2 = 6x + 3$
- C. $7x + 1 = 2x + 5x + 1$
- D. $10x + 6 = 2(5x + 3)$

Part B

Which statements explain why the equation has exactly one solution?

Select **all** that apply.

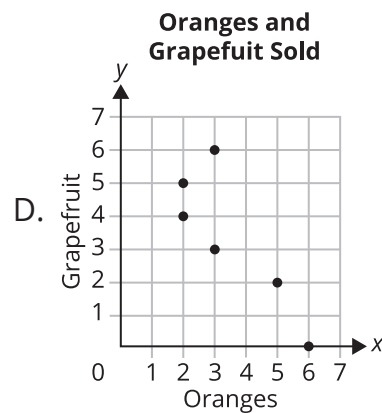
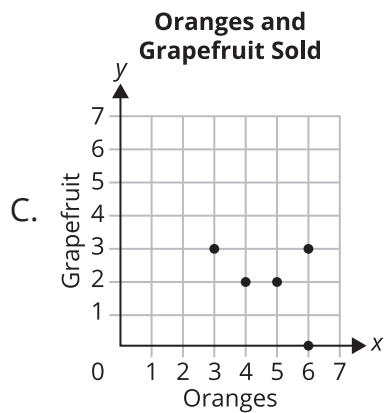
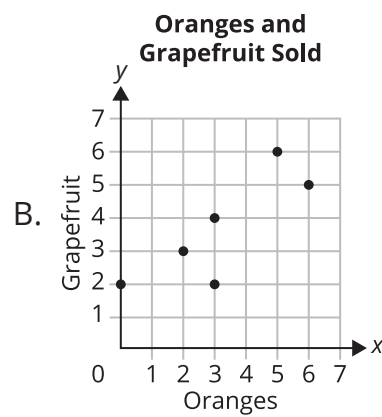
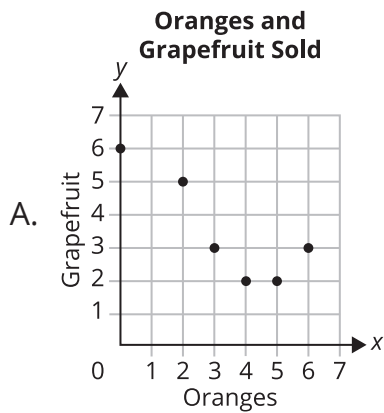
- A. The equation simplifies to eliminate the x 's and have different constants on both sides of the equation.
- B. The equation simplifies to eliminate the x 's and have the same constant on both sides of the equation.
- C. The equation simplifies to x 's on one side of the equation and a constant on the other side.
- D. Substituting the number one into the equation makes the equation true.
- E. There is only one value for x that makes the equation true.
- F. There is only one variable in the equation.

4. Use the table below to answer the question.

Oranges and Grapefruit Sold

Oranges	3	4	0	2	5	6
Grapefruit	3	2	6	5	2	3

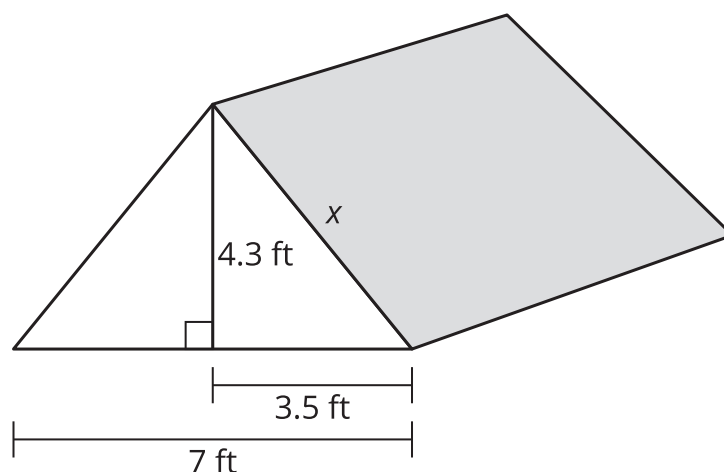
The table shows the numbers of oranges and grapefruits sold to six different customers. Which scatter plot represents the data?



5. Which list is ordered from LEAST to GREATEST?

- A. -7.6 , $-\frac{76}{12}$, $\sqrt{18}$, 3.99
- B. $-\frac{76}{12}$, -7.6 , 3.99 , $\sqrt{18}$
- C. -7.6 , $-\frac{76}{12}$, 3.99 , $\sqrt{18}$
- D. $-\frac{76}{12}$, -7.6 , $\sqrt{18}$, 3.99

6. Use the figure to answer the question.



A company wants to make a tent that has a height of 4.3 feet and a total width of 7 feet. The company needs to know the length of edge x to know how much fabric is needed for the side of the tent. To the nearest tenth, what is the length of edge x of the tent? Write the answer in the box.

 feet

7. Which value of y makes $\frac{4(y - 3)}{2} = 9 - y$ true?

A. 3

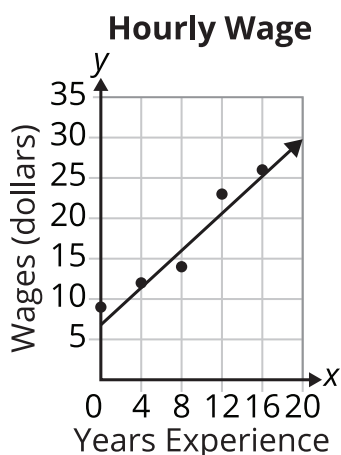
B. 4

C. 5

D. 6

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8. The line shows what people in a particular job can expect to earn based on their years of experience.



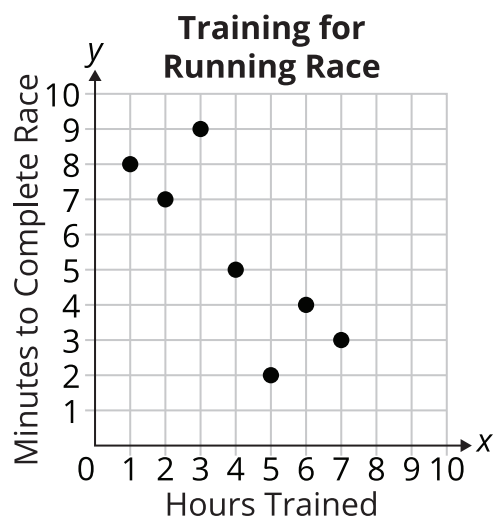
Which statements about the information in the graph are true?

Select **all** that apply.

- A. An employee with 4 years of experience can expect to earn approximately \$12 per hour.
- B. An employee earning \$20 per hour has approximately 11 years of experience.
- C. With 16 years of experience, an employee can expect to earn \$30 per hour.
- D. With 20 years of experience, an employee can expect to earn \$35 per hour.
- E. An employee can expect a raise of slightly more than \$1 per hour each year.
- F. An employee can expect to earn \$10 per hour as a starting wage.

9. What is the value of $|3 + 5| - |4|$?
- A. -12
 - B. -4
 - C. 4
 - D. 12
10. A ball has a diameter of 12 inches. What is the volume of the ball? Use 3.14 for π .
- A. 150.72 cubic inches
 - B. 904.32 cubic inches
 - C. 2,712.96 cubic inches
 - D. 7,234.56 cubic inches

11. Use the scatter plot to answer the question.



Which set of data was used to create the scatter plot? Select and write the numbers to complete the missing values in the table.

1 2 3 4 5 6 7 8 9 10

Training for Running Race

Hours Trained	3		1	4	5		6
Minutes to Complete Race	9	7	8		2	3	

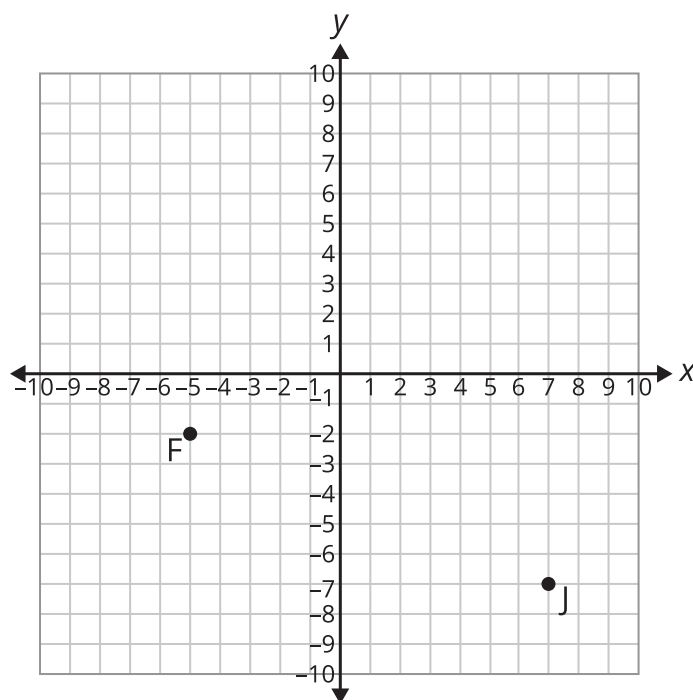
12. Use the table to answer the question.

x	y
-2	12
0	7
2	2

What is the constant rate of change in the table?

- A. $-\frac{5}{2}$
- B. $-\frac{2}{5}$
- C. $\frac{2}{5}$
- D. $\frac{5}{2}$

13. Use the points on the coordinate plane below to answer the question.



What is the distance between points F and J?

- A. 5
B. 13
C. 17
D. 30

14. This question has two parts. Answer Part A, and then answer Part B.

Part A

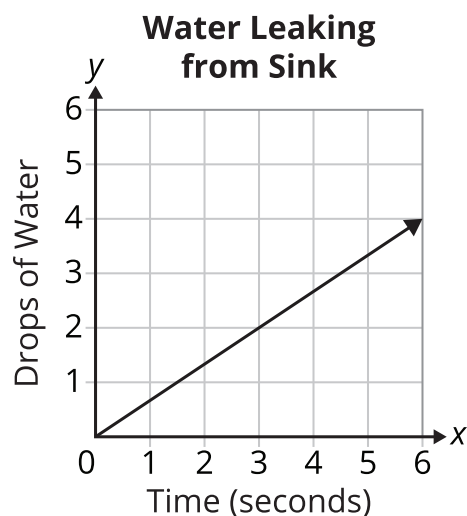
What is -0.0000012 written in scientific notation?

- A. -1.2×10^{-6}
- B. -1.2×10^{-5}
- C. -1.2×10^5
- D. -1.2×10^6

Part B

What is 8.9×10^4 written in standard notation? Write the answer in the box.

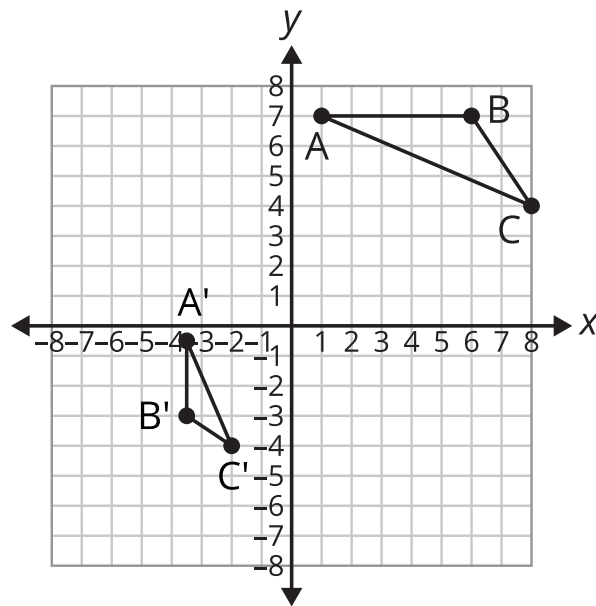
15. Use the graph below to answer the question.



The graph shows the amount of water leaking from a sink over time. Which statement correctly compares the amount of water the sink leaks and the time?

- A. For every 1 second, the sink leaks 2 drops of water.
 - B. For every 2 seconds, the sink leaks 1 drop of water.
 - C. For every 2 seconds, the sink leaks 3 drops of water.
 - D. For every 3 seconds, the sink leaks 2 drops of water.
16. What is the square root of 100?
- A. 5
 - B. 10
 - C. 25
 - D. 50

17. Use the graph to complete the statements.



Triangle ABC is dilated, rotated, and reflected, in that order, to map onto triangle A' B' C'. Which dilation, rotation, and reflection transform triangle ABC onto triangle A' B' C'? Select the correct choices to complete the statements.

The first transformation is a dilation centered at the origin with a scale factor of $(\frac{1}{3} \quad \frac{1}{2} \quad 2 \quad 3)$.

The second transformation is a rotation ($90^\circ \quad 180^\circ \quad 360^\circ$) clockwise about the origin.

The third transformation is a reflection over the (**x-axis**, **y-axis**, **line $x = 1$** , **line $y = 4$**).

18. What is the value of x in the equation $\frac{7}{3}x = \frac{1}{3}x - 24$? Write the answer in the box.

$x =$

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19. What is the value of $(-4)^2$?

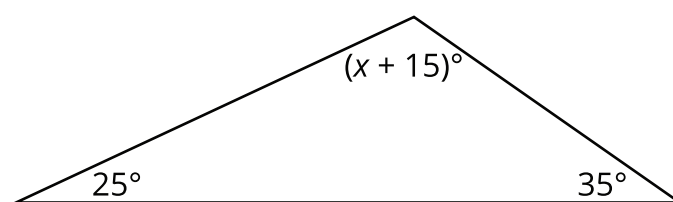
A. -16

B. $-\frac{1}{16}$

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

D. 16

20. Use the diagram below to answer the question.



What is the value of x in the triangle?

A. 60

B. 75

C. 105

D. 120



Grade 8 General Science

Directions:

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Read these directions carefully before beginning the test.

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For all questions:

- Read each question carefully and choose the best answer.
- Review each question carefully. You may not return to a previous question.
- You may use scratch paper to make notes.
- Be sure to answer ALL the questions.

1. Use the information to complete the task.

Seawatch Bay

People on an evening fishing trip in Seawatch Bay notice that the water faintly glows at night. The glow in the water is stronger around their boat as it moves through the bay. They collect a water sample and send it to a marine science lab for analysis.

Scientists examine the water sample under a microscope. They find a microorganism named *Noctiluca scintillans*. The *Noctiluca scintillans* in the water sample exhibits two different traits. Some of the microorganisms in this species can produce light, while others cannot.

The *Noctiluca scintillans* that can produce light make a protein called luciferase. The luciferase protein helps drive a chemical reaction that releases light.

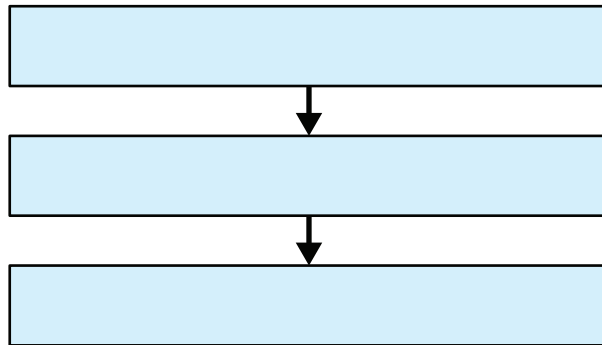
Write the phrases in the flow chart to describe the process that allows *Noctiluca scintillans* to produce light.

trait to produce light

luciferase gene

luciferase protein

Light Production in *Noctiluca scintillans*



Review each question carefully. You may not return to a previous question.

2. Use the information to answer the question.

Seawatch Bay

The *Noctiluca scintillans* in the water sample exhibits two different traits. Some of the microorganisms in this species can produce light, while others cannot.

Scientists at the marine science lab wonder if the *Noctiluca scintillans*' ability to produce light affects the probability of it surviving in Seawatch Bay.

What evidence should the scientists collect to determine whether the light-producing trait affects the *Noctiluca scintillans*' ability to survive in Seawatch Bay?

Select **all** that apply.

- A. whether prey species are attracted to the *Noctiluca scintillans* that are able to glow
- B. whether water pollutants limit the size of the *Noctiluca scintillans* population in Seawatch Bay
- C. whether *Noctiluca scintillans* populations in other bodies of water have the same light-producing traits
- D. whether the *Noctiluca scintillans* reproduce more quickly when the bay's water temperature is warmer
- E. whether predators have an easier time capturing *Noctiluca scintillans* with the light-producing trait

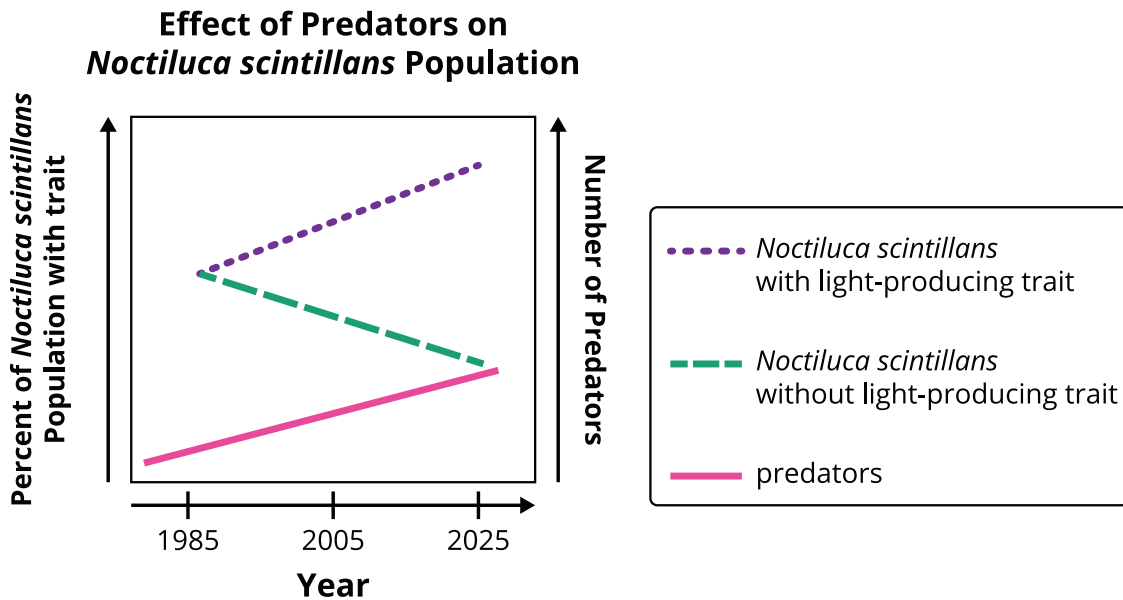
Review each question carefully. You may not return to a previous question.

3. Use the information to answer the question.

Seawatch Bay

Scientists at the marine science lab wonder if the *Noctiluca scintillans*' ability to produce light affects the probability of it surviving in Seawatch Bay.

The scientists collect data on how the number of *Noctiluca scintillans* in Seawatch Bay with the light-producing trait and without the light-producing trait has changed in relation to the predator population that eats them. The graph shows the data.



NSCAS GENERAL — SCIENCE

Which statement BEST describes the effect of predators on the *Noctiluca scintillans* population over time?

- A. As the percentage of *Noctiluca scintillans* that produce light increased, the population of predators remained the same.
- B. As the percentage of *Noctiluca scintillans* that are not able to produce light increased, the population of predators decreased.
- C. As the population of predators increased, the percentage of *Noctiluca scintillans* that produce light increased in the population.
- D. As the population of predators decreased, the percentage of *Noctiluca scintillans* that produce light remained the same in the population.

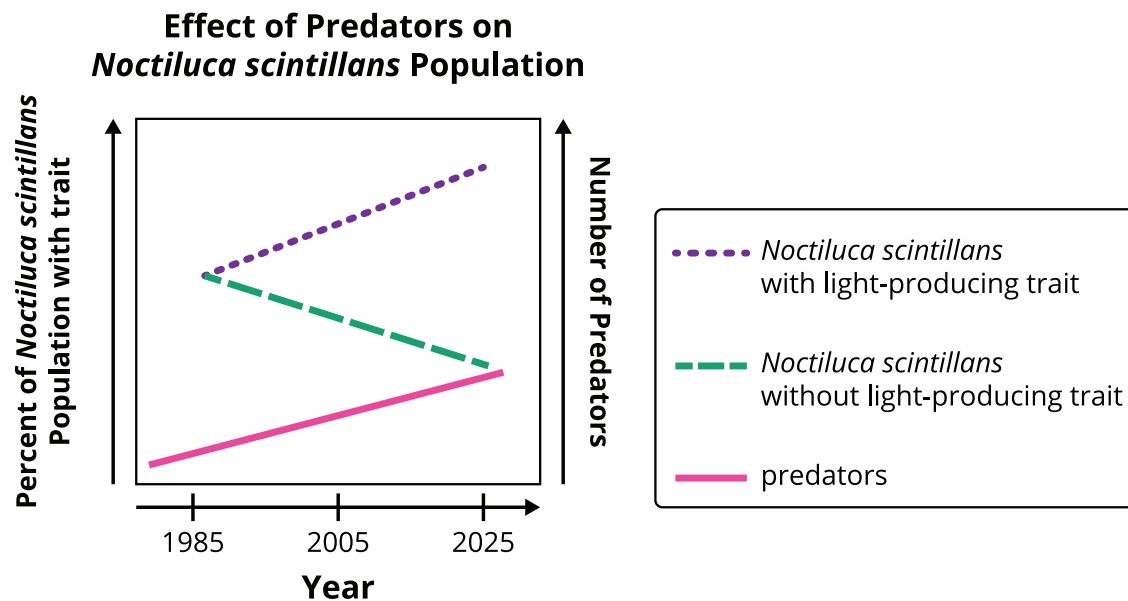
Review each question carefully. You may not return to a previous question.

4. Use the information to answer the question.

Seawatch Bay

Scientists at the marine science lab wonder if the *Noctiluca scintillans*' ability to produce light affects the probability of it surviving in Seawatch Bay.

The scientists collect data on how the number of *Noctiluca scintillans* in Seawatch Bay with the light-producing trait and without the light-producing trait has changed in relation to the predator population that eats them. The graph shows the data.



This question has two parts. Answer Part A, then answer Part B.

Part A

Which statement BEST explains why the percentage of *Noctiluca scintillans* that produce light in the population is increasing?

- A. *Noctiluca scintillans* that produce light attract predators.
- B. The ability to produce light helps the *Noctiluca scintillans* avoid predators.
- C. The ability to produce light decreases the likelihood that the *Noctiluca scintillans* will reproduce.
- D. *Noctiluca scintillans* that produce light are less likely to survive than those that do not produce light.

Part B

Which claim about the Seawatch Bay *Noctiluca scintillans*' light-producing trait is supported by evidence?

Select the correct choices to complete the sentence.

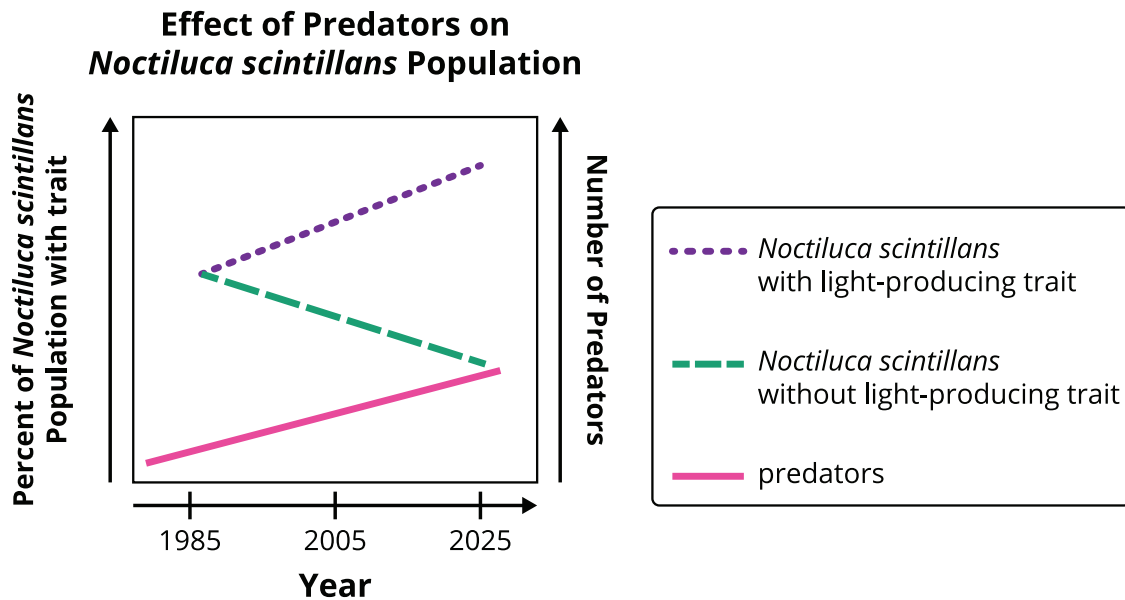
The *Noctiluca scintillans*' ability to produce light is a(n) (**advantageous**, **disadvantageous**) trait in Seawatch Bay, because individuals with that trait are (**less**, **more**) likely to survive and reproduce.

Review each question carefully. You may not return to a previous question.

5. Use the information to answer the question.

Seawatch Bay

The scientists collect data on how the number of *Noctiluca scintillans* in Seawatch Bay with the light-producing trait and without the light-producing trait has changed in relation to the predator population that eats them. The graph shows the data.



Based on the data, the scientists claim that the ability to produce light is an advantageous trait for most microorganisms.

A fellow researcher recommends that the scientists' claim should be revised based on limitations in the data.

NSCAS GENERAL — SCIENCE

Why should the scientists' claim be revised?

Select **all** that apply.

- A. The data does not include information gathered over multiple years.
- B. The data does not include information on microorganisms outside of Seawatch Bay.
- C. The data does not include a description of how traits are expressed in populations.
- D. The data does not include the population change of *Noctiluca scintillans* that do not produce light as a control.
- E. The data does not include information from multiple microorganisms that produce light, only the *Noctiluca scintillans*.

Review each question carefully. You may not return to a previous question.

6. Use the information to answer the question.

Water Balloon Challenge

Teachers volunteer to get soaked for a water balloon challenge. Each student team gets one balloon to launch, and the goal is to get water on as much of the teacher as possible. The students can fill their balloons with as much water as they want, and they must use a catapult to launch the balloons. The catapult can launch the balloon at a maximum speed of 10 meters per second (m/s).

The teams need to figure out the best balloon mass and the best launch speed to get the most water on the teachers. The students measure the mass of five water balloons. They set the catapult to launch the balloons at a speed of 7 m/s. They launch each balloon and calculate its kinetic energy. The table shows the data.

Water Balloon Mass and Kinetic Energy

Balloon Number	Mass (kilograms)	Speed (meters per second)	Kinetic Energy (joules)
1	0.16	7	3.9
2	0.20	7	4.9
3	0.24	7	5.9
4	0.40	7	9.8
5	0.48	7	11.8

Which statement BEST describes the relationship shown in the data table?

Write the correct choice in each blank to complete the sentence.

mass speed doubles halves

When the _____ of the water balloon doubles, its kinetic energy _____.

Review each question carefully. You may not return to a previous question.

7. Use the information to answer the question.**Water Balloon Challenge**

The students decide to launch water balloons at different speeds to see how speed affects the kinetic energy of the balloons. The students use five water balloons that all have a mass of 0.6 kilograms. The table shows the data.

Water Balloon Speed and Kinetic Energy

Balloon Launch Speed (m/s)	Kinetic Energy (joules)
4	4.8
5	7.5
6	10.8
7	14.7
8	19.2

Which statement BEST identifies the cause and effect relationship between speed and kinetic energy?

- A. When kinetic energy increases, speed increases.
- B. When kinetic energy increases, speed decreases.
- C. When speed increases, kinetic energy increases.
- D. When speed increases, kinetic energy decreases.

Review each question carefully. You may not return to a previous question.

8. Use the graph to answer the question.

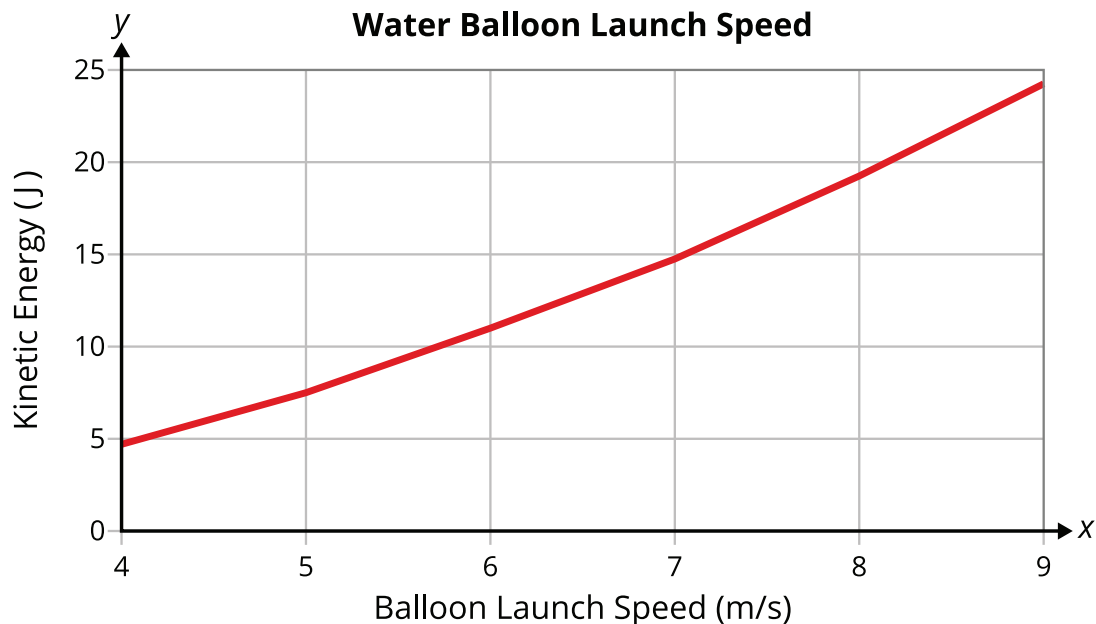
Water Balloon Challenge

The students decide to launch water balloons at different speeds to see how speed affects the kinetic energy of the balloons. The students use five water balloons that all have a mass of 0.6 kilograms. The table shows the data.

Water Balloon Speed and Kinetic Energy

Balloon Launch Speed (m/s)	Kinetic Energy (joules)
4	4.8
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7	14.7
8	19.2

The students graph the data they collected.



NSCAS GENERAL — SCIENCE

What is the approximate kinetic energy, in joules (J), of a 0.6-kilogram water balloon moving at a speed of 9 m/s?

- A. 11 J
- B. 19 J
- C. 24 J
- D. 29 J

Review each question carefully. You may not return to a previous question.

9. Use the information to answer the question.

Water Balloon Challenge

To win the water balloon challenge, students need to maximize the mass of the water balloon and avoid having it burst before it can be catapulted.

Students fill 7 identical water balloons with water until they reach masses between 0.90 and 0.94 kilograms. They observe the water balloons to see if they immediately burst and record the data.

Maximum Water Balloon Mass

Mass (kg)	0.90	0.91	0.92	0.93	0.94	0.94	0.94
Does it burst?	No	No	Yes	No	Yes	Yes	Yes

A student claims that the maximum mass for the water balloon should be 0.91 kg. Another student is concerned that there may be a measurement error.

What method would help the students improve the accuracy of the data?

- A. Expand the range of masses from 0.85 kg to 0.99 kg.
- B. Fill each of the 7 water balloons with 0.90 kg of water instead of different masses.
- C. Measure the mass of the water balloons before they are filled with water to see if they can hold more than 0.91 kg of water.
- D. Conduct multiple trials using water balloons with masses between 0.91 kg and 0.94 kg to determine at what mass the water balloons burst.

Review each question carefully. You may not return to a previous question.

10. Use the information to complete the task.**Water Balloon Challenge**

Students have discovered this information.

- The mass and the speed of a water balloon affects its kinetic energy.
- The maximum mass for the water balloons is 0.92 kilograms.
- Water balloons with the most kinetic energy will have the biggest splash radius on impact.

The students want to make sure they are creating the largest splash radius possible. They lean a large piece of cardboard against a wall to act as a target. They catapult a 0.46-kg water balloon at the target at a speed of 8 m/s and mark the splash radius with a marker. Next, they catapult a 0.92-kg water balloon at the target at a speed of 8 m/s and mark its splash radius with a marker.

They confirm that the water balloon with the larger mass has a much larger splash radius than the water balloon with the smaller mass.

What can the students do to create an even larger splash radius?

Use the choices to complete the sentences.

lower

higher

decrease

increase

The splash radius will be even larger if the 0.92-kg balloon is catapulted at a _____ speed at the target.

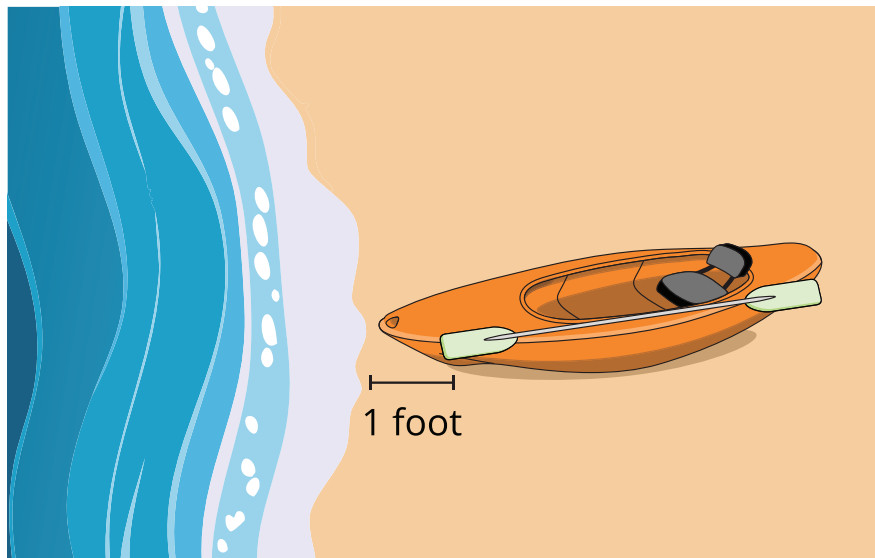
An increase in speed causes a(n) _____ in kinetic energy.

Review each question carefully. You may not return to a previous question.

11. Use the information to answer the question.

Runaway Kayak

Keri visited Santa Barbara, California. On May 10th, she went kayaking in an ocean bay with calm water. She left her kayak on dry sand about one foot away from the waterline at high tide. She checked on the kayak every few days to make sure it was still not touching the high tide waterline, and she made notes in her journal.

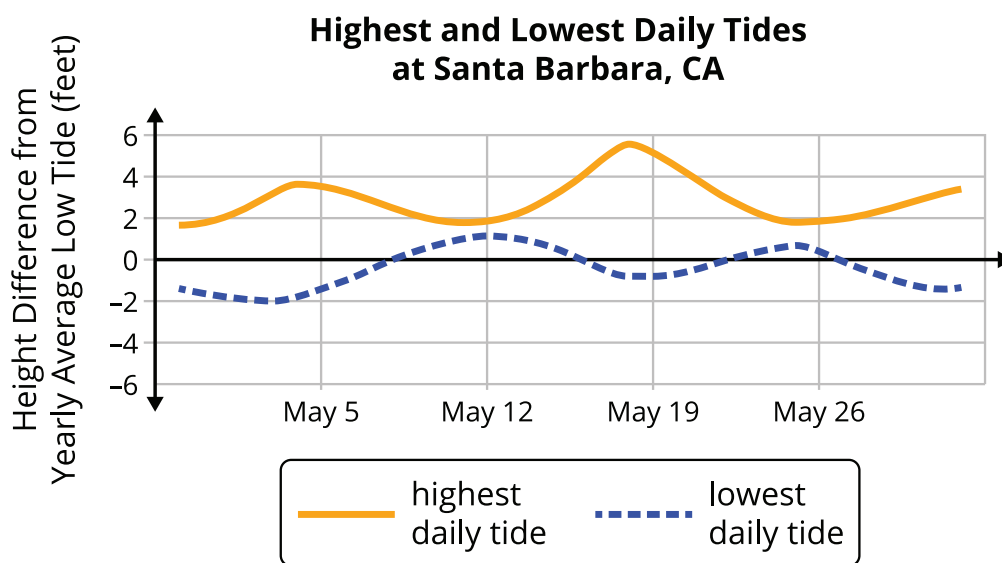


Date	Journal Entry
May 10 th	Went kayaking then pulled the kayak onto the beach.
May 12 th	Checked on the kayak. It is still on the beach not touching the waterline.
May 14 th	Had a picnic on the beach. The kayak is still on the dry sand.

NSCAS GENERAL — SCIENCE

Keri decides to go kayaking again on May 18th. When she returns to the beach, her kayak is floating in the water. Keri wonders what happened.

She looks at this graph that shows the highest and lowest daily tides for May of this year in Santa Barbara.



What claim can be made based on the data?

Select the correct words to complete the sentence.

The kayak is floating in the water because the **(high, low)** tide on May 18th caused the water level at the beach to **(fall, rise)** more than at any other time during the month.

Review each question carefully. You may not return to a previous question.

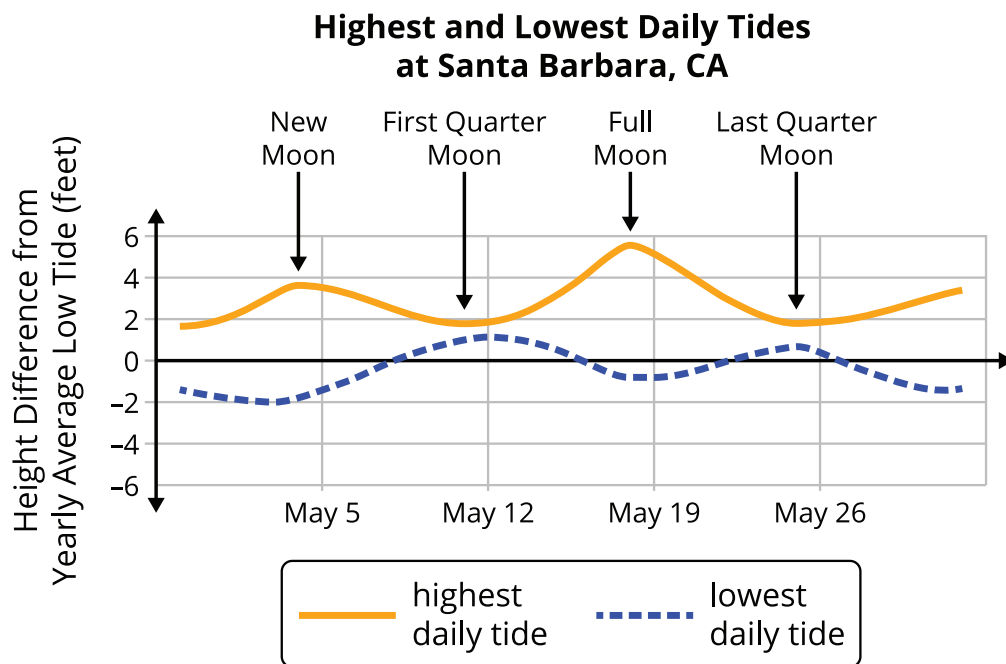
12. Use the information to answer the question.

Runaway Kayak

Keri visited Santa Barbara, California. On May 10th, she went kayaking in an ocean bay with calm water. She left her kayak on dry sand about one foot from the waterline at high tide. She checked on the kayak every few days to make sure it was still not touching the high tide waterline, and she made notes in her journal.

Keri decides to go kayaking again on May 18th. When she returns to the beach, her kayak is floating in the water.

During the high tide on May 18th, the water rose higher than earlier in the month. Keri learns that tides are affected by the phases of the moon. She finds information about the phases of the moon for May of this year and adds it to the tide graph.



NSCAS GENERAL — SCIENCE

What phase is the moon in when Keri finds her kayak floating in the water?

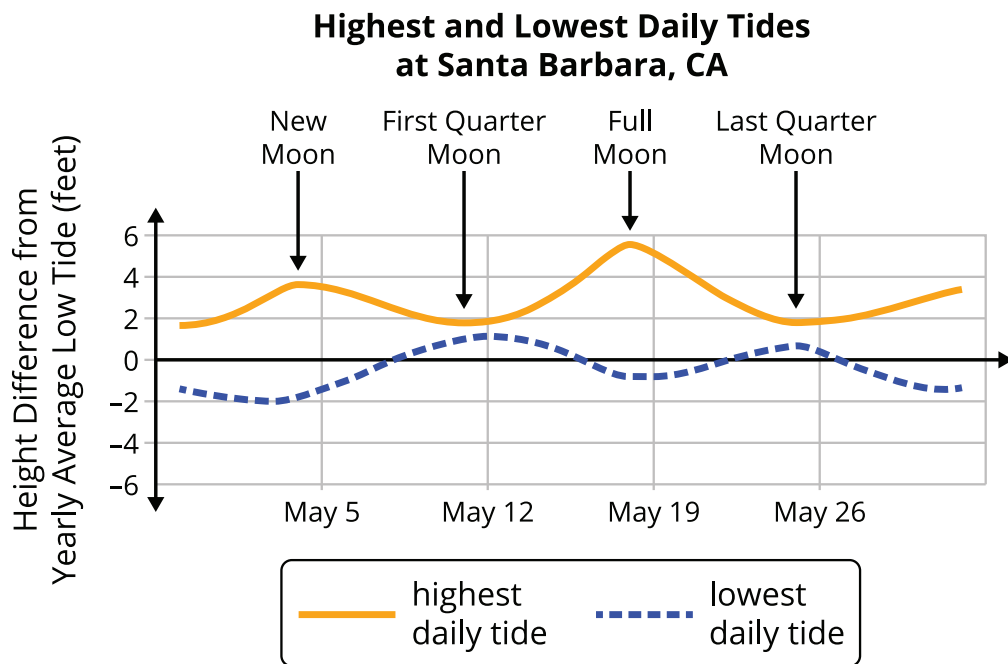
- A. full moon
- B. new moon
- C. last quarter moon
- D. first quarter moon

Review each question carefully. You may not return to a previous question.

13. Use the information to answer the question.

Runaway Kayak

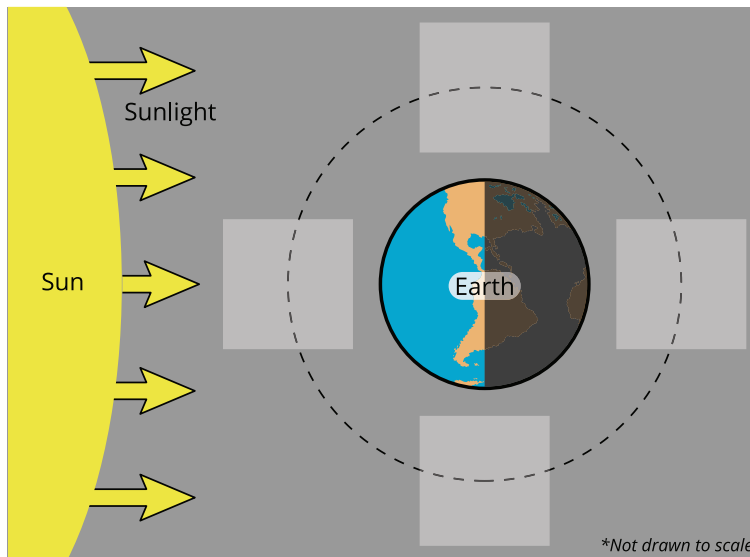
During the high tide on May 18th, the water rose higher than earlier in the month. Keri learns that tides are affected by the phases of the moon. She finds information about the phases of the moon for May of this year and adds it to the tide graph.



It was a full moon on May 18th when Keri found her kayak floating in the water. She wants to make a model to show where the Moon was relative to Earth on that day.

NSCAS GENERAL — SCIENCE

Indicate the correct position of the Moon to show the relationship between the Sun, Earth, and Moon on May 18th.



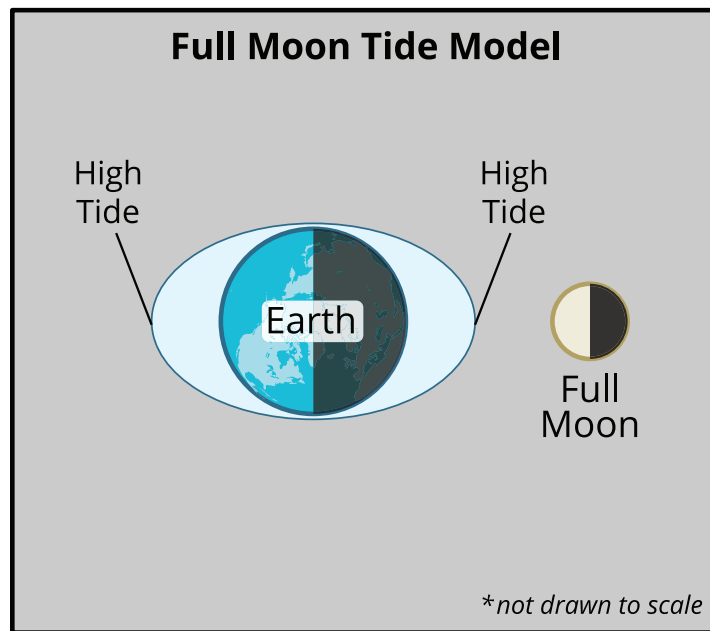
Review each question carefully. You may not return to a previous question.

14. Use the information to answer the question.

Runaway Kayak

Keri researches how tides are affected by the moon. She learns that the Moon's gravitational pull on Earth's oceans causes the water to be redistributed. This results in bulges of water, or high tides, on the sides of Earth closest to the Moon and farthest from the Moon.

She creates a new model to represent the information she finds.



Keri claims that high tides are higher when it is a full moon than when it is a first quarter moon or last quarter moon, because the Moon is in line with Earth and the Sun.

NSCAS GENERAL — SCIENCE

How could Keri revise the model to better support her claim?

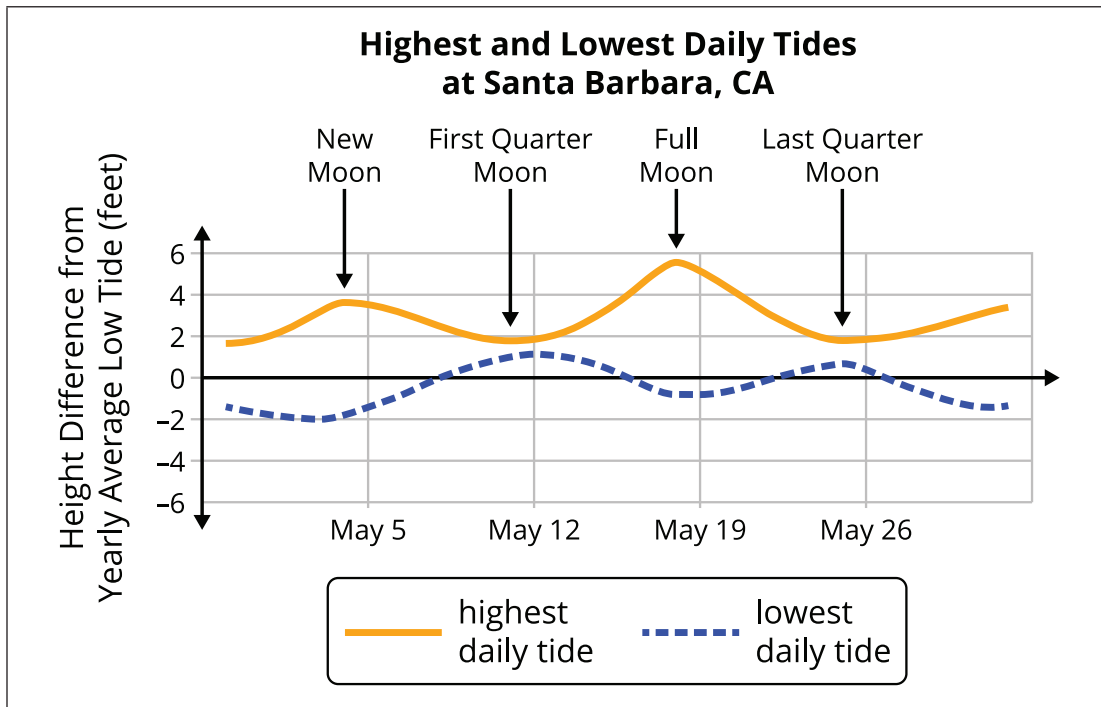
Select **all** that apply.

- A. Include the Sun in the model.
- B. Make Earth appear larger relative to the Moon.
- C. Add arrows to represent Earth rotating on its axis.
- D. Show how the bulge of water changes when it is not a full moon.
- E. Show how solar energy travels in a straight line from the Sun to Earth and the Moon.

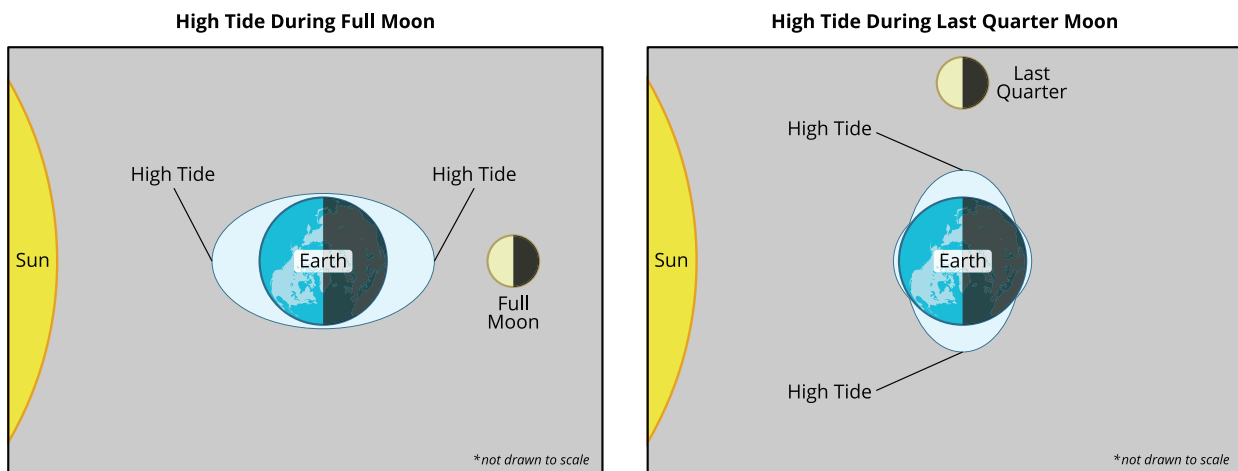
Review each question carefully. You may not return to a previous question.

15. Use the information to answer the question.

Runaway Kayak



The model that Keri revised shows the high tide during a full moon and during a last quarter moon.



Keri pulls her kayak out of the water on May 18th. She leaves it on the dry sand about one foot from the water line at high tide. She will not return to the beach until May 26th.

This question has two parts. Answer Part A, and then answer Part B.

Part A

Can Keri leave her kayak on the beach and expect it to not be in the water when she returns on May 26th?

Select the correct words to complete the sentences.

Keri (**can, cannot**) leave her kayak on the beach. The moon phase will change from a full moon to a (**new, first quarter, last quarter**) moon between May 18th and May 26th.

Part B

What reasoning BEST supports the answer to Part A?

Select the correct words to complete the sentences.

The high tide on May 26th will be (**higher, lower**) than it was during the full moon on May 18th when Keri's kayak floated in the water. This is because high tides are lower when the Moon (**is, is not**) in line with Earth and the Sun.



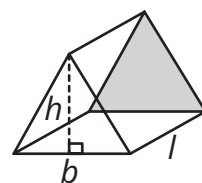
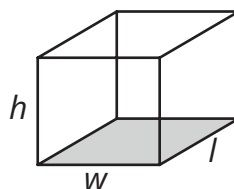
NSCAS NEBRASKA STUDENT-CENTERED ASSESSMENT SYSTEM

Mathematics Reference Sheet

2-Dimensional Shape	Area	Circumference
Circle	$A = \pi r^2$	$C = \pi d = 2\pi r$
Triangle	$A = \frac{1}{2}bh$	Perimeter
Rectangle	$A = l \times w$	$P = 2l + 2w = 2(l + w)$
Square	$A = s \times s$	$P = s + s + s + s$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$	
Parallelogram	$A = bh$	

3-Dimensional Shape	Volume	Surface Area
Rectangular Prism	$V = lwh = Bh$	SA = the sum of the areas of all the faces
Triangular Prism	$V = \frac{1}{2}bhl = Bl$	SA = the sum of the areas of all the faces
Cone	$V = \frac{1}{3}\pi r^2h$	
Cylinder	$V = \pi r^2h$	
Sphere	$V = \frac{4}{3}\pi r^3$	

In the images to the right, the shaded faces are the bases.



2-Dimensional Shape Key		
b = base length	l = length	s = side
h = height	w = width	
d = diameter	r = radius	

Use 3.14 for π .

3-Dimensional Shape Key		
d = diameter	l = length	w = width
r = radius	h = height of shape	B = area of base
	b = base length	

Percent Change	Pythagorean Theorem
% change = $\frac{\text{difference in amounts}}{\text{original amount}}$	$c^2 = a^2 + b^2$

Standard Units	Metric Units
Conversions – Length	
1 foot (ft) = 12 inches (in.)	1 centimeter (cm) = 10 millimeters (mm)
1 yard (yd) = 3 feet (ft) = 36 inches (in.)	1 meter (m) = 100 centimeters (cm)
1 mile (mi) = 1,760 yards (yd) = 5,280 feet (ft)	1 meter (m) = 1,000 millimeters (mm)
	1 kilometer (km) = 1,000 meters (m)
Conversions – Volume	
1 cup = 8 fluid ounces (fl oz)	1 liter (l) = 1,000 milliliters (ml)
1 pint (pt) = 2 cups	1 liter (l) = 1,000 cubic centimeters (cu cm)
1 quart (qt) = 2 pints (pt)	
1 gallon (gal) = 4 quarts (qt)	
Conversions – Weight/Mass	
1 pound (lb) = 16 ounces (oz)	1 gram (g) = 1,000 milligrams (mg)
1 ton = 2,000 pounds (lb)	1 kilogram (kg) = 1,000 grams (g)