

Name: _____

AXIOM CHALLENGE

6th grade; Spring 2026

$$5w + 15 = 35$$

$$13.7 - 8r = 2.9$$

$$23 + 2.5y = 47.6$$

$$w =$$

$$r =$$

$$y =$$

Solve the inequalities and graph their solutions:

$$-2 + q > 5$$

$$q \boxed{} \text{ ____}$$

$$-4 + t \geq 9$$

$$t \boxed{} \text{ ____}$$



$$\frac{2}{3} =$$

$$\frac{3}{15} =$$



$$\frac{3}{4} =$$

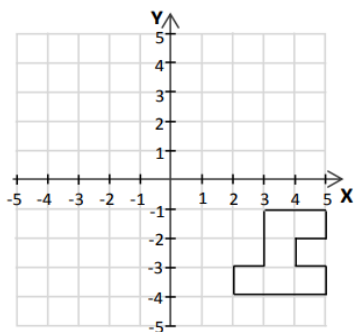
$$\sqrt{256} =$$

$$\sqrt{16} =$$

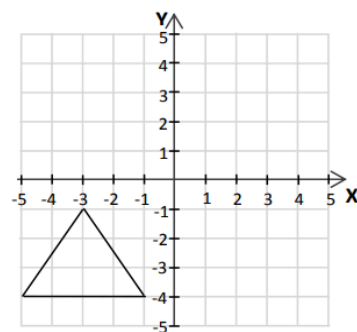
$$\sqrt{729} =$$

$$\sqrt{144} =$$

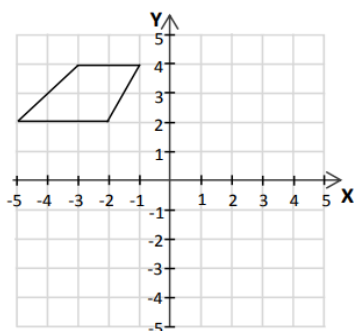
Translate 7 left and 1 down



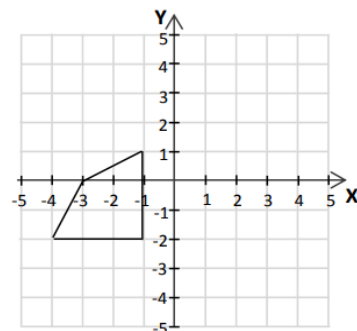
Rotate 90° clockwise about the origin



Reflect across the line $y = 1$



Reflect across the y-axis



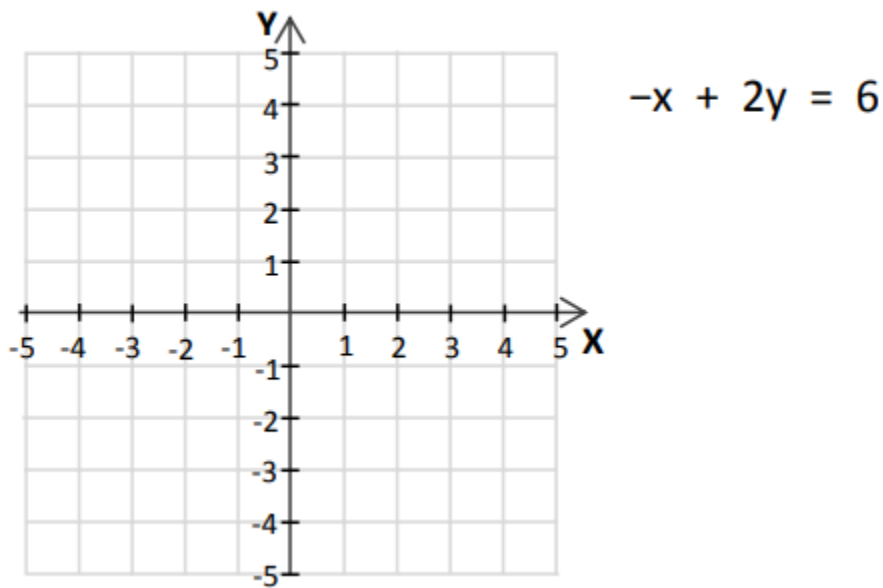
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AXIOM CHALLENGE

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1) Determine the GCD (greatest common factor/divisor) of the following numbers: {306, 372, 240}.

2) Graph the equation and determine its intercepts in coordinate form:



3) Chloe has \$120 in her account at Dedham Savings. She spends 30% of her money, then deposits \$25, and later spends \$15 more. **What is her final balance?**

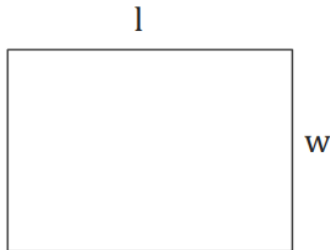
\$_____.

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3) Determine the perimeter and area of the following image:



$$\begin{aligned} l &= 9.5 \text{ ft} \\ w &= 7.4 \text{ ft} \end{aligned}$$

Perimeter = _____
Area = _____

4) Mark bought a sandwich for \$3.65, a bag of chips for \$1.65, and a drink for \$1.75. The tax was \$0.55. He gave the cashier \$10.00. **How much change should Mark have received?**

\$_____.

5) Students in Mrs. Johnson's class can win prizes like colorful pencils and fun-shaped erasers for performing acts of kindness. Mrs. Johnson displays the prizes in a glass case shaped like a rectangular prism. It has a length of 18 inches, a height of 3 inches, and a volume of 270 cubic inches.

a) Which equation can you use to find the width of the prize case, w ?

b) What is the width of the prize case?

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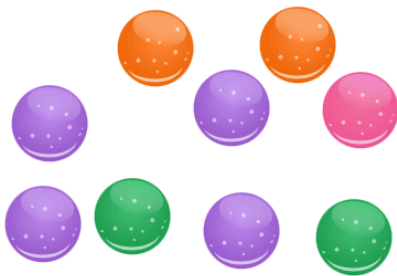
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6) Look at this set of 8 numbers:

51, 20, 23, 76, 11, 93, 39, 95

How would the mean change if the number 36 replaced the number 20 in the set?

7) You select a marble without looking and then put it back. If you do this 9 times, **what is the best prediction possible for the number of times you will pick up a purple marble?**



8) Tracy has the following data:

12, 15, 16, 19

If the median is 15, what number could p be? Give an example.

$p =$ _____.

9) **What is the ratio of triangles to circles?**



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10) Complete the following statement. Use the integers that are closest to the number in the middle.

$$\boxed{} < \sqrt{10} < \boxed{}$$

11) Expand the polynomial: $(4x^2 - 67y)^2$

_____.

12) Determine the LCM (least common multiple) of the following numbers:
 $\{12, 18, 30\}$

13) Sofia has \$85 in her wallet. She spends 20% of her money on a book, then her grandmother gives her \$18, and later she spends \$12 on lunch. What is her final amount of money?

\$_____.

14) A storage box is shaped like a rectangular prism. It has a length of 15 inches, a width of 4 inches, and a volume of 300 cubic inches.

Which equation can you use to find the height of the box, h ?

What is the height of the box?

$h =$ _____.

15) Look at this set of 7 numbers:

14, 18, 22, 25, 29, 31, 35

How would the **mean** change if the number **18** were replaced by **32**?

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1) Circle whether the statements below are true or false.

a) Heat goes from cold to hot.

True

False

b) H₂O is an elementary substance.

True

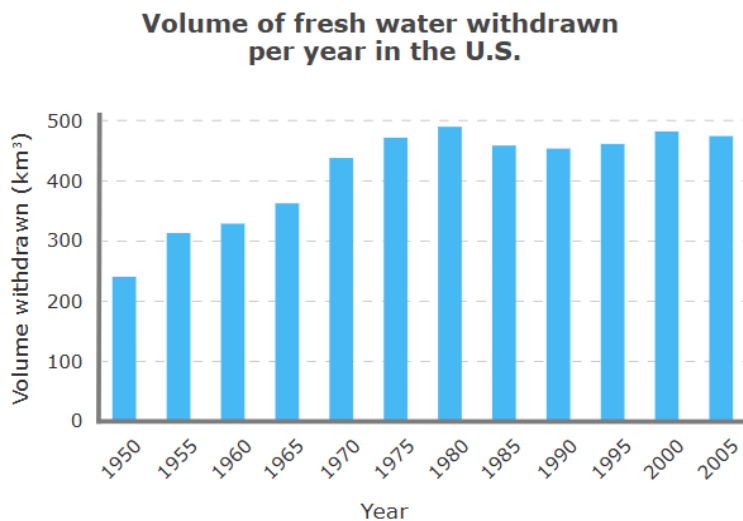
False

c) Particles in solids are packed together.

True

False

2) Since 1950, the United States Geological Survey (USGS) has tracked the volume of fresh water used in the United States. The graph below shows the volume of fresh water withdrawn, or taken by humans for any use, in a given year. The data were collected every five years, starting in 1950 and ending in 2005.



Select the statement that is best supported by the data:

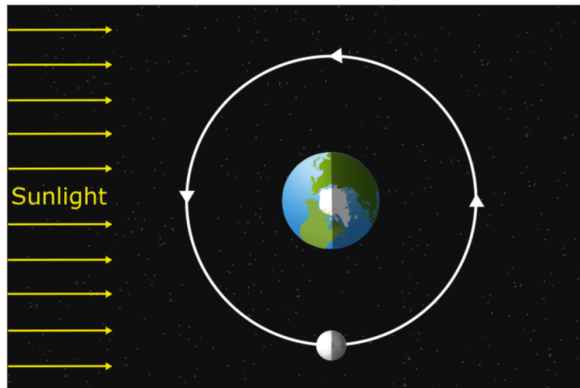
- a) The volume of fresh water withdrawn per year steadily increased until 1980
- b) The volume of fresh water withdrawn per year increased every five years between 1950 and 2005

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3) The model below shows the Moon at one position in its orbit around Earth. The white half of the Moon represents the part of the Moon that is lit up by the Sun.



Identify the phase of the moon based on the model.



4) Fill in the blanks:

Gravity is a fundamental force of _____ between all types of matter in the universe. It is responsible for the _____ of moons, planets, and stars.

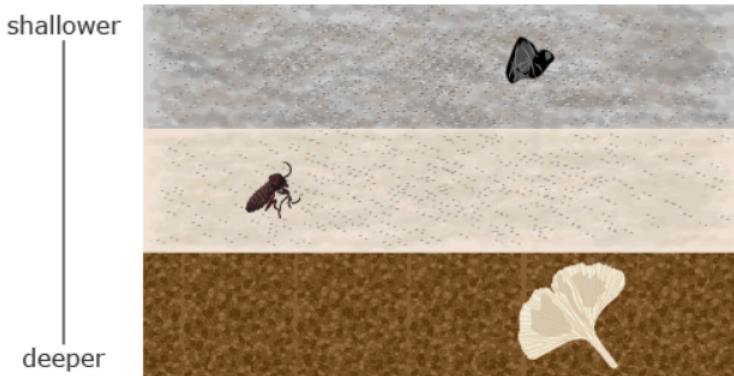
- a) Attraction ... mass
- b) Attraction ... orbits
- c) Repulsion ... mass
- d) Repulsion ... orbits

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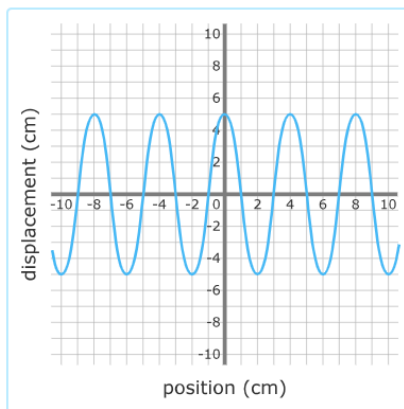
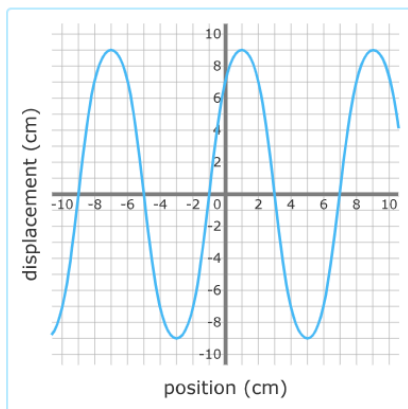
5) The following diagram shows fossils in an undisturbed sedimentary rock sequence:



Which of the following fossils is older? Select the more likely answer.

- a)  Ginkgo leaf
- b)  Mammal tooth

6) The graphs below describe two waves. The waves are traveling at the same speed. **Circle the graph of the wave with the greater amplitude.**



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7) Jeffery runs an experiment to see how sunlight affects plant growth. He finds that plants with more sunlight grow faster (on average). **Select the correct option below:**

- a) The plants were the independent variable and plant growth was the dependent variable
- b) Plant growth was the independent variable and sunlight was the dependent variable
- c) Sunlight was the independent variable and plant growth was the dependent variable
- d) Plant growth was the independent variable and the plants were the dependent variable

8) Which of the following statements describes the atmosphere?

- a) All living things on Earth
- b) All of Earth's rocks and minerals
- c) All of Earth's water
- d) The layer of gas surrounding Earth's surface

9) Read the description of a trait:

Sanjay has pale skin.

What information supports the conclusion that Sanjay inherited this trait?

- a) Sanjay and his father both have brown hair
- b) Sanjay's parents both have pale skin

10) Isaac Newton was born in the 1600s and studied how objects move. He discovered three fundamental laws about forces and motion. According to Newton's third law, for every force, there is an equal and opposite force.

Consider the following force:

Beth's foot is pushing on her car's gas pedal.

According to Newton's third law, what other force must be happening?

- a) The gas pedal is pushing on Beth's foot
- b) The gas pedal is pulling on Beth's foot

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Open Responses:

1) Why do energy transfers like melting and evaporation occur?

Hint: Particle motion

2) Why do some places have more earthquakes than others?

Hint: Tectonic plates

3) Describe an example of an energy transformation and which forms (of energy) transform into one another.

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Instructions:

Imagine that you have all the everyday household materials (that a normal household would use) in your hands. Draw a rube goldberg machine that would accomplish a simple task (of your choosing) at the end:

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OPTIONAL Coding Problems (Receive Extra Credit)

Multiple Choice:

1) What does the middle mouse button do?

- a) Opens the start menu
- b) Opens a link in a new tab in web browsers
- c) Scrolls the desktop
- d) Deletes files

2) What is machine learning?

- a) A way AI (Artificial Intelligence) learns data
- b) A type of cooking robot
- c) A method to print books
- d) A new video game

3) What does AI do?

- a) Helps computers think or make decisions
- b) Makes coffee automatically
- c) Turns on your lights
- d) Types letters on its own

4) What is one common use of AI on the internet?

- a) Turns your computer screen on
- b) Recommending videos, ads, or search results
- c) Making your keyboard type automatically
- d) Controlling house lights without smart devices

5) What is one thing AI cannot do by itself?

- a) Recognize images
- b) Play music
- c) Translate languages
- d) Feel human emotions

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6) How does AI learn?

- a) By watching TV
- b) By reading your mind
- c) By analyzing data
- d) By sleeping

7) What is a variable in coding?

- a) A random number generator
- b) A type of mouse
- c) A storage for a value that can change
- d) A type of monitor

8) What does HTML do?

- a) Creates computer viruses
- b) Runs a program automatically
- c) Makes coffee
- d) Structures content on a webpage

9) What is the main loop in a Snake game?

- a) Playing music automatically
- b) Drawing pictures on the screen
- c) Typing code automatically
- d) Repeatedly checking for player input and updating the snake

10) What is the first index in most arrays?

- a) 0
- b) 1
- c) 2
- d) 3

11) What is a binary number system?

- a) A system using numbers 0–9
- b) A system using numbers 1–9
- c) A system using only 0 and 1
- d) A system using only letters

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OPTIONAL Essay Topics (Receive Extra Credit); Pick One Topic from the List to Write About **(All 300 Words or Under!)**:

Topic 1: What books, articles, podcasts, or documentaries have you most enjoyed in the past year, and why?

Topic 2: If you could teach a one-day course on something you know well, what would it be called and what would you teach? Why?

Topic 3: What is your greatest talent or skill, and how have you developed and demonstrated it over time? Be detailed about your involvement.