

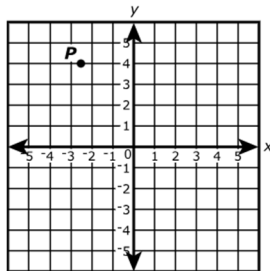
Let's So Some Math Notice and Wonder	Memphis, TN Saturday 5:00 PM Light Rain Showers 37°F 3°C 	Bangor, ME Saturday 6:00 PM Partly Cloudy 1°F -17°C 
Standards Unpacking		
Key	Standard	Prerequisites/Vocabulary
Put a box around the <u>conceptual component</u> of the standard. Underline the <u>procedural/fluency component</u> of the standard. Put a cloud around the <u>application component</u> of the standard.	6.NS.5- Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	What prior knowledge should my students have?
	6.NS.6- Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.	What vocabulary/ notation should students know for this standard?
		What prior knowledge should my students have?
	6.NS.6a- Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	6.NS.6b- Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?

Standards Unpacking		
Key	Standard	Prerequisites/Vocabulary
Put a box around the conceptual component of the standard. Underline the <u>procedural/fluency component</u> of the standard. Put a cloud around the application component of the standard.	6.NS.6c- Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	6.NS.7- Understand ordering and absolute value of rational numbers.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	6.NS.7a- Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	6.NS.7b- Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?

Standards Unpacking		
Key	Standard	Prerequisites/Vocabulary
Put a box around the conceptual component of the standard. Underline the <u>procedural/fluency component</u> of the standard. Put a cloud around the application component of the standard.	6.NS.7c- Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	6.NS.7d- Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</i>	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	6.NS.8- Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?
	6.G.3- Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	What prior knowledge should my students have?
		What vocabulary/ notation should students know for this standard?

Rational Number and Coordinate Plane Questions-

The graph shows the location of point P. The x-coordinate of point Q is equal to the opposite of the x-coordinate of point P. The y-coordinate of point Q is equal to the opposite of the y-coordinate of point P.



What are the coordinates of point Q?

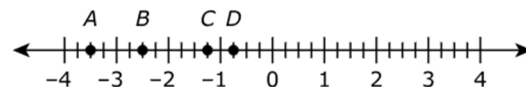
Sea level is located at an elevation of 0 feet. Here are the elevations of some locations in Death Valley National Park. Determine whether each of these locations has an elevation above sea level or below sea level.

Campground: -218 feet	Gas Station: 1,926 feet
Gift Shop: 3,000 feet	Park Hotel: -190 feet
Ranger Station: 10 feet	Visitor Center: -196 feet

Part A: Thomas knows how to plot point J at $(-3, 4)$ on a coordinate grid. Thomas needs to plot point K at $(-3.5, 4)$. Explain where point K is on the coordinate grid in relation to point J.

Part B: Thomas needs to plot the point $(-3.5, -4)$. Identify any similarities between the ordered pair for the point K and the ordered pair for point L. Explain which reflection would create point L from point K.

The number line shows four points.



Which point is located at $-3/4$?

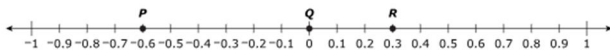
What is the perimeter, in units, of a polygon with the vertices located at $(-7, -3)$, $(-7, -4)$, $(6, -3)$, and $(6, 4)$?

Part A: Select the location of -2 and -9 on the number line.



Part B: Use mathematical symbols to write an inequality that compares -2 and -9 . Explain how the number line can be used to show that your inequality is correct.

Points P, Q, and R are shown on the number line.



Part A: Find the distance between points P and Q and between points R and Q. Show your work or explain your answers. Refer to the number line in your explanation.

Part B: Point S is a different point on the number line. Point S and point R are the same distance from point Q. Explain how to determine the location of point S on the number line.

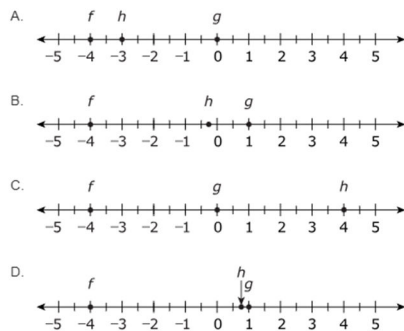
Water freezes at 0 degrees Celsius. The table shows five different temperatures in degrees Celsius. Indicate whether each temperature is above or below freezing. Select one cell per row.

Temperature	Above Freezing	Below Freezing
0.5°C	☐	☐
-13°C	☐	☐
100°C	☐	☐
5.5°C	☐	☐
-2.25°C	☐	☐

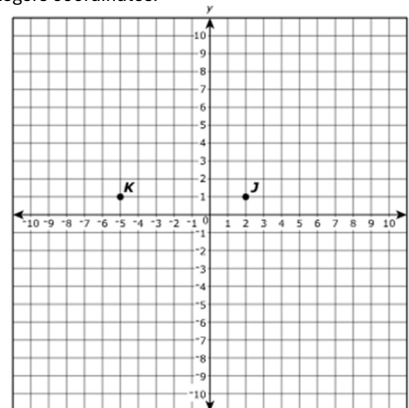
Three values on a number line are labeled f , g , and h .

$$\begin{aligned} f &= -4 \\ g &= -g \\ h &= -f \end{aligned}$$

Which number line correctly shows the values of f , g , and h ?



Points J and K, plotted on the coordinate grid, are two vertices of rectangle JKLM. Rectangle JKLM has an area of 7 square units. Point J is located at $(2, 1)$, and point K is located at $(-5, 1)$. Each vertex of the rectangle is located at a point that has integer coordinates.

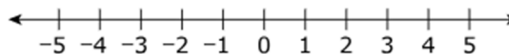


What could be the other points? What is the perimeter of JKLM?

Rational Number and Coordinate Plane Questions-

The point (2, -4) is reflected across the x-axis. What are the coordinates of the reflected point?

Select a place on the number line to plot the point $-(-2)$?



These five rational numbers are plotted on a horizontal number line.

$$-\frac{2}{3}, \frac{7}{8}, -\frac{4}{5}, \frac{7}{10}, -\frac{4}{3}$$

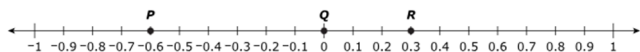
Which statement about their locations on the number line of the rational number is true?

- A. $-\frac{2}{3}$ is farthest to the left, and $\frac{7}{8}$ is farthest to the right.
- B. $-\frac{4}{3}$ is farthest to the left, and $\frac{7}{8}$ is farthest to the right.
- C. $-\frac{2}{3}$ is farthest to the left, and $\frac{7}{10}$ is farthest to the right.
- D. $-\frac{4}{3}$ is farthest to the left, and $\frac{7}{10}$ is farthest to the right.

Which statement about the temperatures below is true?

- A. $-13.4^{\circ}\text{C} < -13.2^{\circ}\text{C}$ because -13.2°C is warmer than -13.4°C .
- B. $-13.4^{\circ}\text{C} < -13.2^{\circ}\text{C}$ because -13.2°C is colder than -13.4°C .
- C. $-13.4^{\circ}\text{C} > -13.2^{\circ}\text{C}$ because -13.2°C is warmer than -13.4°C .
- D. $-13.4^{\circ}\text{C} > -13.2^{\circ}\text{C}$ because -13.2°C is colder than -13.4°C .

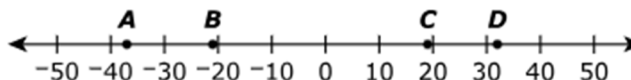
Points P, Q, and R are shown on the number line.



Part A: Find the distances between points P and Q and between points R and Q. Show your work or explain your answers. Refer to the number line in your explanation.

Part B: Point S is a different point on the number line. Point S and point R are the same distance from point Q. Explain how to determine the location of point S on the number line.

Which point shows the location of the number with the greatest absolute value?

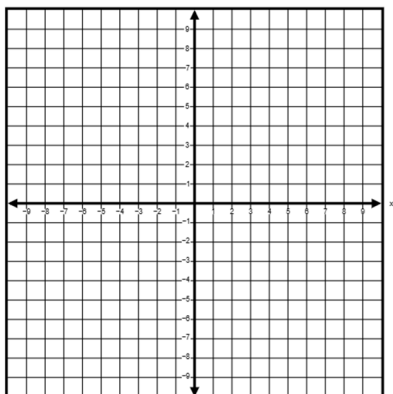


City planners are creating a neighborhood map on a coordinate grid. The table shows the locations of the neighborhood library and school on a coordinate grid.

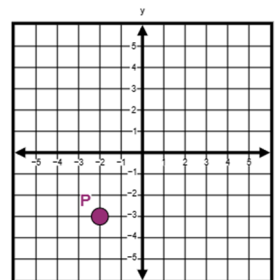
Neighborhood Planning

Building	Location
library	$(-4, -6)$
school	$(5, -6)$

In this coordinate grid, the distance between each gridline represents 1 mile. What is the distance, in miles, between the library and the school?



Point P is located at $(-2, -3)$. A second point on the coordinate grid is location 4 units from point P and has an x-coordinate of -2. What is one location of the second point?



Lesson 16: Representing Rational Numbers

Directions: Complete the following SOLVE problem with your partner.

Travis and Sonia are creating a matching game and want to identify a number that is equal to 35. Travis suggests that they write -35 on a card as the match but Sonia argues that the card should show $-(^{-}35)$ to be equal to 35. Who will create the correctly matched card? Explain your answer using a number line.

S Underline the question.

This problem is asking me to find _____.

Up	
Left	
Hot	
Day	
In	
Enter	
Fast	
Wet	
Happy	
Soft	
Loud	
Long	
Large	
Above	

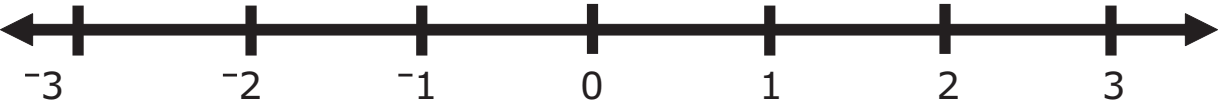
Bonus: _____

Lesson 16: Representing Rational Numbers

Directions: Complete this page with your teacher and partner.

In our Warm-Up, we showed that we are able to plot positive rational numbers on a number line. On the previous page, we compiled a list of words that are opposites of each other. Numbers also have _____. Let’s explore this idea on the number line below.

1. As we move farther to the right of zero on the number line, what happens to the number values?	
2. What numbers are to the left of 0 on the number line below?	
3. What do you notice about the number values as we move to the left as compared to the number values as we move to the right on the number line?	



Original Number	Opposite of Original Number
1	
3	
$\frac{3}{2}$	
-2.5	
$-\frac{1}{3}$	

Lesson 16: Representing Rational Numbers

Directions: Complete this page with your teacher and partner.

4. Do you notice any patterns in the numbers in the table? Justify your answer.

Similarly, the word “opposite” is a signal word to use the negative symbol ($-$) in front of a number, and it can help us to decode what the question is asking us to find.

What is $-(-1)$ equal to?

5. What is the question asking us to find?



6. Where is the opposite of 1 located on the number line?
7. If we find the opposite of our answer, where do we end on the number line?



8. What is the opposite of -1 or $-(-1)$ equal to?
9. What can you conclude about the simplified expression when it contains two negative signs next to each other?

Lesson 16: Representing Rational Numbers

Directions: Complete this page with your teacher and partner.

In the table below are a list of original expressions. Using your knowledge of opposites with positive and negative numbers, write the opposite expression.

ORIGINAL EXPRESSION	WHAT DOES IT MEAN?
The opposite of 10	
$-(-4)$	
The opposite of -9	
$-(13)$	
$-(-100)$	

1. Why do you think that we use negatives numbers, or opposites, in mathematics?
2. Can you think of any situations where you have seen negative numbers?
3. What do you think negative numbers can represent in the real world?

Lesson 17: Comparing, Ordering, and Absolute Value of Rational Numbers

Directions: Complete this page with your teacher and your partner.

While positive and negative numbers are very helpful when looking at numbers in the context of the problem, sometimes it can be just as helpful to know how far away we are from zero, no matter what direction we are going.

Take the two integers 3 and -3 for example. Plot both integers.



1. What is the distance from -3 to 0?
2. What is the distance from 3 to 0?

The distance from a point on the number line to zero is called the **absolute value** of the number, and it is represented using vertical brackets: $| |$. Therefore, $|3| = \underline{\hspace{1cm}}$ and $|-3| = \underline{\hspace{1cm}}$ because both -3 and 3 are away from 0.

Find the absolute value of numbers provided in the table below.

3. $ -6 =$	4. $ 1 =$
5. $ -4 =$	6. $ 9 =$
7. $ -5\frac{1}{2} =$	8. $ -2.3 =$

Lesson 17: Comparing, Ordering, and Absolute Value of Rational Numbers

Directions: Complete this page with your teacher and your partner.

What symbol do you think we should use to complete the comparison below? Explain your answer.

$$|-3| \bigcirc |3|$$

Why might the correct symbol for the comparison be surprising?

Keeping this idea in mind, let's try to order the following set of numbers from least to greatest.

$$^{-}6, 5, 9.5, 14, |32|, ^{-}11.3, |^{-}15|$$

Prior to organizing from least to greatest, it may be beneficial to simplify all values first and then order them:

Which values are still negative?

Which values are positive?

What are the negative values ordered from least to greatest?

What are the positive values ordered from least to greatest?

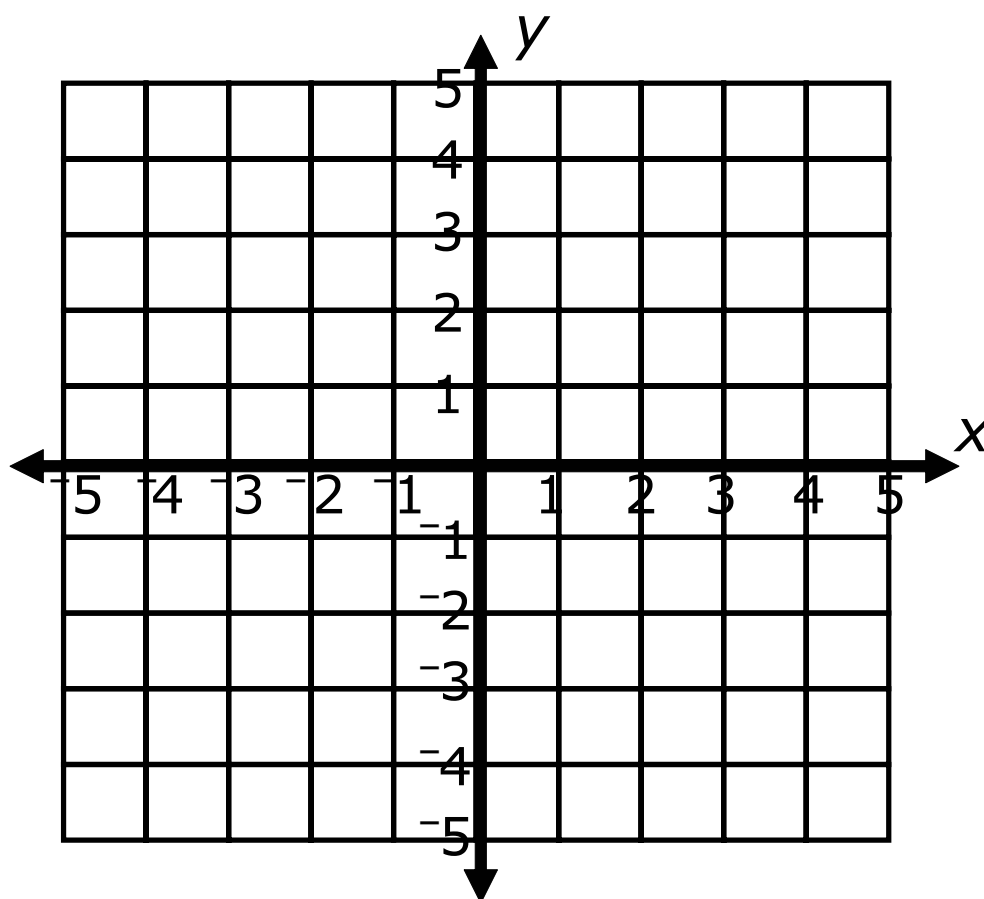
What is the list of values from least to greatest?

Are all of the values in their original form that was given in the list?

Return the numbers to their original given form by replacing them in the list we just created.

Lesson 18: Plotting Points in the Coordinate Plane and on the Number Line

Directions: Complete this page with your teacher and partner.



Lesson 18: Plotting Points in the Coordinate Plane and on the Number Line

Directions: Complete this page with your teacher and partner.

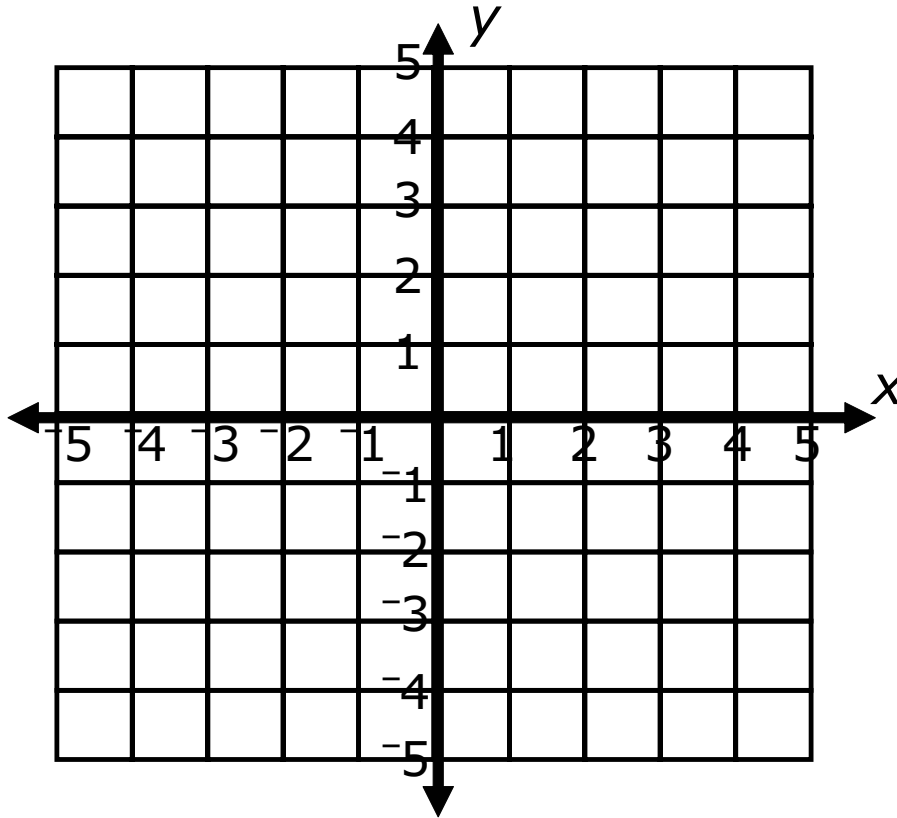
Quadrant	Points	Sign of x-coordinate	Sign of y-coordinate	Observations
Quadrant I				
Quadrant II				
Quadrant III				
Quadrant IV				

Let's sum up our observations in a sign chart.

Quadrant I	Quadrant II	Quadrant III	Quadrant IV

Lesson 18: Plotting Points in the Coordinate Plane and on the Number Line

Directions: Complete this page with your teacher and partner.



Plot and label the following points:

<i>A</i>	$(4, 3)$
<i>B</i>	$(-4, 3)$
<i>C</i>	$(4, -3)$
<i>D</i>	$(-4, -3)$

Lesson 18: Plotting Points in the Coordinate Plane and on the Number Line

Directions: Complete this page with your teacher and your partner.

1. What do you notice about the x-coordinates of A and C? 2. What do you notice about the y-coordinates of A and C?	
3. What do you notice about the x-coordinates of B and D? 4. What do you notice about the y-coordinates of B and D?	
5. What do you notice about the relationship between Points A and C or Points B and D? Explain your answer.	
6. What do you notice about the x-coordinates of A and B? 7. What do you notice about the y-coordinates of A and B?	
8. What do you notice about the x-coordinates of C and D? 9. What do you notice about the y-coordinates of C and D?	
10. What do you notice about the relationship between Points A and B or Points C and D? Explain your answer.	
11. What word do we use to describe what can be seen when looking into a mirror? 12. How does this idea relate to opposites on a number line?	13. What generalizations can we make about opposite values that appear in points?

Lesson 19: Solving Problems in the Coordinate Plane

Directions: Complete the following SOLVE problem with your partner.

Laura is creating string art on the wall of her living room. She uses a coordinate plane to help plan her design. She currently has nails in the wall at the points $(3.5, 1.4)$, $(0.3, 1.4)$, $(0.3, 4.6)$, and $(3.5, 4.6)$. What shape does Laura create with the nails?

S Underline the question.

This problem is asking me to find _____.

O Identify the facts.

Eliminate the unnecessary facts.

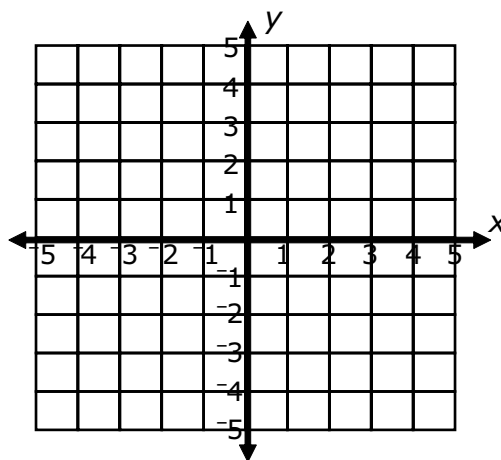
List the necessary facts.

L Write in words what your plan of action will be.

Choose an operation or operations.

V Estimate your answer.

Carry out your plan.



E Does your answer make sense? (Compare your answer to the question.)

Is your answer reasonable? (Compare your answer to the estimate.)

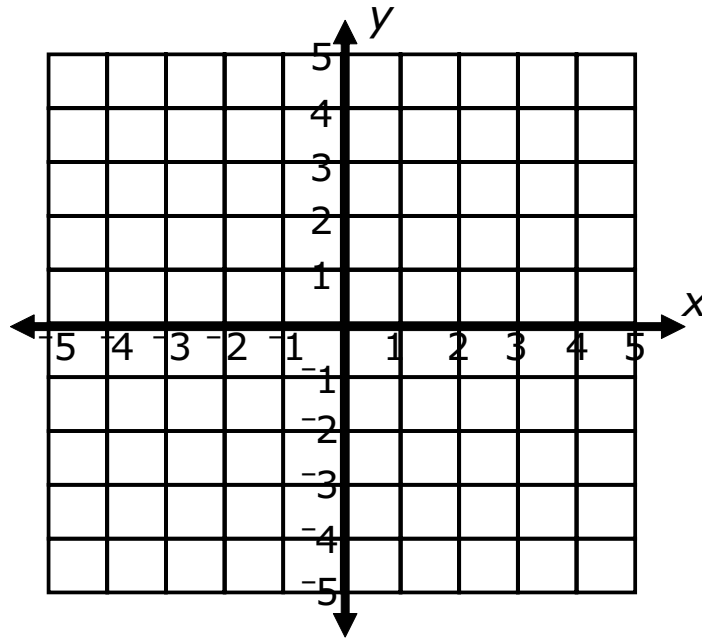
Is your answer accurate? (Check your work.)

Write your answer in a complete sentence.

Lesson 19: Solving Problems in the Coordinate Plane

Directions: Complete this page with your teacher and partner.

Let's recreate the four points and the shape of the figure from the SOLVE problem on the previous page. Starting from the top left corner and moving clockwise, label the points $A - D$.



1. What do you notice about $ABCD$?

2. What is similar about the points?

Lesson 19: Solving Problems in the Coordinate Plane

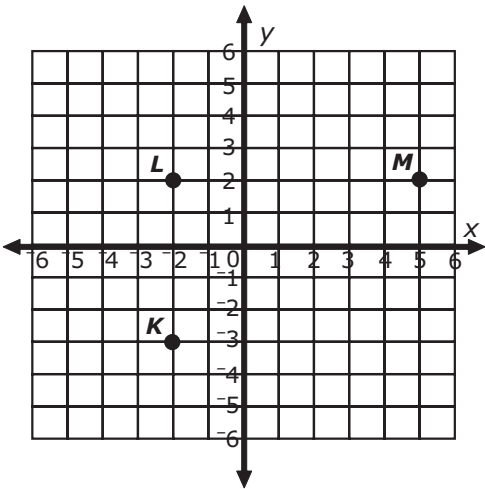
Directions: Complete this page with your teacher and partner.

3. What do you notice about Points A and B ?
4. How can we find the horizontal distance between Points A and B ?
5. What is the horizontal distance between Points A and B ? Justify your answer.
6. What is the horizontal distance between Points C and D ? Justify your answer.
7. What do you notice about Points A and D ?
8. How can we find the vertical distance between Points A and D ?
9. What is the vertical distance between Points A and D ? Justify your answer.
10. What is the vertical distance between Points B and C ? Justify your answer.
11. Being as specific as possible, what shape is $ABCD$? Justify your answer.

LESSON 27: Polygons in the Coordinate Plane

Directions: Complete this page with your teacher and partner.

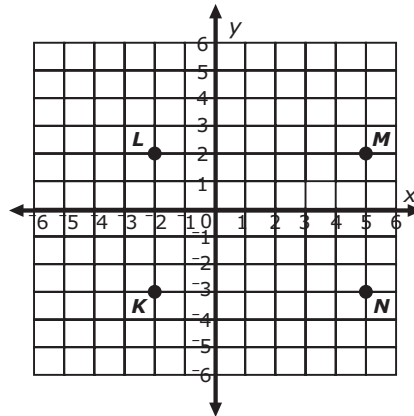
Using Length to Find Missing Coordinates: Different Quadrants



1. What information do we know about the coordinates of the three given vertices?	Point <i>K</i> : _____ Point <i>L</i> : _____ Point <i>M</i> : _____
2. How can we determine the length of the horizontal side of the rectangle?	We can count the units between ____ and ____.
3. How many units can we count between Point <i>L</i> and Point <i>M</i> ?	
4. How did we determine the distance between the two points on the same horizontal line when they were in the same quadrant?	
5. Will the same strategy work when the points are in different quadrants? Explain your answer.	
6. Draw an arrow from Point <i>L</i> to 0 and from Point <i>M</i> to 0.	
7. How many units from Point <i>L</i> to 0?	
8. How many units from Point <i>M</i> to 0?	
9. What is the total distance from Point <i>L</i> to Point <i>M</i> or the length of <i>LM</i> ? Explain your answer.	

LESSON 27: Polygons in the Coordinate Plane

Directions: Complete this page with your partner.



10. How can we determine the length of the vertical side (KL) of the rectangle?	We can count the units between _____ and _____.
11. How many units can we count between Point K and Point L ?	
12. How did we determine the distance between the two points on the same vertical line when they were in the same quadrant?	
13. Will the same strategy work when the points are in different quadrants? Explain your answer.	
14. Draw an arrow from Point K to 0 and from Point L to 0.	
15. How many units from Point K to 0?	
16. How many units from Point L to 0?	
17. What is the total distance from Point K to Point L or the length of KL ? Explain your answer.	

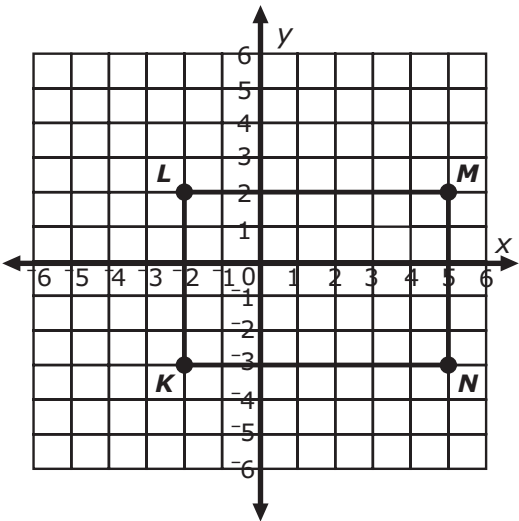
Conclusion: When the coordinates of a figure are in different quadrants, you can use _____ to find the length of the sides.

What are the coordinates of Point N ? _____

LESSON 27: Polygons in the Coordinate Plane

Directions: Complete this page with your teacher and partner.

Area and Perimeter of Figures on the Coordinate Plane:

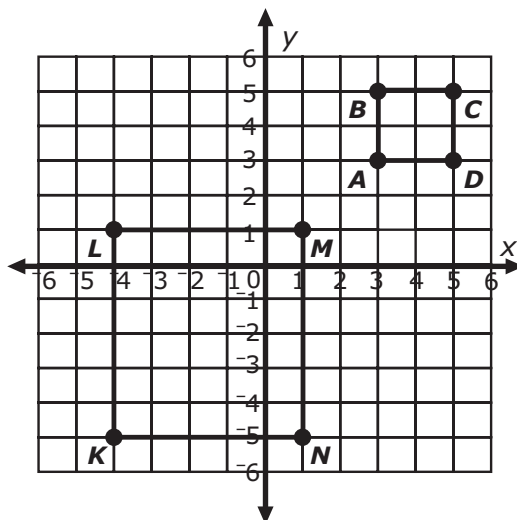


1. What is the horizontal length of Rectangle $KLMN$?	
2. Explain your answer.	
3. What is the vertical length of the Rectangle $KLMN$?	
4. What is the perimeter of the rectangle? Explain your answer.	
5. What is the area of the rectangle? Explain your answer.	

LESSON 27: Polygons in the Coordinate Plane

Directions: Complete this page with your partner.

Practice with Area and Perimeter of Figures on the Coordinate Plane:



	Rectangle <i>KLMN</i>	Square <i>ABCD</i>
1. What is the horizontal length?		
2. Explain your answer.		
3. What is the vertical length?		
4. Explain your answer.		
5. What is the perimeter of the figure? Explain your answer.		
6. What is the area of the figure? Explain your answer.		

Understanding Modeling Questions

Use this sheet as a reflection tool to support the understanding of the evidence statement around the modeling questions. After you engage/learn about the questions, use the tool to make notes around your take aways and implementation ideas.

Current Unit Topics:

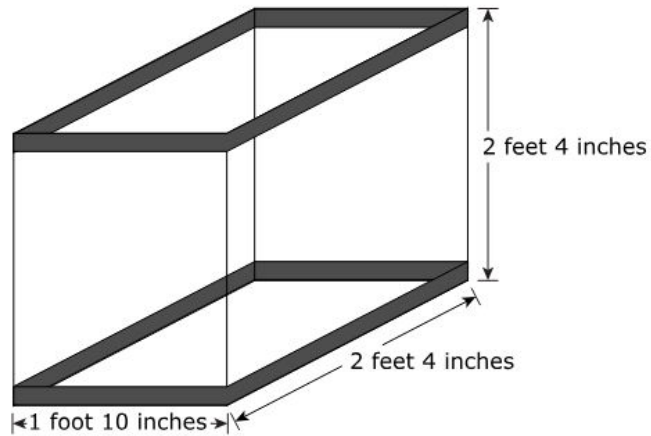
	Evidence Statement for Modeling
What Content Standards Are Addressed in This Evidence Statement from the Current Unit?	
Takeaways About the Statement – What Do Students Need to Be Able to Do	
What Should Be Evident in a Student Response	

Think Quantities!	Think Structure!	Think Repetition!
What can I count? What can I measure? How are the quantities related? How can I represent the quantities so I can see relationships?	How is this situation behaving? What kind of problem is this? Does the problem remind me of another I've solved? Will changing the form help? How can I chunk this expressions/number/visual?	Is there a process that keeps repeating? Am I counting /building/drawing in the same way each time? Do I keep repeating the same calculations? How can I use repetition to write a rule?

Modeling Question – 6.D.2

Used from: NJ Released Questions – 6.D.2- Measurement and Data- 2019- UIN-1298-M21432

Darren has a fish tank with the dimensions shown. He plans to purchase goldfish for his fish tank.



Part A

- Determine the dimensions, in inches, of the fish tank.
- Then find the volume, in cubic inches, of the fish tank.
- Show your work or explain your answers.

Part B

Darren researches information about goldfish. He finds the information shown. The recommended amount of space needed is 10 gallons for each goldfish. The volume of 1 gallon of water is 231 cubic inches.

- Determine the number of gallons that the fish tank can hold.
- Then determine the maximum number of goldfish that Darren can put in the fish tank.
- Show your work or explain your answers.