Name ______________________________ Period __________ Date _____________

6-15
STUDENT PACKET

MATHLINKS: GRADE 6
STUDENT PACKET 15
GRAPHING IN THE COORDINATE PLANE

WORD BANK

Word or Phrase	Definition or Description	Example or Picture
coordinate plane		
line of symmetry		
ordered pair		
quadrant		
reflection		
vertex		
x-axis		
x-coordinate		
y-axis		
y-coordinate		

GRAPHING POINTS WITH INTEGER COORDINATES

Summary

We will graph ordered pairs of integers in the coordinate plane in one quadrant and in four quadrants. We will solve graphing challenges, scale graphs appropriately, draw polygons in the plane given coordinates of vertices, and find the lengths of horizontal and vertical line segments.

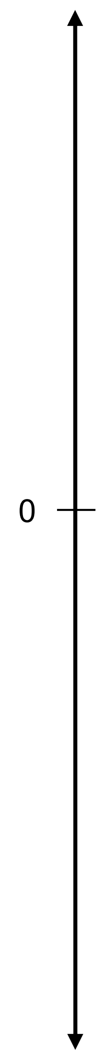
Goals

- Graph ordered pairs of integers in one quadrant and four quadrants.
- Scale graphs appropriately.
- Draw polygons in the plane given coordinates of vertices.
- Find lengths of horizontal and vertical line segments.

Warmup

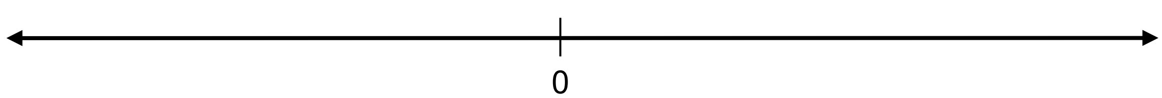
Write the opposite of each expression. Then graph the opposites on the vertical number line to the right. Scale the number line appropriately.

1. -10	2. 7	3. 0	4. -(-8)



Simplify the absolute value expressions. Then graph their values on the horizontal number line below. Scale the number line appropriately.

5. $\lvert 9 \rvert$	6. $\lvert -11 \rvert$	7. $\lvert -6 \rvert$	8. $-\lvert 7 - 2 \rvert$

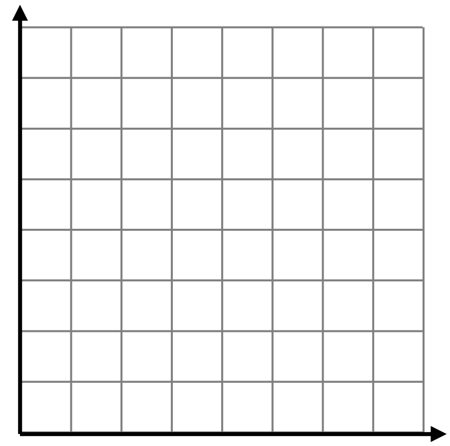


Write symbols for greater than, less than, or equal to in the blanks to make each statement true.

9. -10 ____ -5	10. $\lvert -10 \rvert$ ____ $\lvert -5 \rvert$	11. $\lvert -2 \rvert$ ____ 2	12. $\lvert -2 \rvert$ ____ -2

GRAPHING ORDERED PAIRS

On the grid to the right, each grid square is 1 square unit.



1. Label the x-axis and the y-axis.

2. Graph the ordered pairs below and label them with the given capital letters.

   A (0, 0) *B* (4, 4) *C* (1, 5) *D* (5, 1)

   E (3, 0) *F* (0, 3) *G* (8, 6) *H* (6, 8)

3. How can you remember that we count on the horizontal axis (x-axis) first when graphing ordered pairs?

Use the word list below to help you fill in the blanks. Some words are used more than once. Answers to some blanks may not be in the word list.

coordinate plane	horizontal	ordered pairs	origin	vertical

4. A ______________________ ________________ is a plane with a horizontal and a vertical axis meeting at a point called the ________________.

5. The ______________________ axis is frequently referred to as the x-axis.

6. The ______________________ axis is frequently referred to as the y-axis.

7. Points in the coordinate plane are named by pairs of numbers, called _____________ ________________. They are written in the form (x, y).

8. An x-coordinate of 3 represents a distance of 3 units from the y-axis in the _________________ direction.

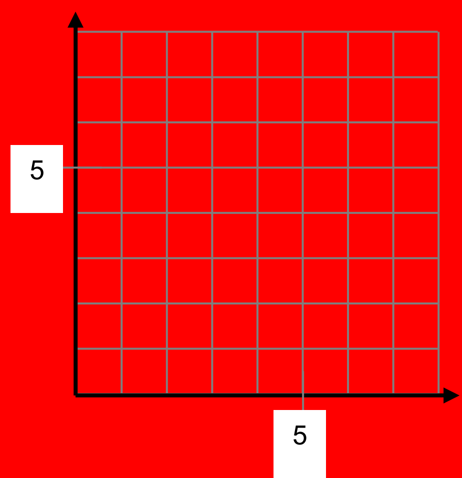
9. A y-coordinate of 5 represents a distance of 5 units from the x-axis in the _________________ direction.

10. The ordered pair corresponding to the origin is (_____, _____).

GRAPHING CHALLENGE 1

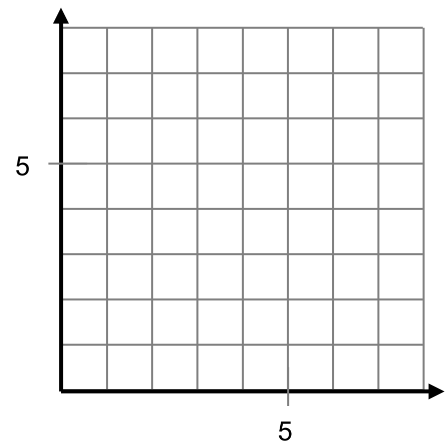
For this page, consider only points whose coordinates are whole numbers. Graph ALL of the ordered pairs (x, y) that satisfy the given conditions and fit on the grid. List all of the ordered pairs that you graphed.

1. $x = 3$
   $y < 7$



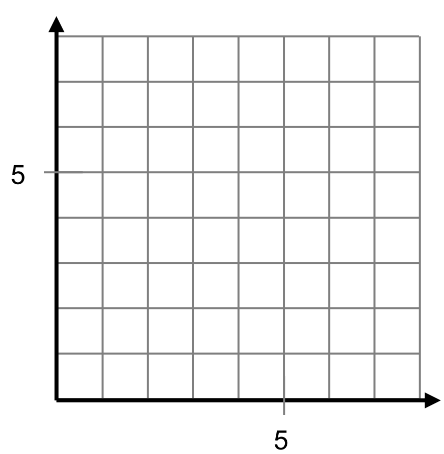
Ordered pairs:

2. x is even
   $y > 6$



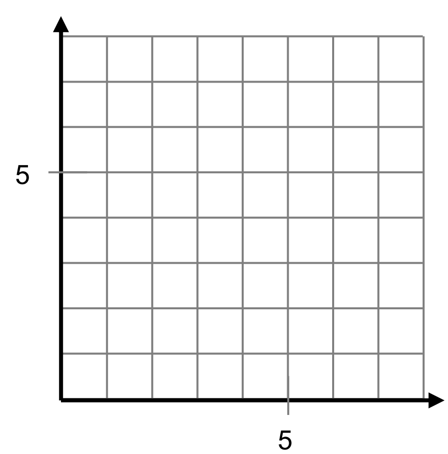
Ordered pairs:

3. x is a multiple of 3
   y is an odd number less than 6



Ordered pairs:

4. x is a factor of 8
   $y = 0$



Ordered pairs:

GRAPHING IN FOUR QUADRANTS

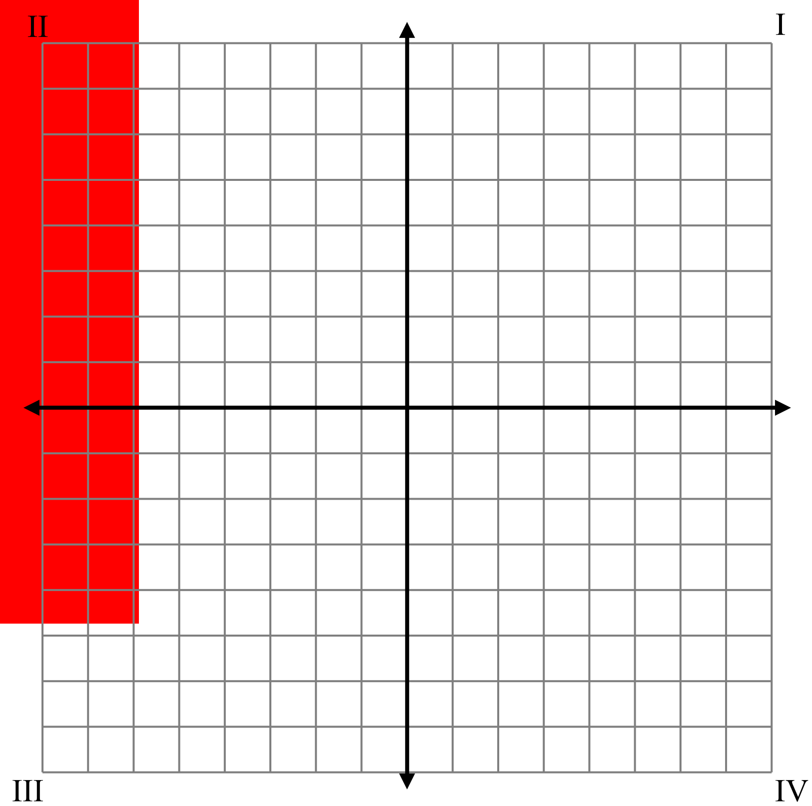
When the *x*-axis and *y*-axis are extended to include negative values, they divide the coordinate plane into four regions, called quadrants. The quadrants are numbered counterclockwise using Roman numerals.

1. Label the *x*-axis and the *y*-axis.

2. Locate the origin at the point (0, 0) and label it *O*.

3. Graph the ordered pairs below and label them with the given capital letters.

A (3, 3)	*B* (-3, -3)
C (1, 6)	*D* (-1, -6)
E (6, 1)	*F* (6, -1)
G (4, 0)	*H* (-4, 0)
I (0, 4)	*J* (0, -4)
K (7, 8)	*L* (-7, 8)
M (8, 7)	*N* (8, -7)



4. In the table below, name the location of each ordered pair by the quadrant it is in or the axis it is on.

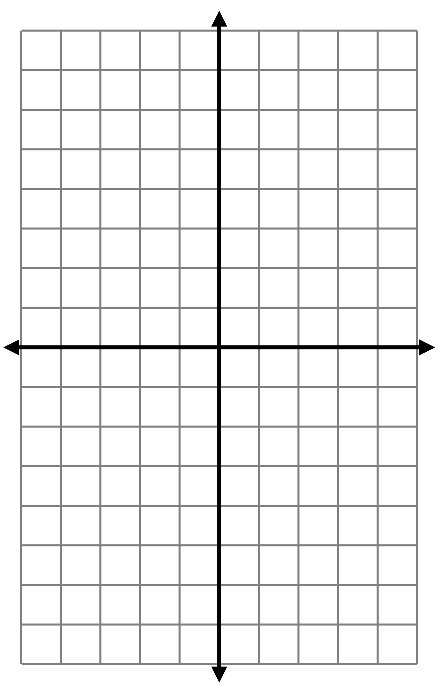
Point	Location	Point	Location
A		*H*	
B		*I*	
C		*J*	
D		*K*	
E		*L*	
F		*M*	
G		*N*	

GRAPHING CHALLENGE 2

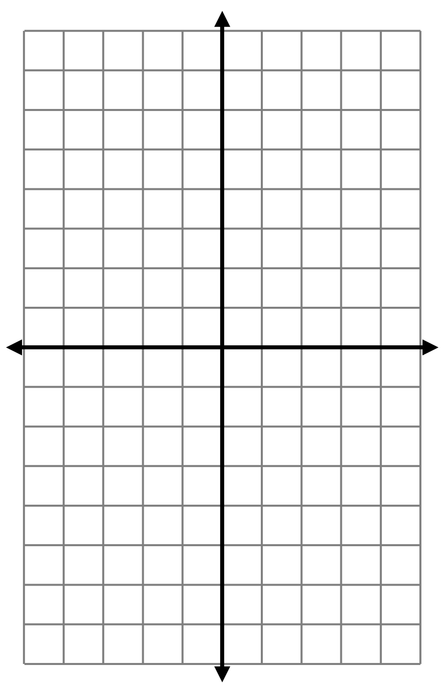
For this page, find points with integer coordinates that satisfy the conditions and fit on the grid below. Each square on the grid is one square unit.

Conditions on (x, y)	**List all points that fit on the grid and whose coordinates satisfy the conditions.**	**Explain why this ordered pair does not appear on your list.**
1. $x \neq 0$ $y < -7$		(1, -7)
2. x is even y is the opposite of 5		(12, -5)
3. the absolute value of x = 2 $y < -3$		(-2, -4.5)

1.



2.



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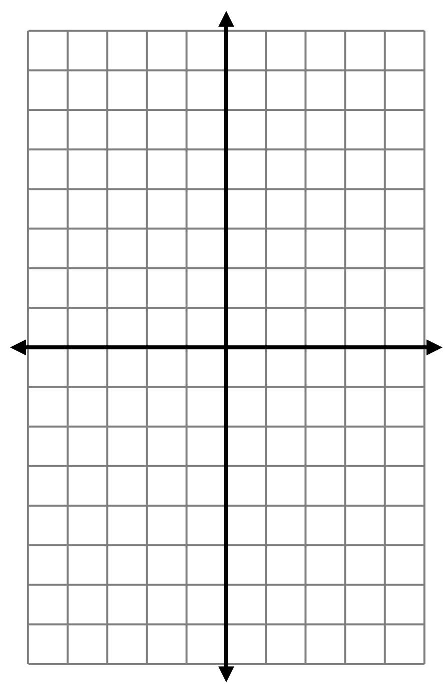


BATTLING SHIPS

The Setup:

Each player uses two coordinate grids. Label all axes from -5 to 5. One grid should be labeled "Self" and the other "Opponent." (One game setup is provided below.)

Each player then decides where to place three rectangular ships: a **B**attleship (5 units x 1 unit), a **C**ruiser (3 units x 1 unit), and a **D**estroyer (2 units x 1 unit). All ships must be placed in straight lines either horizontally or vertically. Two ships may be adjacent to each other, but they cannot overlap. Label the ships B, C, and D.

The Game:

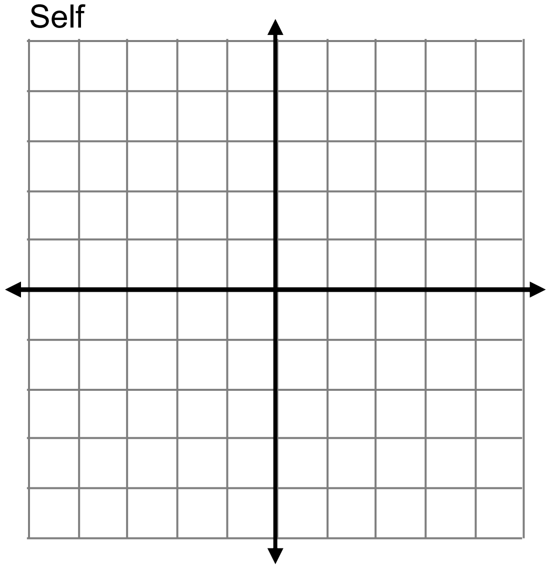
Players take turns calling out one coordinate at a time. If a player calls a coordinate where an edge or corner of a ship is located, the opponent says "hit" and the player gets another turn. If no ship is located at the coordinate, the opponent says "miss," and players change roles.

Players should take care to record their hits and misses on their "Opponent" grid so that they do not call a coordinate more than once. Players should also mark the "Self" grid with shots taken by their opponent.

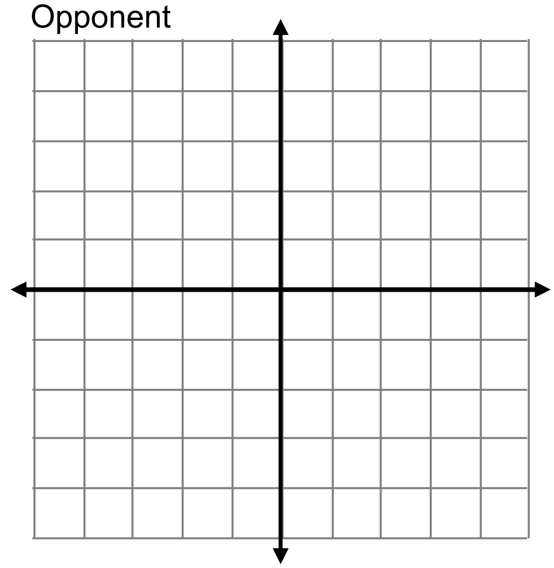
A ship is sunk when all of its coordinates have been hit. When this happens, the player whose ship was sunk says, "You sank my (B, C, or D) ship."

You win by either sinking all of your opponent's ships, or by scoring the most hits before time is called. Make sure to exchange grids afterwards to check that both players marked coordinates correctly.

Self



Opponent

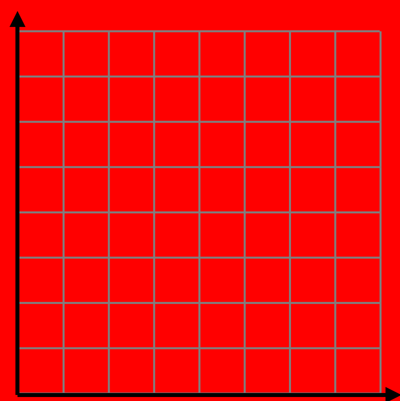


SCALING GRAPHS: INTEGERS

For problems 1-3, graph the given ordered pairs on the grids below. ALL of these points must be graphed, label and scale the axes appropriately first.

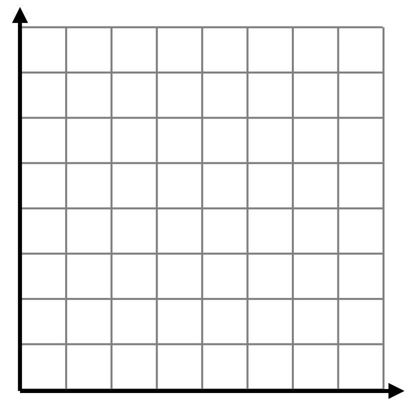
1. *A* (6, 8) B (10, 14) *C* (2, 16)

   D (0, 4) *E* (4, 12) *F* (1, 11)



2. *G* (0, 10) *H* (10, 30) *I* (22, 60)

   J (80, 40) *K* (25, 25) *L* (55, 0)



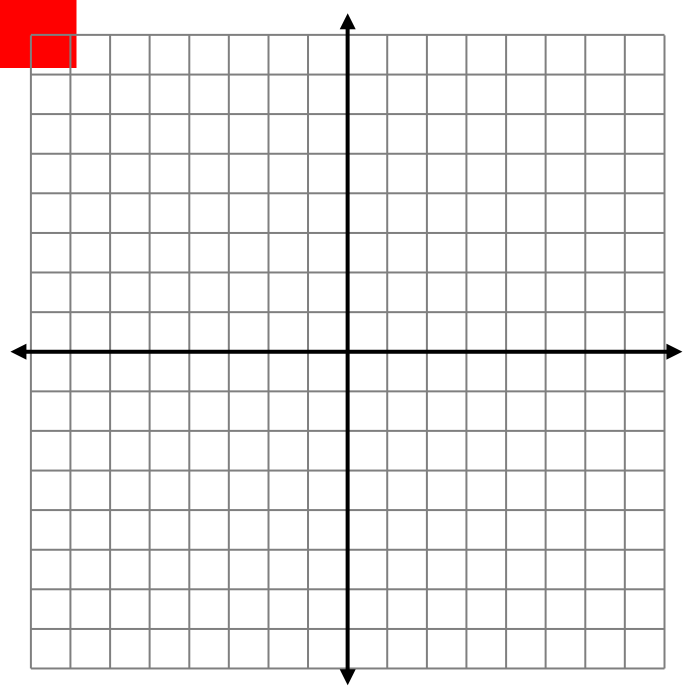
3. *M* (4, 4) *N* (0, 16)

   P (20, 32) *Q* (-20, 0)

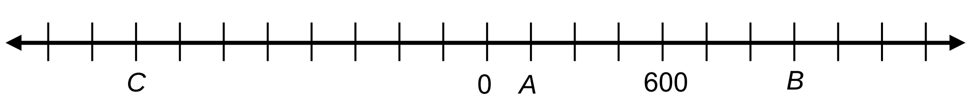
   R (0, -20) *S* (-12, -16)

   T (28, -4) *U* (-24, 4)

   V (2, -8) *W* (-10, 16)

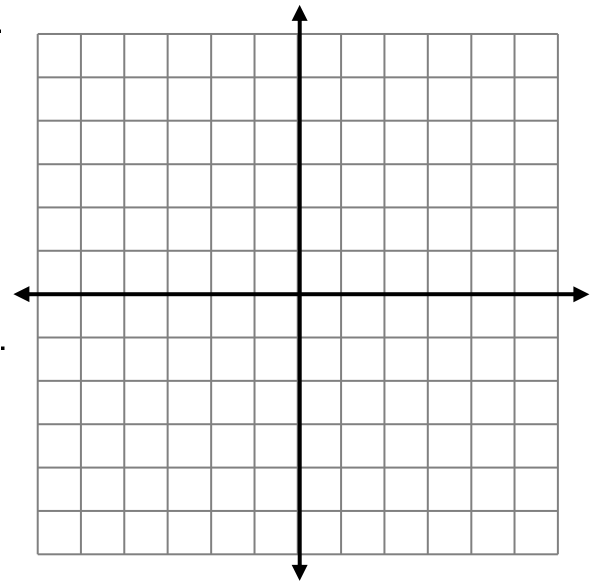


4. Find the values for *A*, *B*, and *C* on the number line below. All tick marks are equally spaced.



POLYGONS IN THE PLANE 1

Each small square on the grid is one unit by one unit.



1. Label the *x*-axis and the *y*-axis.
2. Graph these ordered pairs.

   A (4, 5) *B* (4, 1)

   C (-3, 1) *D* (-3, 5)

3. Connect the coordinates to create polygon *ABCD*. What kind of polygon did you draw?

We will use the notation $\overline{AB}$ to represent

- the distance from point *A* to point *B* on the number line, or
- the length of the line segment $\overline{AB}$ with endpoints *A* and *B*.

4. How do you get from *D* to *A*?	9. How do you get from *B* to *A*?
5. How do you get from *A* to *D*?	10. How do you get from *A* to *B*?
6. $\lvert AD \rvert$ = ____	11. $\lvert AB \rvert$ = ____
7. Is $\overline{AD}$ horizontal or vertical?	12. Is $\overline{AB}$ horizontal or vertical?
8. How can you tell by looking at the coordinates of *A* and *D* whether $\overline{AD}$ is horizontal or vertical?	13. How can you tell by looking at the coordinates of *A* and *B* whether $\overline{AB}$ is horizontal or vertical?

GRAPHING POINTS WITH RATIONAL COORDINATES

Summary

We will graph ordered pairs of rational numbers in four quadrants. We will solve graphing challenges, scale graphs appropriately, draw polygons in the plane given coordinates of vertices, and find the lengths of horizontal and vertical segments.

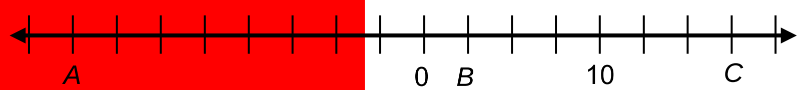
Goals

- Graph ordered pairs of rational numbers in four quadrants.
- Scale graphs appropriately.
- Draw polygons in the plane given coordinates of vertices.
- Find lengths of horizontal and vertical line segments.

Warmup

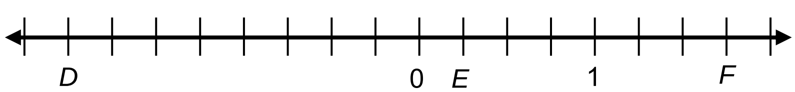
Find the values for *A* through F on the number lines below.

1.



A = _________ *B* = _________ *C* = _________

2.



D = _________ *E* = _________ *F* = _________

ORDERED PAIRS OF RATIONAL NUMBERS

Each small square on the grid is one square unit.

1. Label the *x*- and *y*-axes.

2. Locate the origin at the point (0, 0) and label it *O*.

3. Graph the given ordered pairs below and label them with the given capital letters.

A $\left(0,\ 3\frac{1}{2}\right)$ *B* $\left(-3\frac{1}{2},\ -3\frac{1}{2}\right)$

C (2.5, 4.5) *D* (-2.5, -4.5)

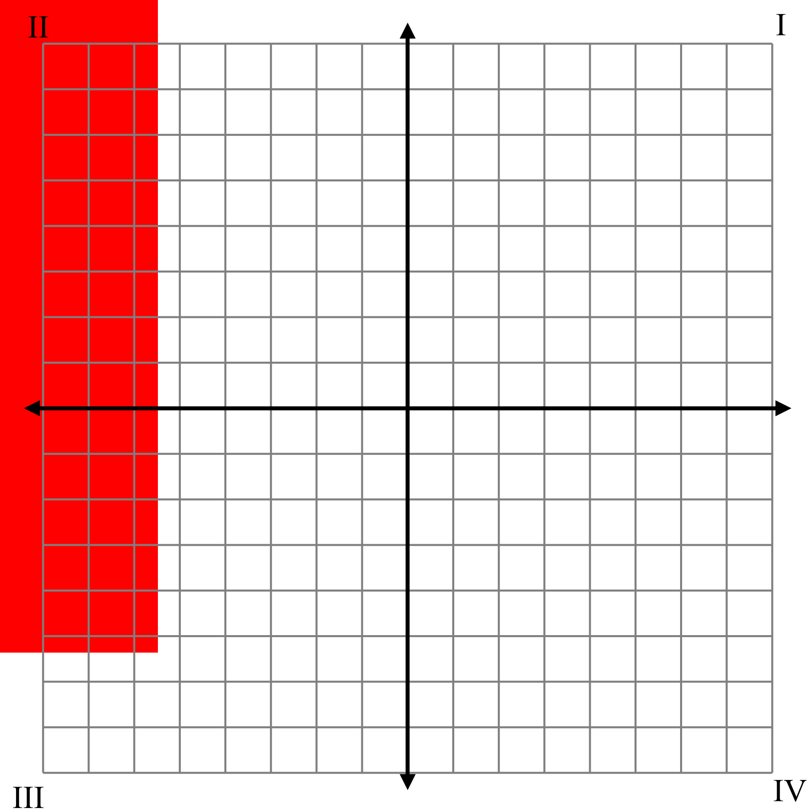
E $\left(6\frac{1}{4},\ 1\frac{3}{4}\right)$ *F* $\left(-6\frac{1}{4},\ -1\frac{3}{4}\right)$

G (4.2, 0.6) *H* (-4.2, 0.6)

I (0.6, 4.2) *J* (0.6, -4.2)

K $\left(6\frac{1}{3},\ 6\frac{2}{3}\right)$ *L* $\left(-6\frac{1}{3},\ 6\frac{2}{3}\right)$

M $\left(6\frac{2}{3},\ 0\right)$ *N* $\left(6\frac{2}{3},\ -6\frac{1}{3}\right)$



4. In the table below, name the location of each ordered pair by the quadrant it is in or the axis it is on.

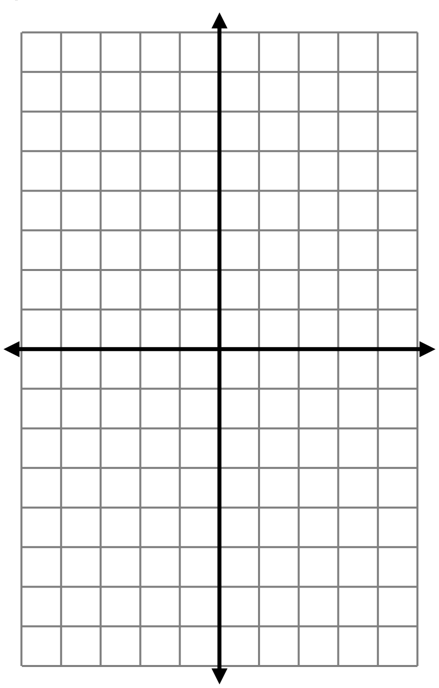
Point	Location	Point	Location
A		*H*	
B		*I*	
C		*J*	
D		*K*	
E		*L*	
F		*M*	
G		*N*	

GRAPHING CHALLENGE 3

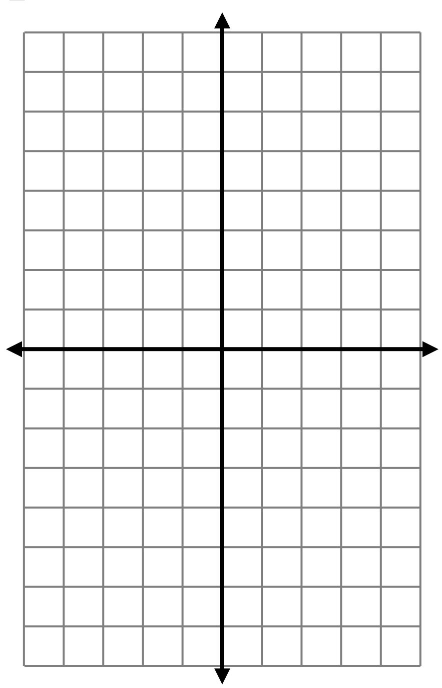
For each description, list the ordered pairs that meet the requirements given and graph them on the grids below. Each small square on the grid below is $\frac{1}{2}$ unit by $\frac{1}{2}$ unit.

1. The *x*-coordinate is an integer less than 1 and greater than -1. The *y*-coordinate is a non-integer, (positive) fraction with a denominator of 2.	Four ordered pairs:
2. The *x*-coordinate is an integer less than 2 and greater than -2. The *y*-coordinate is $\frac{1}{2}$.	Three ordered pairs:
3. The absolute value of the *x*-coordinate is 0.25. The *y*-coordinate is the opposite of the opposite of -0.75.	Two ordered pairs:

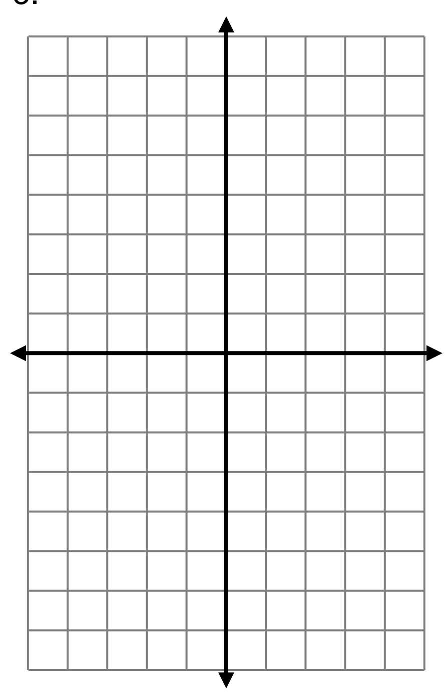
1.



2.



3.



SCALING GRAPHS: RATIONAL NUMBERS

For problems 1-2, review ALL of the coordinates first, and choose a scale so that they all will fit on the grids below. Label and scale the axes. Finally graph the points.

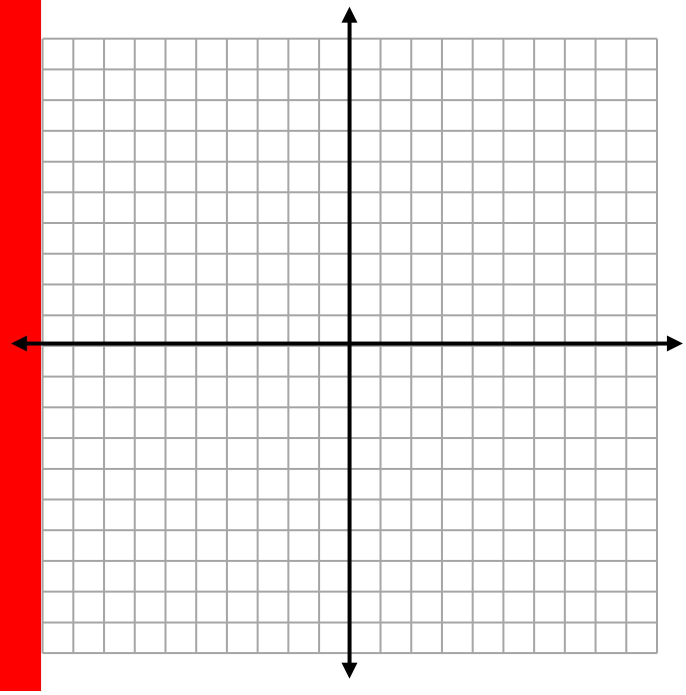
1. *A* (1, 1) B (-1, -1)

   C (0.2, 0.4) *D* (0, 0.6)

   E (-0.8, 0) *F* (0.5, -0.3)

   G (-0.4, -0.9) *H* (0, -0.6)

   J (0.25, 0.45) *K* (0, -0.15)



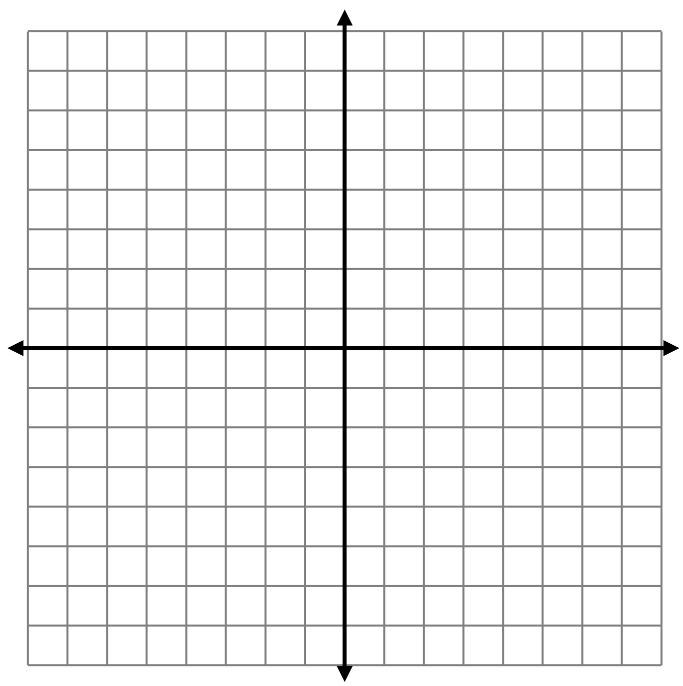
2. *L* (1, -1) *M* (-1, 0)

   N $\left(\frac{1}{2}, -\frac{1}{2}\right)$ *P* $\left(-\frac{1}{4}, \frac{1}{4}\right)$

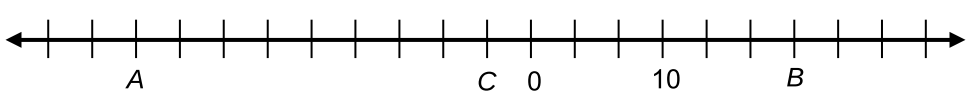
   Q $\left(-\frac{1}{8}, -\frac{1}{8}\right)$ *R* $\left(\frac{1}{4}, \frac{3}{4}\right)$

   S $\left(-\frac{1}{4}, -\frac{1}{2}\right)$ *T* $\left(0, -\frac{3}{8}\right)$

   U $\left(-\frac{5}{8}, -\frac{7}{8}\right)$ *V* $\left(\frac{3}{4}, -\frac{3}{8}\right)$

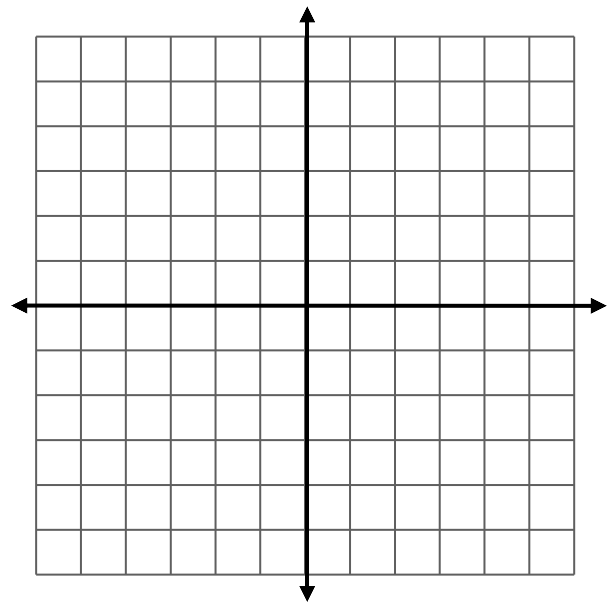


3. Find the values for *A*, *B*, and *C* on the number line below.



POLYGONS IN THE PLANE 2

Each small square on the grid is $\frac{1}{2}$ unit by $\frac{1}{2}$ unit.



1. Label the axes and number them as desired.

2. Graph the following points.

$A\left(2\frac{1}{2}, 1\frac{1}{2}\right)$ $B\left(2\frac{1}{2}, -1\right)$ $C\left(-1\frac{1}{2}, -1\right)$

3. Connect the points to form polygon *ABC*. What kind of polygon did you draw?

4. How do you get from *C* to *B*?	9. How do you get from *B* to *A*?
5. How do you get from *B* to *C*?	10. How do you get from *A* to *B*?
6. $\lvert BC \rvert$ = ____	11. $\lvert AB \rvert$ = ____
7. Is $\overline{BC}$ horizontal or vertical?	12. Is $\overline{AB}$ horizontal or vertical?
8. How do you know from looking at the coordinates of *B* and *C* that $\overline{BC}$ is horizontal or vertical?	13. How do you know from looking at the coordinates of *A* and *B* that $\overline{AB}$ is horizontal or vertical?

POLYGONS IN THE PLANE 3

Use the coordinate planes below to help you complete the problems. Scale appropriately. The sides of all rectangles described below are either horizontal or vertical.

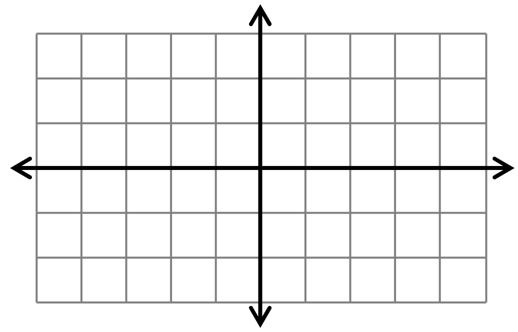
1. The endpoints of one diagonal of a rectangle are (3, 2) and (-4, -1). Find:

   a. The rectangle's other two vertices: (____,____) and (____,____)

   b. The dimensions: L = _____, W = _____

   c. The perimeter: P = ______________

   d. The area: A = ______________



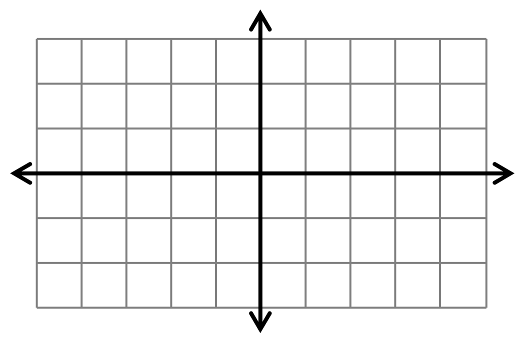
2. The endpoints of one diagonal of a rectangle are $\left(-3\frac{3}{4},\ 0\right)$ and (0, 2). Find:

   a. The rectangle's other two vertices: (____,____) and (____,____)

   b. The dimensions: L = _____, W = _____

   c. The perimeter: P = ______________

   d. The area: A = ______________



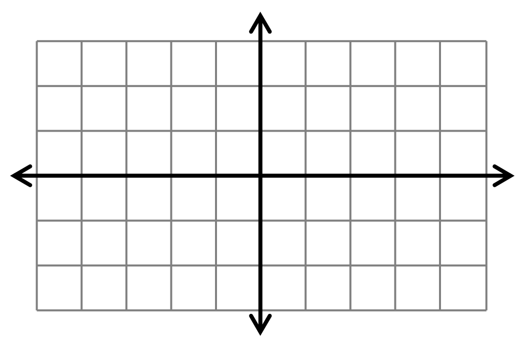
3. A rectangle has vertices (23, 19), (23, -11), and (-44, -11). Find:

   a. The fourth vertex: (____,____)

   b. The dimensions: L = _____, W = _____

   c. The perimeter: P = ______________

   d. The area: A = ______________



REFLECTIONS

Summary

We will graph polygons in the coordinate plane and their reflections across a coordinate axis. We will observe how the coordinates of a point change when the point is reflected across a coordinate axis.

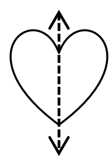
Goals

- Graph polygons in the coordinate plane and their reflections across a coordinate axis.
- Observe how the coordinates of a point change when the point is reflected across a coordinate axis.

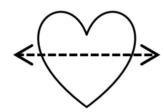
Warmup

A line of symmetry is a line that divides a figure into two parts that are reflections of each other across the line.

This is a line of symmetry.

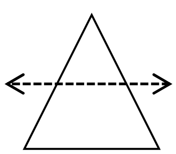


This is not a line of symmetry.

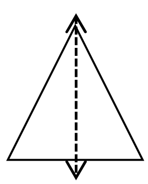


State whether or not each line appears to be a line of symmetry for the following figures.

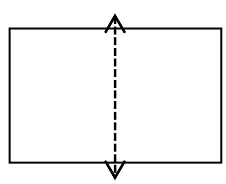
1. ______



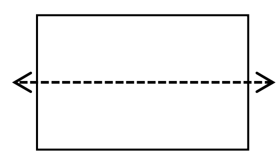
2. ______



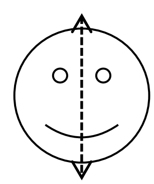
3. ______



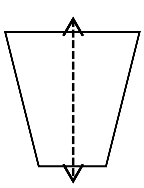
4. ______



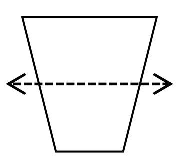
5. ______



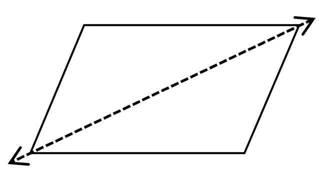
6. ______



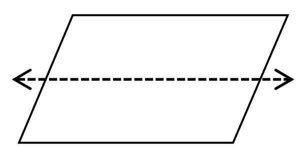
7. ______



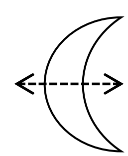
8. ______



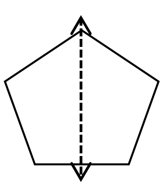
9. ______



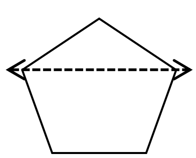
10. ______



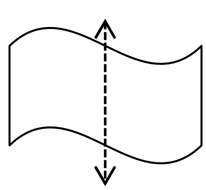
11. ______



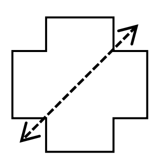
12. ______



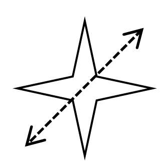
13. ______



14. ______



15. ______



REFLECTIONS ACROSS AXES

A point on one side of an axis is the <u>reflection</u> of another point on the other side of the axis if the segment joining the two points is perpendicular to the axis, and the two points are the same distance from the axis.

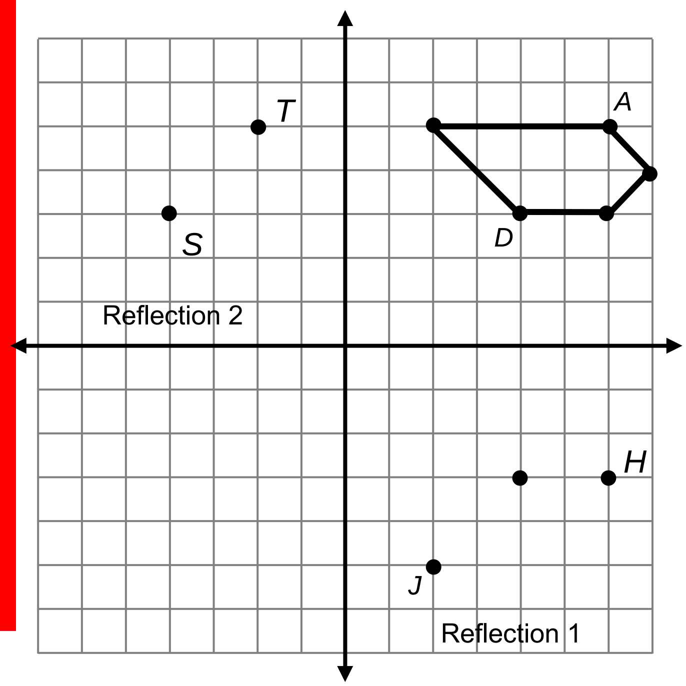
1. For the original figure graphed to the right, label the vertices clockwise as started, *A* through *E*.

2. Draw a reflection of the original figure across the *x*-axis. Three points are already graphed.

   Label the corresponding vertices counterclockwise as *F* through *J* (which correspond to *A* through *E*).

3. Draw a reflection of the original figure across the *y*-axis. Two points are already graphed.

   Label the corresponding vertices counterclockwise as *P* through *T*.



4. Write all coordinates below. Each row lists corresponding vertices for the figures.

Original figure	Reflection 1	Reflection 2
A (_____, _____)	*F* (_____, _____)	*P* (_____, _____)
B (_____, _____)	*G* (_____, _____)	*Q* (_____, _____)
C (_____, _____)	*H* (_____, _____)	*R* (_____, _____)
D (_____, _____)	*I* (_____, _____)	*S* (_____, _____)
E (_____, _____)	*J* (_____, _____)	*T* (_____, _____)

5. In your own words, describe how Reflection 1 looks compared to the original figure.

6. In your own words, describe how Reflection 2 looks compared to the original figure.

REFLECTIONS ACROSS AXES (Continued)

7. Describe the relationship between coordinates of corresponding vertices of the original figure and Reflection 1.

8. Describe the relationship between coordinates of corresponding vertices of the original figure and Reflection 2.

9. Describe the relationship between coordinates of corresponding vertices of Reflection 1 and Reflection 2.

A clothing company created the following diagram for a shirt. To show the other portion of the shirt, the company will reflect the drawing across the *y*-axis.

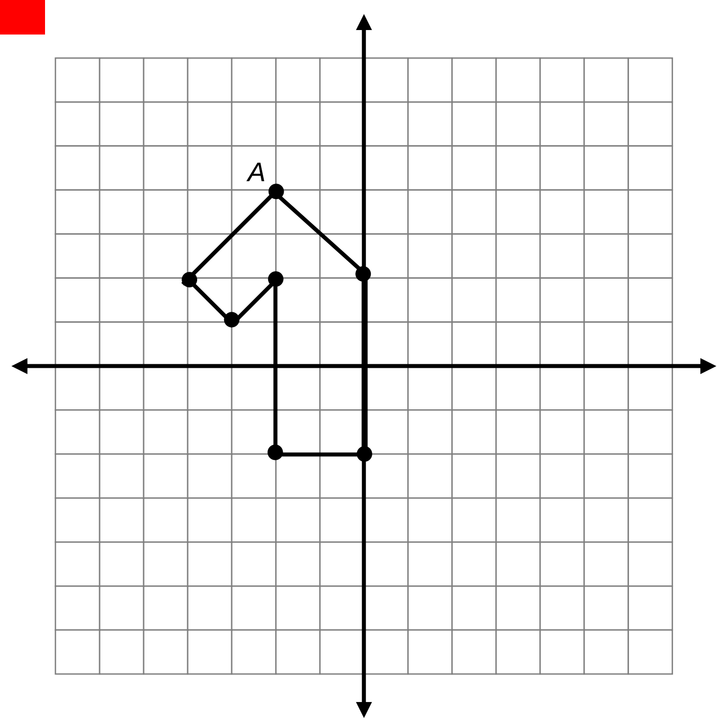
10. Label the coordinates of each vertex clockwise from *A* through *G*.

11. Draw the reflection and label the corresponding vertices *P* through *V*.

12. Should these be labeled clockwise or counterclockwise?

13. Which vertices are "double-labeled?"

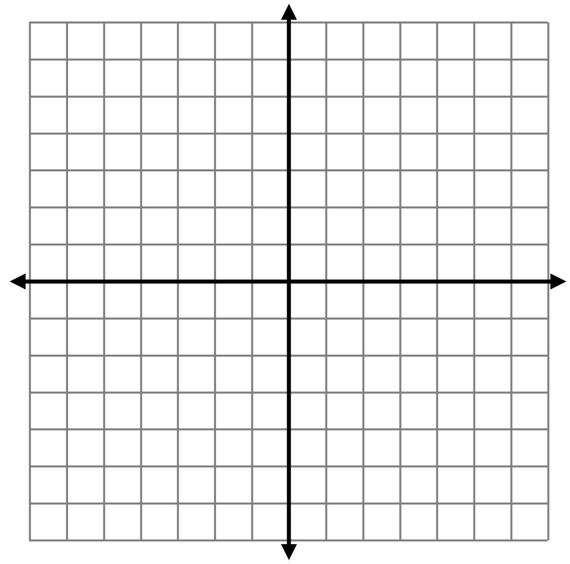
14. Write down some ordered pairs for corresponding vertices of the left portion of the shirt and the right portion? How do the coordinates compare for these corresponding vertices?



PRACTICE WITH REFLECTIONS

1. Graph the points below and draw triangle *ABC*.

   A (-1, -5) *B* (-3, -5) *C* (-6, -2)



2. Draw the reflection of △ *ABC* across the *x*-axis and label it △ *EFG*.

3. Draw the reflection of △ *EFG* across the *y*-axis and label it △ *KLM*.

4. List all corresponding vertices and their coordinates in the table below.

△ *ABC*	**△ *EFG***	**△ *KLM***
A (______, ______)	_____ (______, ______)	_____ (______, ______)
B (______, ______)	_____ (______, ______)	_____ (______, ______)
C (______, ______)	_____ (______, ______)	_____ (______, ______)

5. Describe the relationship between coordinates of corresponding vertices when:

   a. A triangle is reflected across the *x*-axis.

   b. A triangle is reflected across the *y*-axis.

   c. A triangle is reflected across one axis, and the result is reflected across another axis.

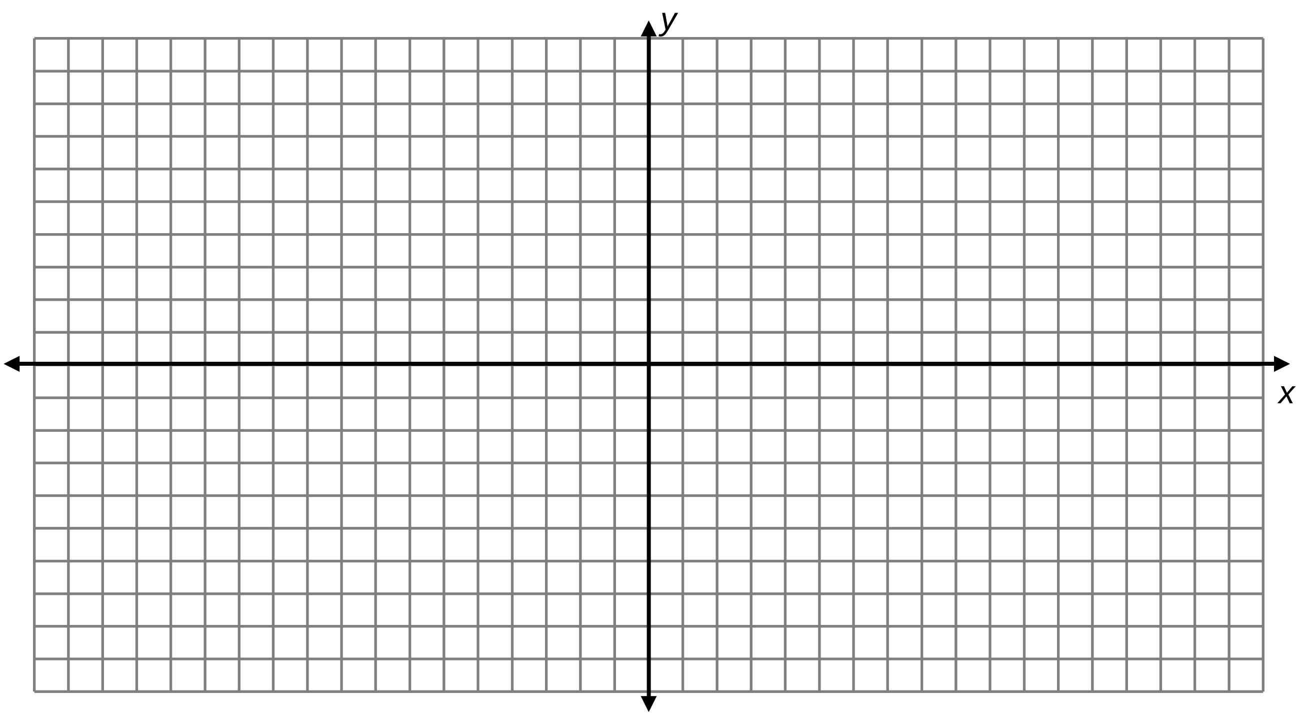
SUMMER CAMP MAP

Marlon is at a summer camp for two weeks. Since this is Marlon's second time, he is familiar with the campground, but some of the first-time campers are getting a little lost. In order to help them find their way around, he creates some clues so that the campers can make their own maps.

1. Create a map based on Marlon's clues. The grid represents the portion of the camp where campers will spend most of their time. Each grid square is 100 ft. by 100 ft. Big Pine Road (x-axis) goes east and west through the camp. Sequoia Road (y-axis) goes north and south through the camp. They meet at the center of the camp *C* (0, 0). All points listed represent approximate locations based upon Marlon's research.

2. Use blank graph paper or the grid below to locate other places in camp.

- The flagpole (*F*) is at (200, 200).
- The main office (*U*) is at (-200, 900).
- The crafts area (*S*) is at (-500, 600).
- The theater (*T*) is at (-1500, 900).
- The archery area (*R*) is at (-900, -250).
- The girl's restroom (*G*) is at (-50, -400).
- The cafeteria (*A*) is at (650, 0).
- The nurse's office (*N*) is at (150, 800).
- The swimming pool (*W*) is at (800, -300).
- The fire pit (*P*) is at (-1250, 500).
- The horse barn (*H*) is at (1700, -700).
- The boy's restroom (*B*) is at (-800, -400).



SUMMER CAMP QUESTIONS

1. How do you get from…
   a. the center of camp to the cafeteria?
   b. the boy's restroom to the girl's restroom?
   c. the main office to the theater?

2. What is the distance from…
   a. the center of camp to the cafeteria?
   b. the boy's restroom to the girl's restroom?
   c. the main office to the theater?

3. What are the coordinates of…
   a. the location that is 400 feet west of the cafeteria?
   b. the location that is 500 feet south of the main office?

4. A friend wants to meet you at a location that is half the distance between the boys' and girls' restrooms. What are the coordinates of this location?

5. One of the girl's tents is located 400 feet west of the flagpole.
   a. What are the coordinates of this tent?
   b. In what "quadrant" of the camp is this tent located?

6. One of the boy's tents is the same distance from Big Pine Road as the girl's tent, but it is south of the road.
   a. What are the coordinates of this tent?
   b. Use precise mathematical language to describe the relationship of the location of the boys' tent in relation to the flagpole.

SUMMER CAMP QUESTIONS (Continued)

7. Carlos is at the center of camp and wants to go to the pool. However, Danielle wants to walk there with him, and she is 800 feet east of him on Big Pine Road and will wait there for him.

   a. What is Danielle's location?

   b. How far is Carlos' walk to the pool in all?

   c. If Carlos walked straight (diagonally) to the pool from the center of camp without Danielle, would that be the same distance? Explain how you counted or estimated this distance, including the use of any tools.

8. The owners decide to build another girl's cabin and another boy's cabin. Choose locations for the cabins, and explain why you chose those locations.

9. Little Lake is located on the camp property. Part of its shoreline includes the location with coordinates (650, -900), and its area is about 90,000 square feet.

   a. Draw in a possible location for the lake. Explain how you know its area is about 90,000 square feet.

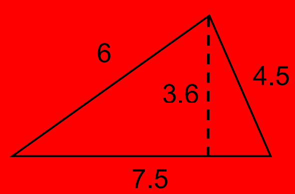
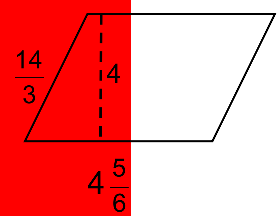
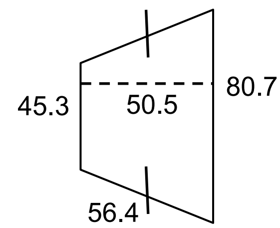
   b. Is this lake large enough for canoeing? Explain.

10. In the context of the camp map, explain why it is okay to have negative coordinates, but that distance can never have a negative value.

SKILL BUILDERS, VOCABULARY, AND REVIEW

SKILL BUILDER 1

Find the perimeter and area of each figure. Assume any angle that looks like a right angle, is a right angle, and any sides that look parallel are parallel.

1.  Perimeter: ____________ Area: ______________	2.  Perimeter: ____________ Area: ______________	3.  Perimeter: ____________ Area: ______________

4. A punch recipe calls for 5 parts kiwi juice and 2 parts soda water. Roza accidentally starts with 4 cups of kiwi juice and 3 cups of soda water in a punch bowl. How can Roza add to the current punch bowl mixture and correct the mistake so that the punch mixture follows the recipe?

Solve. If you use mental math, write MM. Otherwise show all work.

5. $x + 8 = 13$	6. $y - 4\frac{1}{2} = 8$	7. $15\frac{3}{4} = g + 2\frac{1}{4}$
8. $3.56m = 34.888$	9. $4524 = 87n$	10. $2.7p = 3.24$

SKILL BUILDER 2

1. Jax makes $58 for each 8 hour work shift. Complete the table below. Then circle the column in the table that could be used to represent Jax's hourly pay rate (unit rate).

pay ($)	58	116		580			72.50
# of hours	8		2		1	4	

Andrew is creating a plastic flower vase in the shape of a rectangular prism. The base of the prism is a square with an area of 25 cm^2. Its height is 8 cm.

2. Sketch the vase.	3. Find the volume of the vase.
4. Find the surface area of the sides and bottom of the vase.	5. Andrew's next vase will have the same base area, but a volume of 225 cm^3. What must its height be?

6. Lance is buying a car for $21,500. He wants to pay 15% as a down payment. How much will his down payment be?

Complete the chart below.

Expression (simplify first if possible)	**Number of terms**	**Constant term(s)**	**Term(s) with Variables**	**Coefficient of the Variable(s)**
7. $6a + 9b + a + 6b$				
8. $x + x + x + 19$				

9. Roberto wants to draw a 4 yard by 3 yard rectangle with chalk on his driveway. His only tool is a 12-inch ruler. How many times will he need to trace the length of this ruler to complete the rectangle?

10. Evaluate for $x = 5$ and $y = 9$: $y^2 + 2(8 - x)^3 - xy$

SKILL BUILDER 3

1. Advon and Cameron ran for 6th grade class president. There were 48 students voting. Advon got three votes for every vote Cameron got. Make a table or double number line to find how many votes each candidate got.

The lot of land that Calista is buying for her new one story house is 40 yards by 45 yards.

2. Find the area of Calista's lot in square feet.

3. Her house plans show that her house will cover 4,500 square feet. How many square feet of the lot are not covered by the house?

4. What percent of Calista's lot will not be covered by the house?

5. A mixture of concrete is made up of sand and cement in a ratio of 5 : 3. Complete the table.

parts sand			20		24		1	
parts cement		6				1		
total parts	8			64				160

6. Using the table above, what is the unit rate of cement to sand?

SKILL BUILDER 4

Oops! The total cost of each order is correct. However, for each order, someone wrote an incorrect variable (label) for one of the items in the order. Identify the incorrect item and rewrite the order so that the equation will be true.

1. Order #1: $c + d = \$3.20$

2. Order #2: $h + L + a = \$5.55$

3. Order #3: $2h + s + L + n = \$8.35$

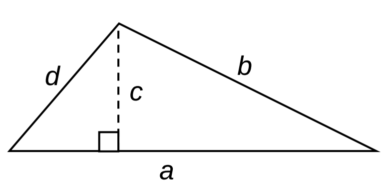
BURGER BARN MENU (The variable represents the cost of an item.)	
Hamburger (*h*)...............................	$1.85
Cheeseburger (*c*)...........................	$2.15
Fries (*f*)..	$1.05
Small drink (*s*)...............................	$0.95
Medium drink (*m*)...........................	$1.25
Large drink (*L*)...............................	$1.55
Extra-large drink (*x*).......................	$2.05

Complete the chart.

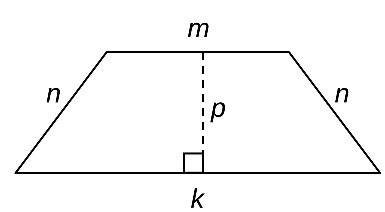
	Fraction	**Decimal**	**Percent**
4.	$\frac{7}{2}$		
5.		0.07	
6.			15.6%
7.		3.45	

Write variable expressions to represent the area of each figure.

8.



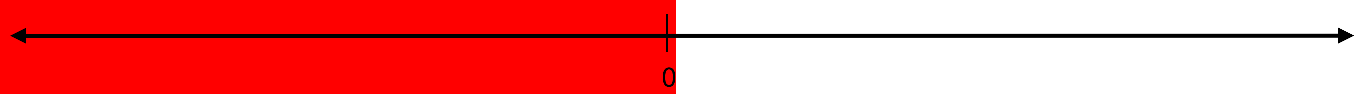
9.



SKILL BUILDER 5

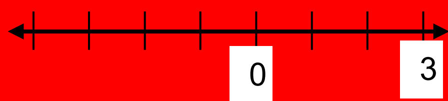
Simplify the absolute value expressions. Then graph the value for each answer and its opposite on the horizontal number line below. Scale the number line appropriately.

1. $\lvert 10 - 8 \rvert$	2. $-\lvert 3 \rvert$	3. $\lvert -1.5 \rvert$	4. $-\lvert 2.25 \rvert$



Solve

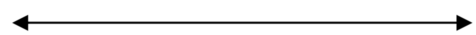
5. Draw the solution set of the inequality $x > -2$.



6. Circle all numbers below that are solutions of the inequality $x > -2$.

0 -2 -4.8 2.4 -2.24

7. On a number line to the right, draw an arrow starts at 5 and ends at -2.

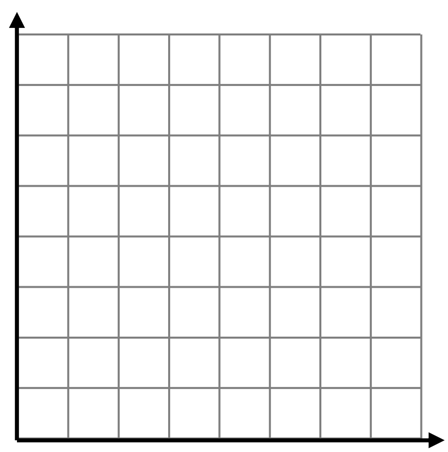


What is the length of the arrow? ______ What number does the arrow represent? ______

8. Label the *x*-axis, the *y*-axis on the grid to the right, and number them as needed. Then graph and label the given ordered pairs.

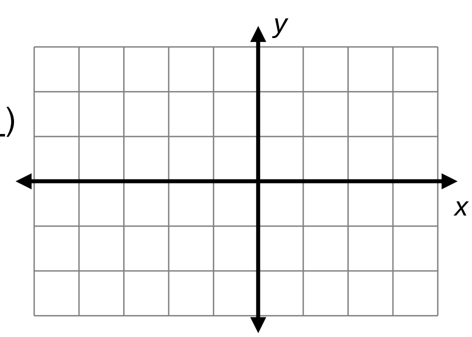
A (0, 6) *B* (2, 4) *C* (3, 8) *D* (1, 7)

E (4, 0) *F* (0, 0) *G* (8, 2) *H* (7, 5)



For problems 9-13, a rectangle has horizontal and vertical segments for its sides. The endpoints of one diagonal are (2, 3) and (-4, -2).

9. Draw the rectangle on the grid to the right.



10. Find the other two vertices. (____,____) and (____,____)

11. Find the dimensions. *L* = ______, *W* = ______

12. Find the perimeter. *P* = ______________

13. Find the area. *A* = ______________

SKILL BUILDER 6

Graph ALL of the given ordered pairs on the coordinate plane to the right. Scale the axes appropriately.

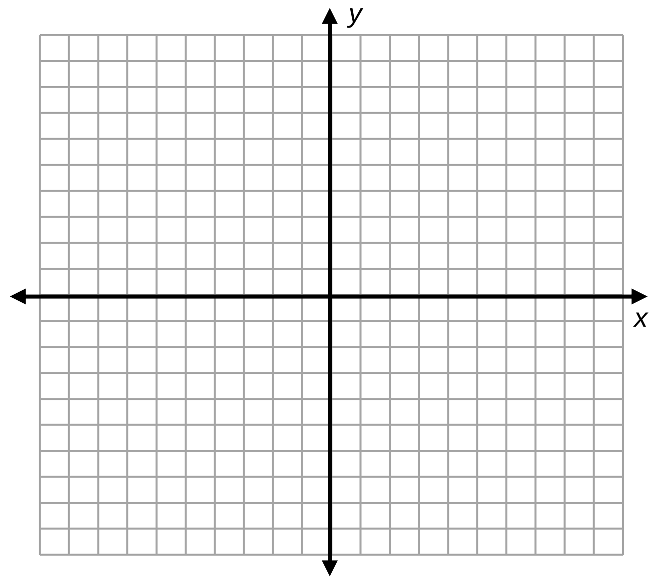
1. *A* (2, 2) B (-1, -1)

   C (1.5, 0.25) *D* (0, 0.25)

   E (-0.5, 0.25) *F* (-0.5, -0.5)

   G (-1.5, -2) *H* (-2, 0.75)

   J (0.25, 0.5) *K* (0, -1.25)

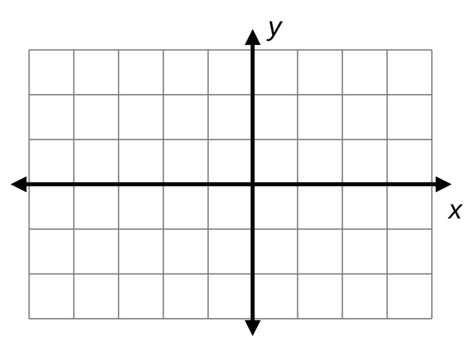


For problems 2-5, use the graph above.

2. Connect the points *C* and *D*. Is $\overline{CD}$ a vertical or horizontal line?	3. Find $\lvert CD \rvert$.
4. Connect the points *E* and *F*. Is $\overline{EF}$ a vertical or horizontal line?	5. Find $\lvert EF \rvert$.

For problems 6-10, a rectangle has horizontal and vertical segments for its sides. The endpoints of one diagonal are $\left(-2\frac{1}{4}, 0\right)$ and (0, 1).

6. Scale the axes appropriately. Draw the rectangle.
7. Name the other two vertices. ________________
8. State the dimensions. ________________
9. Find the perimeter. ________________
10. Find the area. ________________

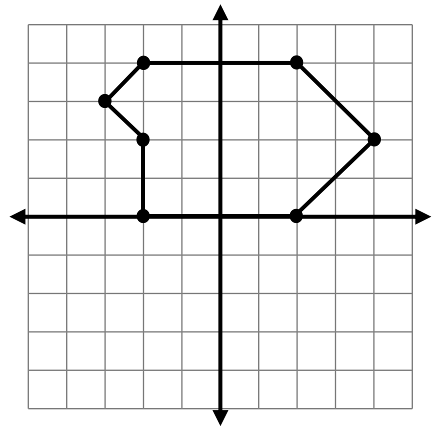


SKILL BUILDER 7

For problems 1-4, use the figure to the right. Each square is 1 unit by 1 unit.

1. Label the point *A* (-2,0). Label the vertices clockwise from *A* through *G*.

2. Reflect the polygon across the *x*-axis and label the corresponding vertices *P* through *V*.



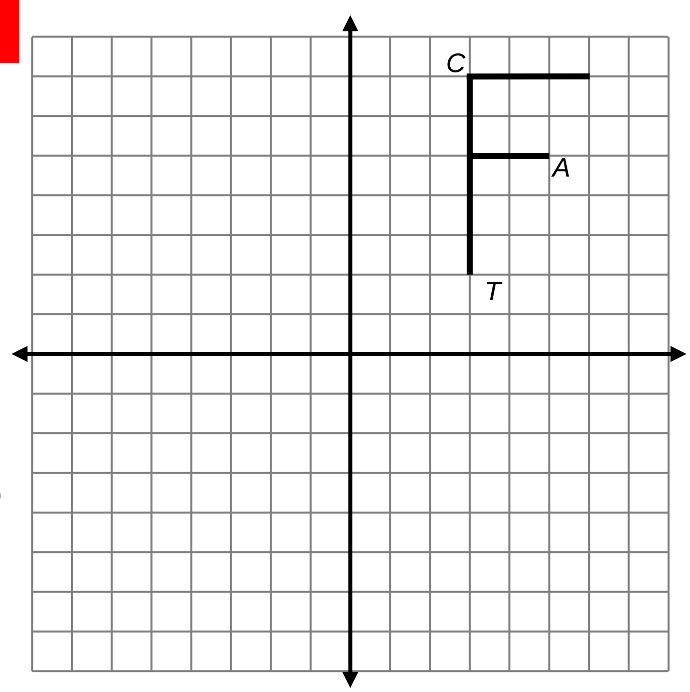
3. Write pairs of corresponding vertices and their coordinates:

   D (-2, ___) and __ (-2, -4)

   __ (4, 2) and *U* (4, ___)

4. What is the same about corresponding vertices?

For problems 5-9, the ordered pair for point *C* is $\left(\frac{3}{8}, \frac{7}{8}\right)$.



5. Scale the axes appropriately.

6. Write coordinates for these other points:

   A (_____, _____) *T* (_____, _____)

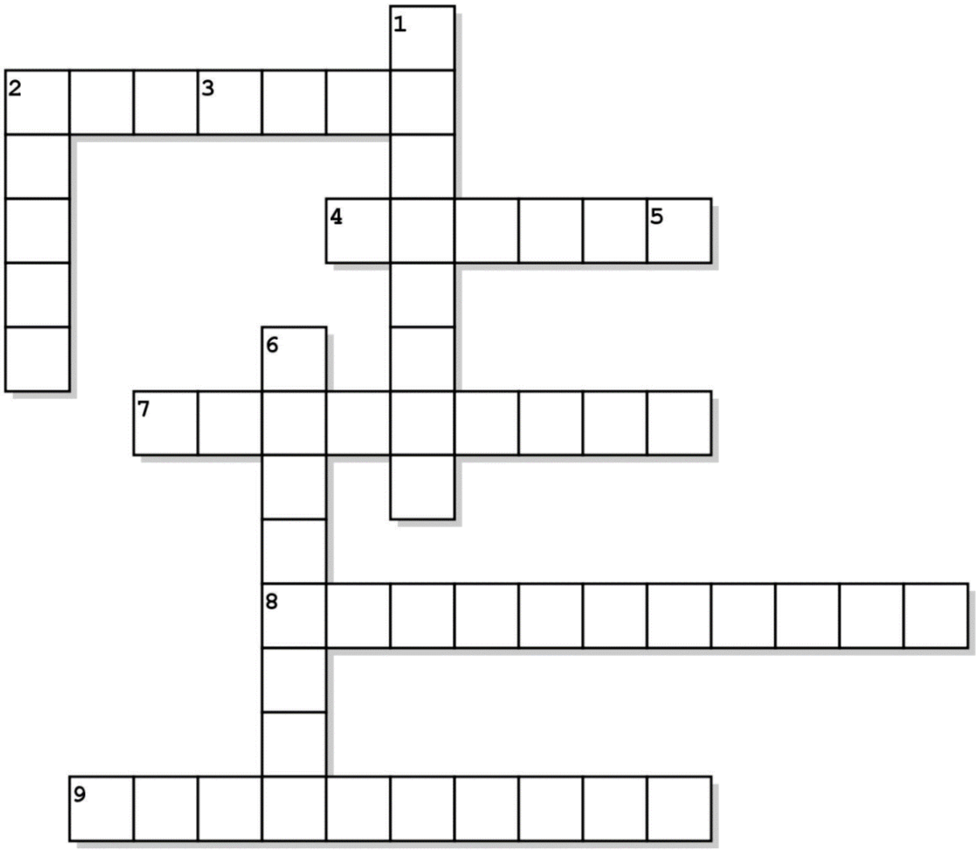
7. Draw the reflection of the figure across the *x*-axis. Label points corresponding to *C*, *A*, and *T* as *D*, *O*, and *G* respectively.

   D (_____, _____) *G* (_____, _____)

8. Draw the reflection of the figure in quadrant IV across the *y*-axis. Label points corresponding to points *D*, *O*, and *G* as *P*, *E*, and *N* respectively.

9. What is the relationship between the coordinates for point *C* and point *P*?

FOCUS ON VOCABULARY



Across

2 a closed figure made up of line segments.

4 point of intersection of two sides of a polygon

7 the *xy*-coordinate plane has four of these

8 (5, 2), for instance (two words)

9 mirror image on another side of a line

Down

1 whole numbers and their opposites

2 infinite flat surface

3 the vertical axis is often the _____-axis

5 the horizontal axis is often the _____-axis

6 a quotient of integers is a ______ number

(For word hints, see the word bank and other vocabulary used in this packet.)

SELECTED RESPONSE

Show your work on a separate sheet of paper and select the best answer(s).

1. Choose all ordered pairs that are located in quadrant III.

   A. (-2, 3) B. (4, 5) C. (-6, -7) D. (3, -8)

2. A line segment has endpoints *A*(-3, 7) and *B*(5, 7). Choose all the statements that are true about $\overline{AB}$.

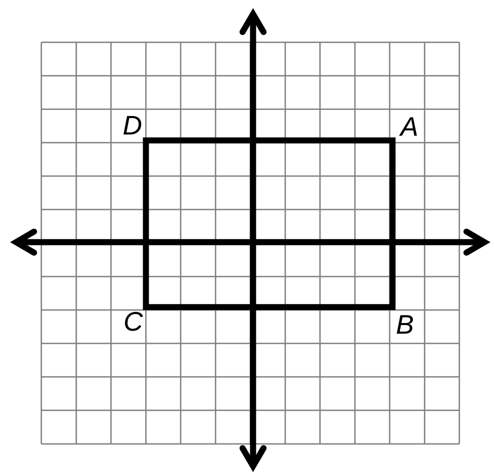
   A. $\overline{AB}$ is vertical.
   B. $\left|AB\right|$ is horizontal.
   C. $\overline{AB}$ is 8.
   D. $\left|AB\right|$ is 2.

3. A rectangle has vertices at (-12, 3), (-12, -6), and (5, -6). What is the location of the fourth vertex?

   A. (-12, -6) B. (-5, -6) C. (12, 3) D. (5, 3)

Use the graph to the right for problems 4–6.

Each small square on the grid is $\frac{1}{4}$ unit by $\frac{1}{4}$ unit.



4. What is the ordered pair for *B*?

   A. (4, 2) B. (4, -2) C. $\left(1, -\frac{1}{2}\right)$ D. $\left(1, \frac{1}{2}\right)$

5. Choose all the statements that are true.

   A. $\left|BC\right| = 7$ B. $\left|BC\right| = \frac{7}{4}$ C. $\left|AB\right| = \frac{1}{4}$ D. $\left|AB\right| = 1\frac{1}{4}$

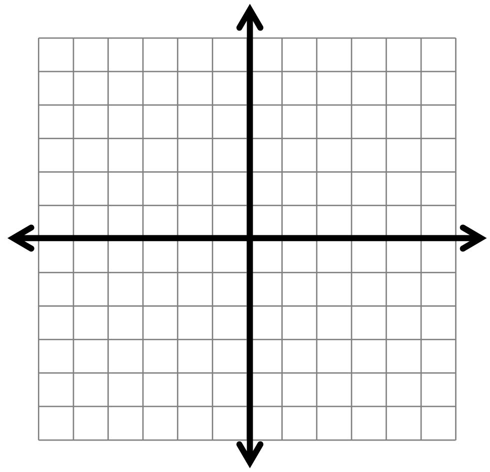
6. If *A* is reflected across the *y*-axis and labeled as point *P*, what is the location of point *P*?

   A. (-4, 3) B. (4, -3) C. $\left(1, -\frac{3}{4}\right)$ D. $\left(-1, \frac{3}{4}\right)$

KNOWLEDGE CHECK

Show your work on a separate sheet of paper and write your answers on this page.

15.1 Graphing Points with Integer Coordinates



1. Graph the following ordered pairs to the right. Each small square is 1 unit by 1 unit.

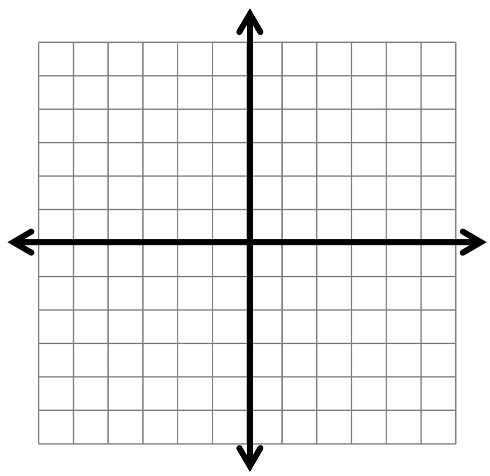
   A (-4, 5)   *B* (-4, -3)   *C* (2, -3)

2. Find the lengths of the following segments.

   $|AB|$ = _____ $|BC|$ = _____

3. Ricardo said, "I knew from the coordinates, even before graphing, that the segment from *A* to *B* was going to be vertical and the segment from *B* to *C* was going to be horizontal." Explain what Ricardo means.

15.2 Graphing Points with Rational Coordinates



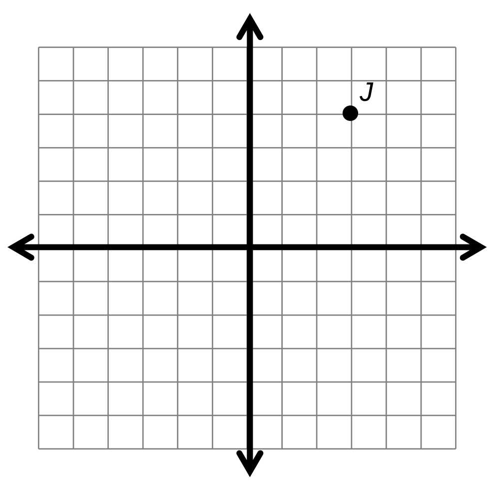
4. Graph the following ordered pairs to the right. Each small square is $\frac{1}{5}$ of a unit by $\frac{1}{5}$ of a unit.

   D (0.8, -0.2)   *E* $\left(\frac{4}{5}, \frac{3}{5}\right)$

   F $\left(-\frac{6}{5}, \frac{3}{5}\right)$ *G* (-1.2, -0.2)

5. What are the dimensions of figure *DEFG*?

15.3 Reflections



Each small square is 1 unit by 1 unit.

6. Reflect *J* across the *y*-axis and label it *K*.
   Reflect *J* across the *x*-axis and label it *L.*
   Write the coordinates of each:

   J (_____, _____)   *K* (_____, _____)   *L* (_____, _____)

7. Explain how *K* and *L* each relate to *J*.

HOME-SCHOOL CONNECTION

Here are some problems to review with your young mathematician.

Without graphing, explain how you know the location (quadrant) of each of the following points.

1. *A* (2, 3)	2. *B* (5, -3)	3. *C* (-5, 6)	4. *D* (-2, -4)

5. Create a point that is horizontally aligned to *E* (-4, -5).

   Create a point that is vertically aligned to *G* (5, 6).

   Explain how you can determine if points are vertically aligned, horizontally aligned, or not aligned by looking at the coordinates of the points.

6. Reflect the point $\left(\frac{1}{2}, -3\right)$ across the *x*-axis. What is the location of the reflected point? ______________. How are the coordinates of the reflected point related to the coordinates of the original point?

7. Reflect the point $\left(\frac{1}{2}, -3\right)$ across the *y*-axis. What is the location of the reflected point? ______________. How are the coordinates of the reflected point related to the coordinates of the original point?

Parent (or Guardian) Signature _____________________________

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COMMON CORE STATE STANDARDS – MATHEMATICS

STANDARDS FOR MATHEMATICAL CONTENT	
6.NS.C	**Apply and extend previous understandings of numbers to the system of rational numbers.**
6.NS.6a	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 number line and in the plane with negative number coordinates. 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 itself, e.g., -(-3) = 3, and that 0 is its own opposite.
6.NS.6b	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 number line and in the plane with negative number coordinates. 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.
6.NS.6c	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 number line and in the plane with negative number coordinates. 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.
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.
6.G.A	**Solve real-world and mathematical problems involving area, surface area, and volume.**
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.

STANDARDS FOR MATHEMATICAL PRACTICE	
MP3	Construct viable arguments and critique the reasoning of others.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.

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