

**Unit 2 – Transformations****Target 1: Identify and determine congruent parts given a rigid motion.****Target 2: Perform and identify rigid transformations of points, segments, and figures.****a. Perform and identify translations of points, segments, and figures.****b. Perform and identify rotations of points, segments, and figures.****c. Perform and identify reflections of points, segments, and figures.****Target 3: Perform multiple transformations to determine coordinates and location of the image.**YouTube Playlist:  
<https://goo.gl/bpGam>

Date	Target	Assignment	Done!
T 9-5	2.1	2.1 Worksheet	
W 9-6	2.1	Tessellations	
R 9-7	Quiz	<b>2.1 Quiz</b>	
F 9-8	2.2a	2.2a Worksheet	
M 9-11	2.2b	2.2b Worksheet	
T 9-12	2.2b	2.2b Day 2	
W 9-13	2.2c	2.2c Worksheet	
R 9-14	2.2	2.2 Quiz Review	
F 9-15	Quiz	<b>2.2 Quiz</b>	
M 9-18	2.3	2.3 Day 1 Worksheet	
T 9-19	2.3	2.3 Day 2 Worksheet	
W 9-20	Quiz	<b>2.3 Quiz</b>	
R 9-21	Rev	Unit 2 Test Review	
F 9-22	Test	<b>Unit 2 Test</b>	

**Name** \_\_\_\_\_

## 2.1 – Transformations and Congruent Figures

### Target 1 – Identify and determine congruent parts given a rigid motion

#### Vocabulary

**Transformation:** change of \_\_\_\_\_ or \_\_\_\_\_ of a figure.

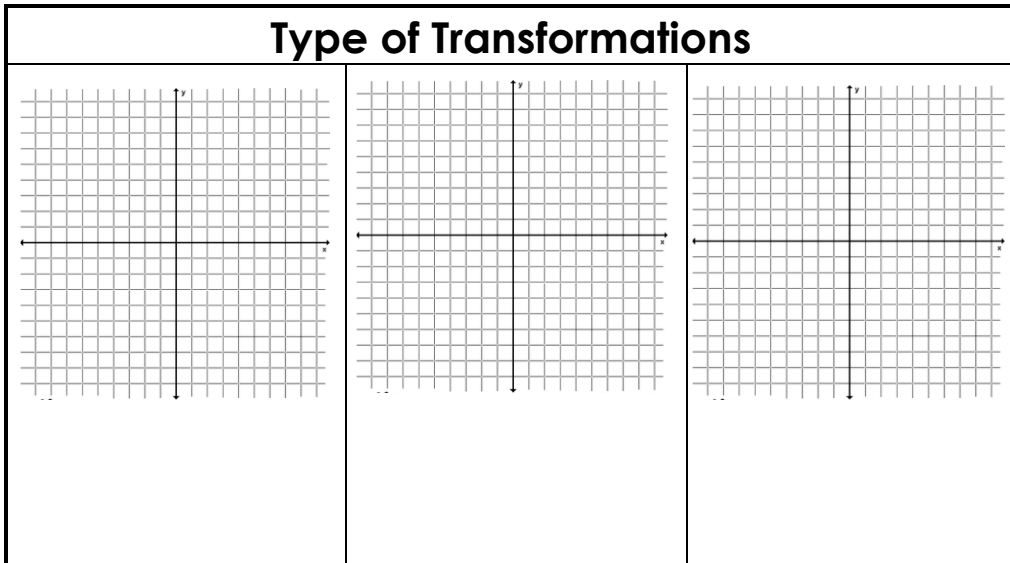
#### Annotate Here

(location, size)

What's a "rigid motion?"

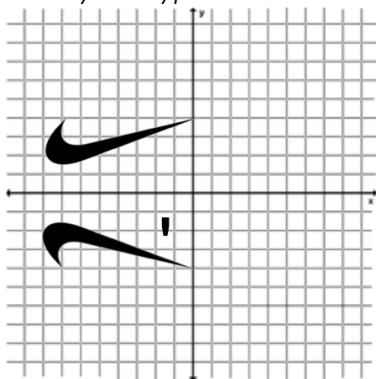
What symbol is used to mean "congruence?"

### Type of Transformations



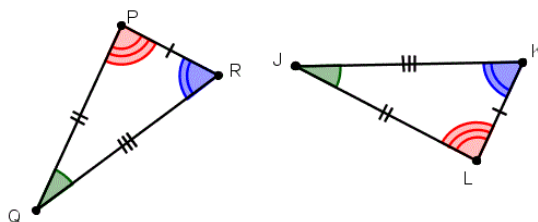
#### **Example 1: Using rigid motions**

Identify the type of transformation shown.



#### **Example 2: Congruent Figures**

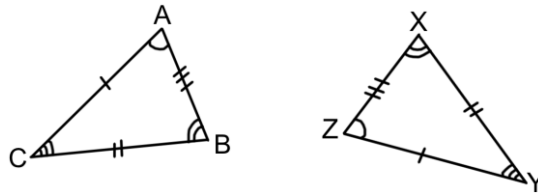
The figures below are congruent. Identify the following: All pairs of congruent angles, congruent pairs of sides, and the congruent statement.



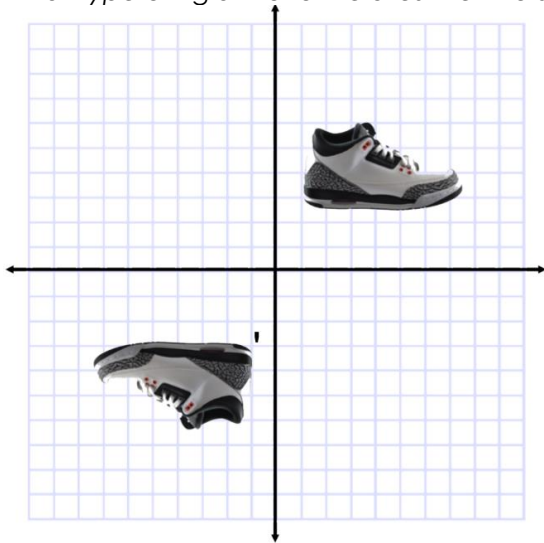
**YOU TRY NOW!**

1. The triangles below are congruent. Which of the statements below are true? Circle all that apply.

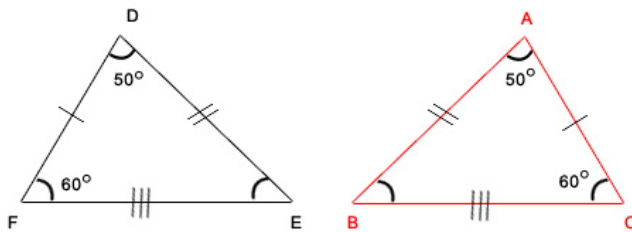
- A)  $\triangle ABC \cong \triangle XZY$
- B)  $\angle BAC \cong \angle XZY$
- C)  $\overline{AB} \cong \overline{ZX}$
- D)  $\triangle BCA \cong \triangle XYZ$
- E)  $\triangle CBA \cong \triangle YXZ$



2. What type of rigid motion relates the two shoes?



3. Is this an example of a rigid motion? Explain below.



**Explanation:**

Annotate Here

1. B, C, E  
2. rotation  
3. Yes, the figures are the same size same shape. The rigid motion is a reflection.

**YOU TRY NOW!**

## 2.2a – Translations

### Target 2 – Perform and identify rigid motions of points, segments, and figures

**Vocabulary**

**Image** – the \_\_\_\_\_ of a figure after a transformation.

**Pre image** – the position of a(n) \_\_\_\_\_ prior to a transformation.

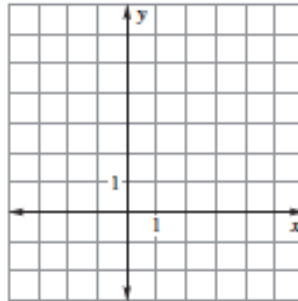
**Isometry** – a \_\_\_\_\_ in which the pre-image and its image are \_\_\_\_\_.

**Example 1: Translate a figure in the coordinate plane**

Graph and label the quadrilateral ABCD with vertices A( -2, 6), B( 2, 4), C(2,1), and D( -2, 3).

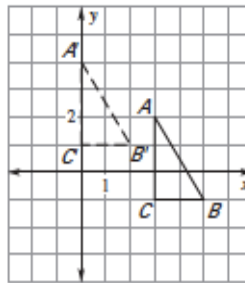
Find the image of each vertex after the translation:

$(x, y) \rightarrow (x + 3, y - 3)$ . Then graph the image using prime notation.



**Example 2: Write a translation rule and verify congruence**

Write a rule for the translation of  $\triangle ABC$  to  $\triangle A'B'C'$ . Then verify that the transformation is an isometry.

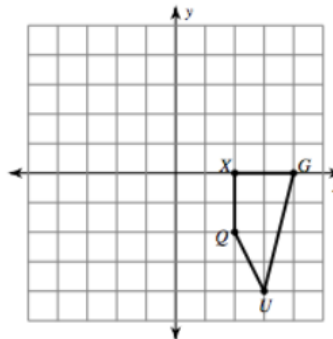
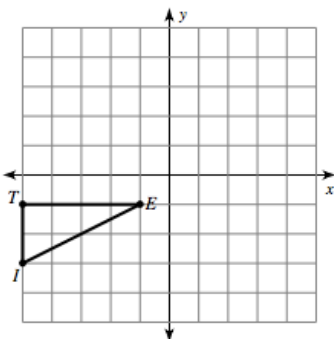


**Annotate Here**

(new position , original figure, transformation, congruent)

**YOU TRY NOW!**

- Graph and label image of the figure using the translation given
  - 1 unit right & 2 units down.
  - 4 units left & 3 units up



(b) X'(-2, 3), G'(0, 3), U'(-1, -1), Q'(-2, 1)

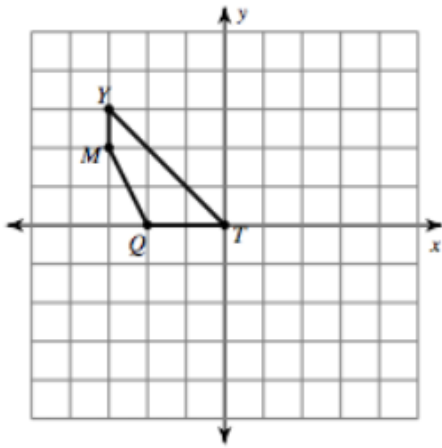
(a) T'(-4, -3), I'(-3, -5), E'(0, -3)



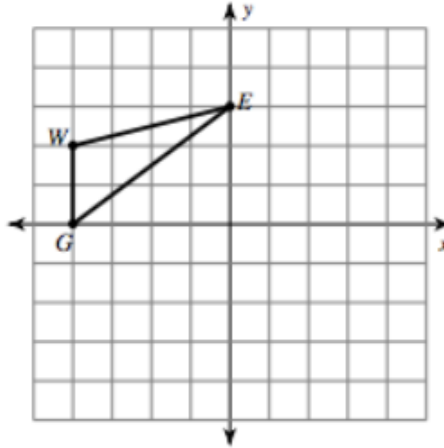
**YOU TRY NOW!**

2. Graph and label the image of the figure using the given translation rule

c)  $(x, y) \rightarrow (x - 2, y + 1)$



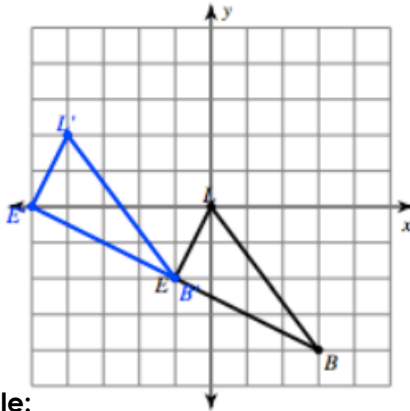
d)  $(x, y) \rightarrow (x + 4, y - 4)$



3. Write the rule in proper notation to describe each translation

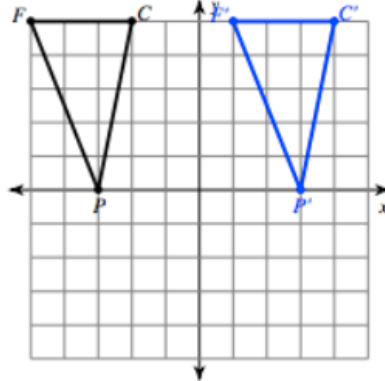
Proper notation:  $(x, y) \rightarrow (x \pm \_, y \pm \_)$

a) pre-image on the right



Rule:

b) pre-image on the left



Rule:

4. Find the coordinates of the vertices of each figure after the given translation.

**3 units to the right and 6 units down**

Z (-4, -3), I (-2, -2), V (-2, -4)

**QUESTIONS OR REFLECTION**

Write down at most 2 questions that you can ask the next day. BE SPECIFIC.

1.

2.

**Annotate Here**

2a) Y' (-1, 4), M' (-1, 3), Q' (0, 1), T' (2, 1)  
 3a)  $(x, y) \rightarrow (x - 4, y + 2)$   
 4) Z' (-1, -9), I' (1, -8), V' (1, -10)

2b) E' (4, -1), W' (0, -2), G' (0, -4)  
 3b)  $(x, y) \rightarrow (x + 4, y - 2)$

## 2.2b – Rotations

### **Target 2 – Perform and identify rigid motions of points, segments, and figures**

**Vocabulary**

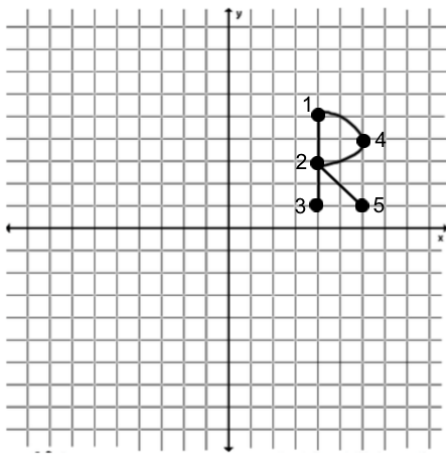
**Rotation:** a transformation that moves a figure along a \_\_\_\_\_ path about a \_\_\_\_\_ called the \_\_\_\_\_.

**Angle of rotation:** can be both \_\_\_\_\_ and \_\_\_\_\_. Angle of rotation is defined by two rays where one goes from the \_\_\_\_\_ to a starting point on the figure and the other goes from the center of rotation to the corresponding final point on the figure.

***AT HOME Example 1: Rotate the pre image 90 degrees about the origin***

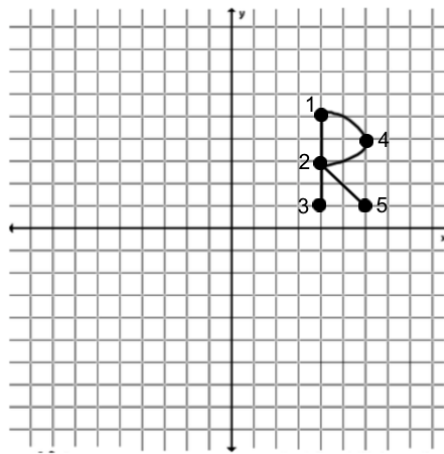
Write the coordinates of the pre-image and the image below.

**Clockwise (CW)**



<b>Pre-Image</b>	<b>Image</b>
1 (     )	1' (     )
2 (     )	2' (     )
3 (     )	3' (     )
4 (     )	4' (     )
5 (     )	5' (     )

**Counterclockwise (CCW)**



<b>Pre-Image</b>	<b>Image</b>
1 (     )	1' (     )
2 (     )	2' (     )
3 (     )	3' (     )
4 (     )	4' (     )
5 (     )	5' (     )

**REFLECTION/ANALYSIS**

What do you notice about the corresponding coordinates of the pre-image and the image? Write your predictions below

**Annotate Here**

(circular, fixed point, center of rotation)

(clockwise, counterclockwise, center of rotation)



SCAN FOR EXTRA SUPPORT

SCAN ME FOR EXAMPLE 1

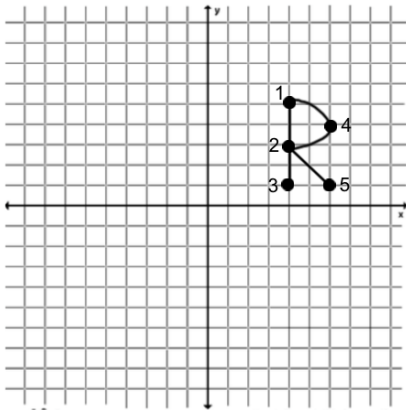


*Having difficulty? Write a question below to ask the next day. REMEMBER to ask!*

**IN CLASS Example 2: Rotate the pre image 180 degrees about the origin.**

Write the coordinates of the pre-image and the image below.

**(CW)/(CCW)**



<b>Pre-Image</b>	<b>Image</b>
1 (     )	1' (     )
2 (     )	2' (     )
3 (     )	3' (     )
4 (     )	4' (     )
5 (     )	5' (     )

**REFLECTION/ANALYSIS**

What do you notice about the corresponding coordinates of the pre-image and the image? Write your thoughts below.

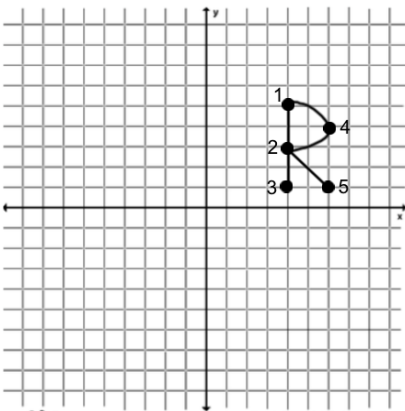
**Annotate Here**

**Having difficulty? Write a question below to ask the next day. REMEMBER to ask!**

**IN CLASS Example 3: Rotate the pre image 270 degrees about the origin**

Write the coordinates of the pre-image and the image below.

**(CCW)**



<b>Coordinates</b>	
<b>Pre-Image</b>	<b>Image</b>
1 (     )	1' (     )
2 (     )	2' (     )
3 (     )	3' (     )
4 (     )	4' (     )
5 (     )	5' (     )

**REFLECTION/ANALYSIS**

What do you notice about the corresponding coordinates of the pre-image and the image? Write your thoughts below.



## 2.2c – Reflections

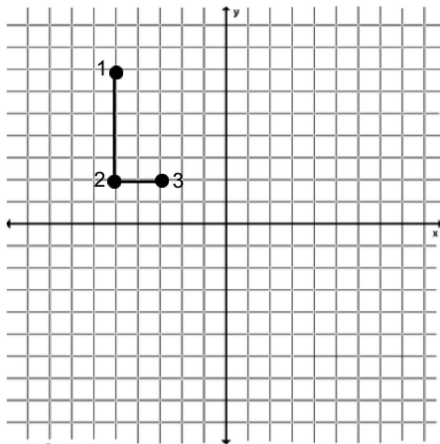
### Target 2 – Perform and identify rigid motions of points, segments, and figures

**Vocabulary**

**Line of Reflection:** also called the \_\_\_\_\_, the axis that a figure is reflected about forming a congruent image that is symmetrical to the its original

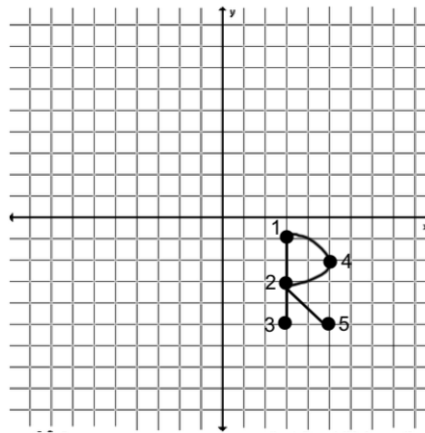
**AT HOME Example 1: Reflect each image over the given line of reflection to find coordinates of the image.**

Write the coordinates of the pre-image and the image below.  
(Over the x-axis)



<i>Coordinates</i>	
<i>Pre-Image</i>	<i>Image</i>
1 (     )	1' (     )
2 (     )	2' (     )
3 (     )	3' (     )

(Over the y-axis)



<i>Coordinates</i>	
<i>Pre-Image</i>	<i>Image</i>
1 (     )	1' (     )
2 (     )	2' (     )
3 (     )	3' (     )
4 (     )	4' (     )
5 (     )	5' (     )

**Annotate Here**

(axis of symmetry)

SCAN ME FOR EXAMPLE 1



**REFLECTION/ANALYSIS**

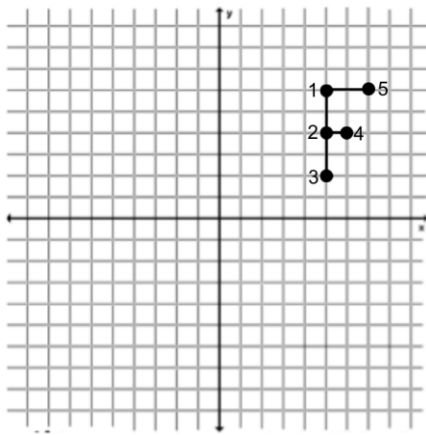
What is the line called that helps you visually see how a figure is being reflected?

What do you notice about the corresponding coordinates of the pre-image and the image? Write your thoughts below.

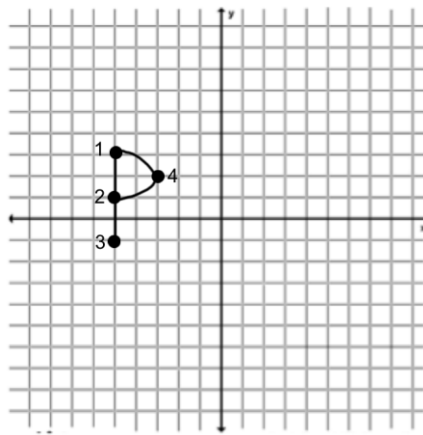
**IN CLASS Example 2:** Reflect each image over the given line of reflection to find coordinates of the image.

Write the coordinates of the pre-image and the image below

(Over the line of  $x = 3$ )



(Over the line of  $y = -2$ )



**Coordinates**

**Pre-Image**

**Image**

1 (      )      1' (      )

2 (      )      2' (      )

3 (      )      3' (      )

4 (      )      4' (      )

5 (      )      5' (      )

**Coordinates**

**Pre-Image**

**Image**

1 (      )      1' (      )

2 (      )      2' (      )

3 (      )      3' (      )

4 (      )      4' (      )

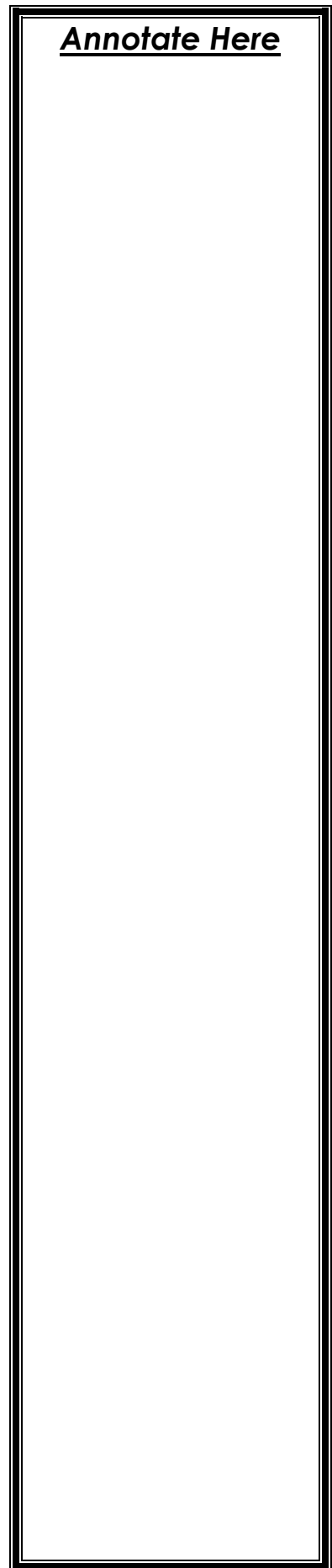
5 (      )      5' (      )

**REFLECTION/ANALYSIS**

Which direction do "x = any number" equations go? (horizontal or vertical)

What direction do "y = any number" equations go? ( horizontal or vertical)

**Annotate Here**



## 2.3 - Compositions

### **Target 3– Perform multiple transformations to determine coordinates and location of the image**

**Vocabulary**

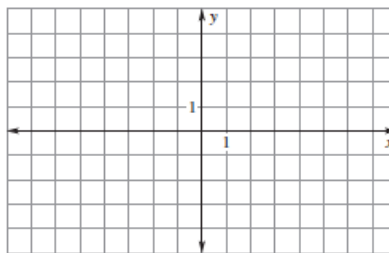
**Glide Reflection:** a transformation in the plane that is a combination of a \_\_\_\_\_ and a \_\_\_\_\_ through a line parallel to that line of reflection

**Composition of transformations:** When two or more transformations are combined to form a new transformation.

***Example 1: Find the image of a glide reflection***

The vertices of  $\triangle ABC$  are  $A(2, 1)$ ,  $B(5, 3)$ , and  $C(6, 2)$ . Find the coordinates image of  $\triangle ABC$  AFTER the glide reflection.

FIRST: TRANSLATE:  $(x, y) \rightarrow (x - 8, y)$



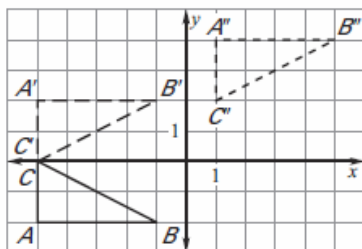
**THEN** REFLECT the **translated** figure in the x-axis

A' (            )  
 B' (            )  
 C' (            )

**Coordinates of the GLIDE REFLECTION:**

***Example 2: Describing the composition of transformations***

In the diagram, the coordinates of triangle ABC are given. Describe the composition of transformations from ABC to A'B'C' to A''B''C''. Write each rule for each transformation.



**Rule for ABC to A'B'C'**

**Rule for A'B'C' to A''B''C''**

**Annotate Here**

(line reflection, translation)

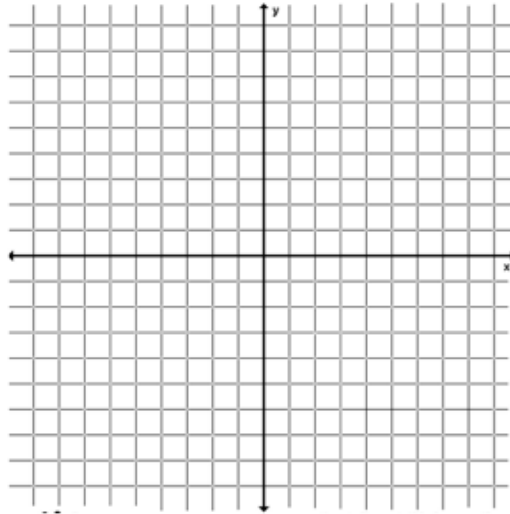
**YOU TRY NOW!**

1. The vertices of  $\triangle ABC$  are  $A(-6, 2)$ ,  $B(4, -3)$ , and  $C(4, 2)$ . Find the coordinates image of  $\triangle ABC$  after the glide reflection. Graph and label the composition.

Transformation 1: Reflect in the y axis

Transformation 2: the **translated** figure  $(x, y) \rightarrow (x - 4, y + 7)$

A'' (       )  
 B'' (       )  
 C'' (       )



**Annotate Here**

**YOU TRY NOW!**  
 1. A' (6, 2), B' (-4, 3), C' (-4, 2)  
 A'' (2, 9), B'' (0, -4), C'' (0, 9)