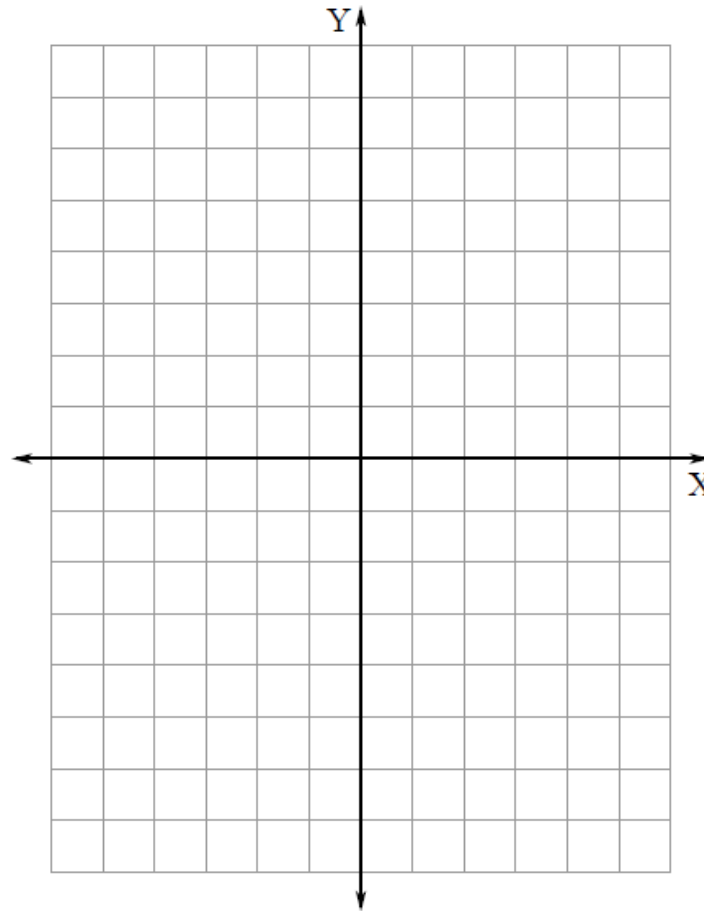


## Bellringer

**Graph triangle  $ABC$  with vertices  $A(-3, 4)$ ,  $B(0, 2)$ , and  $C(-2, 1)$  on a coordinate grid.**

1. Graph the image of triangle  $ABC$  after a translation of 4 units right and 3 units down.
2. Which side of the image is congruent to side  $\overline{AB}$ ?
3. Which angle in the image is congruent to angle  $B$ ?
4. Angle  $G$  in quadrilateral  $FGHJ$  measures  $135^\circ$ . Brent translates the quadrilateral 3 units right and 1 unit up. What is the measure of the image of angle  $G$ ?



# 9.2 Properties of Reflections

## Common Core Standard

### 8.G.1

Verify experimentally the properties of rotations, reflections, and translations.

### 8.G.3

Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates

# Vocabulary

Reflection - a transformation that flips  
a figure across a line

Line of Reflection - line the figure flips over

## EXPLORE ACTIVITY 1

The triangle shown on the grid is the preimage. You will explore reflections across the  $x$ - and  $y$ -axes.

- D** Find the perpendicular distance from each point to the line of reflection.  $x$ -axis

$$A=5 \quad B=2 \quad C=2$$

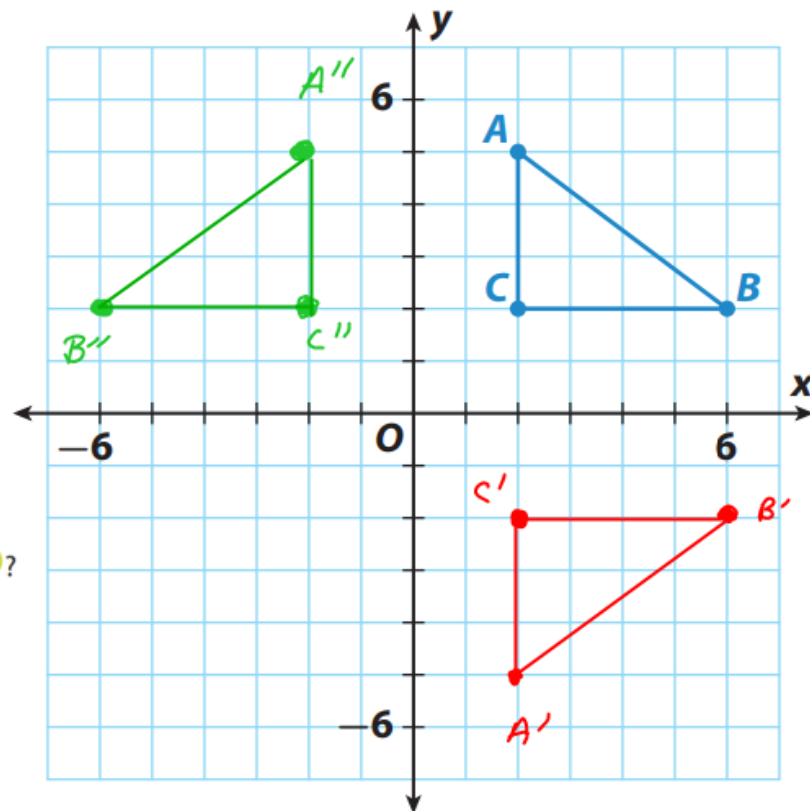
- E** Find the perpendicular distance from each point to the line of reflection.

$y$ -axis

$$A=2 \quad B=6 \quad C=2$$

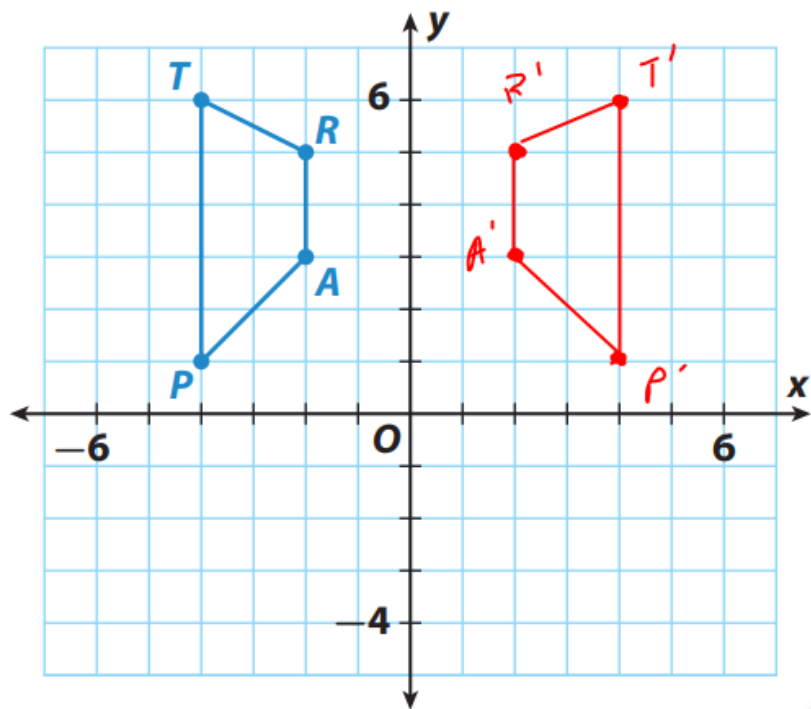
- F** What do you notice about the distances you found in **D** and **E**?

Same for a point & its reflection



**EXPLORE ACTIVITY 2**

Then reflect your trapezoid across the  $y$ -axis.

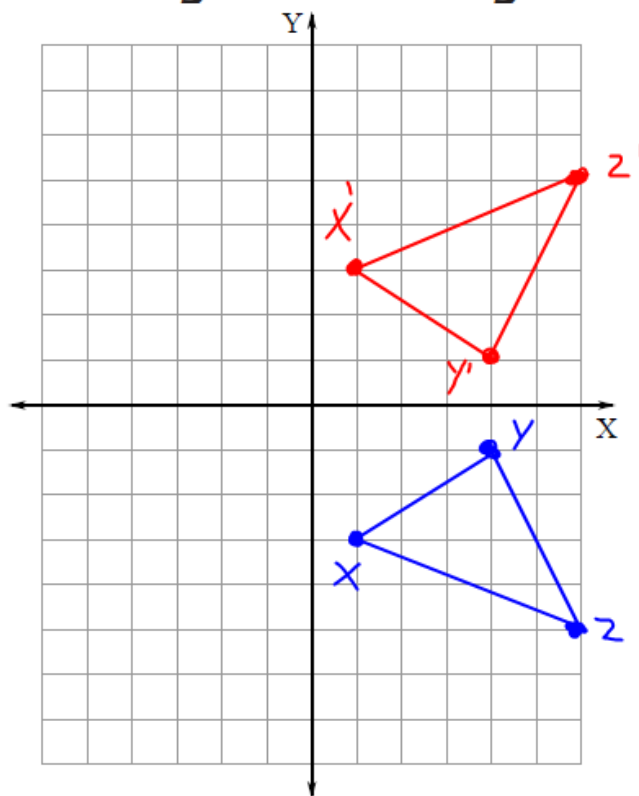


# Graphing Reflections

To reflect a figure across a line of reflection, reflect each of its vertices

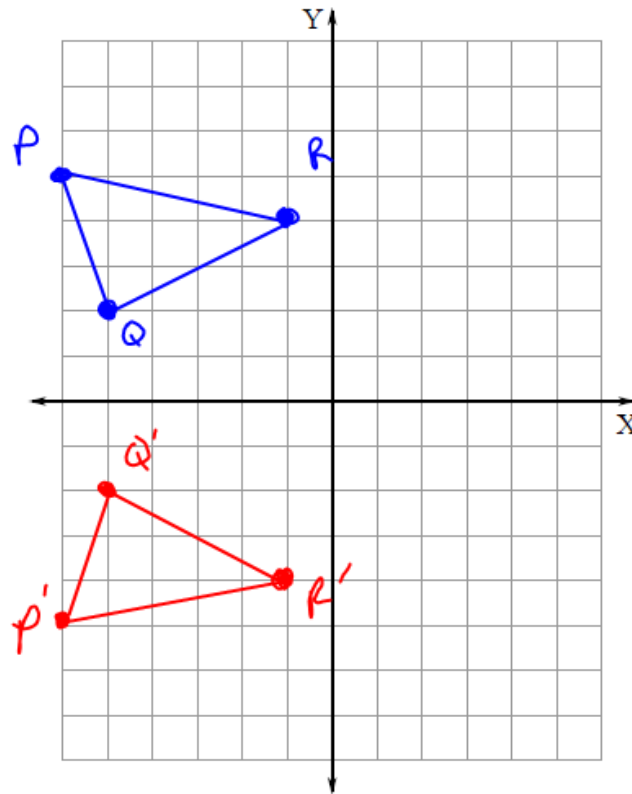
**EXAMPLE 1**

The figure shows triangle  $XYZ$ . Graph the image of the triangle after a reflection across the  $x$ -axis.



## ADDITIONAL EXAMPLE 1

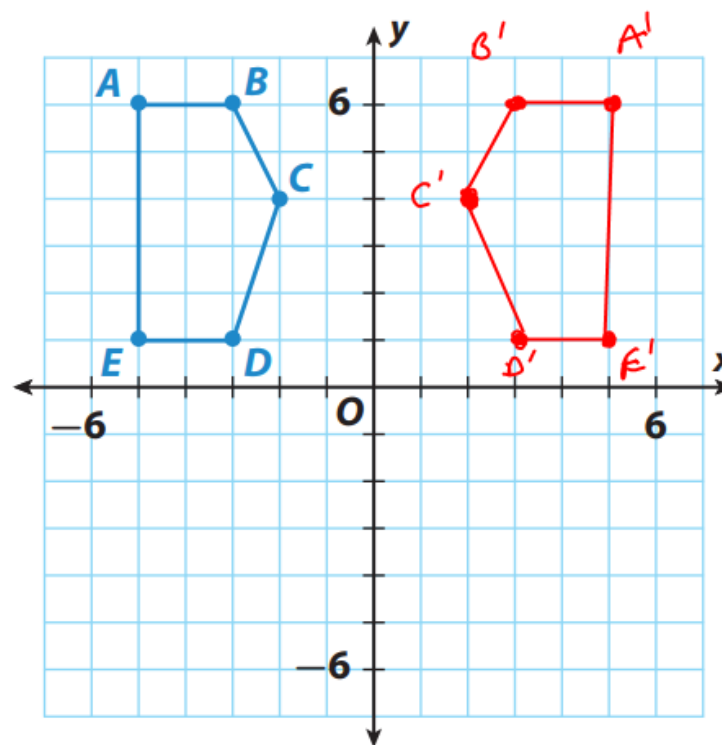
The figure shows triangle  $PQR$ . Graph the image of the triangle after a reflection across the  $x$ -axis.





**YOUR TURN**

4. The figure shows pentagon  $ABCDE$ . Graph the image of the pentagon after a reflection across the  $y$ -axis.



# Reflection Calculation

Reflecting across  
the x-axis

Keep the x, opposite y  
 $A(1,2) \rightarrow A'(1,-2)$

Reflecting across  
the y-axis

opposite x, keep the y  
 $A(5,7) \rightarrow A'(-5,7)$

**EXAMPLE 2**

Rectangle  $RSTU$  has vertices  $R(-4, -1)$ ,  $S(-1, -1)$ ,  $T(-1, -3)$ , and  $U(-4, -3)$ . Find the vertices of rectangle  $R'S'T'U'$  after a reflection across the y-axis. Then graph the rectangle and its image.

Reflect  $y$ -axis  $\Rightarrow$  opposite  $x$ , keep  $y$

$$R(-4, -1) \rightarrow R'(4, -1)$$

$$S(-1, -1) \rightarrow S'(1, -1)$$

$$T(-1, -3) \rightarrow T'(1, -3)$$

$$U(-4, -3) \rightarrow U'(4, -3)$$

Do algebraically

### ADDITIONAL EXAMPLE 2

Triangle  $PQR$  has vertices  $P(3, 3)$ ,  $Q(5, -1)$ , and  $R(1, -3)$ . Find the vertices of triangle  $P'Q'R'$  after a reflection across the  $y$ -axis. Then graph the triangle and its image.

$$\begin{aligned} P(3, 3) &\rightarrow P'(-3, 3) \\ Q(5, -1) &\rightarrow Q'(-5, -1) \\ R(1, -3) &\rightarrow R'(-1, -3) \end{aligned}$$

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**YOUR TURN***Do Algebraically*

2. Triangle  $ABC$  has vertices  $A(-2, 6)$ ,  $B(0, 5)$ , and  $C(3, -1)$ . Find the vertices of triangle  $A'B'C'$  after a reflection across the  $x$ -axis.
- 

$$A(-2, 6) \rightarrow A'(-2, -6)$$

$$B(0, 5) \rightarrow B'(0, -5)$$

$$C(3, -1) \rightarrow C'(3, 1)$$

## HW

G.P. p. 288 (1-2)  
I.P. p. 289 (4-11)  
G.P. p. 300 (#2)  
I.P. p. 301 (8-10)