

# Reflections

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Lesson 6.2

# Vocabulary:

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## Reflection -

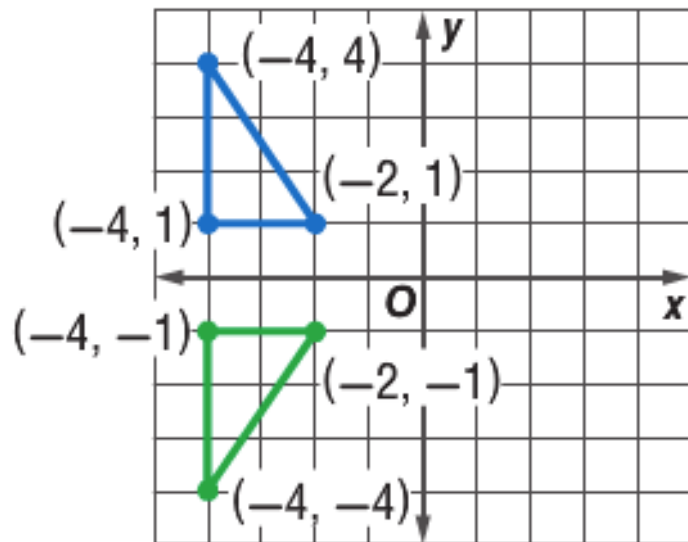
a mirror image of the original figure

## Line of Reflection -

the line over which a figure is reflected

# ▶ Reflections in the Coordinate Plane

Over the x-axis:

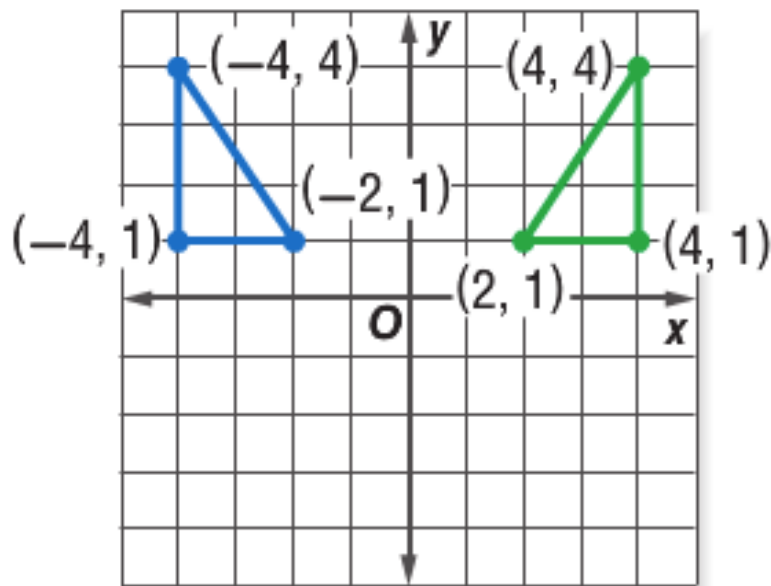


To reflect a figure over the x-axis, multiply the y-coordinates by  $-1$ .

$$(x, y) \rightarrow (x, -y)$$

## Reflections in the Coordinate Plane

Over the  $y$ -axis:



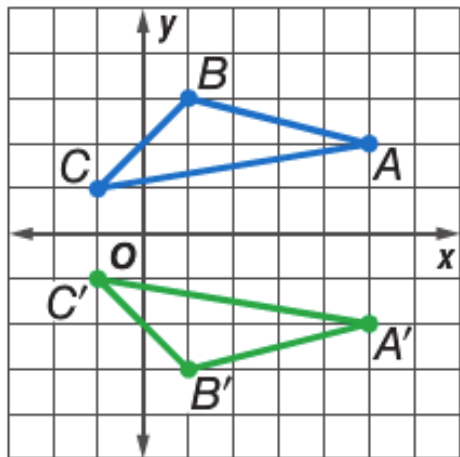
To reflect a figure over the  $y$ -axis, multiply the  $x$ -coordinates by  $-1$ .

$$(x, y) \rightarrow (-x, y)$$

# Examples

- 1.** Triangle  $ABC$  has vertices  $A(5, 2)$ ,  $B(1, 3)$ , and  $C(-1, 1)$ . Graph the figure and its reflected image over the  $x$ -axis. Then find the coordinates of the vertices of the reflected image.

The  $x$ -axis is the line of reflection. So, plot each vertex of  $A'B'C'$  the same distance from the  $x$ -axis as its corresponding vertex on  $ABC$ .



Point  $A$  is 2 units above the  $x$ -axis, . . .

. . . so point  $A'$  is plotted 2 units below the  $x$ -axis

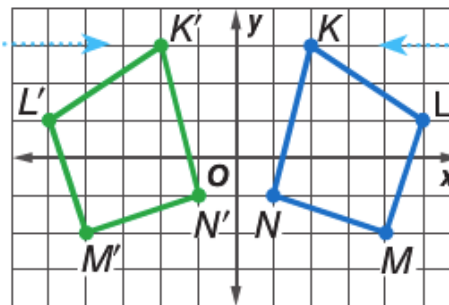
The coordinates are  $A'(5, -2)$ ,  $B'(1, -3)$ , and  $C'(-1, -1)$ .

## Examples

- 2.** Quadrilateral  $KLMN$  has vertices  $K(2, 3)$ ,  $L(5, 1)$ ,  $M(4, -2)$ , and  $N(1, -1)$ . Graph the figure and its reflection over the  $y$ -axis. Then find the coordinates of the vertices of the reflected image.

The  $y$ -axis is the line of reflection. So, plot each vertex of  $K'L'M'N'$  the same distance from the  $y$ -axis as its corresponding vertex on  $KLMN$ .

Point  $K'$  is 2 units to the left of the  $y$ -axis.

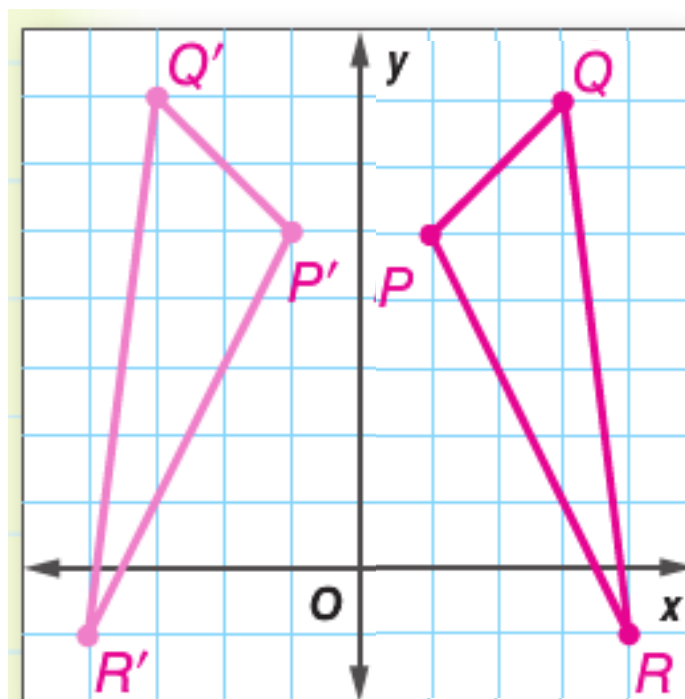


Point  $K$  is 2 units to the right of the  $y$ -axis.

The coordinates are  $K'(-2, 3)$ ,  $L'(-5, 1)$ ,  $M'(-4, -2)$ , and  $N'(-1, -1)$ .

**Got It?** Do this problem to find out.

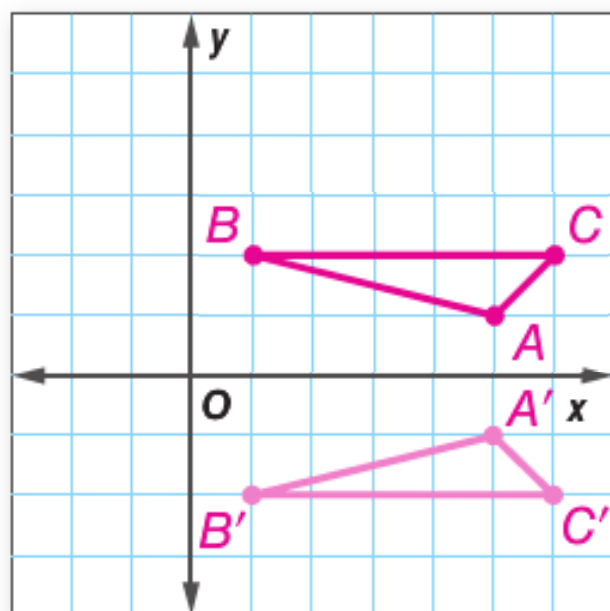
- a. Triangle  $PQR$  has vertices  $P(1, 5)$ ,  $Q(3, 7)$ , and  $R(4, -1)$ . Graph the figure and its reflection over the  $y$ -axis. Then find the coordinates of the reflected image.



$P'(-1, 5)$ ,  $Q'(-3, 7)$ ,  
 $R'(-4, -1)$

**Got It?** Do this problem to find out.

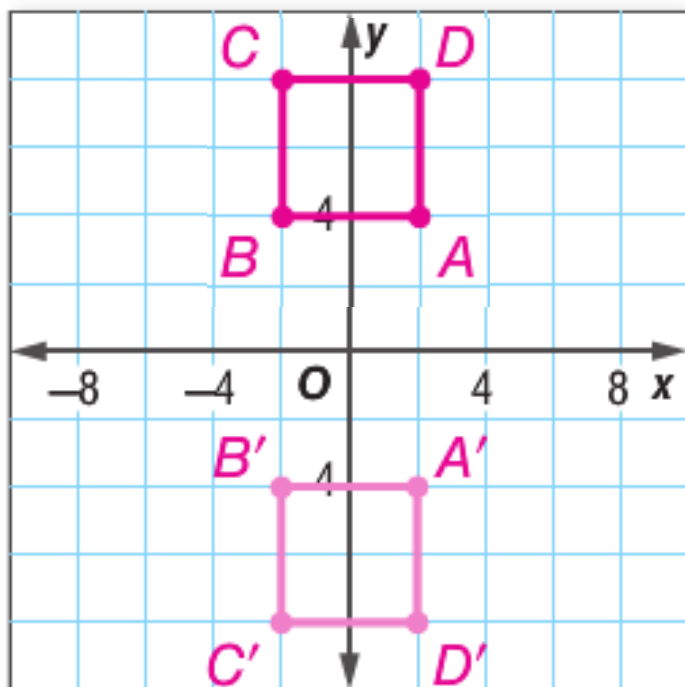
Graph  $\triangle ABC$  with vertices  $A(5, 1)$ ,  $B(1, 2)$ , and  $C(6, 2)$  and its reflection over the  $x$ -axis. Then find the coordinates of the image.



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

**Got It?** Do this problem to find out.

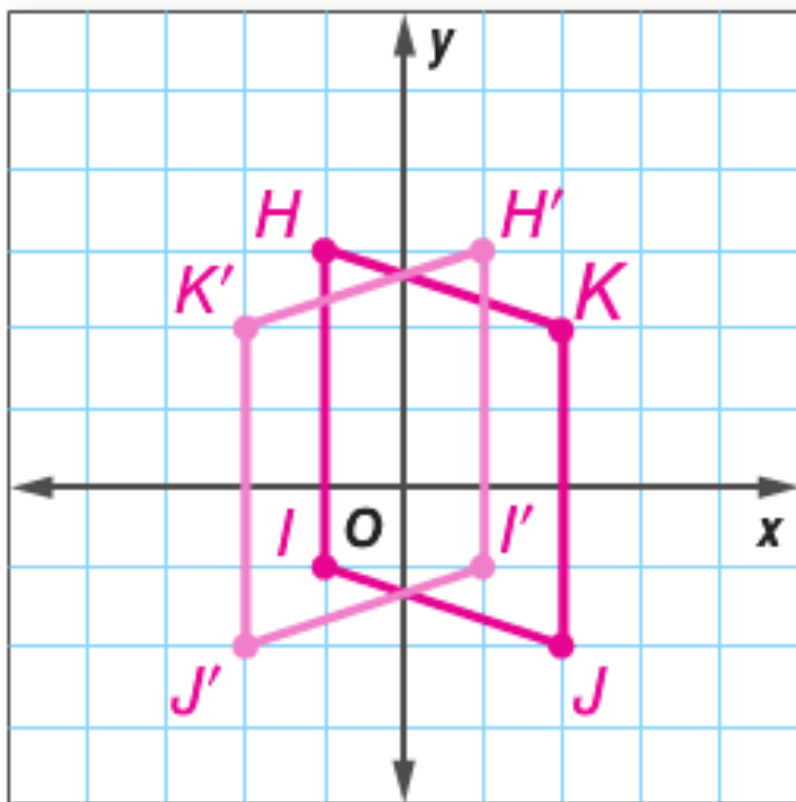
square  $ABCD$  with vertices  $A(2, 4)$ ,  $B(-2, 4)$ ,  $C(-2, 8)$ , and  $D(2, 8)$  over the  $x$ -axis



$A'(2, -4)$ ,  $B'(-2, -4)$ ,  $C'(-2, -8)$ ,  $D'(2, -8)$

**Got It?** Do this problem to find out.

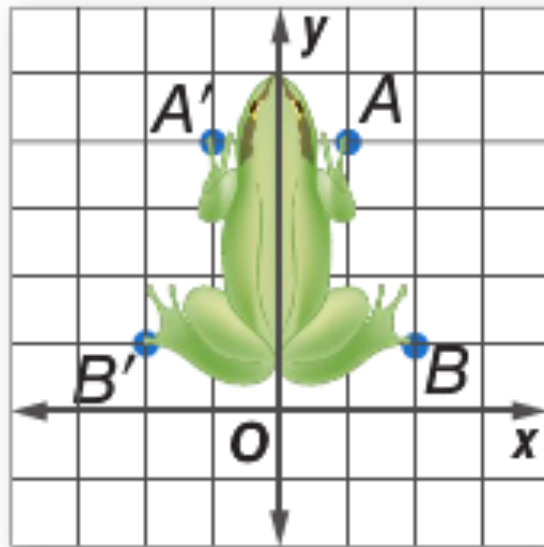
parallelogram  $HIJK$  with vertices  $H(-1, 3)$ ,  $I(-1, -1)$ ,  $J(2, -2)$ , and  $K(2, 2)$  over the  $y$ -axis



$H'(1, 3)$ ,  $I'(1, -1)$ ,  $J'(-2, -2)$ ,  $K'(-2, 2)$

## Examples

- 3.** The figure below is reflected over the  $y$ -axis. Find the coordinates of point  $A'$  and point  $B'$ . Then sketch the figure and its image on the coordinate plane.



Point  $A$  is located at  $(1, 4)$ . Point  $B$  is located at  $(2, 1)$ .  
Since the figure is being reflected over the  $y$ -axis, multiply the  $x$ -coordinates by  $-1$ .

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

$$B(2, 1) \rightarrow B'(-2, 1)$$

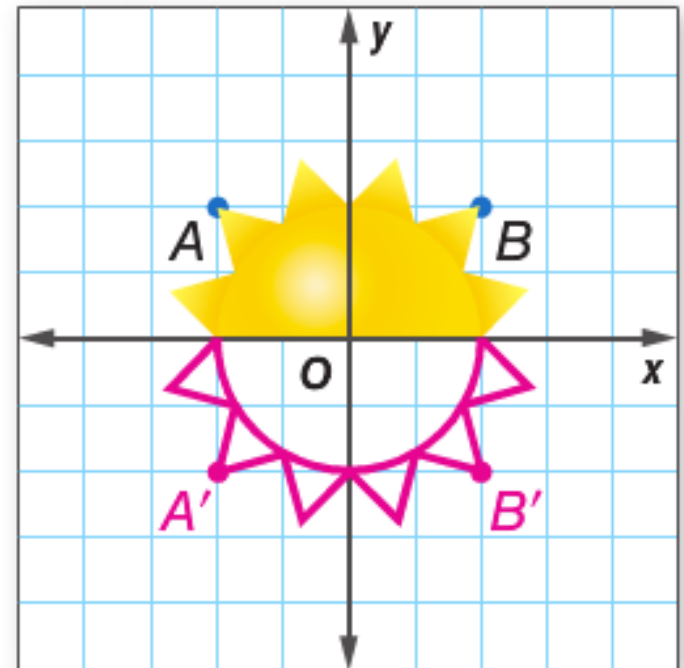
**Got It?** Do this problem to find out.

- b. The figure at the right is reflected over the  $x$ -axis. Find the coordinates of point  $A'$  and point  $B'$ . Then sketch the image on the coordinate plane.

$$(x, y) \rightarrow (x, -y)$$

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

$$B(2, 2) \rightarrow B'(2, -2)$$



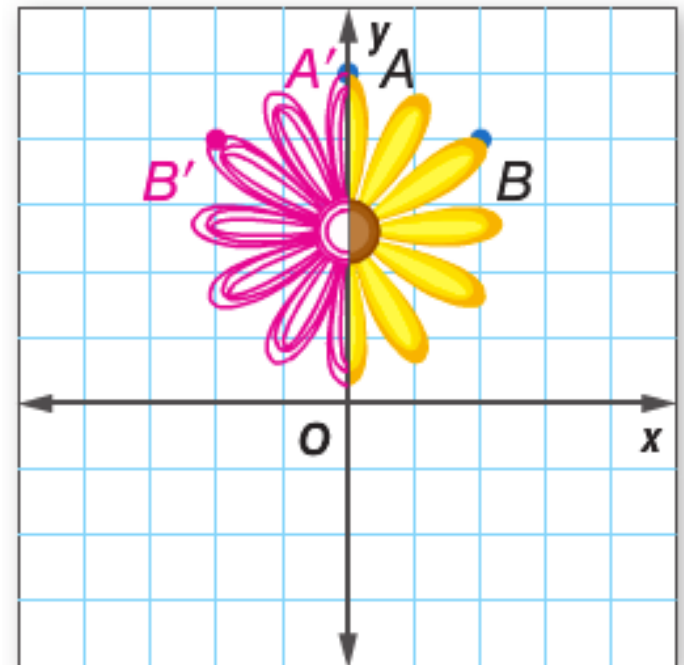
**Got It?** Do this problem to find out.

The figure is reflected over the  $y$ -axis. Find the coordinates of point  $A'$  and point  $B'$ . Then sketch the image on the coordinate plane. (Example 3)

$$(x, y) \rightarrow (-x, y)$$

$$A (0, 5) \rightarrow \underline{A'(0, 5)}$$

$$B (2, 4) \rightarrow \underline{B'(-2, 4)}$$



# Homework:

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**Pg. 465-468**

# 1-7 (all), #13-25 (odds)