

In a reflection, you flip a figure over a line. This line is called a line of reflection (or symmetry).
A reflection does not change the shape or size of the figure.

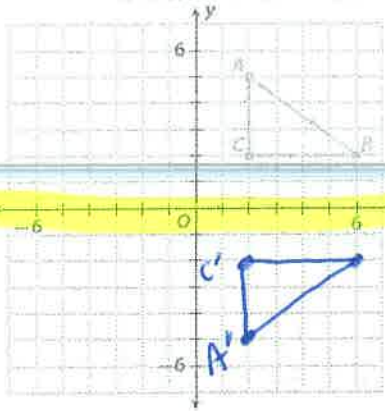
To reflect a point over the x-axis, use the same x-coordinate and multiply the y-coordinate by -1.

To reflect a point over the y-axis, use the same y-coordinate and multiply the x-coordinate by -1.

$(x, -y)$
 $(-x, y)$

Reflect $\triangle ABC$ across the x-axis.

Reflect over x: x is same, -y



A (2, 5)

A' (2, -5)

B (6, 2)

B' (6, -2)

C (2, 2)

C' (2, -2)

Complete the table below. Write the algebraic representation of the reflection over the x-axis.

Vertices of $\triangle ABC$	Algebraic Representation across the x-axis $(x, y) \rightarrow (x, -y)$	Vertices of $\triangle A'B'C'$
A (2, 5)	$(2, 5 \cdot -1)$	(2, -5)
B (6, 2)	$(6, 2 \cdot -1)$	(6, -2)
C (2, 2)	$(2, 2 \cdot -1)$	(2, -2)

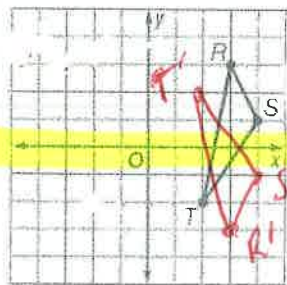
Write the algebraic representation of the reflection over the y-axis. Complete the table below.

Vertices of $\triangle ABC$	Algebraic Representation across the y-axis $(x, y) \rightarrow (-x, y)$	Vertices of $\triangle A''B''C''$
A (2, 5)	$(2 \cdot -1, 5)$	(-2, 5)
B (6, 2)	$(6 \cdot -1, 2)$	(-6, 2)
C (2, 2)	$(2 \cdot -1, 2)$	(-2, 2)

Reflect over y: -x; y is same

Example 2: Write an algebraic representation of the reflection of $\triangle RST$ across the x-axis. Then reflect the figure on the coordinate plane.

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



Example 3:

Point $A(4.5, 2.5)$ is reflected across the x-axis. Write an algebraic representation of the reflection. What are the coordinates of A' ?

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

$$A'(4.5, 2.5 \rightarrow -1) \rightarrow A'(4.5, -2.5)$$

Example 4:

Point $B(-3, 2)$ is reflected to become $B'(-3, -2)$. Which axis was the reflection across?

Same x ; opposite y so reflection across x -axis.

Example 5:

The vertices of the pre-image are $A(-2, 3)$, $B(0, 5)$, $C(3, 1)$, $D(-3, -3)$. Determine the coordinates of $A'B'C'D'$ after a reflection across the y-axis.

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

$$A'(-2, 3) \quad B'(0, 5) \quad C'(-3, 1) \quad D'(3, -3)$$

Extend The Math:

Point $G(1, 3)$ is translated 7 units right and 4 units down. Then it is reflected across the x -axis. Finally, it is translated 2 units up. What is the final location of this point? ☺

$$G(1, 3) \xrightarrow{G'} (x, y) \rightarrow (x+7, y-4)$$

$$G'(1+7, 3-4) \rightarrow G'(8, -1)$$

$$G'(8, -1) \xrightarrow{G''} (x, y) \rightarrow (x, -y) \quad G''(8, 1)$$

$$G''(8, 1) \xrightarrow{G'''} (x+0, y+2)$$

$$G'''(8+0, 1+2) \rightarrow G'''(8, 3)$$