

7-2 Reflections

Date _____

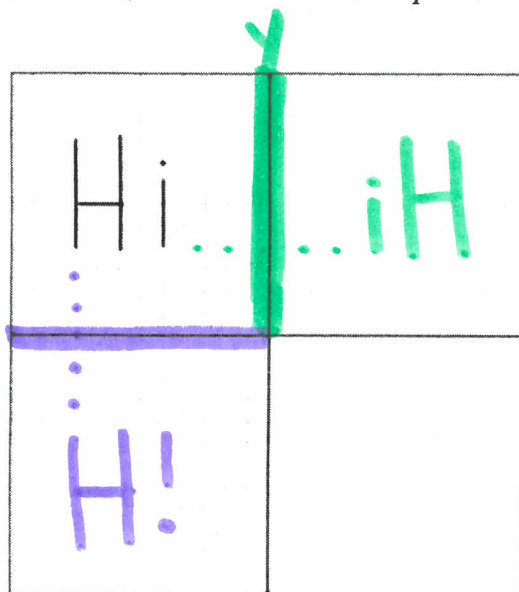
Learning Target: *I can reflect figures to create congruent images with and without a coordinate plane.*

Warm Up: Can you reflect the word "Hi" over the y-axis? If so, what would it look like?

Hi

Then, can you reflect the original word "Hi" over the x-axis? If so, what would its image look like?

Hi



Guided Practice:

A **Reflection** (FLIP) of a point or a figure is another type of basic rigid motion.

- A reflection may be thought of as the **MIRROR IMAGE** of the point or figure, with an axis serving as the line is called the line of reflection.
- Each image must be the same distance away from the line of reflection as the pre-image.
- Reflections preserve side lengths and angle measurements.
- Orientation is **not** preserved

Exercise 1- Triangle ABC is plotted on the coordinate *plane to the right*.

- Write the coordinates of the vertices of $\triangle ABC$.
- **Reflect** triangle ABC over the x-axis.

What are the coordinates of triangle A'B'C'?

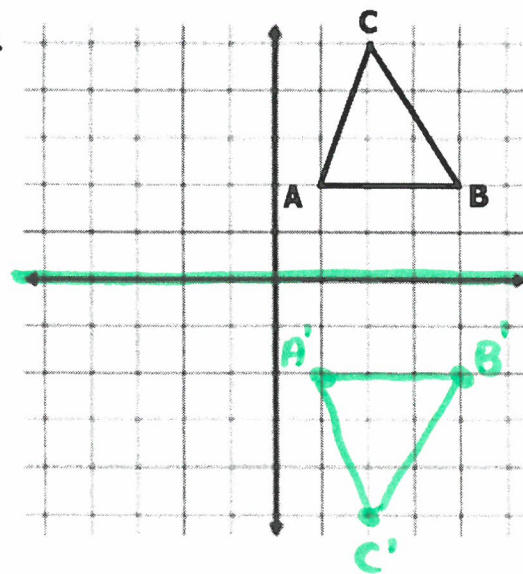
$$A(1, 2) \rightarrow A'(1, -2)$$

$$B(4, 2) \rightarrow B'(4, -2)$$

$$C(2, 5) \rightarrow C'(2, -5)$$

What do you notice about prime coordinates from the original points?

*x-stayed the same,
y-switched sign!*



Rule:

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

Exercise 2- Rectangle PQRS is plotted on the coordinate plane below.

- Write the coordinates of the vertices of rectangle PQRS.
- Reflect rectangle PQRS over the y-axis.

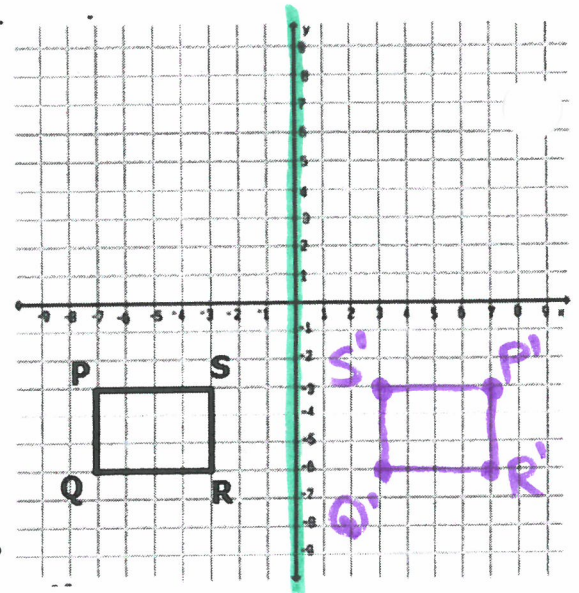
What are the coordinates of P'Q'R'S'?

$$P(-7, -3) \rightarrow P'(7, -3)$$

$$Q(-7, -6) \rightarrow Q'(7, -6)$$

$$R(-3, -6) \rightarrow R'(3, -6)$$

$$S(-3, -3) \rightarrow S'(3, -3)$$



What do you notice about prime coordinates from the original points?

y-value stayed same,
x-value switched sign!

Rule:

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

Exercise 3-

- Plot the following points to form $\triangle ABC$: A(-7, 0), B(-5, 7), C(-3, 0)
- Reflect $\triangle ABC$ over the x-axis.

What are the coordinates of the image of $\triangle ABC$?

$$A'(-7, 0) \quad B'(-5, -7) \quad C'(-3, 0)$$

What quadrant is $\triangle ABC$ in? Quadrant 2

What quadrant is $\triangle A'B'C'$ in? Quadrant 3

Compute the areas of $\triangle ABC$ and $\triangle A'B'C'$.

Area of $\triangle ABC$

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(4)(7)$$

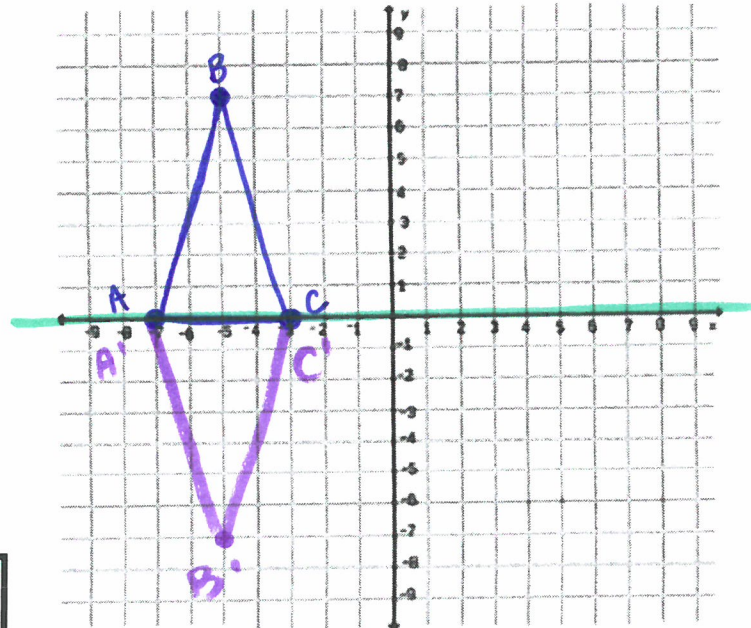
$$A = 14$$

Area of $\triangle A'B'C'$

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(4)(7)$$

$$A = 14$$

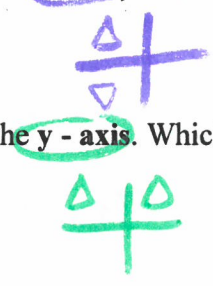


**What do you notice about the areas? Explain.

Area is the same because dimensions & size are preserved with reflections.

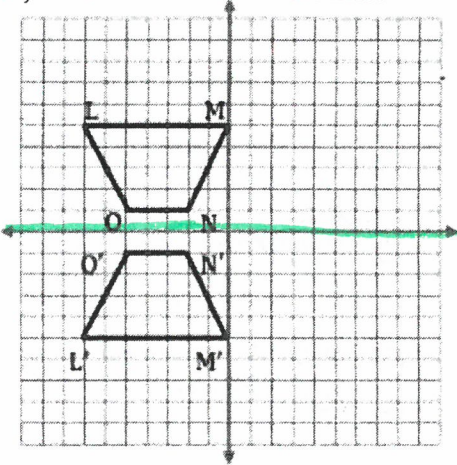
Problem Set:

1. A triangle is located in Quadrant II. If the triangle is reflected over the x-axis, in which quadrant does the triangle lie in? 3
2. A triangle is drawn entirely in Quadrant II. It is then reflected over the y-axis. Which quadrant will the image of the triangle be in now? 1



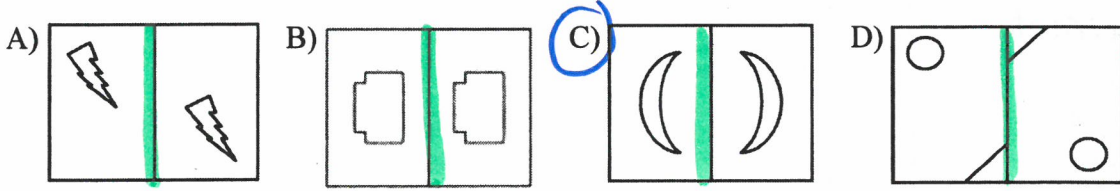
3. Figure LMNO and its image after a transformation, Figure L'M'N'O', are shown on the coordinate plane below. The two figures are congruent.

How was Figure LMNO transformed to create the congruent Figure L'M'N'O'?



- A) It was reflected across the x-axis.
- B) It was reflected across the y-axis.
- C) It was translated 9 units to the right.
- D) It was rotated 90 degrees clockwise around the origin.

4. Which drawing best represents a reflection over the vertical line segment in the center of the rectangle?



5. **Complete the following:**

- Plot the points to form quadrilateral ABCD
 $A(0,0)$, $B(0,-7)$, $C(-6,-6)$, $D(-6,1)$
- Reflect quadrilateral ABCD over the y-axis.

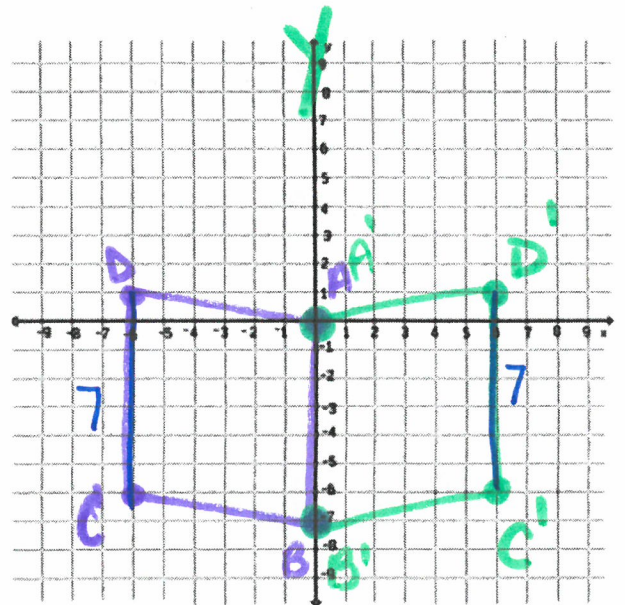
What are the coordinates of the **image** of ABCD?

$A'(0, 0)$ $B'(0, -7)$
 $C'(6, -6)$ $D'(6, 1)$

What is the length of side DC? 7

What is the length of side D'C'? 7

If $m\angle C = 110^\circ$, what is $m\angle C'$? 110



**Because size + angle measures are preserved. Reflection is a "rigid motion".*