

7.5

Glide Reflections and Compositions

- Goals**
- Identify glide reflections in a plane.
 - Represent transformations as compositions of simpler transformations.

VOCABULARY

Glide reflection

Composition

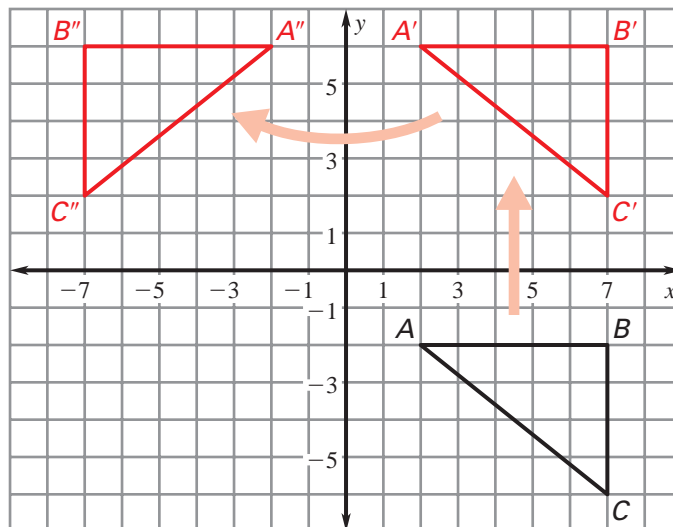
Example 1 Finding the Image of a Glide Reflection

Sketch the image of $\triangle ABC$ after a glide reflection.

Translation: $(x, y) \rightarrow (x, y + 8)$

Reflection: in the y-axis

Translate $\triangle ABC$ by moving it units to produce $\triangle A'B'C'$.
 The vertices of $\triangle A'B'C'$ are $A'(\underline{\quad}, \underline{\quad})$, $B'(\underline{\quad}, \underline{\quad})$, and $C'(\underline{\quad}, \underline{\quad})$.
 Next, reflect $\triangle A'B'C'$ in the y-axis to produce $\triangle A''B''C''$. Its vertices are $A''(\underline{\quad}, \underline{\quad})$, $B''(\underline{\quad}, \underline{\quad})$, and $C''(\underline{\quad}, \underline{\quad})$.



- ✓ **Checkpoint** Write the coordinates of the image of $P(4, -2)$ after the given glide reflection.

<p>1. Translation: $(x, y) \rightarrow (x + 4, y)$ Reflection: in the x-axis</p>	<p>2. Translation: $(x, y) \rightarrow (x, y - 6)$ Reflection: in the y-axis</p>
-----------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------

THEOREM 7.6: COMPOSITION THEOREM

The composition of two (or more) isometries is an isometry.

Example 2 *Finding the Image of a Composition*

Sketch the image of \overline{MN} after a composition of the given rotation and reflection.

$M(-4, 2), N(-2, 5)$

Rotation: 90° clockwise about the origin

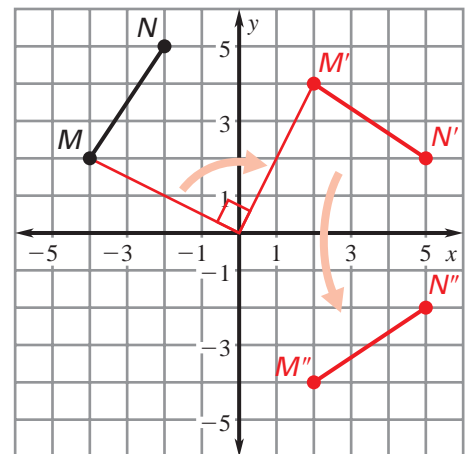
Reflection: in the x -axis

Solution

The graph of \overline{MN} is shown.

Rotate \overline{MN} 90° about the origin to produce $\overline{M'N'}$. The endpoints of $\overline{M'N'}$ are $M'(_, _)$ and $N'(_, _)$.

Reflect $\overline{M'N'}$ in the x -axis to produce $\overline{M''N''}$. The endpoints of $\overline{M''N''}$ are $M''(_, _)$ and $N''(_, _)$.

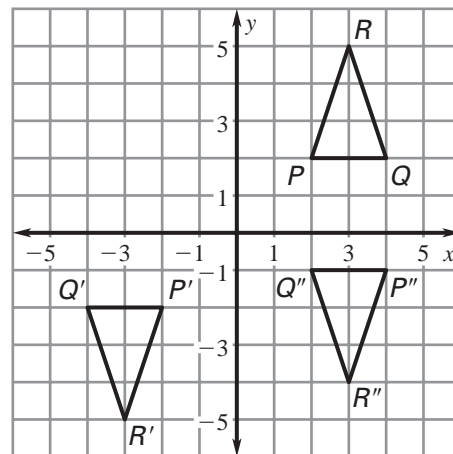


Example 3 Describing a Composition

Describe the composition of transformations in the diagram.

Solution

Two transformations are shown. First, $\triangle PQR$ is rotated 180° about the origin to produce $\triangle P'Q'R'$. Then $\triangle P'Q'R'$ is translated using $(x, y) \rightarrow (x + 2, y - 2)$ to produce $\triangle P''Q''R''$.



- ✔ **Checkpoint** Write the coordinates of the image of $A(-3, 5)$ after a composition using the given transformations in the order they appear.

<p>3. Translation: $(x, y) \rightarrow (x + 9, y - 8)$ Rotation: 90° counterclockwise about the origin</p>	<p>4. Rotation: 180° about the origin Reflection: in the y-axis</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------

Describe the composition of the transformations.

<p>5.</p>	<p>6.</p>
------------------	------------------