

Discovering Patterns in Transformations

Double Reflection over Lines Parallel to the Axes

Place the Geoboard Template under your Communicator.

Set up your geoboard for quadrant I. Draw the lines $x = 3$ and $x = 7$

Draw a scalene triangle that is completely in Quadrant I to the left of the line $x = 3$. Name the vertices A, B, and C.

Record the coordinates of each vertex in the chart below.

<i>Coordinates of A</i>	<i>Coordinates of B</i>	<i>Coordinates of C</i>

First reflect the triangle over the line $x = 3$. Then take the image and reflect it over the line $x = 7$.

Label the corresponding vertices of the new triangle A', B' and C'. Record their coordinates in the chart below.

<i>Coordinates of A'</i>	<i>Coordinates of B'</i>	<i>Coordinates of C'</i>

Study the change made in the coordinates to find a pattern.

Let's try it again.

Draw the lines $y = 3$ and $y = 7$. Draw a scalene triangle that is completely in Quadrant I but below the line $y = 3$. Name the vertices A, B, and C.

Record the coordinates of each vertex in the chart below.

<i>Coordinates of A</i>	<i>Coordinates of B</i>	<i>Coordinates of C</i>

First reflect the triangle over the line $y = 3$. Then take the image and reflect it over the line $y = 7$.

Label the corresponding vertices of the new triangle A' , B' and C' . Record their coordinates in the chart below.

<i>Coordinates of A'</i>	<i>Coordinates of B'</i>	<i>Coordinates of C'</i>

Study the change made in the coordinates to find a pattern.

If you started with a polygon that had a vertex $(3,1)$ and you reflected it first over the line $x = 4$ and then reflected the image over the line $x = 7$, what would the new coordinate be? _____

If you started with a polygon that had a vertex $(3,1)$ and you reflected it first over the line $y = 4$ and then reflected the image over the line $y = 7$, what would the new coordinate be? _____

This means that a double reflection over vertical parallel lines is really like

_____.

This means that a double reflection over horizontal parallel lines is really like

_____.

If you started with a polygon that had a vertex (x,y) and you first reflect it over the line $x = a$ and then over the line $x = b$, it would be equivalent to

_____.