

Transformation #2: Reflections

Lesson Objective

INBAT perform reflections across the ~~x-axis~~ & y-axis, perform glide reflections, and

Reflection: A reflection is a transformation that uses a line like a mirror to reflect a figure. identify lines of symmetry

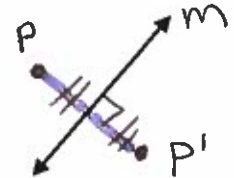
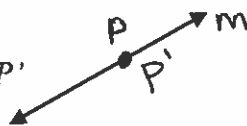
→ The "mirror" is called the line of reflection

A reflection in a line m maps every point P in the plane to a point P' , so that for each point one of the following properties is true:

1. If P is NOT on line m , then m is the $\perp$ bisector of $\overline{PP'}$

OR

2. If P is ON line m , then $P = P'$



Reflection across the x- and y-axis

From our Exploration, we saw that...

1. When $\triangle ABC$ is reflected across the y-axis, the y-coordinates stayed the same and the x-coordinates had the opposite signs
2. When $\triangle ABC$ is reflected across the x-axis, the x-coordinates stayed the same and the y-coordinates had the opposite signs

From these observations, we can make the following rules:

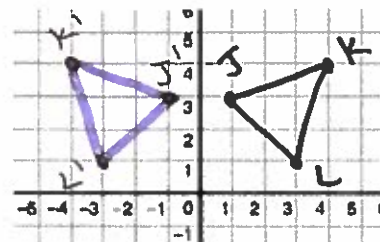
If (x, y) is reflected in the y-axis, then its image is the point $(-x, y)$

If (x, y) is reflected in the x-axis, then its image is the point $(x, -y)$

Example:

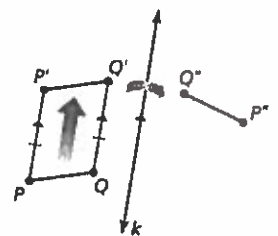
1. The vertices of $\triangle JKL$ are $J(1, 3)$, $K(4, 4)$ and $L(3, 1)$.
Graph the image of $\triangle JKL$ after a reflection in the y-axis

$J'(-1, 3)$ $K'(-4, 4)$ $L'(-3, 1)$



Glide Reflection: A glide reflection is a transformation involving a translation followed by a reflection in which every point P is mapped to P'' by the following steps:

1. First, a translation maps P to P'
2. Then, a reflection in a line parallel to the direction of the translation maps P' to P''

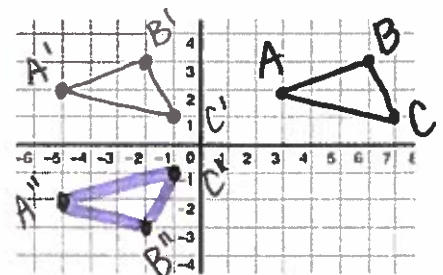


Example:

2. Graph $\triangle ABC$ with vertices $A(3, 2)$, $B(6, 3)$ and $C(7, 1)$ and its image after the glide reflection.

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

Reflection: in the x-axis



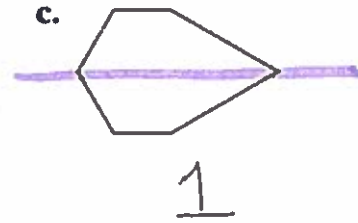
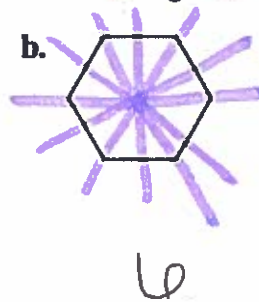
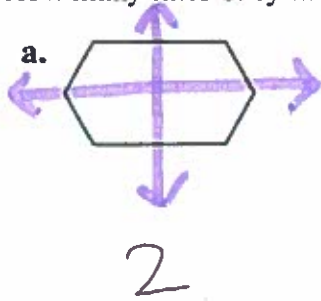
Line Symmetry: A figure in the plane has line symmetry when the figure can be mapped onto itself by a reflection in a line.

→ The line of reflection is a line of symmetry, such as line m here:



Example:

3. How many lines of symmetry does each hexagon have? Draw them in with a highlighter.



★ a figure has line symmetry if it has a line of symmetry.