Lesson 7-2

Example 1

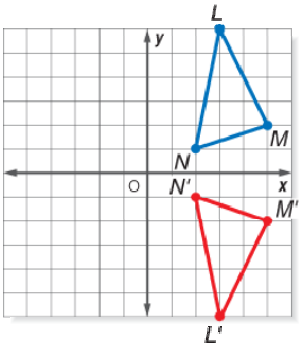
Graph the image of $\triangle LMN$ with vertices $L(3, 6)$, $M(5, 2)$, and $N(2, 1)$ reflected across the x-axis.

Solution

First graph $\triangle LMN$. Multiply the y-coordinate of each vertex by –1.

$L(3, 6) \rightarrow L'(3, -6)$
$M(5, 2) \rightarrow M'(5, -2)$
$N(2, 1) \rightarrow N'(2, -1)$

Graph $\triangle L'M'N'$.



Example 2

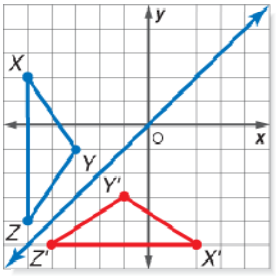
Graph the image of $\triangle XYZ$ with vertices $X(-5, 2)$, $Y(-3, -1)$, and $Z(-5, -4)$ under a reflection across the line y = x.

Solution

Graph $\triangle XYZ$ and the line $y = x$. Transpose the x-coordinate and y-coordinate of each vertex using the rule $(x, y) \rightarrow (y, x)$.

$X(-5, 2) \rightarrow X'(2, -5)$
$Y(-3, -1) \rightarrow Y'(-1, -3)$
$Z(-5, -4) \rightarrow Z'(-4, -5)$

Graph $\triangle X'Y'Z'$.



Example 3

ART Students in an art club are designing a new logo for the club. Carolyn is creating a pattern that shows a triangle and its reflected image. Triangle HJK has vertices $H(0, 4)$, $J(-4, -1)$, and $K(-1, -3)$; and its image has vertices $H'(2, 4)$, $J'(6, -1)$, and $K'(3, -3)$. Graph the triangles and find the line of reflection.

Solution

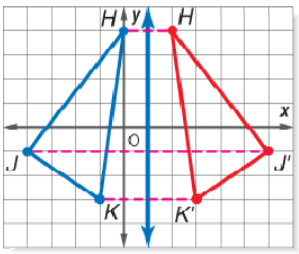
First graph $\triangle HJK$ and $\triangle H'J'K'$. Imagine line segments connecting each pair of corresponding vertices. Use the midpoint formula to find the midpoint of each of these three line segments. Recall the midpoint formula.

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) \quad \square \quad (x, y)$$

For $\overline{HH'}$, $M = \left(\frac{0 + 2}{2}, \frac{4 + 4}{2}\right) = \left(\frac{2}{2}, \frac{8}{2}\right) = (1, 4)$

For $\overline{JJ'}$, $M = \left(\frac{-4 + 6}{2}, \frac{-1 - 1}{2}\right) = \left(\frac{2}{2}, \frac{-2}{2}\right) = (1, -1)$

For $\overline{KK'}$, $M = \left(\frac{-1 + 3}{2}, \frac{-3 - 3}{2}\right) = \left(\frac{2}{2}, \frac{-6}{2}\right) = (1, -3)$



Draw a line through the midpoints. The equation of the line of reflection is $x = 1$.