

6-3: Line Reflections in the Coordinate Plane

A reflection in the y-axis

In the figure, $\triangle ABC$ is reflected in the y-axis.

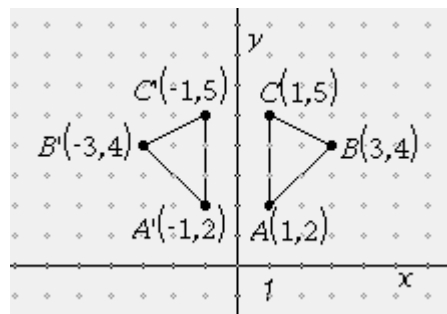
Its image under the reflection is $\triangle A'B'C'$.

From the figure we see that

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

$$B(3,4) \rightarrow B'(-3,4)$$

$$C(1,5) \rightarrow C'(-1,5)$$



Theorem: Under a reflection in the y-axis, the image of $P(a, b)$ is $P'(-a, b)$.

- We write: $r_{y\text{-axis}}(a, b) = (-a, b)$

A reflection in the x-axis

In the figure, $\triangle ABC$ is reflected in the x-axis.

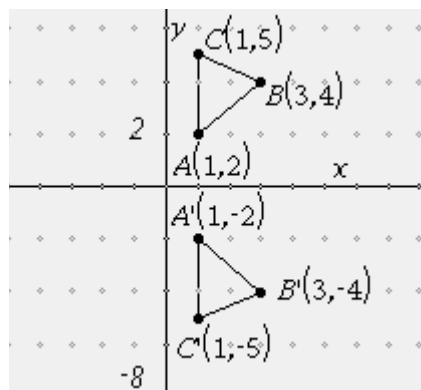
Its image under the reflection is $\triangle A'B'C'$.

From the figure we see that

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

$$B(3,4) \rightarrow B'(3,-4)$$

$$C(1,5) \rightarrow C'(1,-5)$$



Theorem: Under a reflection in the x-axis, the image of $P(a, b)$ is $P'(a, -b)$.

- We write: $r_{x\text{-axis}}(a, b) = (a, -b)$

A reflection in the line $y = x$

In the figure, $\triangle ABC$ is reflected in the line $y = x$.

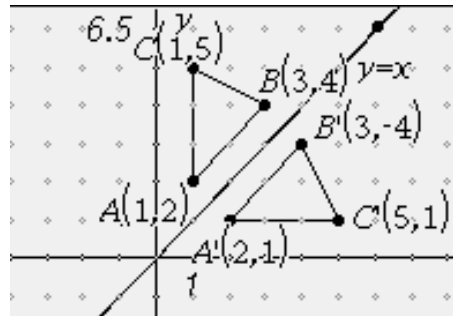
Its image under the reflection is $\triangle A'B'C'$.

From the figure we see that

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

$$B(3,4) \rightarrow B'(4,3)$$

$$C(1,5) \rightarrow C'(5,1)$$



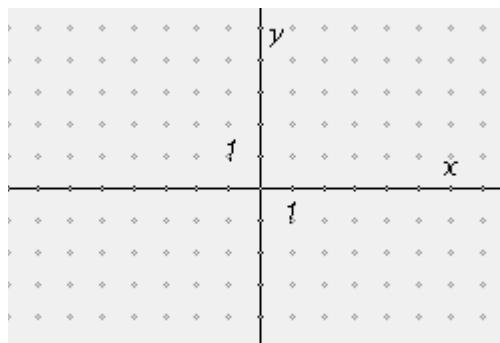
Theorem: Under a reflection in the line $y = x$, the image of $P(a, b)$ is $P'(b, a)$.

- We write: $r_{y=x}(a, b) = (b, a)$

Example:

The vertices of $\triangle DEF$ are $D(-2, -2)$, $E(0, -3)$, and $F(2, 0)$.

- Draw $\triangle DEF$.
- Draw the image of $\triangle DEF$ under a reflection in the line $y = x$.



Homework: