

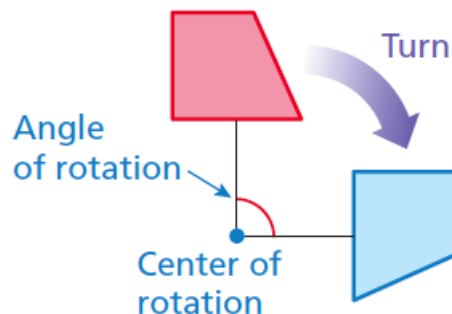
Rotations

Key Idea

Rotations

A **rotation**, or *turn*, is a transformation in which a figure is rotated about a point called the **center of rotation**. The number of degrees a figure rotates is the **angle of rotation**.

In a rotation, the original figure and its image are congruent.



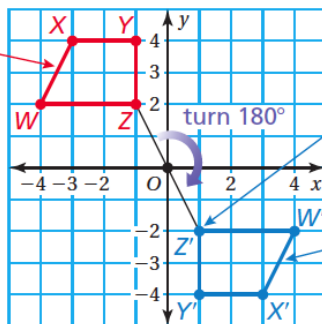
EXAMPLE 2 Rotating a Figure

The vertices of a trapezoid are $W(-4, 2)$, $X(-3, 4)$, $Y(-1, 4)$, and $Z(-1, 2)$. Rotate the trapezoid 180° about the origin. What are the coordinates of the image?

Study Tip

A 180° clockwise rotation and a 180° counterclockwise rotation have the same image. So, you do not need to specify direction when rotating a figure 180° .

Draw $WXYZ$.



Plot Z' so that segment OZ and segment OZ' are congruent and form a 180° angle.

Use a similar method to plot points W' , X' , and Y' . Connect the vertices.

❖ The coordinates of the image are $W'(4, -2)$, $X'(3, -4)$, $Y'(1, -4)$, and $Z'(1, -2)$.

EXAMPLE 3 Rotating a Figure

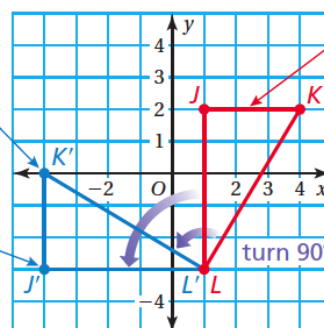
The vertices of a triangle are $J(1, 2)$, $K(4, 2)$, and $L(1, -3)$. Rotate the triangle 90° counterclockwise about vertex L . What are the coordinates of the image?

Common Error

Be sure to pay attention to whether a rotation is clockwise or counterclockwise.

Plot K' so that segment KL and segment $K'L$ are congruent and form a 90° angle.

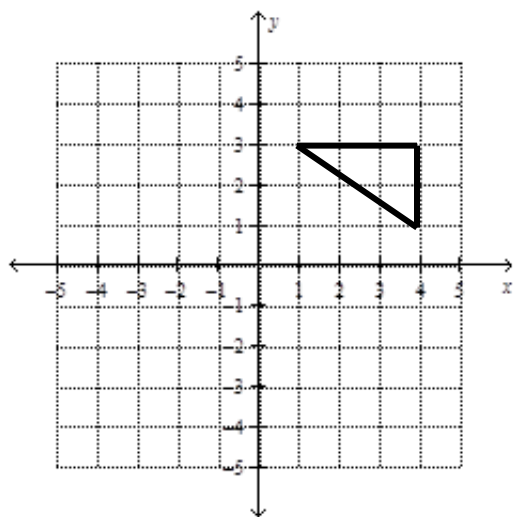
Use a similar method to plot point J' . Connect the vertices.



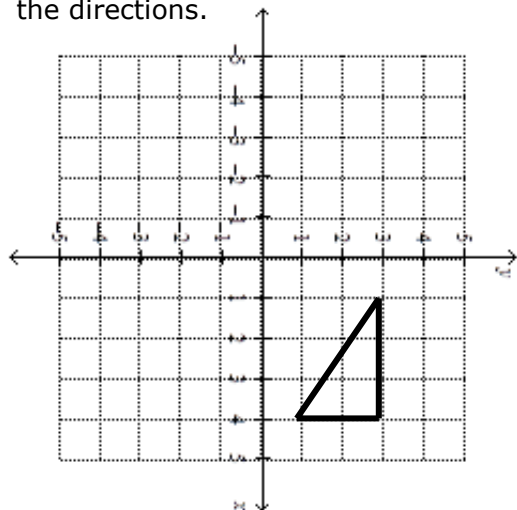
❖ The coordinates of the image are $J'(-4, -3)$, $K'(-4, 0)$, and $L'(1, -3)$.

How to do it yourself:

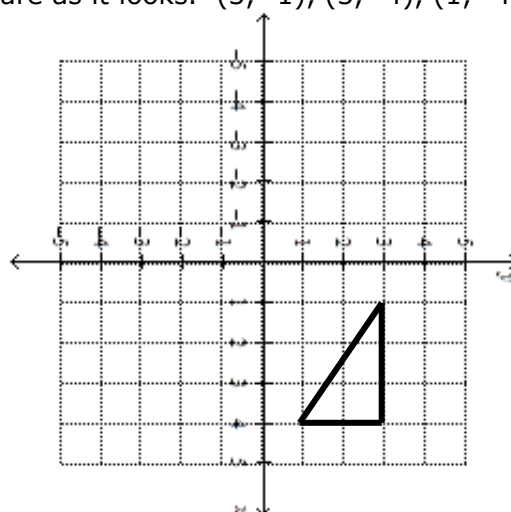
Rotate 90° clockwise around the origin.



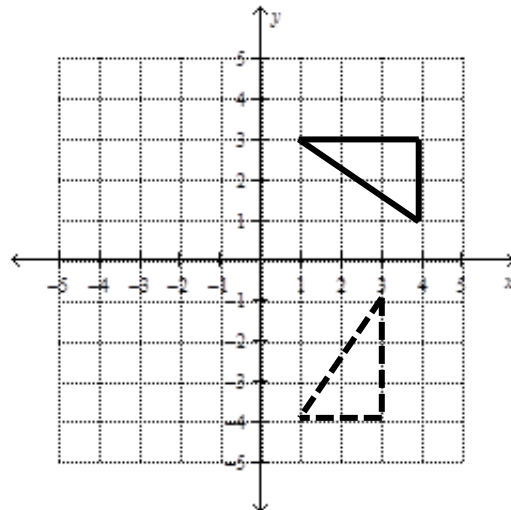
1 Rotate your paper according to the directions.



2 Write down the coordinates of the "new" figure as it looks. $(3, -1)$, $(3, -4)$, $(1, -4)$

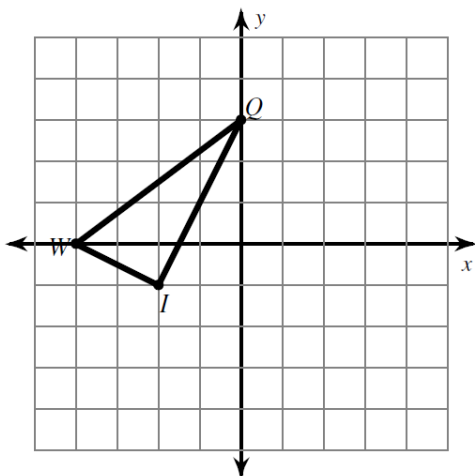


3 Turn your paper back and plot the points.

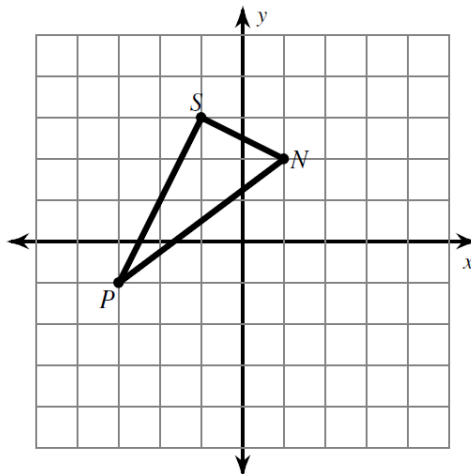


Practice:

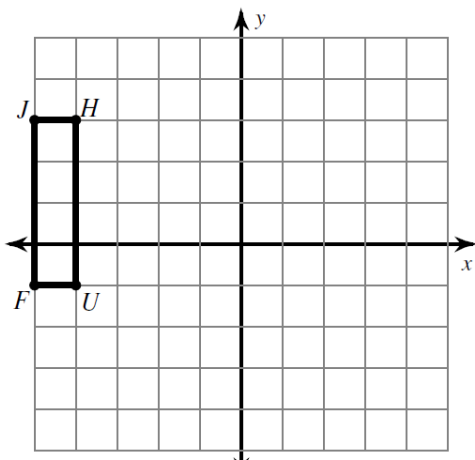
1) rotation 90° counterclockwise about the origin



2) rotation 180° about the origin



3) rotation 90° counterclockwise about the origin



4) rotation 180° about the origin

