



Rotations

Warm Up

Lesson Presentation

Lesson Quiz



Rotations

Objective

Identify and draw rotations.



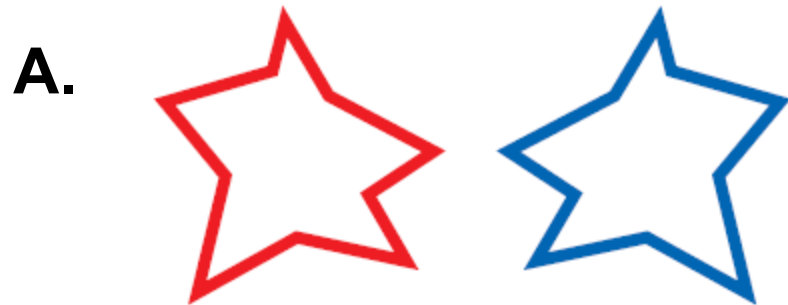
Rotations

Remember that a rotation is a transformation that turns a figure around a fixed point, called the center of rotation. A rotation is an isometry, so the image of a rotated figure is congruent to the preimage.

Rotations

Example 1: Identifying Rotations

Tell whether each transformation appears to be a rotation. Explain.



No; the figure appears to be flipped.



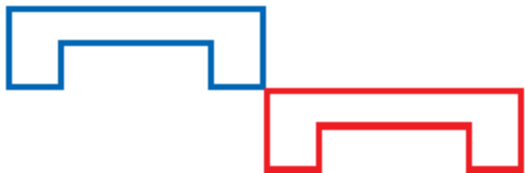
Yes; the figure appears to be turned around a point.

Rotations

Check It Out! Example 1

Tell whether each transformation appears to be a rotation.

a.



No, the figure appears to be a translation.

b.

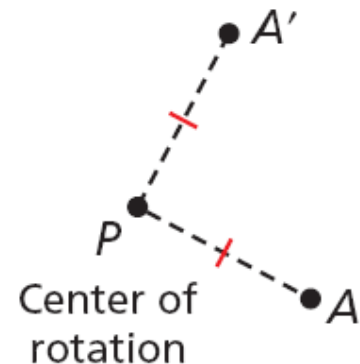


Yes, the figure appears to be turned around a point.

Rotations

Rotations

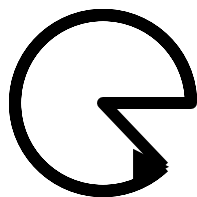
A rotation is a transformation about a point P , called the center of rotation, such that each point and its image are the same distance from P , and such that all angles with vertex P formed by a point and its image are congruent. In the figure, $\angle APA'$ is the angle of rotation.



Rotations

Helpful Hint

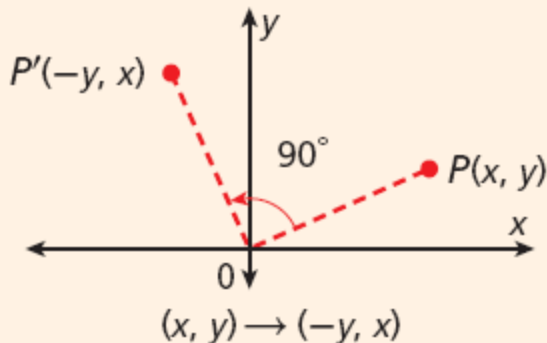
Unless otherwise stated, all rotations in this book are counterclockwise.



Rotations

Rotations in the Coordinate Plane

BY 90° ABOUT THE ORIGIN



$$(x, y) \rightarrow (-y, x)$$

90° Counter Clockwise

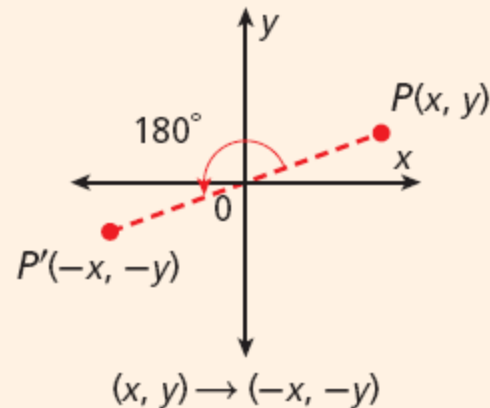
270° Clockwise

$$(x, y) \rightarrow (y, -x)$$

90° Clockwise

270° Counter Clockwise

BY 180° ABOUT THE ORIGIN



$$(x, y) \rightarrow (-x, -y)$$

180° same for CC & CW

Rotations

Example 3: Drawing Rotations in the Coordinate Plane

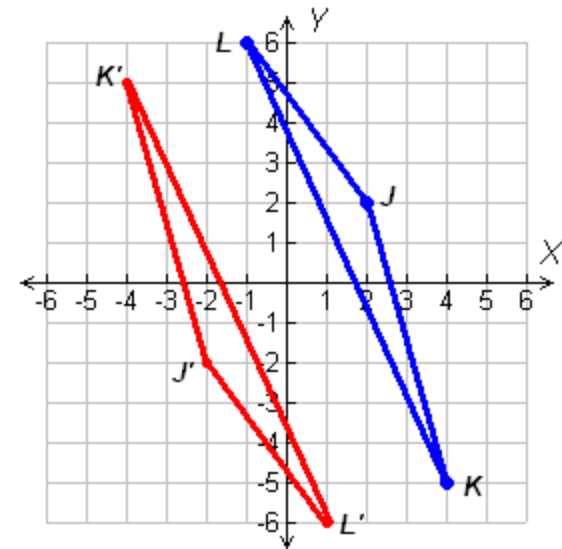
Rotate $\triangle JKL$ with vertices $J(2, 2)$, $K(4, -5)$, and $L(-1, 6)$ by 180° about the origin.

The rotation of (x, y) is $(-x, -y)$.

$$J(2, 2) \rightarrow J'(-2, -2)$$

$$K(4, -5) \rightarrow K'(-4, 5)$$

$$L(-1, 6) \rightarrow L'(1, -6)$$



Graph the preimage and image.

Rotations

Check It Out! Example 3

Rotate $\triangle ABC$ by 180° about the origin.

The rotation of (x, y) is $(-x, -y)$.

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

$$B(4, 1) \rightarrow B'(-4, -1)$$

$$C(3, 3) \rightarrow C'(-3, -3)$$

Graph the preimage and image.

