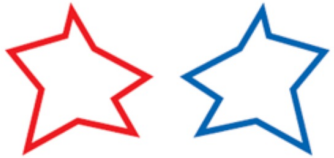
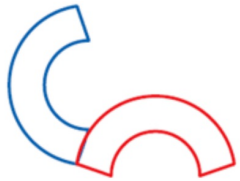
Warm Up

1. The translation image of $P(-3, -1)$ is $P'(1, 3)$. Find the translation image of $Q(2, -4)$.

Remember that a _____ is a transformation that _____ a figure around a _____ called the _____. A rotation is an _____, so the _____ of a rotated figure is _____ to the _____.

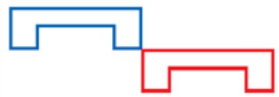
Tell whether each transformation appears to be a rotation. Explain.





Tell whether each transformation appears to be a rotation.

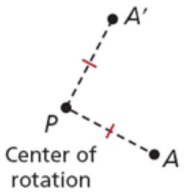
a.



b.

Rotations

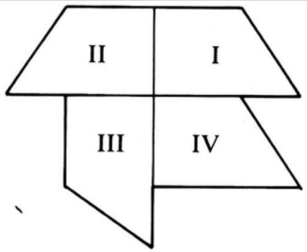
A rotation is a transformation about a point P, called the center of rotation, such that each point and its image are the same distance from P, and such that all angles with vertex P formed by a point and its image are congruent. In the figure, $\angle APA'$ is the angle of rotation.



Helpful Hint

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

20-23: State whether the specified trapezoid is mapped to the other trapezoid by a reflection, translation, rotation, or half-turn.



20) I to IV

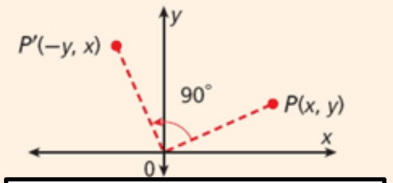
21) II to III

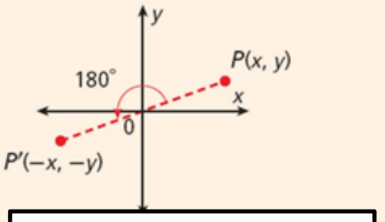
22) III to I

23) II to IV

Rotations in the Coordinate Plane

BY 90° ABOUT THE ORIGIN	BY 180° ABOUT THE ORIGIN





9-3 Rotations

Example 3: Drawing Rotations in the Coordinate Plane

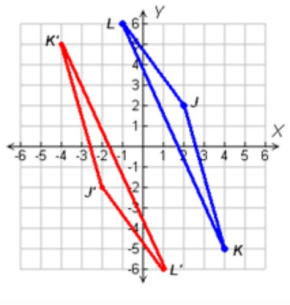
Rotate ΔJKL with vertices J(2, 2), K(4, −5), and L(−1, 6) by 180° about the origin.

The rotation of (*x*, *y*) is

J(2, 2) →

K(4, −5) →

L(−1, 6) →



Graph the preimage and image.

9-3 Rotations

Check It Out! Example 3

Rotate ΔABC by 180° about the origin.

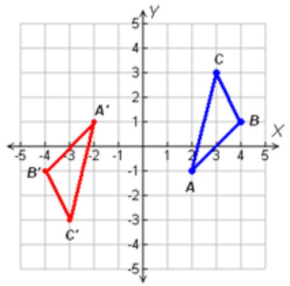
The rotation of (*x*, *y*) is

A(2, −1) →

B(4, 1) →

C(3, 3) →

Graph the preimage and image.



Rotate $\triangle ABC$ with vertices $A(2, -1)$, $B(4, 1)$, and $C(3, 3)$ by 90° about the origin.

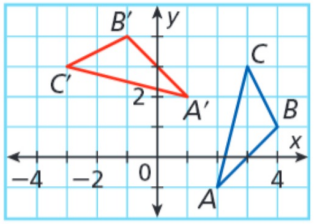
The rotation of (x, y) is ☐

$A(2, -1) \rightarrow$ ☐

$B(4, 1) \rightarrow$ ☐

$C(3, 3) \rightarrow$ ☐

Graph the preimage and image.



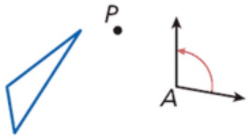
9-3 Rotations

Lesson Quiz: Part I

1. Tell whether the transformation appears to be a rotation.

☐

2. Copy the figure and the angle of rotation. Draw the rotation of the triangle about P by $\square A$.



☐

9-3 Rotations

Lesson Quiz: Part II

Rotate ΔRST with vertices $R(-1, 4)$, $S(2, 1)$, and $T(3, -3)$ about the origin by the given angle.

3. 90° ☐

4. 180° ☐