Chapter 9: Transformational Geometry

SECTION 3: ROTATIONS

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I Can

- ❑ Identify and draw rotations

Isometry

An **isometry** is a transformation that does not change the shape or size of a figure. Also called *congruence transformations or rigid motions.*

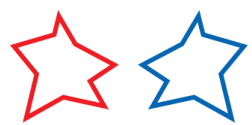
THREE TYPES:

1. Reflections (flipping across a line)
2. Translations (sliding along a vector)
3. Rotations (turning around a point)

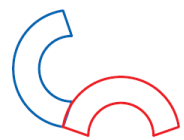
Rotation?

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

A.



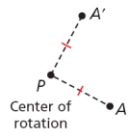
B.



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.

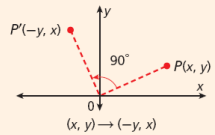
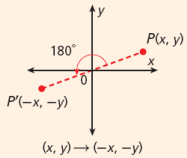


Helpful Hint

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

In the Coordinate Plane

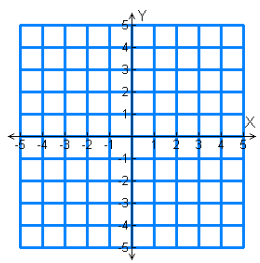
Rotations in the Coordinate Plane

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

If the angle of a rotation in the coordinate plane is not a multiple of 90°, you can use sine and cosine ratios to find the coordinates of the image.

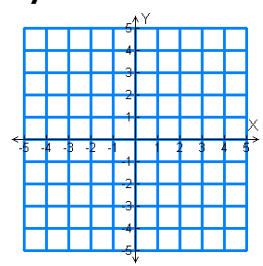
Example

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



Example

Rotate Δ*RST* with vertices *R*(−1, 4), *S*(2, 1), and *T*(3, −3) about the origin by 90°.



Example

A Ferris wheel has a 100 ft diameter and takes 60 s to make a complete rotation. A chair starts at (100, 0). After 5 s, what are the coordinates of its location to the nearest tenth?

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