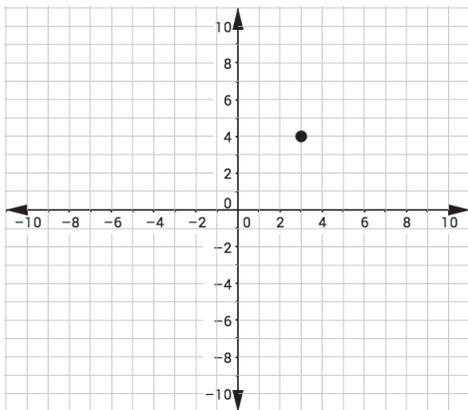


Section 2 – Topic 5

Examining and Using Rotations

A **rotation** changes the _____ of a figure by moving it around a fixed point to the right (clockwise) or to the left (counterclockwise).

Let's consider the following graph.



Use the graph to help you determine the coordinates for (x', y') after the following rotations about the origin.

	Counterclockwise	Clockwise
90° Rotation:	$R_{90^\circ}(3, 4) = \underline{\hspace{2cm}}$	$R_{-90^\circ}(3, 4) = \underline{\hspace{2cm}}$
180° Rotation:	$R_{180^\circ}(3, 4) = \underline{\hspace{2cm}}$	$R_{-180^\circ}(3, 4) = \underline{\hspace{2cm}}$
270° Rotation:	$R_{270^\circ}(3, 4) = \underline{\hspace{2cm}}$	$R_{-270^\circ}(3, 4) = \underline{\hspace{2cm}}$

The function $R_t(x, y)$ rotates the point (x, y) t° _____ around the origin.

The function $R_{-t}(x, y)$ rotates the point (x, y) t° _____ around the origin.

Make generalizations about rotations around the origin and complete the following table.

	Counterclockwise	Clockwise
90° Rotation:	$(x, y) \rightarrow \underline{\hspace{2cm}}$	$(x, y) \rightarrow \underline{\hspace{2cm}}$
180° Rotation:	$(x, y) \rightarrow \underline{\hspace{2cm}}$	$(x, y) \rightarrow \underline{\hspace{2cm}}$
270° Rotation:	$(x, y) \rightarrow \underline{\hspace{2cm}}$	$(x, y) \rightarrow \underline{\hspace{2cm}}$

What happens if the rotation is 360° clockwise or counterclockwise?

What happens if the center of rotation is not the origin?

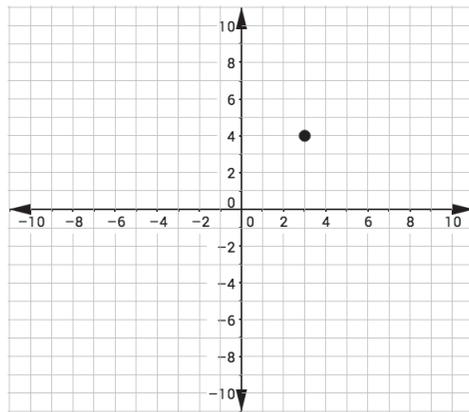
What happens if the degree of rotation is other than 90°, 180°, 270°, and 360°?



Let's Practice!

- \overline{RT} has endpoints $R(0, 3)$ and $T(4, 1)$. Rotate \overline{RT} clockwise 90 degrees about the origin.
 - Write an algebraic description of the transformation of \overline{RT} .
 - What are the endpoints of the new line segment?

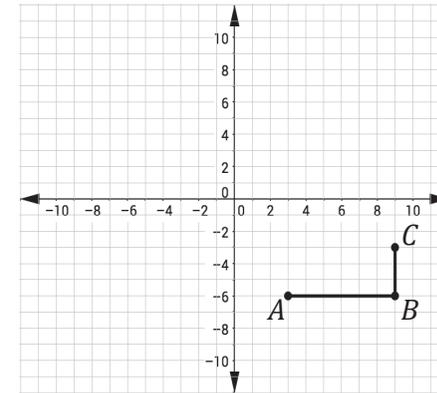
- Let's consider the following graph.



Rotate $(3, 4)$ counterclockwise 90° about $(5, 7)$.

Try It!

- Consider the following figure.



- Rotate figure ABC 270° counterclockwise about the origin. Graph the new figure on the coordinate plane, and complete each blank below with the appropriate coordinates.

$$A (\underline{\quad}, \underline{\quad}) \rightarrow A'(\underline{\quad}, \underline{\quad})$$

$$B (\underline{\quad}, \underline{\quad}) \rightarrow B'(\underline{\quad}, \underline{\quad})$$

$$C (\underline{\quad}, \underline{\quad}) \rightarrow C'(\underline{\quad}, \underline{\quad})$$

- Rotate figure ABC 90° clockwise about the origin. Graph the new figure on the coordinate plane, and complete each blank below with the appropriate coordinates.

$$A (\underline{\quad}, \underline{\quad}) = A'(\underline{\quad}, \underline{\quad})$$

$$B (\underline{\quad}, \underline{\quad}) = B'(\underline{\quad}, \underline{\quad})$$

$$C (\underline{\quad}, \underline{\quad}) = C'(\underline{\quad}, \underline{\quad})$$



BEAT THE TEST!

1. \overline{PQ} has endpoints $P(-2, -1)$ and $Q(6, -5)$. Consider the transformation $(x, y) \rightarrow (y, -x)$ for \overline{PQ} . What kind of transformation is this? What are the coordinates of $\overline{P'Q'}$?

2. Point $K(10, -3)$ is rotated 90° clockwise. Which of the following is the y -coordinate of K' ?
 - (A) -10
 - (B) -3
 - (C) 3
 - (D) 10

