

Rotation Activity

Name: Answer Key Date: \_\_\_\_\_ Period: \_\_\_\_\_

You will be exploring a **TRANSFORMATION** called a **ROTATION**.

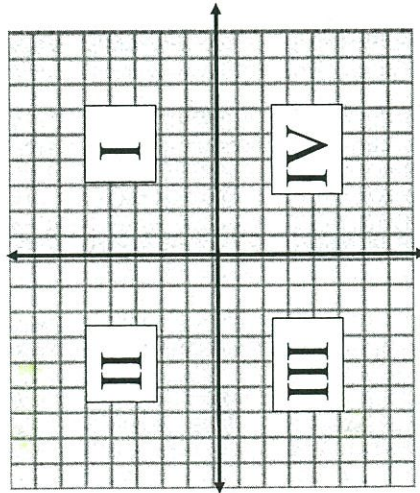
A **ROTATION** is a movement of a figure that involves rotating in 90 degree increments around the origin.

The new prime points will be in the quadrant that is the given number of degrees clockwise or counterclockwise from the original figure.

The following activities will help you discover what happens when a point, line, or figure is rotated a given number of degrees.

In a rotation, the original shape does not change in size or shape but does move to a new position on the coordinate plane.

You will need to remember the names of the quadrants:



EXAMPLE #1:

STEP 1: The following is a 90° clockwise rotation:

STEP 2: List the pre-image points and the image points below.

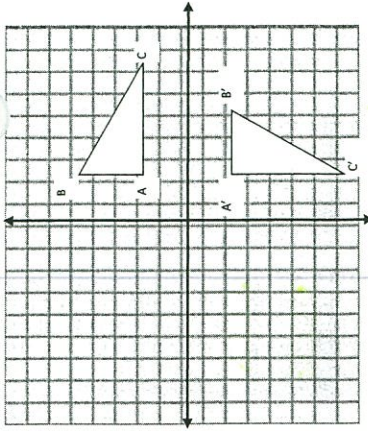
- A(2, 2) → A'(2, -2)
- B(2, 5) → B'(5, -2)
- C(7, 2) → C'(2, -7)

In what quadrant is the

Pre-Image? 1; Image? 4

Compare each set of PRE-IMAGE coordinates with the IMAGE coordinates. What is the relationship between the pre-image coordinates and the image coordinates?

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



EXAMPLE #2:

STEP 1: The following is a 90° clockwise rotation:

STEP 2: List the pre-image points and the image points below.

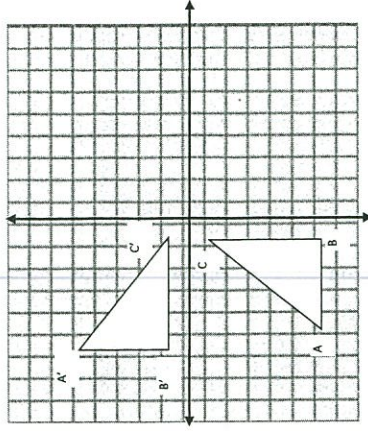
- A(-5, -6) → A'(-6, 5)
- B(-1, -6) → B'(-6, 1)
- C(-1, -1) → C'(-1, 1)

In what quadrant is the

Pre-Image? 3; Image? 2

Compare each set of PRE-IMAGE coordinates with the IMAGE coordinates. What is the relationship between the pre-image coordinates and the image coordinates?

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



Using the two examples above, describe what happens to the coordinates in a 90° clockwise rotation?

The value of x-coordinate changes and you flip.

Using the rule you have discovered, find the prime coordinates for a line with pre-image points at

$(2, -6) \rightarrow (-6, -2)$

$(7, -1) \rightarrow (-1, -7)$

**EXAMPLE #3:**

STEP 1: The following is a 90° counter-clockwise rotation:

STEP 2: List the pre-image points and the image points below.

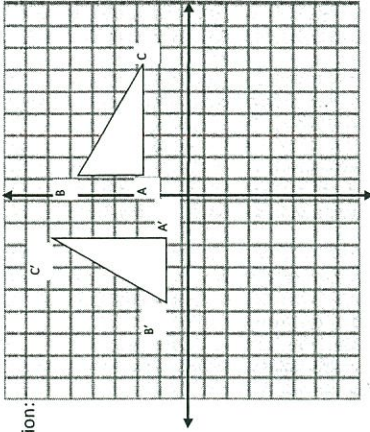
- $A(1, 2) \rightarrow A'(-2, 1)$   
 $B(1, 5) \rightarrow B'(-5, 1)$   
 $C(6, 2) \rightarrow C'(-2, 6)$

In what quadrant is the

Pre-Image? 1; Image? 2

Compare each set of PRE-IMAGE coordinates with the IMAGE coordinates. What is the relationship between the pre-image coordinates and the image coordinates?

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



**EXAMPLE #4:**

STEP 1: The following is a 90° counter-clockwise rotation:

STEP 2: List the pre-image points and the image points below.

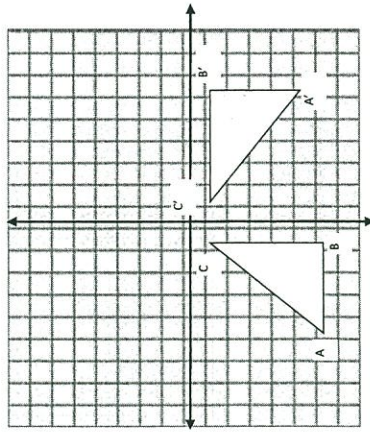
- $A(-5, -6) \rightarrow A'(6, -5)$   
 $B(-1, -6) \rightarrow B'(6, -1)$   
 $C(-1, -1) \rightarrow C'(1, -1)$

In what quadrant is the

Pre-Image? 3; Image? 4

Compare each set of PRE-IMAGE coordinates with the IMAGE coordinates. What is the relationship between the pre-image coordinates and the image coordinates?

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



**EXAMPLE #5:**

STEP 1: The following is a 180° rotation:

STEP 2: List the pre-image points and the image points below.

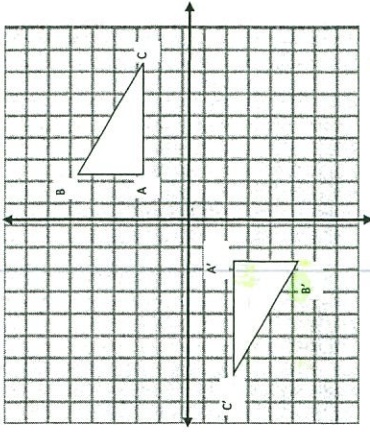
- $A(2, 2) \rightarrow A'(-2, -2)$   
 $B(2, 5) \rightarrow B'(-2, -5)$   
 $C(7, 2) \rightarrow C'(-7, -2)$

In what quadrant is the

Pre-Image? 1; Image? 3

Compare each set of PRE-IMAGE coordinates with the IMAGE coordinates. What is the relationship between the pre-image coordinates and the image coordinates?

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



**EXAMPLE #6:**

STEP 1: The following is a 180° clockwise rotation:

STEP 2: List the pre-image points and the image points below.

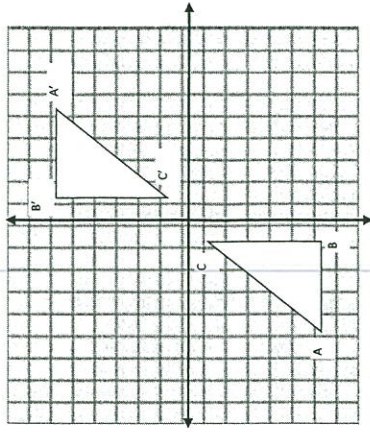
- $A(-5, -6) \rightarrow A'(5, 6)$   
 $B(-1, -6) \rightarrow B'(1, 6)$   
 $C(-1, -1) \rightarrow C'(1, 1)$

In what quadrant is the

Pre-Image? 3; Image? 1

Compare each set of PRE-IMAGE coordinates with the IMAGE coordinates. What is the relationship between the pre-image coordinates and the image coordinates?

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



Using the two examples above, describe what happens to the coordinates in

a 90° counter-clockwise rotation?

The value of the y-coordinate changes and you flip

Using the rule you have discovered, find the prime coordinates for a line with

$(2, -6) \rightarrow (6, 2)$

$(7, -1) \rightarrow (1, 7)$

Using the two examples above, describe what happens to the coordinates in a 180° rotation?

The signs change in both coordinates.

Using the rule you have discovered, find the prime coordinates for a line with

$(2, -6) \rightarrow (-2, 6)$

$(7, -1) \rightarrow (-7, 1)$