

Geometry CC – Mr. Valentino

Name: _____

Unit 4 Lesson 5: Rotations

Date: _____ Period: _____

Aim: What are rotations?

Do Now:

a) $r_{x\text{-axis}}(-4, 5.5) = (-4, -5.5)$

b) $r_{y\text{-axis}}(-4, -6) = (4, -6)$

c) $T_{3,-5}(4, 5) = (7, 0)$
 $+3, -5$

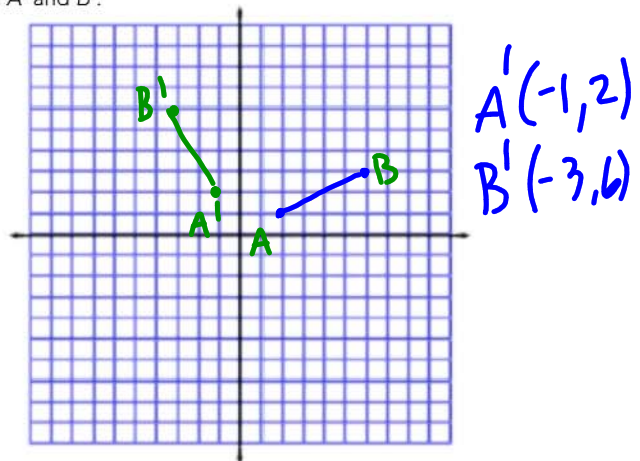
d) $T_{-4,-8}(-2, -7) = (-6, -15)$

Rotation - a transformation that turns a figure about a fixed point called the center of rotation. A positive angle of rotation turns a figure counterclockwise while a negative angle of rotation turns a figure clockwise.

1. Graph the segment with endpoints $A(2, 1)$ and $B(6, 3)$. Rotate this line segment about the origin by 90° . Call this new line segment $A'B'$, and state the coordinates of A' and B' .

★ Under a rotation of 90° counterclockwise about the origin ★

$R_{O, 90^\circ}(x, y) = (-y, x)$

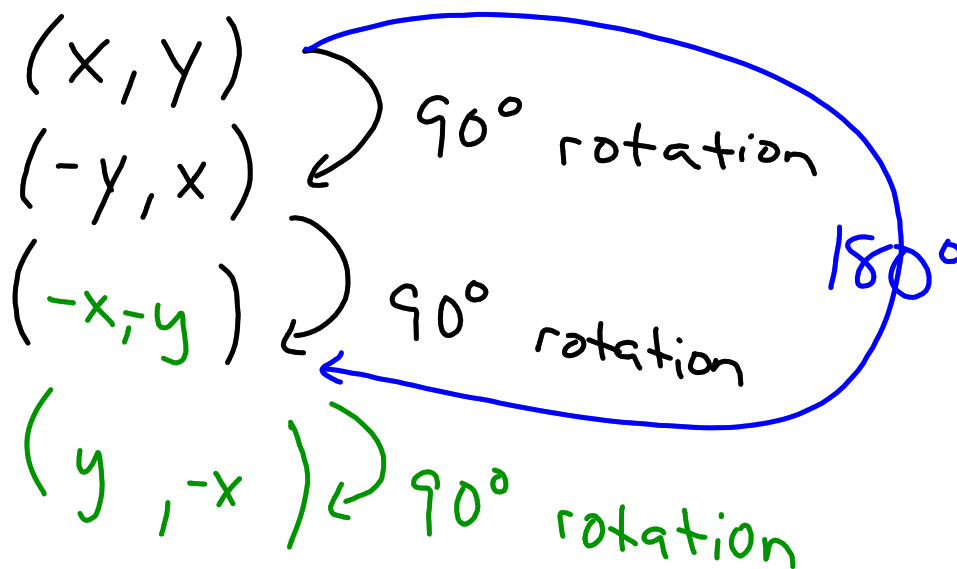


★ Under a rotation of 180° counterclockwise about the origin ★

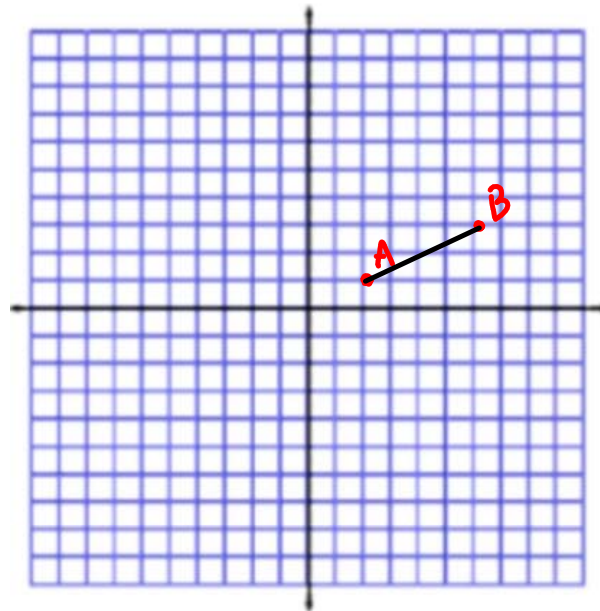
$R_{O, 180^\circ}(x, y) = (-x, -y)$

★ Under a rotation of 270° counterclockwise about the origin ★

$R_{O, 270^\circ}(x, y) = (y, -x)$



$A(2,1)$ $B(6,3)$



What do you think you should do if you were given this transformation?



$$R_{O, -90^\circ}$$

Let's Practice!

- a] $R_{O, 90^\circ}(4,7) = (-7,4)$ e] $R_{O, 180^\circ}(2,8) = (-2,-8)$ i] $R_{O, 270^\circ}(-5,-2) = (-2,5)$
 b] $R_{O, 90^\circ}(-3,11) = (-11,-3)$ f] $R_{O, 180^\circ}(-5,-99) = (5,99)$ j] $R_{O, 270^\circ}(3,-86) = (-86,-3)$
 c] $R_{O, 90^\circ}(13,-9.6) = (9.6,13)$ g] $R_{O, 180^\circ}(-7,4.3) = (7,-4.3)$ k] $R_{O, 270^\circ}(-6,0) = (0,6)$

Let's do some practice. It's graphing time!

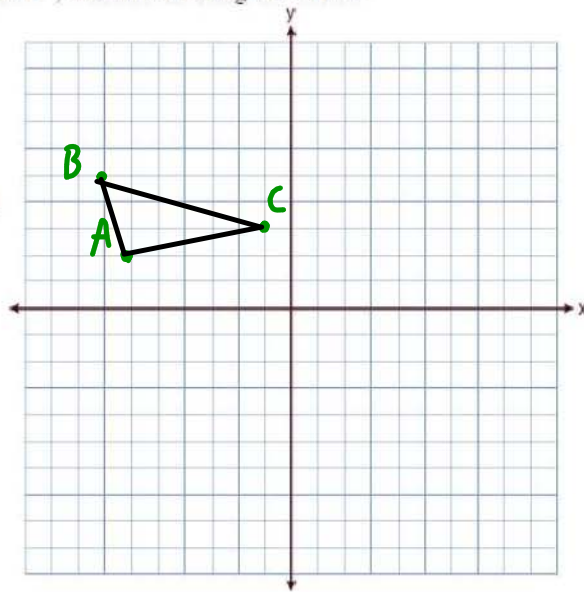
1)

Triangle ABC has coordinates: $A(-6, 2)$ $B(-7, 5)$ $C(-1,3)$

a] On the grid, graph $\triangle ABC$, and then graph $\triangle A'B'C'$, which is the image of $\triangle ABC$ after $R_{O, 90^\circ}$.

b] On the same grid, graph triangle $\triangle A''B''C''$, which is the image of $\triangle ABC$ after $R_{O, 180^\circ}$.

c] On the same grid, graph triangle $\triangle A'''B'''C'''$, which is the image of $\triangle ABC$ after $R_{O, 270^\circ}$.



- | | | | |
|------|------------|--------|-----------|
| A | $(-6, 2)$ | A'' | $(6, -2)$ |
| B | $(-7, 5)$ | B'' | $(7, -5)$ |
| C | $(-1, 3)$ | C'' | $(1, -3)$ |
| A' | $(-2, -6)$ | A''' | $(2, 6)$ |
| B' | $(-5, -7)$ | B''' | $(5, 7)$ |
| C' | $(-3, -1)$ | C''' | $(3, 1)$ |

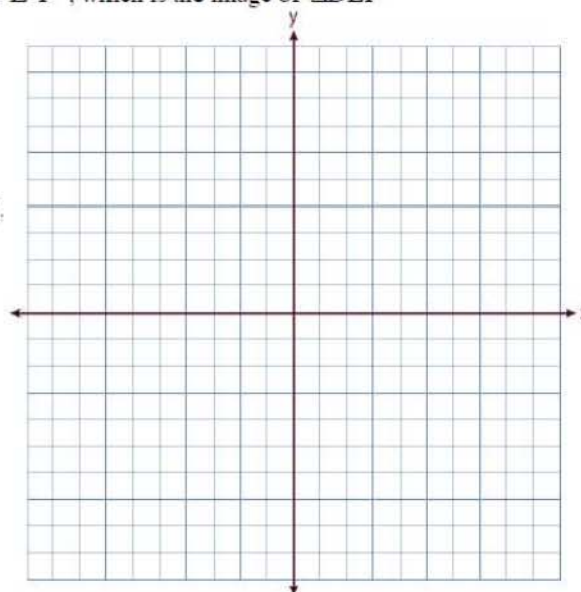
2)

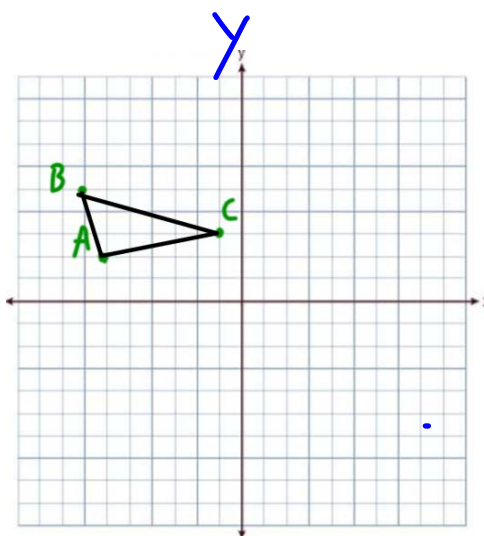
Triangle DEF has coordinates: $D(1, -2)$ $E(8, -3)$ $F(9, -7)$

a) On the grid, graph $\triangle DEF$, and then graph $\triangle D'E'F'$, which is the image of $\triangle DEF$ after $R_{O,90^\circ}$.

b) On the same grid, graph triangle $\triangle D''E''F''$, which is the image of $\triangle DEF$ after $R_{O,180^\circ}$.

c) On the same grid, graph triangle $\triangle D'''E'''F'''$, which is the image of $\triangle DEF$ after $R_{O,270^\circ}$.





$A'(-2, -6)$
 $B'(-5, -7)$
 C'