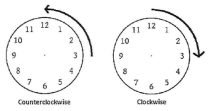
Geometry CC – Unit 4
Lesson 3: Rotations
M1 L13

Name:_____
Date:_____

Rotation (Turn)

Transformation around a center of rotation with a specific angle of rotation and in a certain direction (clockwise or counterclockwise).

Each point of the preimage and the image are the same distance from the center.



Apply each reflection to the Point given

P(2, 3)

$r_{x\text{-axis}}$ (2, -3)

$r_{y\text{-axis}}$ (-2, 3)

$r_{y=x}$ (3, 2)

$r_{y=-x}$ (-3, -2)

R_{90° (-3, 2)

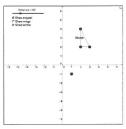
R_{180° (-2, -3)

R_{270° (3, -2)

Oct 22-11:52 AM

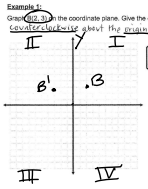
Exploring Rotations

http://www.geogebratube.org/student/m1986



Example 1:

Graph $\triangle ABC$ on the coordinate plane. Give the coordinate of the image if B is rotated 90° counterclockwise about the origin.



Rotation 90° counterclockwise about the origin
(x, y) ⟶ (-y, x)

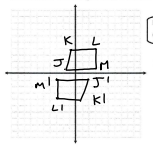
$R_{0,90^\circ}$

Image Coordinate:

$B(2,3) \rightarrow B'(-3,2)$ R_{90°

Example 2:

Graph JKLM on the coordinate plane where J(-2, 1), K(-1, 4), L(3, 4), and M(3, 1). Give the coordinates of the image if JKLM is rotated 180° counterclockwise about the origin.



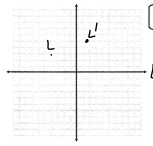
Rotation 180° counterclockwise about the origin
(x, y) ⟶ (-x, -y)

Image Coordinates: R_{180°

$J(-2,1) \rightarrow J'(2,-1)$
$K(-1,4) \rightarrow K'(1,-4)$
$L(3,4) \rightarrow L'(-3,-4)$
$M(3,1) \rightarrow M'(-3,-1)$

Example 3:

Graph L(-4, 2) on the coordinate plane. Give the coordinate of the image if L is rotated 270° counterclockwise about the origin.



Rotation 270° counterclockwise about the origin
(x, y) ⟶ (y, -x)

Image Coordinates:

$L(-4,2) \rightarrow L'(2,4)$

Summary of 90°, 180°, and 270° rotations about the origin:

Rotation 90° counterclockwise about the origin
(x, y) ⟶ (-y, x)

Rotation 180° counterclockwise about the origin
(x, y) ⟶ (-x, -y)

Rotation 270° counterclockwise about the origin
(x, y) ⟶ (y, -x)

What about 360° rotations?

The pre-image would make a complete circle.

Can you keep rotating in 90° increments past 360°?

YES ex. $450^\circ - 360^\circ = 90^\circ$

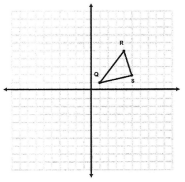
Will these rules hold if the center of rotation is not the origin? Why?

NO

Example 4:
Name the coordinates of the vertices of the image after the given rotation and then graph the image. You do not have to use any tools to complete this process.

90° counterclockwise about the origin

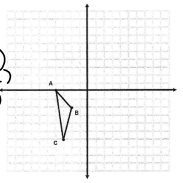
Preimage	Image
Q(1, 1)	Q'(-1, 1)
R(4, 5)	R'(-5, 4)
S(5, 2)	S'(-2, 5)



Example 5:
Name the coordinates of the vertices of the image after the given rotation and then graph the image. You do not have to use any tools to complete this process.

270° counterclockwise about the origin

Preimage	Image
A(-4, 0)	A'(0, 4)
B(-2, -2)	B'(-2, 2)
C(-3, -6)	C'(-6, 3)



Example 6:
Name the coordinates of the vertices of the image after the given rotation and then graph the image. You do not have to use any tools to complete this process.

180° counterclockwise about the origin

Preimage	Image
W(-3, -3)	→ W' (3, 3)
X(3, -4)	→ X' (-3, 4)
Y(4, 1)	→ Y' (-4, -1)
Z(-5, 4)	→ Z' (5, -4)