

**I will be able to:**

3.10 – Draw a geometric figure given a rotation

**4.3 Exploration**

#'s 1 – 3, use a new piece of paddy paper for each and trace the shape, the x and y - axis, and the letters. Hold your pencil on the paddy paper at the origin and then rotate the paddy paper counterclockwise so the letters line up on themselves. Write the angle of rotation. The coordinates of the preimage and image will help you write the image formula that would rotate any point (x, y) using the given angle.

1.

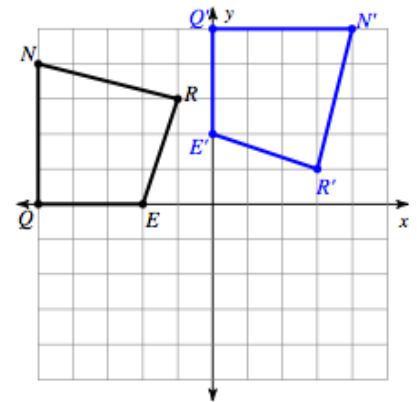
R		E		Q		N	
R'		E'		Q'		N'	

Angle of rotation

\_\_\_\_\_

Image formula for this rotation

\_\_\_\_\_ (x, y) → ( , ) \_\_\_\_\_



2.

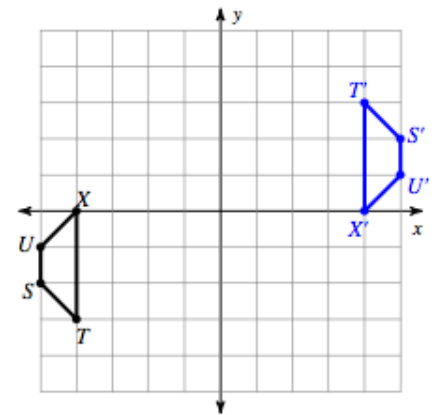
U		S		T		X	
U'		S'		T'		X'	

Angle of rotation

\_\_\_\_\_

Image formula for this rotation

\_\_\_\_\_ (x, y) → ( , ) \_\_\_\_\_



3.

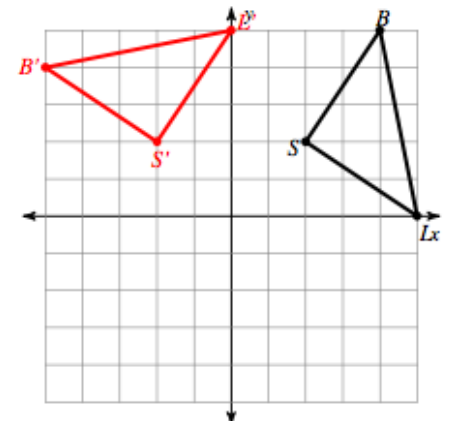
S		L		B	
S'		L'		B'	

Angle of rotation

\_\_\_\_\_

Image formula for this rotation

\_\_\_\_\_ (x, y) → ( , ) \_\_\_\_\_



#s 4 - 6 , find the coordinates of each figure after the given transformation using the image formulas written in #'s 1 - 3.

4. Rotation  $180^\circ$  about the origin using...

Z (-1, -5)

K (-1, 0)

C (1, 1)

N (3, -2)

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5. Rotation  $270^\circ$  about the origin using...

S (1, -4)

W (1, 0)

J (3, -4)

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6. Rotation  $90^\circ$  about the origin using...

M (-2, 4)

H (-2, 1)

F (3, 1)

B (1, 5)

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### CHALLENGE #1:

A *rotation matrix* will perform the same transformation as a coordinate rule, but using matrix multiplication.

$$[\text{rotation matrix}][\text{pre-image}] = [\text{image}]$$

Suppose triangle  $ABC$  has the following pre-image matrix:  $\begin{bmatrix} 2 & 5 & 4 \\ 2 & 0 & 5 \end{bmatrix}$ . For each of the following images, deduce a matrix for each of the following rotations, and state the angle of rotation:

(a)  $\begin{bmatrix} -2 & -5 & -4 \\ -2 & 0 & -5 \end{bmatrix}$

R.M.  $\begin{bmatrix} & \\ & \end{bmatrix}$  Angle \_\_\_\_\_

(b)  $\begin{bmatrix} 2 & 0 & 5 \\ -2 & -5 & -4 \end{bmatrix}$

R.M.  $\begin{bmatrix} & \\ & \end{bmatrix}$  Angle \_\_\_\_\_

(c)  $\begin{bmatrix} -2 & 0 & -5 \\ 2 & 5 & 4 \end{bmatrix}$

R.M.  $\begin{bmatrix} & \\ & \end{bmatrix}$  Angle \_\_\_\_\_

### CHALLENGE #2:

Using a compass and protractor, rotate the triangle  $50^\circ$  counterclockwise about the point.

