Honors Geometry
WS 9.3

Name Key

Hour _____

Find the image coordinates after the transformation.

1. Given A(-6, 2), B(0, 5), C(-4, 4) and center of rotation R(0, 0):

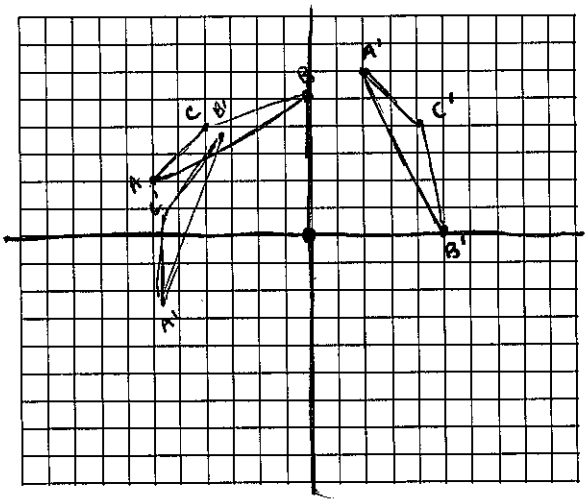
A. Rotate ΔABC 90° clockwise $(y, -x)$

A'(2,6) B'(5,0) C'(4,4)

B. Rotate ΔABC 40° counter clockwise

$$\begin{bmatrix} \cos 40 & -\sin 40 \\ \sin 40 & \cos 40 \end{bmatrix} \cdot \begin{bmatrix} -6 & 0 & -4 \\ 2 & 5 & 4 \end{bmatrix} =$$

A'(-5.9, -2.3) B'(-3.2, 3.8) C'(-5.6, 0.5)



2. Given A(-6, 2), B(0, 5), C(-4, 4) and center of rotation R(-1, 2): translate by $\langle 1, -2 \rangle$ to return to origin

A. Rotate ΔABC 90° clockwise

A(-6,2) B(0,5) C(-4,4)
$\langle 1,-2 \rangle$ $\langle 1,-2 \rangle$ $\langle 1,-2 \rangle$
(-5,0) (1,3) (-3,2)

$(y, -x)$

(0,5) (3,-1) (2,3)
$\langle -1,2 \rangle$ $\langle -1,2 \rangle$ $\langle -1,2 \rangle$ translate back to $\langle -1,2 \rangle$

A'(-1,7) B'(2,1) C'(1,5)

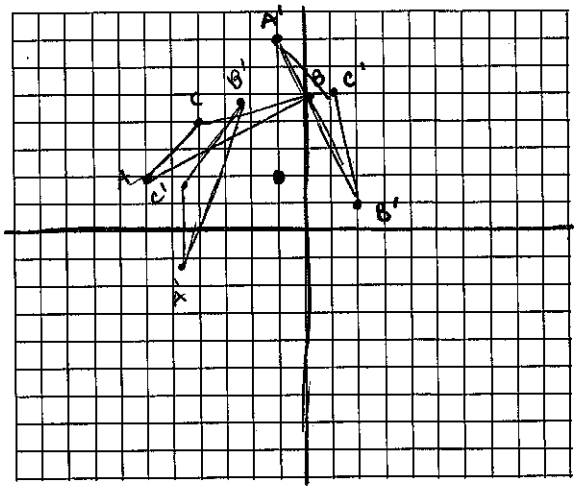
B. Rotate ΔABC 40° counter clockwise

see above for 1st translation to origin

$$\begin{bmatrix} \cos 40 & -\sin 40 \\ \sin 40 & \cos 40 \end{bmatrix} \cdot \begin{bmatrix} -5 & 1 & -3 \\ 0 & 3 & 2 \end{bmatrix}$$

(-3.8, -3.2) (-1.2, 2.9) (-3.6, -4) translate back to $\langle -1,2 \rangle$ w/ $\langle -1,2 \rangle$
$\langle -1,2 \rangle$ $\langle -1,2 \rangle$ $\langle -1,2 \rangle$

A'(-4.8, -1.2) B'(-2.2, 4.9) C'(-4.6, 1.6)



3. Given A(-6, 2), B(0, 5), C(-4, 4) and center of rotation R(-5, 0):

A. Rotate ΔABC 180° clockwise

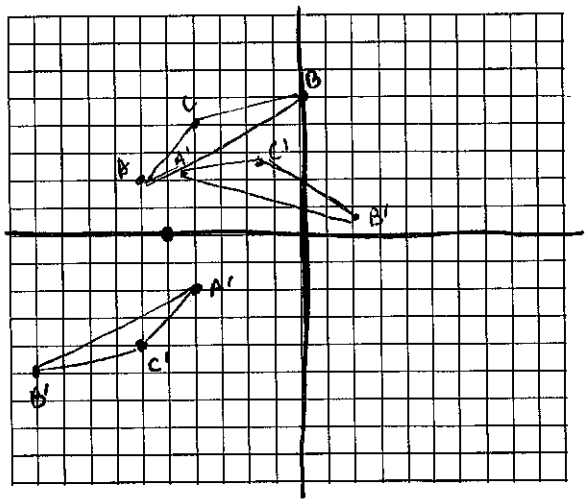
A(-6,2) B(0,5) C(-4,4) translate to origin using $\langle 5,0 \rangle$
$\langle 5,0 \rangle$ $\langle 5,0 \rangle$ $\langle 5,0 \rangle$

(-1,2) (5,5) (1,4) $(y, -x)$ = 90 CW twice in a row
(2,1) (5,-5) (4,-1)
(1,-2) (-5,-5) (-1,-4)

or 180° $(-x, -y)$

$\langle -5,0 \rangle$ $\langle -5,0 \rangle$ $\langle -5,0 \rangle$ translate back to (-5,0) using $\langle -5,0 \rangle$

A'(-4,-2) B'(-10,-5) C'(-6,-4)



B. Rotate ΔABC 40° clockwise = 320 CCW

see above for 1st translation to origin

$$\begin{bmatrix} \cos 320 & -\sin 320 \\ \sin 320 & \cos 320 \end{bmatrix} \cdot \begin{bmatrix} -1 & 5 & 1 \\ 2 & 5 & 4 \end{bmatrix}$$

(.5, 2.2) (7, .6) (3.3, 2.4) translate back to (-5,0) using $\langle -5,0 \rangle$
$\langle -5,0 \rangle$ $\langle -5,0 \rangle$ $\langle -5,0 \rangle$

A'(-4.5, 2.2) B'(2, .6) C'(-1.7, 2.4)