Name: _____

Notes 2.4, Rotations

Date: _____ Pd: _____

Rotation:

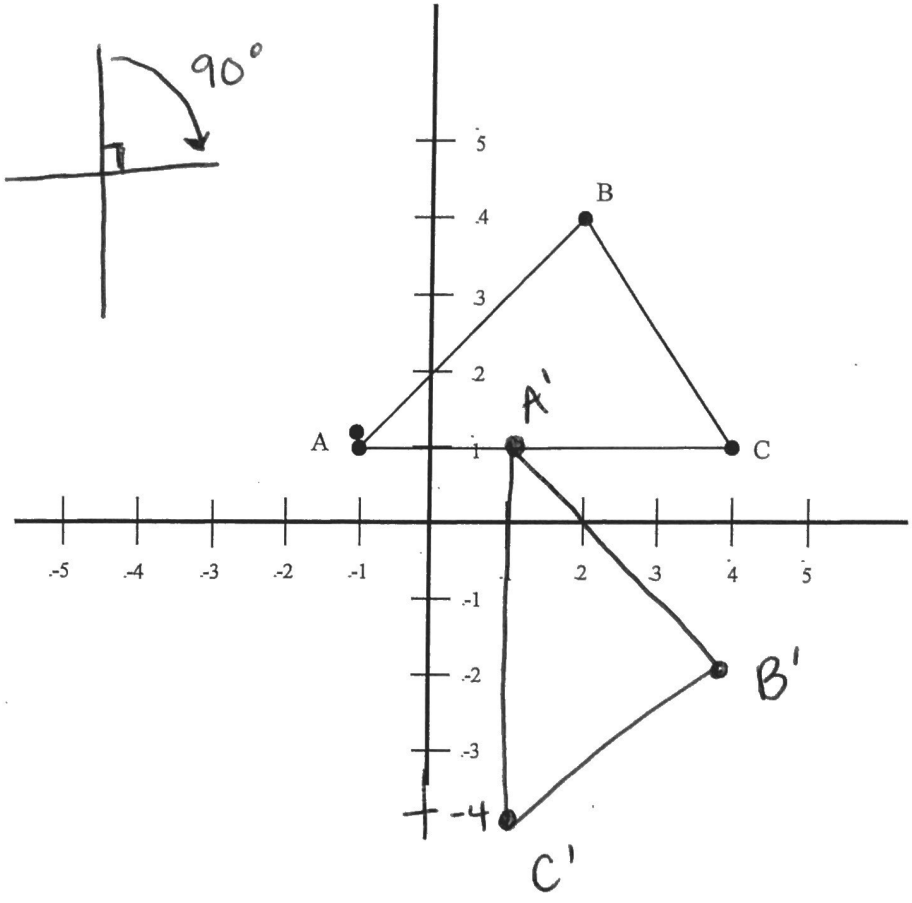
Ex 1: *Given ΔABC with points A(-1, 1), B(2, 4), C(4, 1), rotate ΔABC 90° clockwise about the origin.*

(A) Graph

A(-1, 1)

B(2, 4)

C(4, 1)



(B) Vertex matrices

Given image

$$\begin{matrix} & A & B & C \\ x & -1 & 2 & 4 \\ y & 1 & 4 & 1 \end{matrix}$$

Transformed image

$$\begin{matrix} & A' & B' & C' \\ x & 1 & 4 & 1 \\ y & 1 & -2 & -4 \end{matrix}$$

(C) Algebraic (arrow) rule

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

Notes 2.4 **Rotations**

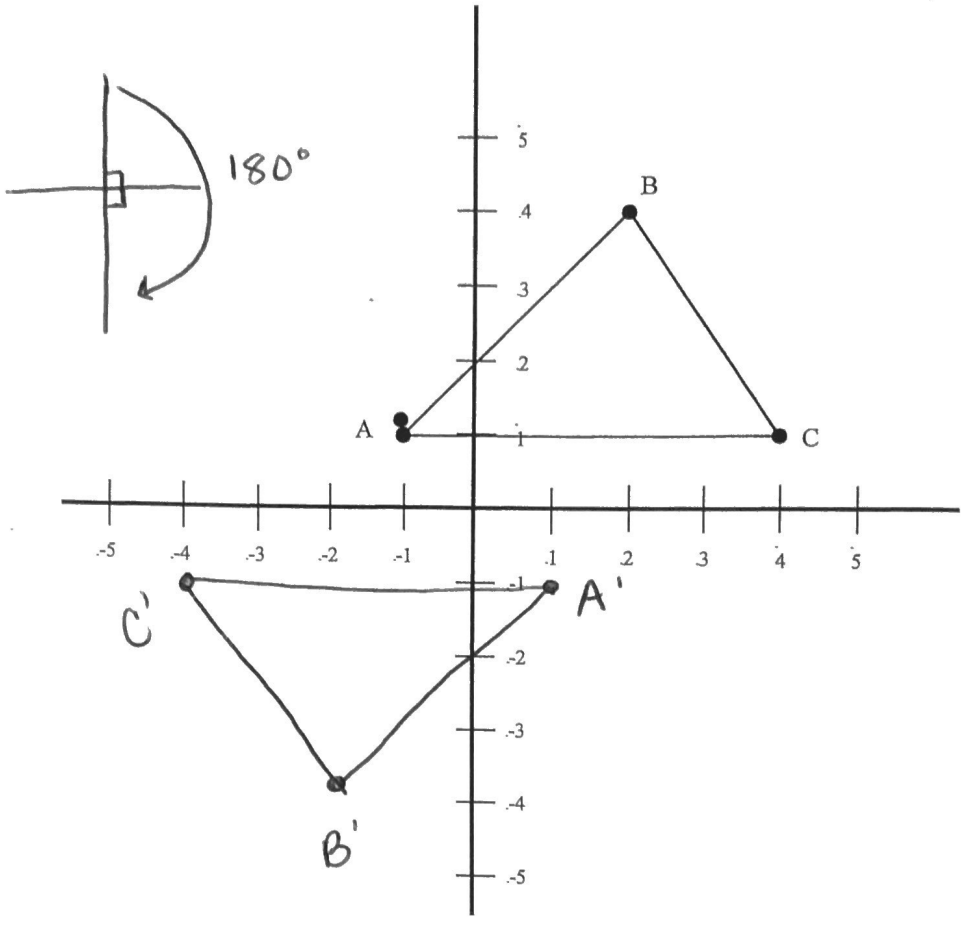
Ex 2: *Given ΔABC with points A(-1, 1), B(2, 4), C(4, 1), <u>rotate</u> ΔABC 180° clockwise about the origin.*

(A) Graph

A(-1, 1)

B (2, 4)

C (4, 1)



(B) Vertex matrices

<u>Given image</u>

$$\begin{matrix} & A & B & C \\ x & -1 & 2 & 4 \\ y & 1 & 4 & 1 \end{matrix} \longrightarrow \begin{matrix} & A' & B' & C' \\ x & 1 & -2 & -4 \\ y & -1 & -4 & -1 \end{matrix}$$

<u>Transformed image</u>

(C) Algebraic (arrow) rule

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

Notes 2.4

Rotations

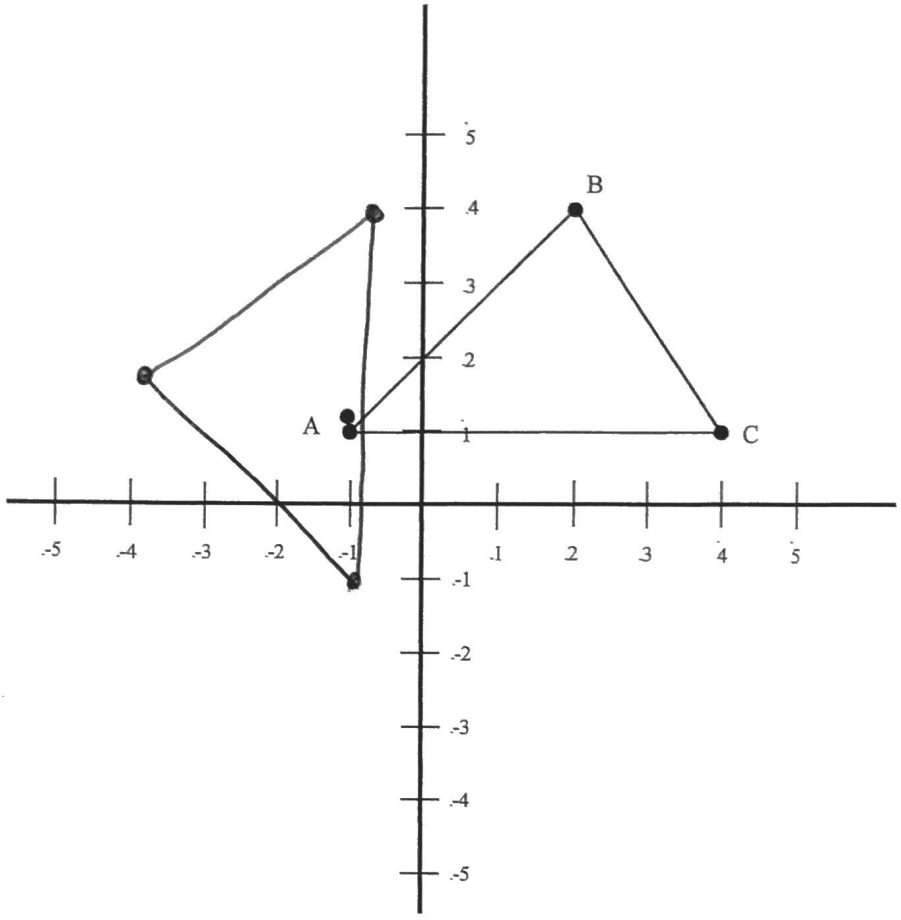
Ex 3: *Given ΔABC with points A(-1, 1), B(2, 4), C(4, 1), rotate ΔABC 270° clockwise about the origin.*

(A) Matrices

A(-1, 1)

B(2, 4)

C(4, 1)



(B) Vertex matrices

Given image

$$\begin{matrix} & A & B & C \\ X & -1 & 2 & 4 \\ Y & 1 & 4 & 1 \end{matrix}$$

Transformed image

$$\begin{matrix} & A' & B' & C' \\ X & -1 & -4 & -1 \\ Y & -1 & 2 & 4 \end{matrix}$$

(C) Algebraic (arrow) rule

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

Review Table

Clockwise Rotation	Counter Clockwise Rotation	Algebraic Rule
90°	270°	$(x, y) \rightarrow (y, -x)$
180°	180°	$(x, y) \rightarrow (-x, -y)$
270°	90°	$(x, y) \rightarrow (-y, x)$

Ex 4: $\triangle XYZ$ with X(2, -1), Y(4, -3), Z(-2, 1). Rotate 90° counterclockwise. Write each vertex matrix.

Ex 5: Quadrilateral ABCD with A(3, 1), B(6, -2), C(5, -5) and D(1, -6). Reflect across the x-axis and then rotate the figure 180°. Write each vertex matrix.

Ex 6: Pentagon MNOPQ with M(-1, 0), N(-1, 5), O(0, 7), P(1, 5), and Q(1, 0). Dilate by r = 3 and then rotate the figure 90° clockwise. Write each vertex matrix.