

1.6 Rotations about Other Fixed Points

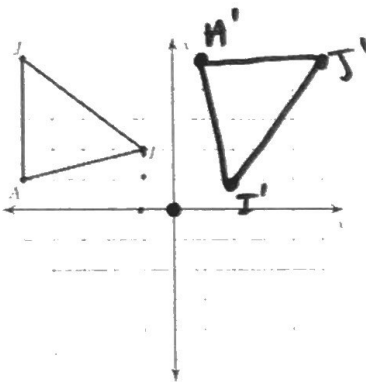
Warm-Up

- |    |    |
|----|----|
| 1. | 5. |
| 2. | 6. |
| 3. | 7. |
| 4. | 8. |

Methods for Rotating about Other Fixed Points

Method One: Redrawing the x and y-axis

Rotate  $\triangle JAI$   $90^\circ$  CW about  $(0, 0)$ .



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

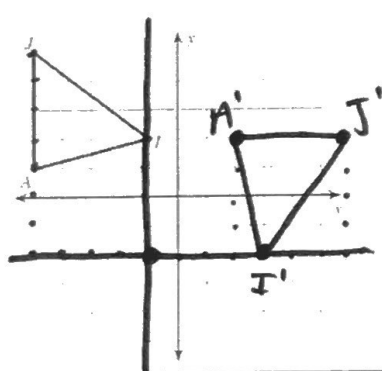
$$I(-1, 2) \rightarrow I'(2, +1)$$

$$J(-5, 5) \rightarrow J'(5, +5)$$

$$A(-5, 1) \rightarrow A'(1, +5)$$

\*Rotation rules only work when we rotate about the origin  $(0, 0)$ .

Rotate  $\triangle JAI$   $90^\circ$  CW about  $(-1, -2)$ .

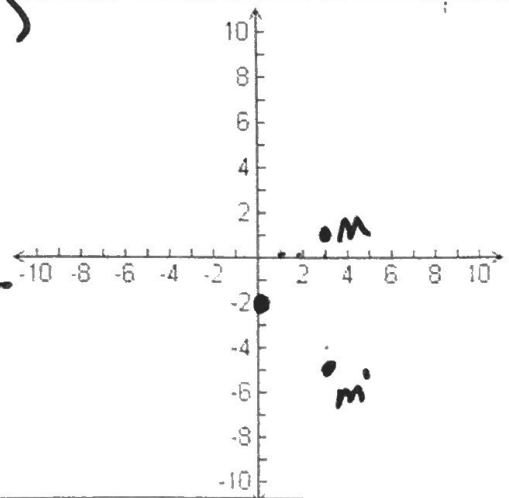


- draw a new x & y axis through the new center.
  - Identify the coordinates from "new" origin.
  - Apply the rule  $(x, y) \rightarrow (y, -x)$
  - Graph new points on "new" axis.
- $$J(-4, 7) \rightarrow J'(7, 4)$$
- $$A(-4, 3) \rightarrow A'(3, 4)$$
- $$I(0, 4) \rightarrow I'(4, 0)$$

Method Two: Solving Algebraically

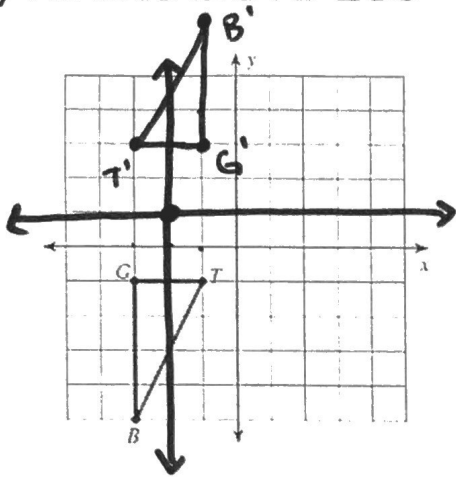
If  $M(3, 1)$  is rotated  $270^\circ$  CCW about  $E(0, -2)$ , what is  $M'$ ?

- Subtract new center.  $90^\circ$  CW  $(y, x)$
  - Apply the Rule
  - Add new center.
- $$\begin{array}{r} m(3, 1) \\ \textcircled{1} - (0, -2) \\ \hline (3, 3) \\ \textcircled{2} (3, -3) \\ \textcircled{3} + (0, -2) \\ \hline m'(3, -5) \end{array}$$



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

1) Rotate  $\triangle GTB$   $180^\circ$  CCW about  $(-2, 1)$ .



① Draw new  $x$  &  $y$  axis.

② ID coordinates on "new" axis.

③ APPLY Rule  $(x, y) \rightarrow (-x, -y)$

$$G(-1, -2) \rightarrow G'(1, 2)$$

$$T(1, -2) \rightarrow T'(-1, 2)$$

$$B(-1, -6) \rightarrow B'(1, 6)$$

④ plot new points on "new" axis.

\* We have to use origin to ID what is the coordinate for  $T'$ ?  $T'(-3, 3)$

2) If  $F(2, -1)$  is rotated  $90^\circ$  CCW about  $E(1, 3)$ , what is  $F'$ ?

① Subtract new center  $(x, y) \rightarrow (-y, x)$

② Apply Rule

③ Add new center

$$\begin{array}{r} F(2, -1) \\ \textcircled{1} - (1, 3) \\ \hline (1, -4) \end{array}$$

$$\textcircled{2} \quad (+4, 1)$$

$$+ (1, 3)$$

$$\boxed{F'(5, 4)}$$

3) What transformation has occurred in the figure?

