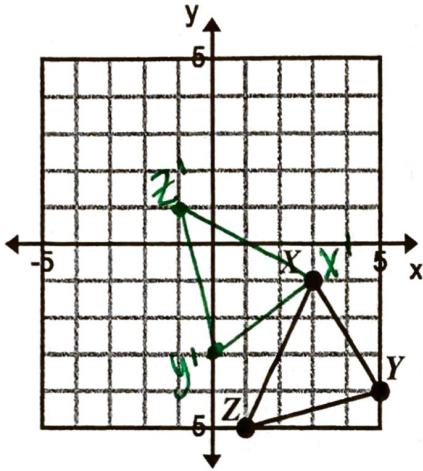


## HW 8-3: Rotations from a vertex

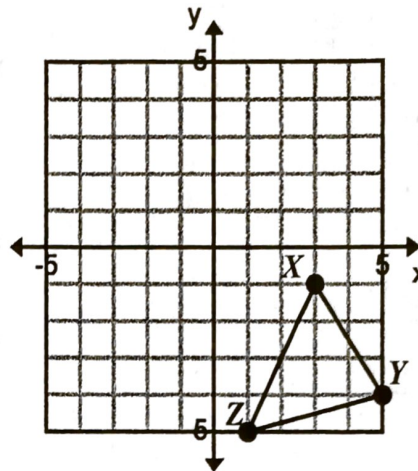
$\triangle XYZ$  has vertices  $X(3, -1)$ ,  $Y(5, -4)$ , and  $Z(1, -5)$ . Graph and label the image of  $\triangle XYZ$  after each rotation. Then give the coordinates of the vertices for  $\triangle X'Y'Z'$ .

1. **90** clockwise about vertex X.

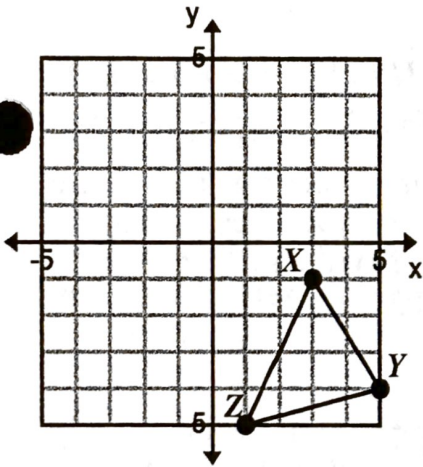


$$\begin{aligned} X' &(3, -1) \\ Y' &(0, -3) \\ Z' &(-1, 1) \end{aligned}$$

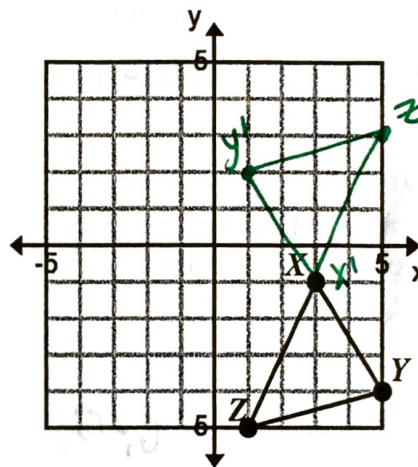
4. **90** counterclockwise about vertex Z.



2. **180** clockwise about vertex X.

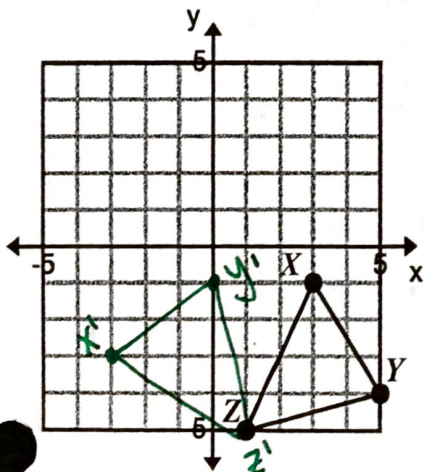


5. **180** counterclockwise about vertex X.



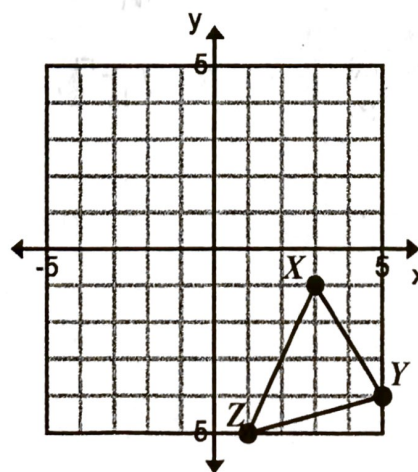
$$\begin{aligned} X' &(3, -1) \\ Y' &(1, 2) \\ Z' &(5, 3) \end{aligned}$$

3. **270** clockwise about vertex Z.

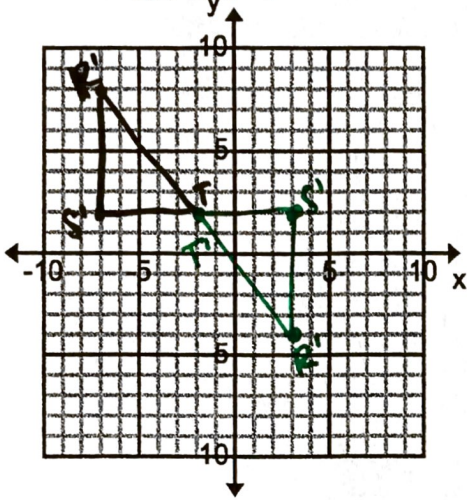


$$\begin{aligned} X' &(-3, -3) \\ Y' &(0, -1) \\ Z' &(1, -5) \end{aligned}$$

6. **270** counterclockwise about vertex X.



7.  $\triangle RST$  has vertices  $R(-7,8)$ ,  $S(-7,2)$ , and  $T(-2,2)$ . Graph the figure and its rotated image after a clockwise rotation of  $180^\circ$  about vertex  $T$ . Then give the coordinates of the vertices for the  $\triangle R'S'T'$ .

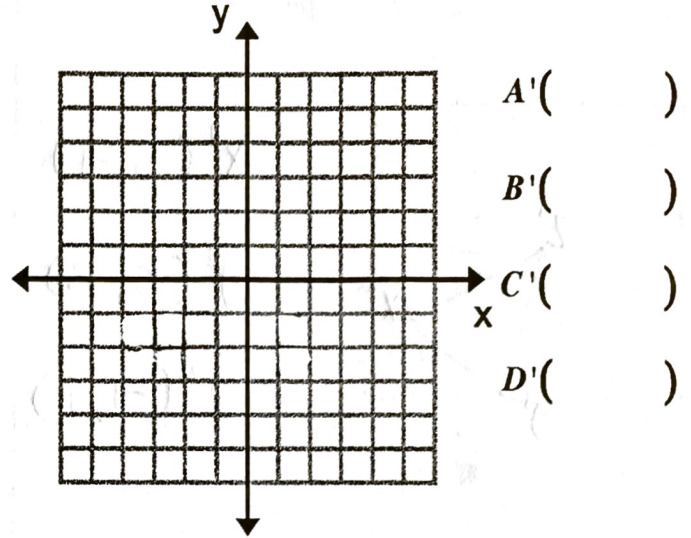


$R'(\quad)$

$S'(\quad)$

$T'(\quad)$

8. Quadrilateral  $ABCD$  has vertices at  $A(-3,-4)$ ,  $B(-1,-1)$ ,  $C(2,-2)$ , and  $D(3,-4)$ . Graph  $ABCD$  and its image after a  $90^\circ$  clockwise rotation about vertex  $D$ . Then give the coordinates of the vertices for quadrilateral  $A'B'C'D'$ .



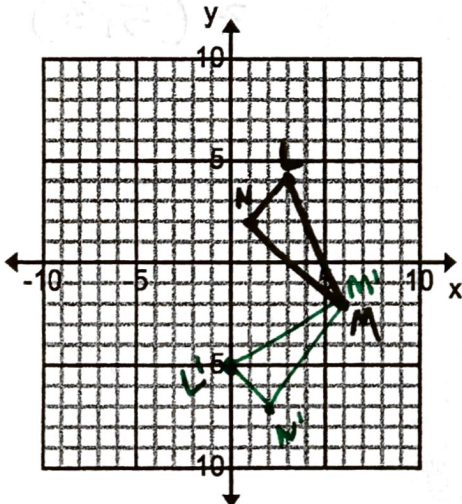
$A'(\quad)$

$B'(\quad)$

$C'(\quad)$

$D'(\quad)$

9.  $\triangle LMN$  has vertices  $L(3,4)$ ,  $M(6,-2)$ , and  $N(1,2)$ . Graph the figure and its rotated image after a counterclockwise rotation of  $90^\circ$  about vertex  $M$ . Then give the coordinates of the vertices for the  $\triangle L'M'N'$ .

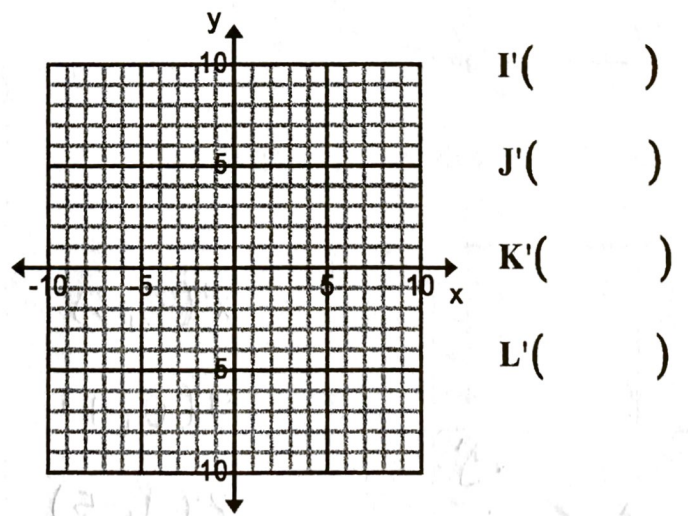


$L'(0, -5)$

$M'(6, -2)$

$N'(2, -7)$

10. Quadrilateral  $IJKL$  has vertices at  $I(1,3)$ ,  $J(4,-1)$ ,  $K(2,-3)$ , and  $L(-2,-1)$ . Graph  $IJKL$  and its image after a  $180^\circ$  clockwise rotation about vertex  $K$ . Then give the coordinates of the vertices for the quadrilateral  $I'J'K'L'$ .



$I'(\quad)$

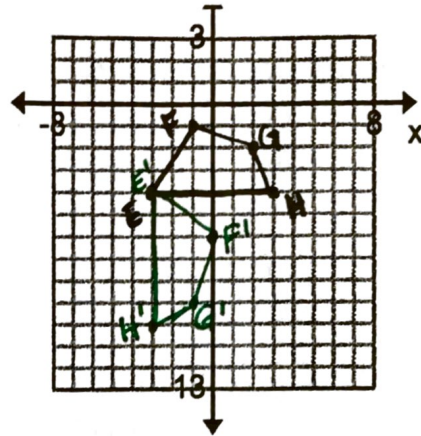
$J'(\quad)$

$K'(\quad)$

$L'(\quad)$

11.  $EFGH$  has vertices  $E(-3, -4)$ ,  
 $F(-1, -1)$ ,  $G(2, -2)$ , and  $H(3, -4)$ .

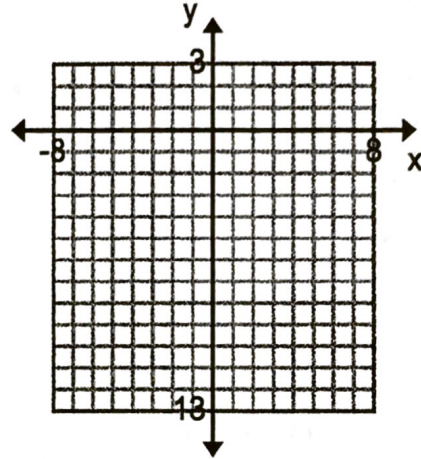
Graph the figure and its rotated image after a clockwise rotation of  $90^\circ$  about vertex  $E$ . Then give the coordinates of the vertices of  $E'F'G'H'$ .



- $E'(-3, -4)$   
 $F'(0, -6)$   
 $G'(-1, -9)$   
 $H'(-3, -10)$

12.  $EFGH$  has vertices  $E(-3, -4)$ ,  
 $F(-1, -1)$ ,  $G(2, -2)$ , and  $H(3, -4)$ .

Graph the figure and its rotated image after a counterclockwise rotation of  $90^\circ$  about vertex  $H$ . Then give the coordinates of the vertices of  $E'F'G'H'$ .

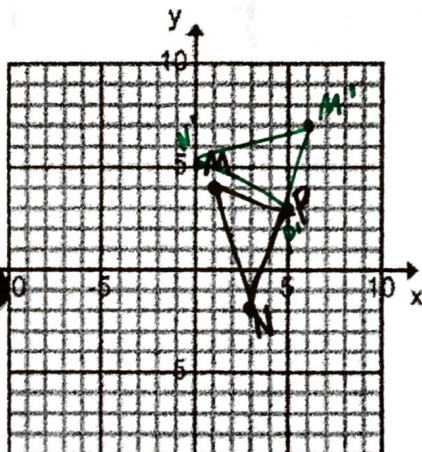


- $E'(\quad)$   
 $F'(\quad)$   
 $G'(\quad)$   
 $H'(\quad)$

$\triangle MNP$  has vertices  $M(1, 4)$ ,  $N(3, -2)$ , and  $P(5, 3)$ . Find the vertices of  $M'N'P'$  after each rotation about the given vertex.

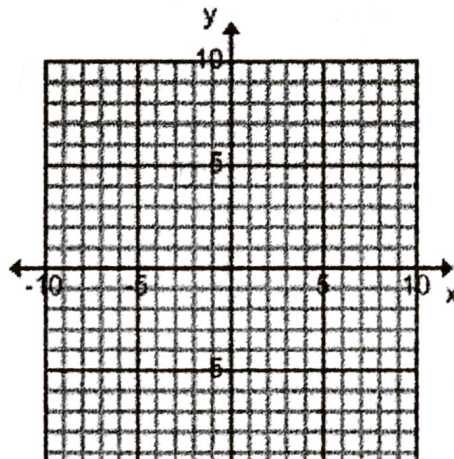
13.  $90^\circ$  clockwise vertex  $P$

- $M'(6, 7)$   
 $N'(0, 5)$   
 $P'(5, 3)$



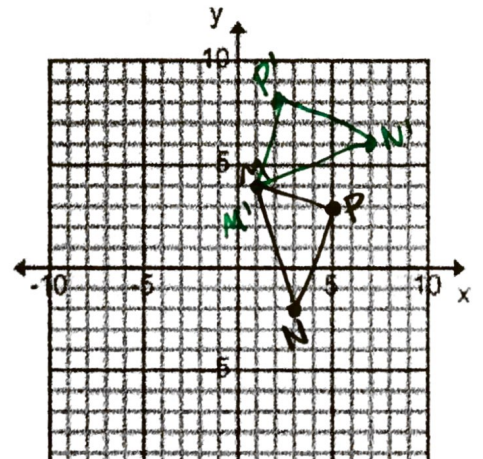
14.  $180^\circ$  clockwise vertex  $N$

- $M'(\quad)$   
 $N'(\quad)$   
 $P'(\quad)$

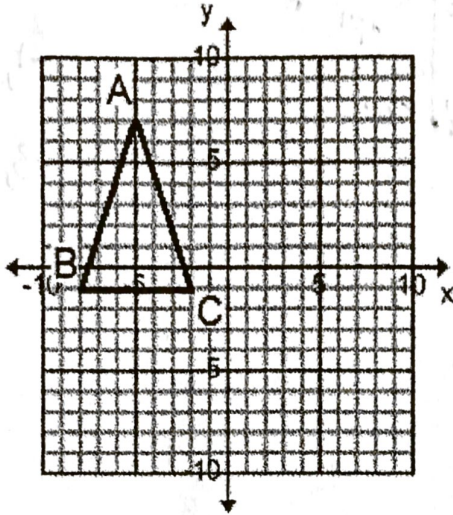


15.  $90^\circ$  counterclockwise vertex  $M$

- $M'(1, 4)$   
 $N'(7, 6)$   
 $P'(2, 8)$



16. If  $\triangle ABC$  is rotated  $90^\circ$  clockwise about vertex C, which is the resulting image of point A?



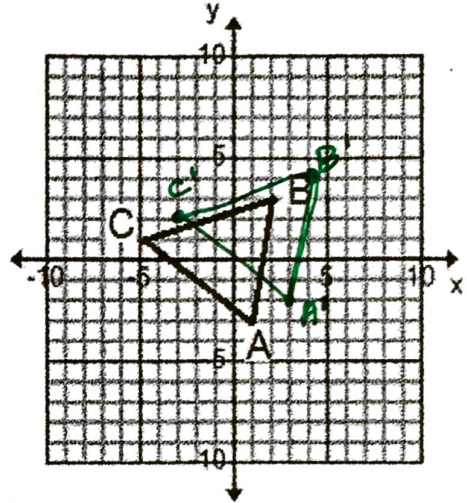
- A. (-10,-4)      B. (0,-4)  
C. (1,-9)        D. (6,2)

17. Use the graph of  $\triangle ABC$  shown below.

- a. What are the coordinates of  $\triangle A'B'C'$  when  $\triangle ABC$  is reflected over the x-axis?

$A'(1, -3)$     $B'(2, -3)$     $C'(-5, -1)$

- b. Graph and label the image of  $\triangle ABC$  after it is translated 2 units right and 1 unit up.



$\triangle MNP$  has vertices  $M(5, 4)$ ,  $N(-3, -2)$ , and  $P(5, -3)$ . Find the vertices of  $M'N'P'$  after each rotation about the origin.

18.  $90^\circ$  clockwise

$M'(4, 5)$

$N'(2, -3)$

$P'(3, -5)$

19.  $180^\circ$  clockwise

$M'(-5, -4)$

$N'(3, 2)$

$P'(-5, 3)$

20.  $90^\circ$  counterclockwise

$M'(\quad, \quad)$

$N'(\quad, \quad)$

$P'(\quad, \quad)$