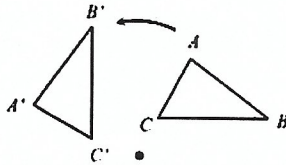
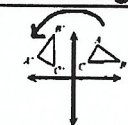
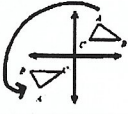

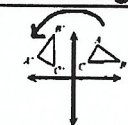
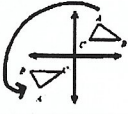

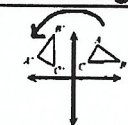
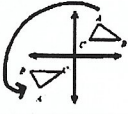



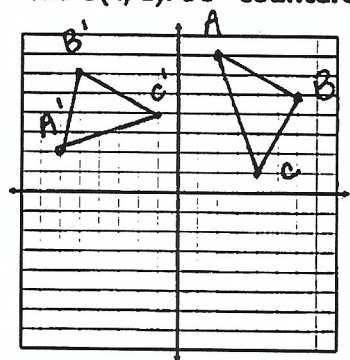
key

Name: _____ Date: _____
 Topic: _____ Class: _____

Main Ideas/Questions	Notes												
<h2 style="text-align: center;">Rotations</h2> 	<ul style="list-style-type: none"> A <u>TURN</u> around a fixed point called the <u>center of rotation</u>. The figure rotates at a specific <u>angle</u> and <u>direction</u>. <table border="1" style="width: 100%;"> <thead> <tr> <th colspan="3">Rules for rotating COUNTERCLOCKWISE about the ORIGIN</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">90°</td> <td></td> <td>$(x, y) \rightarrow (-y, x)$</td> </tr> <tr> <td style="text-align: center;">180°</td> <td></td> <td>$(x, y) \rightarrow (-x, -y)$</td> </tr> <tr> <td style="text-align: center;">270°</td> <td></td> <td>$(x, y) \rightarrow (y, -x)$</td> </tr> </tbody> </table>	Rules for rotating COUNTERCLOCKWISE about the ORIGIN			90°		$(x, y) \rightarrow (-y, x)$	180°		$(x, y) \rightarrow (-x, -y)$	270°		$(x, y) \rightarrow (y, -x)$
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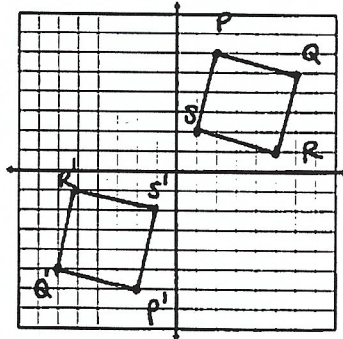
Directions: Graph and label each figure and its image under the given rotation about the origin.

1. Triangle ABC with vertices $A(2, 7)$, $B(6, 5)$, and $C(4, 1)$: **90° counterclockwise**



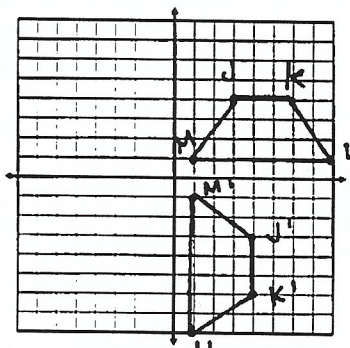
$A'(-7, 2)$
 $B'(-5, 6)$
 $C'(-1, 4)$

2. Square PQRS with vertices $P(2, 6)$, $Q(6, 5)$, $R(5, 1)$, and $S(1, 2)$: **180°**



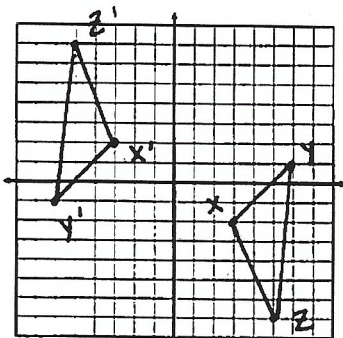
$P'(-2, -6)$
 $Q'(-6, -5)$
 $R'(-5, -1)$
 $S'(-1, -2)$

3. Trapezoid JKLM with vertices $J(3, 4)$, $K(6, 4)$, $L(8, 1)$, and $M(1, 1)$: **270° counterclockwise**



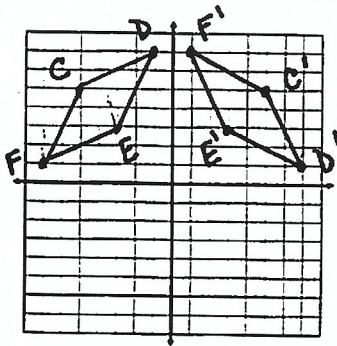
$J'(4, -3)$
 $K'(4, -6)$
 $L'(1, -8)$
 $M'(1, -1)$

4. Triangle XYZ with vertices $X(3, -2)$, $Y(6, 1)$, and $Z(5, -7)$: **180°**



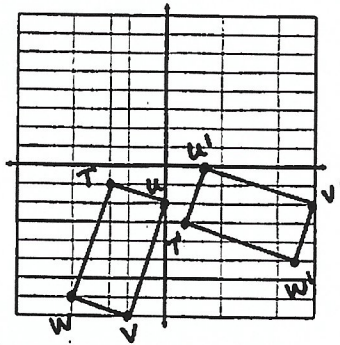
$X'(-3, 2)$
 $Y'(-6, -1)$
 $Z'(-5, 7)$

5. Rhombus $CDEF$ with vertices $C(-5, 5)$, $D(-1, 7)$, $E(-3, 3)$, and $F(-7, 1)$: 270° counterclockwise



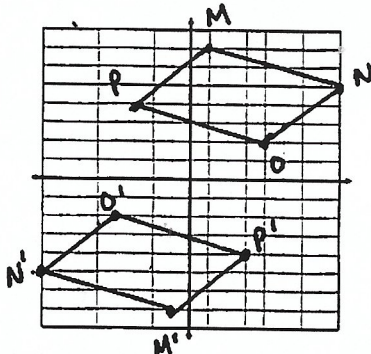
$$\begin{aligned} C' & (5, 5) \\ D' & (7, 1) \\ E' & (3, 3) \\ F' & (1, 7) \end{aligned}$$

6. Rectangle $TUVW$ with vertices $T(-3, -1)$, $U(0, -2)$, $V(-2, -8)$, and $W(-5, -7)$: 90° counterclockwise



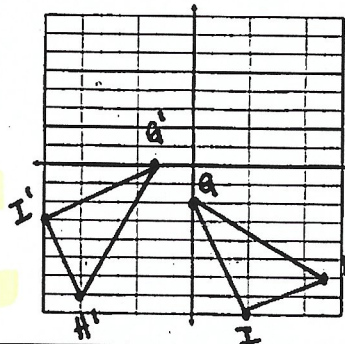
$$\begin{aligned} T' & (1, -3) \\ U' & (2, 0) \\ V' & (8, -2) \\ W' & (7, -5) \end{aligned}$$

7. Parallelogram $MNOP$ with vertices $M(1, 7)$, $N(8, 5)$, $O(4, 2)$, and $P(-3, 4)$: 180°



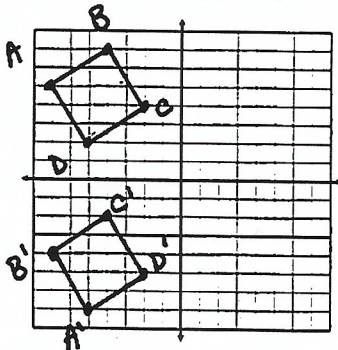
$$\begin{aligned} M' & (-1, -7) \\ N' & (-8, -5) \\ O' & (-4, -2) \\ P' & (3, -4) \end{aligned}$$

8. Triangle GHI with vertices $G(0, -2)$, $H(7, -6)$, and $I(3, -8)$: 270° counterclockwise



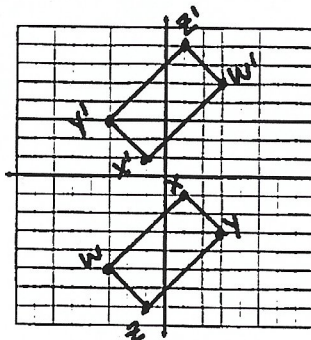
$$\begin{aligned} G' & (2, 0) \\ H' & (-6, -7) \\ I' & (-8, -3) \end{aligned}$$

9. Square $ABCD$ with vertices $A(-7, 5)$, $B(-4, 7)$, $C(-2, 4)$, and $D(-5, 2)$: 90° counterclockwise



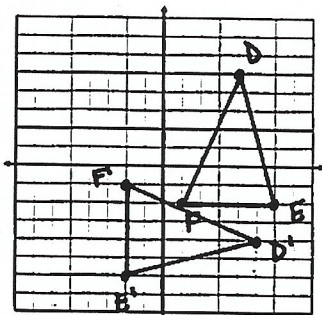
$$\begin{aligned} A' & (-5, -7) \\ B' & (-7, -4) \\ C' & (-4, -2) \\ D' & (-2, -5) \end{aligned}$$

10. Rectangle $WXYZ$ with vertices $W(-3, -5)$, $X(1, -1)$, $Y(3, -3)$, and $Z(-1, -7)$: 180°



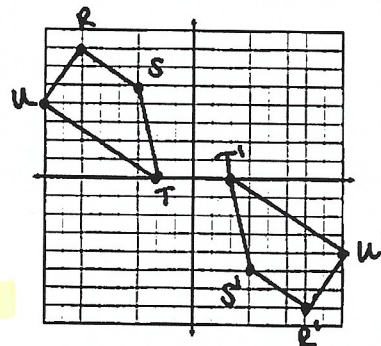
$$\begin{aligned} W' & (3, 5) \\ X' & (-1, 1) \\ Y' & (-3, 3) \\ Z' & (1, 7) \end{aligned}$$

11. Triangle DEF with vertices $D(4, 5)$, $E(6, -2)$, and $F(1, -2)$: 270° counterclockwise



$$\begin{aligned} D' & (5, -4) \\ E' & (-2, -6) \\ F' & (-2, -1) \end{aligned}$$

12. Trapezoid $RSTU$ with vertices $R(-6, 7)$, $S(-3, 5)$, $T(-2, 0)$, and $U(-8, 4)$: 180°

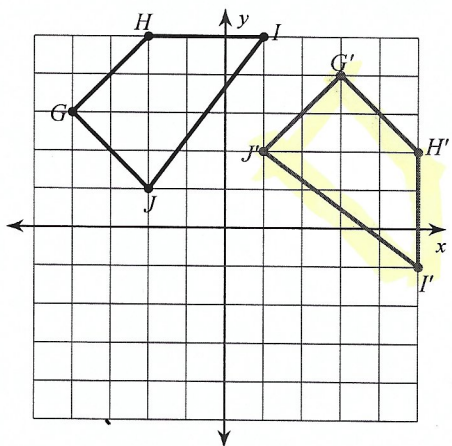


$$\begin{aligned} R' & (6, -7) \\ S' & (3, -5) \\ T' & (2, 0) \\ U' & (8, -4) \end{aligned}$$

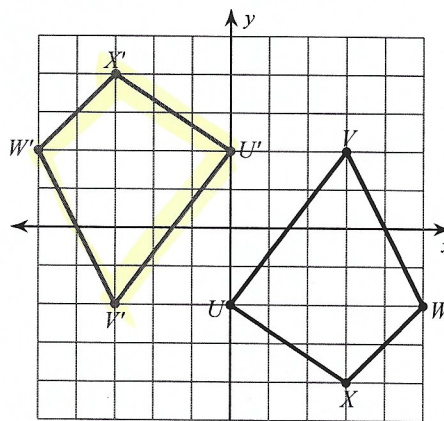
Assignment

Graph the image of the figure using the transformation given.

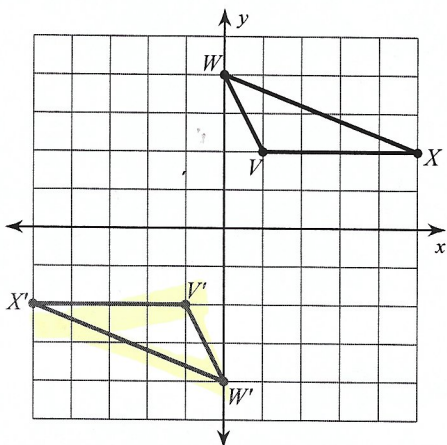
1) rotation 90° clockwise about the origin



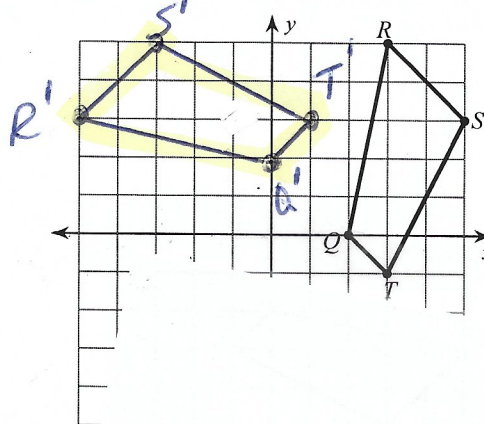
2) rotation 180° about the origin



3) rotation 180° about the origin

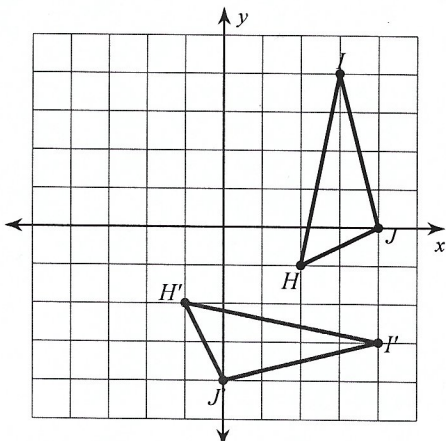


4) rotation 270° clockwise about the origin



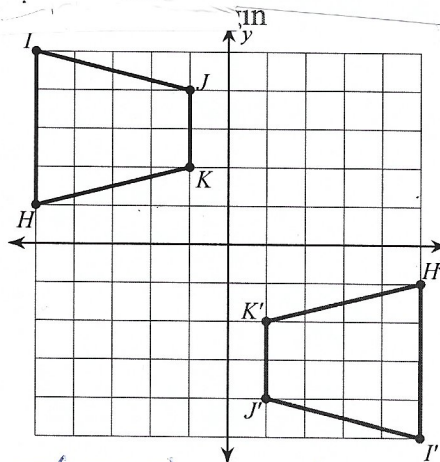
Write a rule to describe each transformation.

5)



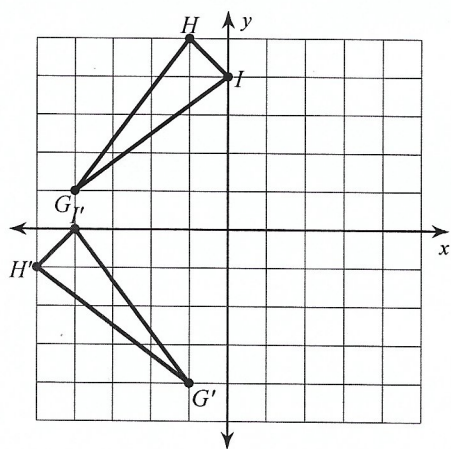
$(x, y) \rightarrow (y, -x)$

° clock



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

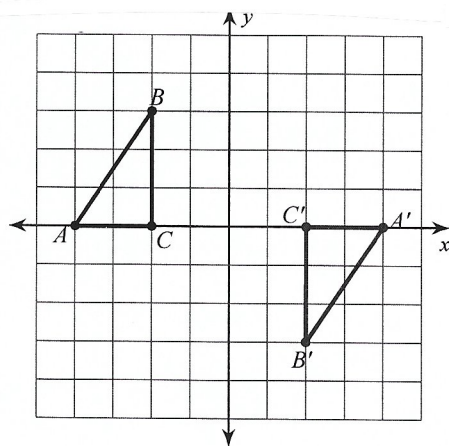
7)



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

about t

c



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

Determine the angle of rotation in each problem below given the preimage, image and point of rotation (state both directions of rotation).

