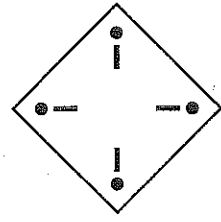
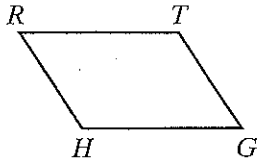
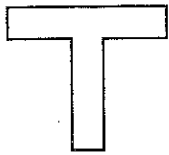


Practice 9-10 Rotations

Judging from appearances, does each figure have rotational symmetry? If yes, what is the angle of rotation?

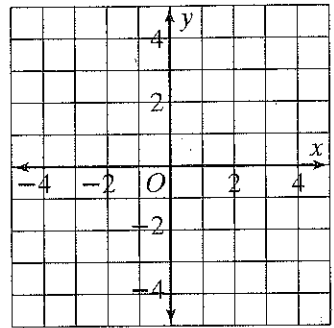
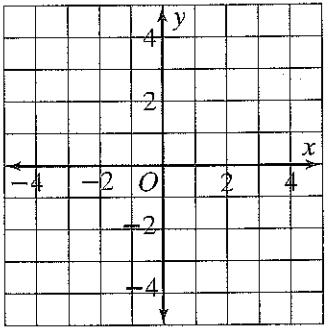
1. _____ 2. _____ 3. _____



The vertices of a triangle are given. Graph each triangle and its image after a rotation of (a) 90° and (b) 180° about the origin. Name the coordinates of the vertices of the images.

4. $A(1, 4), B(1, 1), C(4, 2)$

5. $S(2, 3), T(-2, 4), U(-4, 2)$



90°

180°

90°

180°

A' _____

A'' _____

S' _____

S'' _____

B' _____

B'' _____

T' _____

T'' _____

C' _____

C'' _____

U' _____

U'' _____

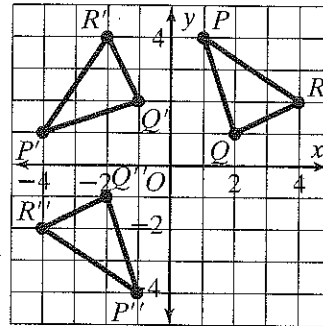
Look for a pattern in Exercises 4 and 5 to complete the following.

6. In a 90° rotation, $(x, y) \rightarrow$ _____

7. In a 180° rotation, $(x, y) \rightarrow$ _____

Reteaching 9-10 Rotations

$\triangle PQR$ has vertices $P(1, 4)$, $Q(2, 1)$ and $R(4, 2)$. Graph the triangle and its image after a rotation of (a) 90° and (b) 180° about the origin.



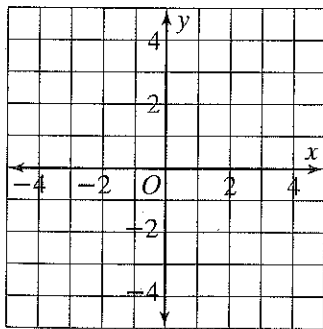
Graph $\triangle PQR$. Trace it onto tracing paper and label the vertices. Also trace the axes. Place your pencil at the origin. Turn the paper counterclockwise until the y -axis on the tracing paper is on top of the x -axis of the graph. Mark the position of each vertex by pressing through the paper. Connect the vertices of the rotated triangle and label them P' , Q' , and R' . The coordinates are $P'(-4, 1)$, $Q'(-1, 2)$, and $R'(-2, 4)$. Put your tracing paper back in its original position. Now turn it until $+5$ on the tracing paper x -axis is by -5 on the graph's x -axis. Mark the vertices, connect them, and label them P'' , Q'' , and R'' . The coordinates are $P''(-1, -4)$, $Q''(-2, -1)$, and $R''(-4, -2)$.

- The coordinates of $\triangle PQR$, its image after a 90° rotation $\triangle P'Q'R'$, and its image after a 180° rotation $\triangle P''Q''R''$ are listed in the table. Look for a pattern. What is the result on any point (x, y) of (a) a 90° rotation, (b) an 180° rotation? Complete the table.

Point	Image	
	90° Rotation	180° Rotation
$P(1, 4)$	$P'(-4, 1)$	$P''(-1, -4)$
$Q(2, 1)$	$Q'(-1, 2)$	$Q''(-2, -1)$
$R(4, 2)$	$R'(-2, 4)$	$R''(-4, -2)$
(x, y)		

The vertices of a triangle are given. Graph each triangle and its image after a rotation of (a) 90° and (b) 180° about the origin. Name the coordinates of the vertices of the images. Use tracing paper or the pattern you found.

- $J(1, 3)$, $K(3, 3)$, $L(1, 0)$



90°

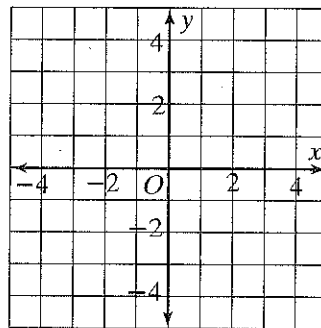
180°

J' _____ J'' _____

K' _____ K'' _____

L' _____ L'' _____

- $W(0, 4)$, $Y(1, 2)$, $Z(-1, 1)$



90°

180°

W' _____ W'' _____

Y' _____ Y'' _____

Z' _____ Z'' _____