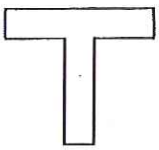
Name Key Class _____ Date _____

Practice 9-10

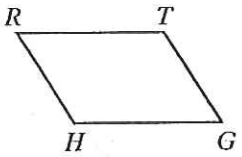
Rotations

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

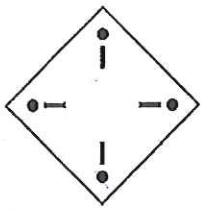
1. No



2. Yes; 180°

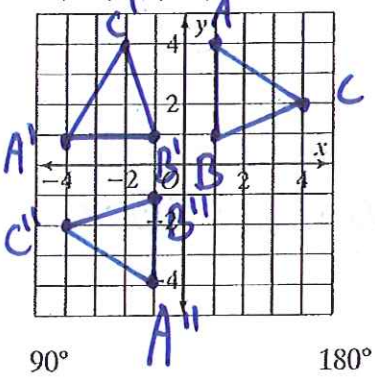


3. Yes; 90°



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



90°

A' (−4, 1)

B' (−1, 1)

C' (−2, 4)

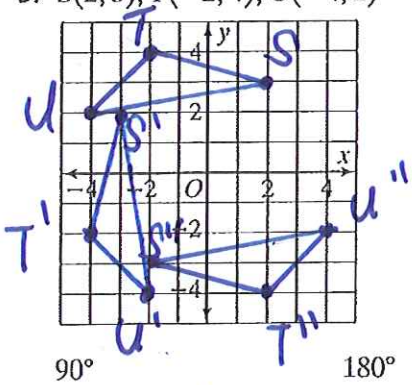
180°

A'' (−1, −4)

B'' (−1, −1)

C'' (−4, −2)

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



90°

S' (−3, 2)

T' (−4, −2)

U' (−2, −4)

180°

S'' (−2, −3)

T'' (2, −4)

U'' (4, −2)

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

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

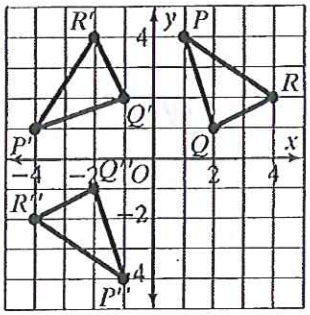
7. In a 180° rotation, $(x, y) \rightarrow$ (−x, −y)

Name Key Class _____ Date _____

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.



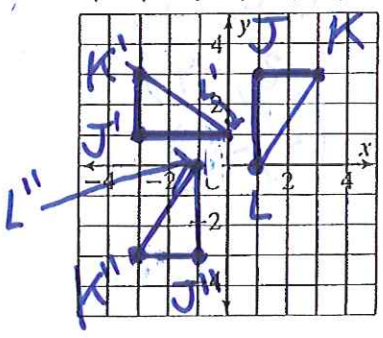
Graph $\triangle PQR$. Trace it onto tracing paper and label the vertices. Also trace the axes. Place your pencil at the origin. Turn the paper counterclockwise until the y-axis on the tracing paper is on top of the x-axis of the graph. Mark the position of each vertex by pressing through the paper. 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 $R''(-4, -2)$.

1. 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)	$(-y, x)$	$(-x, -y)$

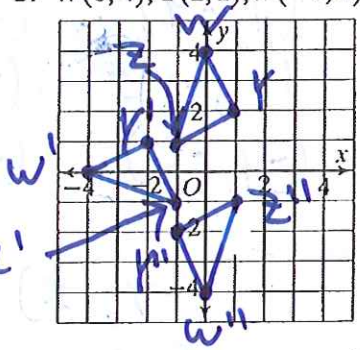
The vertices of a triangle are given. Graph each triangle and its image after a rotation of (a) 90° and (b) 180° about the origin. Name the coordinates of the vertices of the images. Use tracing paper or the pattern you found.

2. $J(1, 3)$, $K(3, 3)$, $L(1, 0)$



90°		180°	
J'	$(-3, 1)$	J''	$(-1, -3)$
K'	$(-3, 3)$	K''	$(-3, -3)$
L'	$(0, 1)$	L''	$(-1, 0)$

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



90°		180°	
W'	$(-4, 0)$	W''	$(0, -4)$
Y'	$(-2, 1)$	Y''	$(-1, -2)$
Z'	$(-1, -1)$	Z''	$(1, -1)$