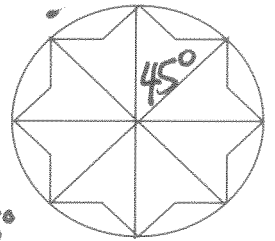


# 9-3 Rotations Practice

1-4: Use the given wheel with center point P to answer each question.

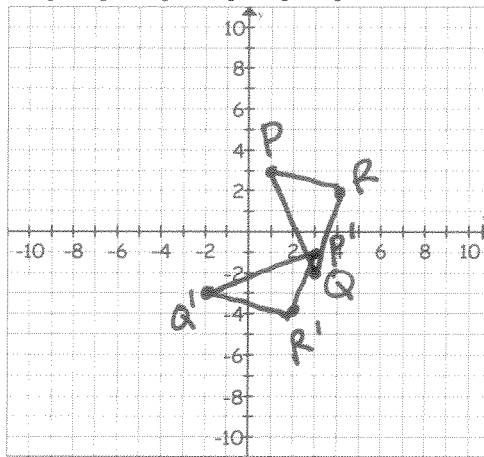
1. Rotate A clockwise  $90^\circ$ . A maps onto image point C.
2. Rotate C counterclockwise  $180^\circ$ . C maps onto image point G.  $(180+45)$
3. Pre-image H maps clockwise to point E. What is the angle of rotation?  $225^\circ$
4. Pre-image F maps counterclockwise to point C. What is the angle of rotation?  $135^\circ$   
 $(90+45)$



5-8: Graph each figure and its image under the given rotation about the origin.

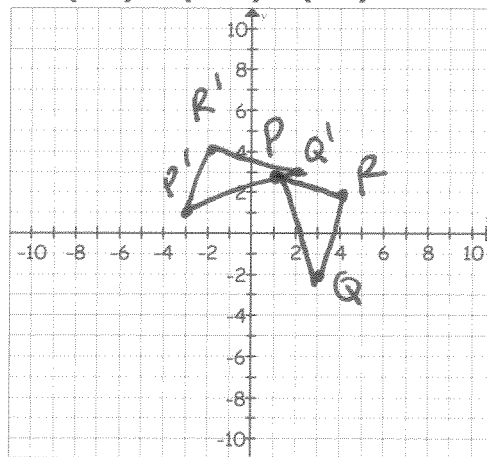
5. Rotate  $\triangle PQR$   $90^\circ$  clockwise.  $\curvearrowright (y, -x)$
6. Rotate  $\triangle PQR$   $90^\circ$  counterclockwise.  $\curvearrowleft (-y, x)$

P(1,3), Q(3,-2), R(4,2)



$P'(3, -1)$   
 $Q'(-2, -3)$   
 $R'(2, -4)$

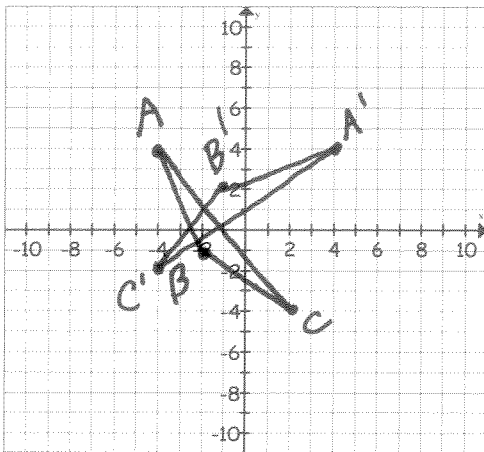
P(1,3), Q(3,-2), R(4,2)



$P'(-3, 1)$   
 $Q'(2, 3)$   
 $R'(-2, 4)$

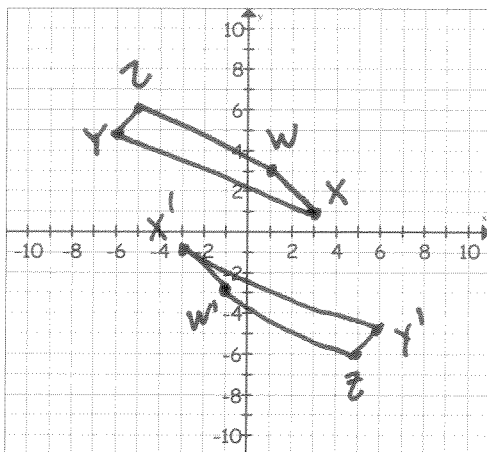
7. Rotate  $\triangle ABC$   $270^\circ$ .  $\curvearrowleft (y, -x)$
8. Rotate Quadrilateral WXYZ  $180^\circ$ .  $(-x, -y)$

A(-4,4), B(-2,-1), C(2,-4)



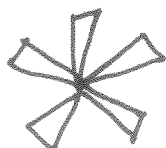
$A'(4, 4)$   
 $B'(-1, 2)$   
 $C'(-4, -2)$

W(1,3), X(3,1), Y(-6,5), and Z(-5,6)



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

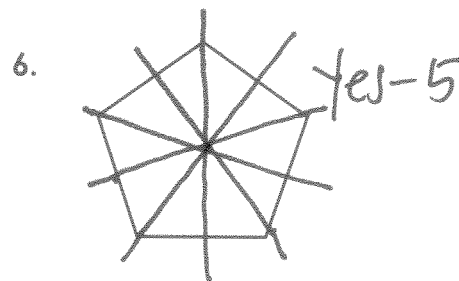
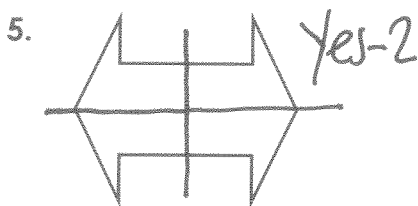
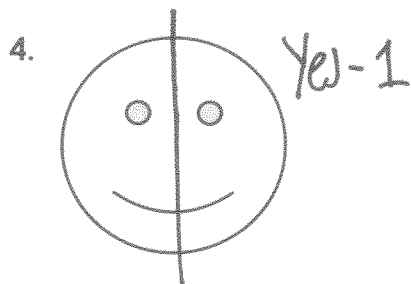
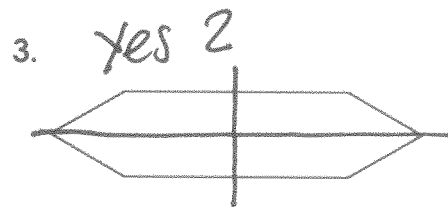
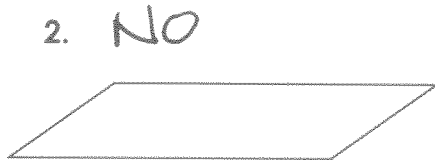
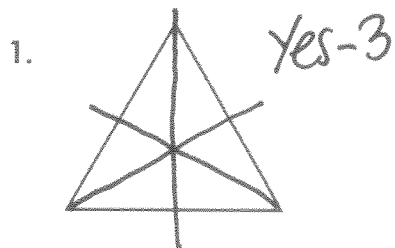
9. If a ceiling fan has 5 equally spaced blades, find the angle of rotation that maps one blade onto the adjacent blade.



$$\frac{360}{5} = 72^\circ$$

# 9-5 Symmetry Practice <sup>Master</sup>

1-6: State whether the figure appears to have line symmetry. Write yes or no. If yes, then state the number of lines of symmetry (draw them to help answer the question).



7-12: State whether the figure has point symmetry. Write yes or no.

