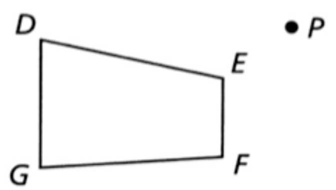
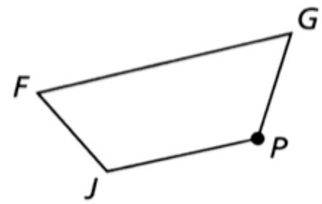
4-3-Rotations – Homework

1) Trace the polygon and point *P.* Then draw a rotation of the polygon about point *P* using the given number of degrees and direction.

   a. 80° clockwise rotation

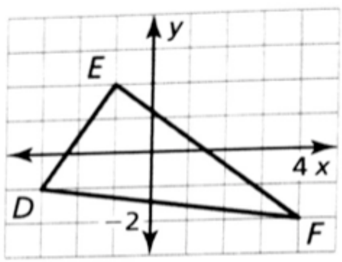


   b. 150° counterclockwise rotation

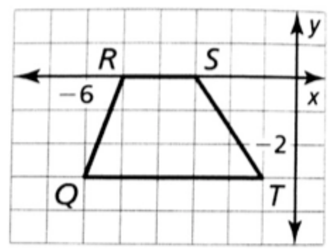


2) Graph the polygon and its image after a rotation of the given number of degrees about the origin.

   a. 180° clockwise



   b. 270° counterclockwise



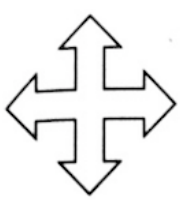
3) Graph $\overline{XY}$ with endpoints *X(-3, 1)* and *Y(4, -5)* and its image after the composition.

   a. Rotation: 180° about the origin, clockwise; Translation: $(x,y) \rightarrow (x-1, y+1)$

   b. b. Reflection: in the line y = x; Rotation: 90° about the origin, counterclockwise

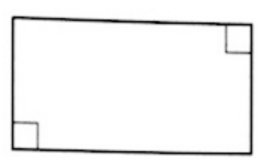
4) Determine whether the figure has rotational symmetry. If so, describe any rotations that map the figure onto itself.

   a.



   b.

   c.

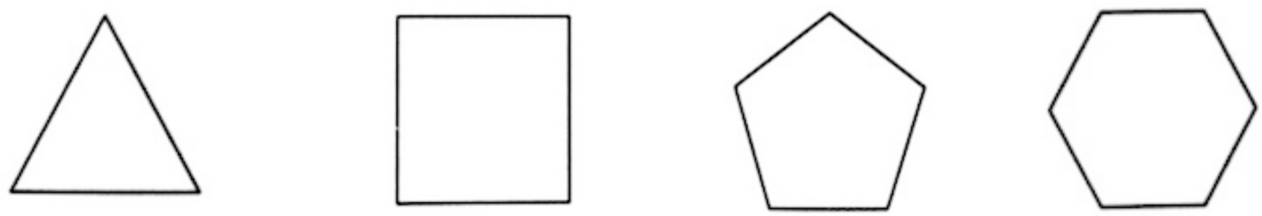


5) ΔXYZ has vertices *X(2, 5)*, *Y(3, 1)*, and *Z(0, 2)*. Rotate the triangle 90° counterclockwise about the point *P(-2, -1)*.

6) Select the angles of rotational symmetry for each regular polygon. Select all that apply.

a. 30° b. 45° c. 60° d. 72°

e. 90° f. 120° g. 144° h. 180°



7) Use the graph of y = 2x – 3.

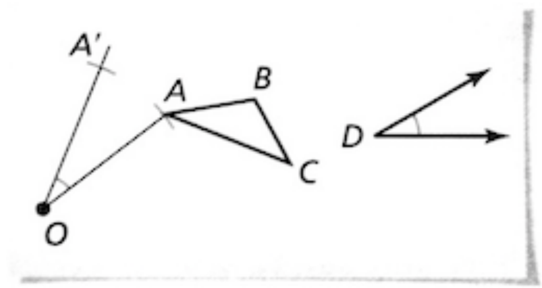
a. Rotate the line 90°, 180°, 270°, and 360° counterclockwise about the origin. Write the equation of the line for each image. Describe the relationship between the equation of the preimage and the equation of each image.

8) Follow these steps to construct a rotation of ΔABC by angle *D* around a point *O*. Use a compass and a straightedge.

a. Step 1 – Draw ΔABC, $\angle D$, and *O*, the center of rotation.

b. Step 2 – Draw $\overline{OA}$. Use the construction for copying an angle to copy $\angle D$ at *O*, as shown. Then use distances *OA* and center *O* to find *A'*.

c. Step 3 – Repeat Step 2 to find points *B'* and *C'*. Draw $\Delta A'B'C'$



9) A polar coordinate system locates a point in a plane by its distance from the origin *O* and by the measure of an angle with its vertex at the origin. For example, the point *A(2, 30°)* is 2 units from the origin and $m\angle XOA = 30°$. What are the polar coordinates of the image of point *A* after a 90° rotation counterclockwise? a 180° rotation counterclockwise? a 270° rotation counterclockwise?