# Rotation

**Reporting Category**  Geometry

**Topic**  Rotating a polygon on the coordinate plane

**Primary SOL**  7.8  The student, given a polygon in the coordinate plane, will represent transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane.

**Materials**
- Graph paper or individual whiteboard with the coordinate plane
- Patty paper or tracing paper
- Rotation Activity Sheet (attached)

**Vocabulary**

*polygon, ordered pair, origin, quadrant, x-axis, y-axis, coordinate plane* (earlier grades)

*rotation, reflection, translation* (7.8)

**Student/Teacher Actions (what students and teachers should be doing to facilitate learning)**
1. Define and demonstrate rotation. Discuss rotations of 90°, 180°, and 270°. Emphasize that the size and shape of the polygon remains the same; only the position has changed.
2. Give each student a Rotation Activity Sheet. Have students graph the trapezoid. Guide students in completing the sheet. Make sure students use the prime notation to represent the rotated figure.
3. Give students additional practice including other polygons, such as triangles, rectangles, pentagons, etc. Individual whiteboards could be used for this practice.

**Assessment**
- **Questions**
  - How does rotating a figure affect the size, shape, and position of that figure?
  - What are some practical examples of rotation?
- **Journal/Writing Prompts**
  - Describe the difference between a polygon that has been rotated 90° counterclockwise and a polygon that has been rotated 270° clockwise.
  - Describe what a triangle looks like after being rotated 180° clockwise.
- **Other**
  - Have students draw a polygon on the coordinate plane. Have them rotate the polygon 90°, 180°, and 270° clockwise.
  - Create a tessellation by rotating a figure.

**Extensions and Connections (for all students)**
- Give students a set of magnetic letters including all the letters of the alphabet. A set of bulletin board letters could also be used. Find all the letters that look the same after a translation (all letters). Create a chart to record your answers. Find all the letters that look

the same after a reflection across the y-axis (A, H, I, M, O, T, U, V, W, X, Y). Record your answers. Find all the letters that look the same after a reflection across the x-axis (B, C, D, E, H, I, O, X). Record your answers. Find all the letters that look the same after a rotation of 180° (H, I, O, S, X, Z). Record your answers. Which letters look the same after translation, reflection, and rotation (O, H, I, X)?

- Use a virtual manipulative to illustrate the rotation of a figure.

**Strategies for Differentiation**
- Have students use a pattern block on a coordinate grid and rotate the block.
- Use *turn* as an alternate vocabulary word for *rotate*.
- Color code the original figure and the rotated figure.
- Enlarge the coordinate plane.

# Rotation Activity Sheet

**Name** _____ **Date** _____

1. Graph and connect these points: (2,2) (3,4) (6,2) (6,4).
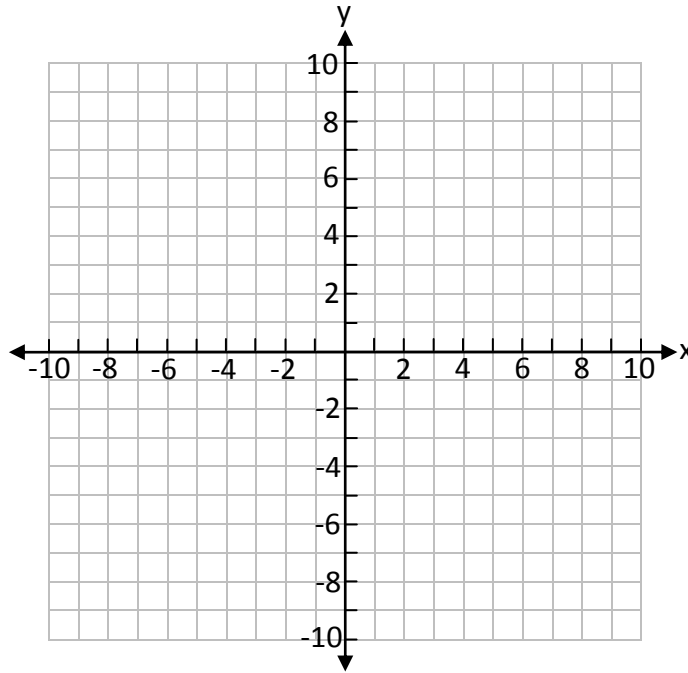


2. On your patty paper, trace the x-axis, the y-axis, and the trapezoid. Rotate the entire piece of patty paper 90° counterclockwise about the origin. Transfer the trapezoid to the graph paper. Compare the original figure to the new figure, including the coordinate points.

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3. Return the patty paper, the x-axis and y-axis, and the trapezoid to their original positions on the graph. Rotate the entire piece of patty paper 180° counterclockwise about the origin. Transfer the trapezoid to the graph paper. Compare the original figure to the new figure, including the coordinate points.

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4. Return the patty paper, the x-axis and y-axis, and the trapezoid to their original positions on the graph. Rotate the entire piece of patty paper 90° clockwise about the origin. Transfer the trapezoid to the graph paper. Compare the original figure to the new figure, including the coordinate points.

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