

Translation and Reflection

Reporting Category Geometry

Topic Translating and reflecting polygons 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
- Tracing paper or patty paper
- Translation Activity Sheet (attached)
- Reflection Activity Sheets (attached)

Vocabulary

polygon, vertical, horizontal, negative, positive, x-axis, y-axis, ordered pair, origin, coordinate plane (earlier grades)

translation, reflection (7.8)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Introduce the lesson by discussing moves on a checkerboard. Note that a move is made by sliding the game piece to a new position. Explain that the move does not affect the size or shape of the game piece. Use this to lead into a discussion on translations. Review horizontal and vertical moves. Review moving in a positive or negative direction on the coordinate plane.
2. Distribute copies of the Translation Activity Sheet, and have students graph the trapezoid. Guide students in completing the sheet. Emphasize the use of the prime notation for the translated figure.
3. Introduce reflection by discussing mirror images.
4. Distribute copies of the Reflection Activity Sheet, and have students graph the trapezoid. Guide students in completing the sheet. Emphasize the use of the prime notation for the translated figure.
5. Give students additional practice. Individual whiteboards could be used for this practice.

Assessment

- **Questions**
 - How does translating a figure affect the size, shape, and position of that figure?
 - How does rotating a figure affect the size, shape, and position of that figure?
 - What are the differences between a translated polygon and a reflected polygon?
- **Journal/Writing Prompts**
 - Describe what a scalene triangle looks like after being reflected over the y-axis. An equilateral triangle.
 - Give a practical situation that represents a translation.

- **Other**
 - Give students a polygon and its translation, and ask the students to describe the translation.
 - Create a tessellation by translating and/or reflecting a figure.
 - Pair students. Have one partner choose a parallelogram, draw it on the coordinate plane, describe its original position, rotate, translate, and reflect the parallelogram several times, and list the steps. Challenge the second partner to return the parallelogram to its original location.

Extensions and Connections (for all students)

- Have students find pictures that show reflections and describe the reflections.

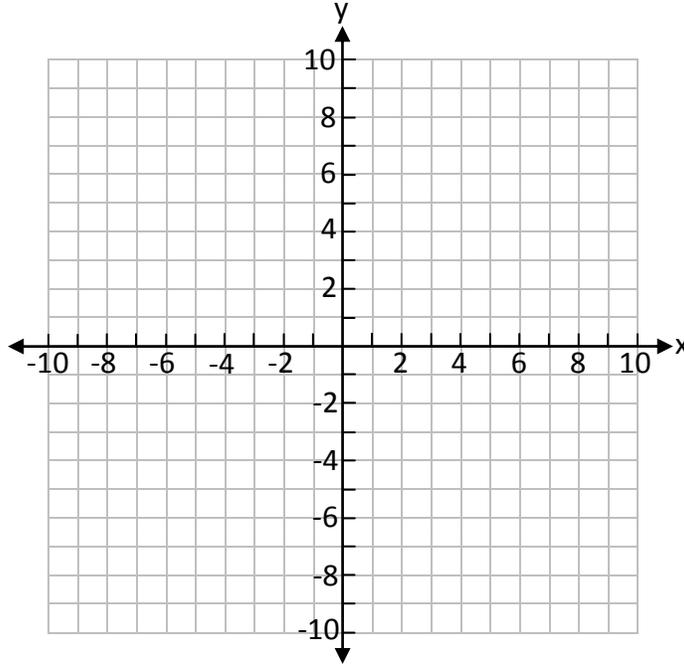
Strategies for Differentiation

- Students can use a pattern block on a coordinate grid and translate and reflect the block.
- Color code the original polygon and its translation or reflection.
- Enlarge the coordinate plane.
- Use *slide* as a vocabulary term for *translate*. Use *flip* as a vocabulary term for *reflection*.

Translation Activity Sheet

Name _____ Date _____

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



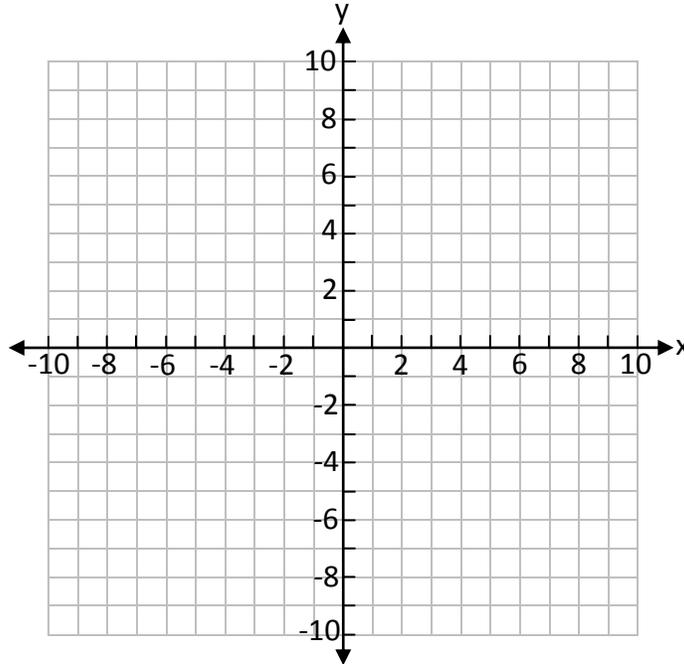
2. Graph a new trapezoid on the same coordinate plane, translating it 4 units horizontally and -5 units vertically. Describe the new figure.

3. Graph a new trapezoid on the same coordinate plane, translating it -6 units horizontally and 2 units vertically. Describe the new figure.

Reflection 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. Reflect the trapezoid across the y-axis by folding the patty paper along the y-axis. Transfer the trapezoid to the graph paper. Compare the original figure to the reflected figure, including coordinate pairs.

3. On your patty paper, trace the x-axis, the y-axis, and the trapezoid. Reflect the trapezoid across the x-axis by folding the patty paper along the x-axis. Transfer the trapezoid to the graph paper. Compare the original figure to the reflected figure, including coordinate pairs.
