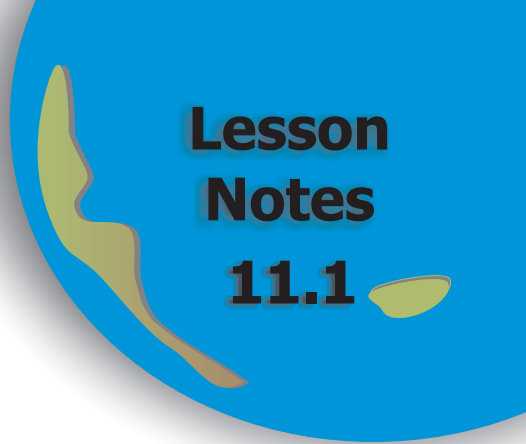


NAME \_\_\_\_\_

**Module 11** Transformation of Shapes  
**Lesson 1** Translations and Reflections



**Lesson Notes**  
**11.1**

**Lesson Objectives**

- Perform translations and reflections of two-dimensional figures using a variety of methods (paper folding, tracing, graph paper).
- Draw and describe the results of translations and reflections about the  $x$ - and  $y$ -axis.

**Subtopic 1** Translations

A **transformation** is a change in the position, shape, or size of a geometric figure. Translations, **reflections**, and **rotations** are three types of transformations that are basic rigid motions of geometry.

Translation (**Slide**)

- Transformation that slides each of the points of a figure the same **distance** in the same direction
- Slides a figure **horizontally**, vertically, or diagonally along a line without turning

The resulting figure after a translation is called the **image** of the original figure.

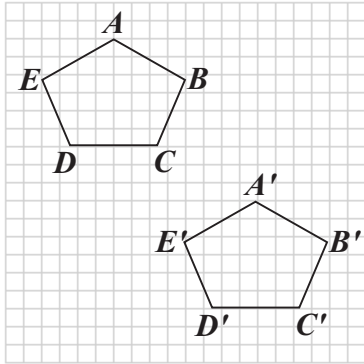
- Are **congruent**
- Have the same orientation

Motion rule

- Describes a transformation made in a coordinate plane
- Movements left and down are **negative**.
- Movements **right** and **up** are positive.

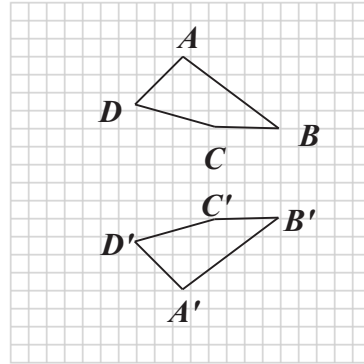
Tell whether the figure shown and its image show a translation. Explain your answer.

1



**Translation:** The image is congruent to the original figure and has the same orientation.

2

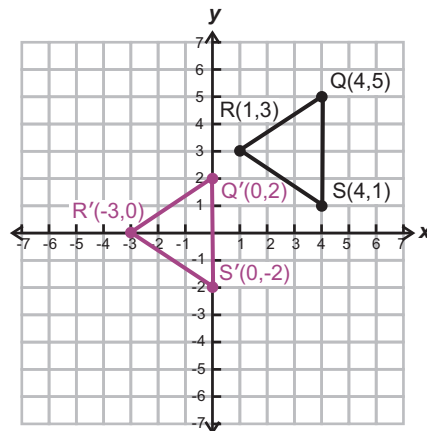


**Not a translation:** It has a different orientation.

3

Translate  $\triangle QSR$  using the rule  $(x, y) \rightarrow (x - 4, y - 3)$ . Give the coordinates of  $Q'$ ,  $R'$ , and  $S'$ .

$Q'$  (0, 2)  
 $R'$  (-3, 0)  
 $S'$  (0, -2)



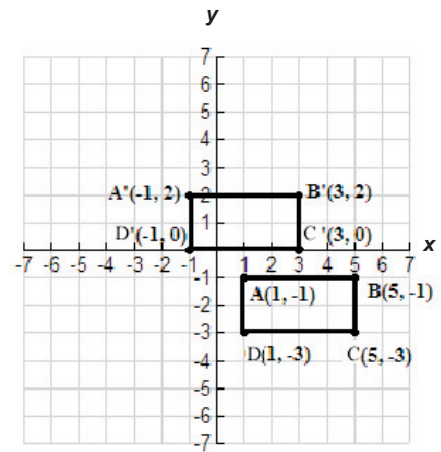
NAME \_\_\_\_\_

**Module 11 Transformation of Shapes**  
**Lesson 1 Translations and Reflections**



Write the motion rule for the transformation of rectangle  $ABCD$  into rectangle  $A'B'C'D'$ .

$$(x, y) \rightarrow (x - 2, y + 3)$$



**Subtopic 2 Reflections**

- A reflection flips each point of a figure across a line and produces a congruent mirror image.
- A reflection is sometimes called a flip.
- A line of reflection is the line over which an image is flipped.

Reflection across y-axis:

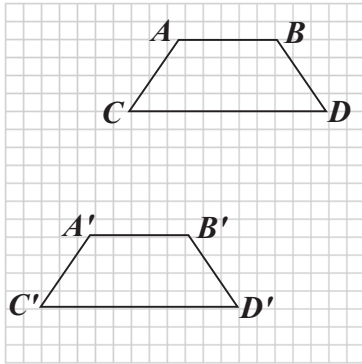
- The  $x$ -coordinate is the opposite.
- The  $y$ -coordinate is the same.
- $(x, y) \rightarrow (-x, y)$

Reflection across x-axis:

- The  $x$ -coordinate is the same.
- The  $y$ -coordinate is the opposite.
- $(x, y) \rightarrow (x, -y)$

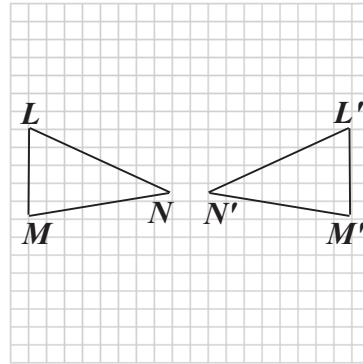
Tell whether the figure and its image show a reflection. Explain your answer.

5



**Not a reflection:** It is a translation. The image and the original have the same orientation.

6

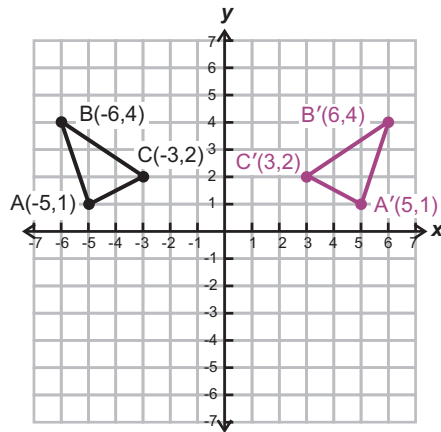


**Reflection:** The image is a congruent mirror image of the original.

7

Reflect  $\triangle ABC$  across the  $y$ -axis.  
Give the coordinates of  $A'$ ,  $B'$ , and  $C'$ .

$A' (5, 1)$   
 $B' (6, 4)$   
 $C' (3, 2)$



8

Write the motion rule for the transformation of square  $LMNP$  into square  $L'M'N'P'$ .

$(x, y) \rightarrow (x, -y)$

