

Key

# Properties of Transformations

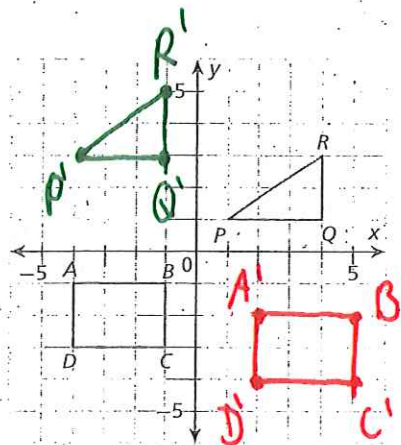
COMMON CORE

CC.8.G.1

**Essential question:** *What properties of a figure are preserved under a translation, reflection, or rotation?*

## 1 EXPLORE Properties of Translations

- A Trace the rectangle and triangle on a piece of paper. Then cut out your traced figures.
- B Place your copy of the rectangle on top of the rectangle in the figure. Then translate the rectangle by sliding your copy 6 units to the right and 1 unit down. Draw the new location of the rectangle on the coordinate plane and label the vertices  $A'$ ,  $B'$ ,  $C'$ , and  $D'$ .
- C Place your copy of the triangle on top of the triangle in the figure. Then translate the triangle by sliding your copy 5 units to the left and 2 units up. Draw the new location of the triangle on the coordinate plane and label the vertices  $P'$ ,  $Q'$ , and  $R'$ .



- D Use a ruler to measure line segments  $\overline{AD}$  and  $\overline{PR}$ . Then, measure  $\overline{A'D'}$  and  $\overline{P'R'}$ . What do you notice?

Translation does NOT change the length

- E Use a protractor to measure  $\angle C$  and  $\angle R$ . Then, measure  $\angle C'$  and  $\angle R'$ . What do you notice?

Translation does NOT change the ~~4~~ angles

- F Count the pairs of parallel lines in rectangle  $ABCD$ . Count the pairs of parallel lines in rectangle  $A'B'C'D'$ . What do you notice?

Translation does NOT change the size or shape.

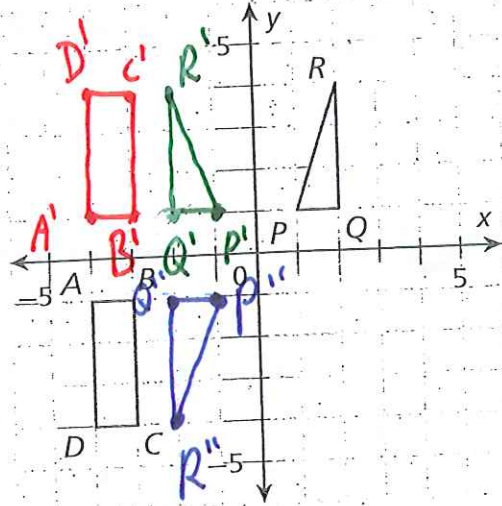
### REFLECT

- 1a. Use your results from D, E, and F to write a conjecture about translations.

Translation does NOT effect size or shape.

## 2 EXPLORE Properties of Reflections

- A Trace the rectangle and triangle on a piece of paper. Then, cut out your traced figures.
- B Place your copy of the rectangle on top of the rectangle in the figure. Then reflect the rectangle across the  $x$ -axis by flipping your copy across the  $x$ -axis. Draw the new location of the rectangle on the coordinate plane and label the vertices  $A'$ ,  $B'$ ,  $C'$ , and  $D'$ .
- C Place your copy of the triangle on top of the triangle in the figure. Then reflect the triangle across the  $y$ -axis by flipping your copy across the  $y$ -axis. Draw the new location of the triangle on the coordinate plane and label the vertices  $P'$ ,  $Q'$ , and  $R'$ .



- D Use a ruler to measure line segments  $\overline{BC}$  and  $\overline{P'R}$ . Then, measure  $\overline{B'C'}$  and  $\overline{P'R'}$ . What do you notice?

Reflection does NOT change length

- E Use a protractor to measure  $\angle D$  and  $\angle P$ . Then, measure  $\angle D'$  and  $\angle P'$ . What do you notice?

Reflection does NOT change  $\neq$  5

- F Count the pairs of parallel lines in rectangle  $ABCD$ . Count the pairs of parallel lines in rectangle  $A'B'C'D'$ . What do you notice?

Reflection does NOT change // lines

### REFLECT

- 2a. Use your results from D, E, and F to write a conjecture about reflections.

Reflection does NOT change size or shape.

### TRY THIS!

- 2b. Rotate your copy of the triangle from A  $180^\circ$  around the origin and draw the new location of the triangle. Make measurements and observations to help you state a conjecture about rotations.

Rotation does NOT change size or shape.