Name _____ Class _____ Date _____

4-2

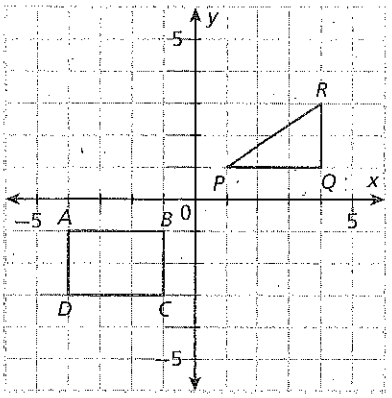
Properties of Transformations

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?

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

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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?

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REFLECT

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

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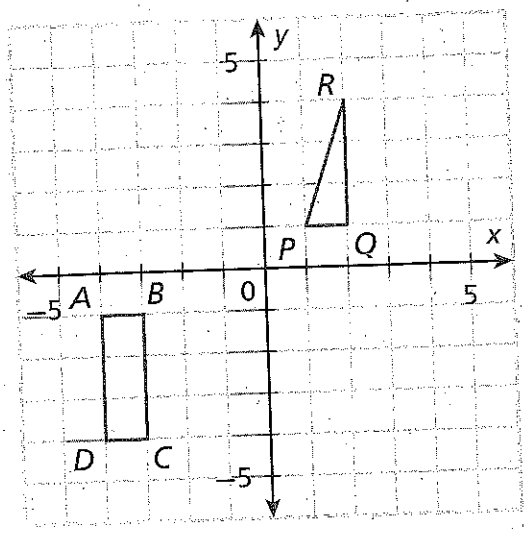
2 EXPLORE Properties of Reflections

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 $\overline{PR}$. Then, measure $\overline{B'C'}$ and $\overline{P'R'}$. What do you notice?

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

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?

REFLECT

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

TRY THIS!

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