

# Transformations and Similarity

COMMON CORE

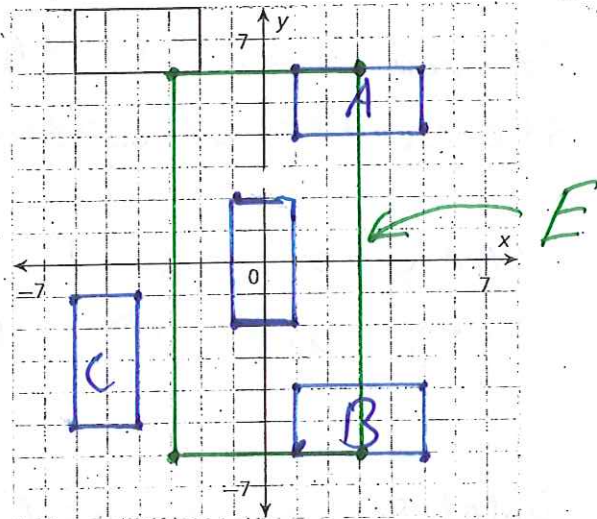
CC.8.G.4

**Essential question:** What is the connection between transformations and similar figures?

pre-image:  $(-6, 8), (-6, 6), (-2, 6), (-2, 8)$

## 1 EXPLORE Combining Transformations with Dilations

Apply the indicated series of transformations to the rectangle. Each transformation is applied to the image of the previous transformation, not to the original figure. Label each image with the letter of the transformation applied.



A  $(x, y) \rightarrow (x + 7, y - 2)$

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

C rotation  $90^\circ$  clockwise around the origin

D  $(x, y) \rightarrow (x + 5, y + 3)$

E  $(x, y) \rightarrow (3x, 3y)$

F List the coordinates of the vertices of rectangle E.

$(3, 6), (3, -6), (-3, -6), (-3, 6)$

G Compare the following attributes of rectangle E to those of the original figure.

Shape	Same shape
Size	Rectangle E is 3 times size of original
Angle Measures	Same $\neq$ measures.

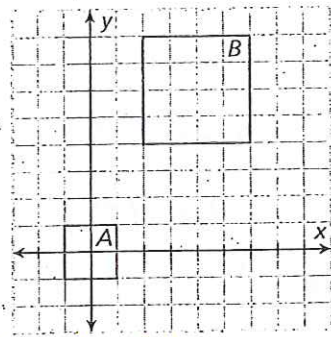
Two figures are similar if one can be obtained from the other by a sequence of translations, reflections, rotations, and dilations. Similar figures have the same shape but may be different sizes.

When you are told that two figures are similar, there must be a sequence of translations, reflections, rotations, and/or dilations that can transform one to the other.

## 2 EXPLORE Similar Figures

- A Identify a sequence of transformations that will transform figure A into figure B.

Dilation by a scale factor of 2 with center at origin and  $(x, y) \rightarrow (x+4, y+6)$



- B What happens if you reverse the order of the sequence you defined in A?

If you translate the figure first, the center of dilation will not be the origin

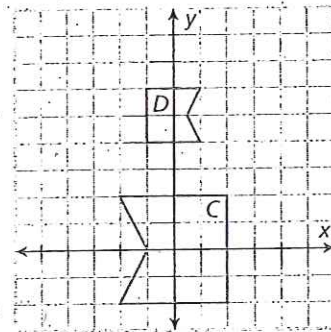
- C Tell whether figures A and B are congruent. Tell whether they are similar.

They are NOT  $\cong$  (congruent)

They are  $\sim$  (similar)

- D Identify a sequence of transformations that will transform figure C into figure D. Include a reflection.

Dilation by a scale factor of  $\frac{1}{2}$ , translation 5 units  $\uparrow$  reflected across the y-axis.



- E Identify a sequence of transformations that will transform figure C into figure D. Include a rotation.

Rotation of  $180^\circ$  about the origin, dilation by a scale factor of  $\frac{1}{2}$ , translation 5 units  $\uparrow$ .

### TRY THIS!

1. Circle the figures that are similar to each other.

