

4.6**Similarity and Transformations**

For use with Exploration 4.6

Essential Question When a figure is translated, reflected, rotated, or dilated in the plane, is the image always similar to the original figure?

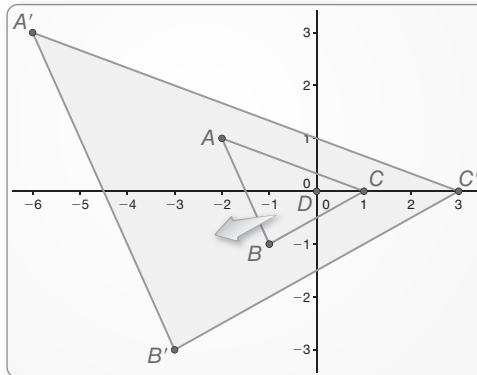
1 EXPLORATION: Dilations and Similarity

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner.

- Use dynamic geometry software to draw any triangle and label it $\triangle ABC$.
- Dilate the triangle using a scale factor of 3. Is the image similar to the original triangle? Justify your answer.

Sample



4.6 Similarity and Transformations (continued)**2 EXPLORATION: Rigid Motions and Similarity**

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner.

- a. Use dynamic geometry software to draw any triangle.
- b. Copy the triangle and translate it 3 units left and 4 units up. Is the image similar to the original triangle? Justify your answer.
- c. Reflect the triangle in the y -axis. Is the image similar to the original triangle? Justify your answer.
- d. Rotate the original triangle 90° counterclockwise about the origin. Is the image similar to the original triangle? Justify your answer.

Communicate Your Answer

3. When a figure is translated, reflected, rotated, or dilated in the plane, is the image always similar to the original figure? Explain your reasoning.
4. A figure undergoes a composition of transformations, which includes translations, reflections, rotations, and dilations. Is the image similar to the original figure? Explain your reasoning.

4.6

Notetaking with Vocabulary

For use after Lesson 4.6

In your own words, write the meaning of each vocabulary term.

similarity transformation

similar figures

Notes:

4.6 Notetaking with Vocabulary (continued)

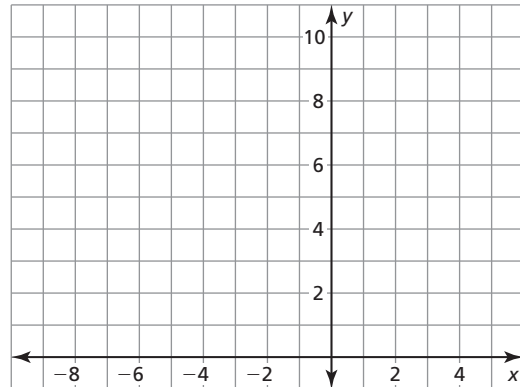
Extra Practice

In Exercises 1–3, graph the polygon with the given vertices and its image after the similarity transformation.

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

Translation: $(x, y) \rightarrow (x - 5, y - 3)$

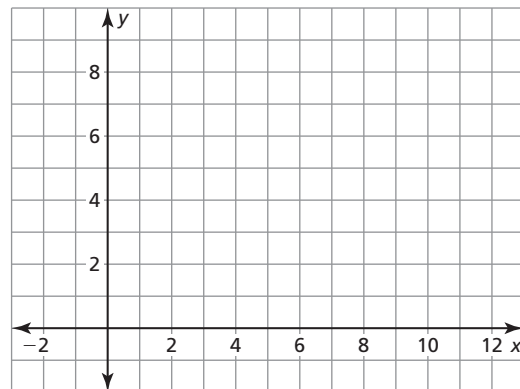
Dilation: $(x, y) \rightarrow (3x, 3y)$



2. $R(12, 8), S(8, 0), T(0, 4)$

Dilation: $(x, y) \rightarrow \left(\frac{1}{4}x, \frac{1}{4}y\right)$

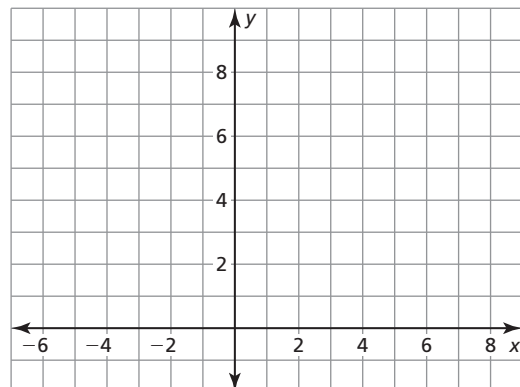
Reflection: in the y -axis



3. $X(9, 6), Y(3, 3), Z(3, 6)$

Rotation: 90° about the origin

Dilation: $(x, y) \rightarrow \left(\frac{2}{3}x, \frac{2}{3}y\right)$



4.6 Notetaking with Vocabulary (continued)

In Exercises 4–6, describe the similarity transformation that maps the preimage to the image.

