

## **Dilations in the Coordinate Plane**

Adapted from Stretching and Shrinking: Similarity, *Connected Mathematics*, Dale Seymour Publications

Plot the ordered pairs given in the table to make six different figures. Draw each figure on a separate sheet of graph paper. Connect the points with line segments as follows:

- For Set 1, connect the points in order. Connect the last point in the set to the first point in the set.
- For Set 2, connect the points in order. Connect the last point in the set to the first point in the set.
- For Set 3, connect the points in order. Do not connect the last point in the set to the first point in the set.
- For Set 4, make a dot at each point (do not connect the dots).

After drawing the six figures, compare Figure 1 to each of the other figures and answer the following questions.

1. How do the coordinates of each figure compare to the coordinates of Figure 1? If possible, write general rules for making Figures 2-6.
2. Describe any similarities and/or differences between Figure 1 and each of the other figures.
  - Describe how corresponding sides compare.
  - Describe how corresponding angles compare.
3. What would be the effect of multiplying each of the coordinates in Figure 1 by  $\frac{1}{2}$ ?
4. Which figures are similar? Describe a sequence of transformations that takes Figure 1 to the similar figure.
5. Translate, reflect, rotate (between  $0$  and  $90^\circ$ ), and dilate Figure 1 so that it lies entirely in Quadrant III on the coordinate plane. You may perform the transformations in any order that you choose. Draw a picture of the new figure at each step and explain the procedures you followed to get the new figure. Use coordinates to describe the transformations and give the scale factor you used. Describe the similarities and differences between your new figures and Figure 1.

**Georgia Department of Education**  
 Common Core Georgia Performance Standards Framework Student Edition  
*Eighth Grade Mathematics • Unit 1*

<b>Figure 1</b>	<b>Figure 2</b>	<b>Figure 3</b>	<b>Figure 4</b>	<b>Figure 5</b>	<b>Figure 6</b>
<b>Set 1</b>	<b>Set 1</b>	<b>Set 1</b>	<b>Set 1</b>	<b>Set 1</b>	<b>Set 1</b>
(6, 4)	(12, 8)	(18, 4)	(18, 12)	(6, 12)	(8, 6)
(6, -4)	(12, -8)	(18, -4)	(18, -12)	(6, -12)	(8, -2)
(-6, -4)	(-12, -8)	(-18, -4)	(-18, -12)	(-6, -12)	(-4, -2)
(-6, 4)	(-12, 8)	(-18, 4)	(-18, 12)	(-6, 12)	(-4, 6)
<b>Set 2</b>	<b>Set 2</b>	<b>Set 2</b>	<b>Set 2</b>	<b>Set 2</b>	<b>Set 2</b>
(1, 1)	(2, 2)	(3, 1)	(3, 3)	(1, 3)	(3, 3)
(1, -1)	(2, -2)	(3, -1)	(3, -3)	(1, -3)	(3, 1)
(-1, -1)	(-2, -2)	(-3, -1)	(-3, -3)	(-1, -3)	(1, 1)
(-1, 1)	(-2, 2)	(-3, 1)	(-3, 3)	(-1, 3)	(1, 3)
<b>Set 3</b>	<b>Set 3</b>	<b>Set 3</b>	<b>Set 3</b>	<b>Set 3</b>	<b>Set 3</b>
(4, -2)	(8, -4)	(12, -2)	(12, -6)	(4, -6)	(6, 0)
(3, -3)	(6, -6)	(9, -3)	(9, -9)	(3, -9)	(5, -1)
(-3, -3)	(-6, -6)	(-9, -3)	(-9, -9)	(-3, -9)	(-1, -1)
(-4, -2)	(-8, -4)	(-12, -2)	(-12, -6)	(-4, -6)	(-2, 0)
<b>Set 4</b>	<b>Set 4</b>	<b>Set 4</b>	<b>Set 4</b>	<b>Set 4</b>	<b>Set 4</b>
(4, 2)	(8, 4)	(12, 2)	(12, 6)	(4, 6)	(6, 4)
(-4, 2)	(-8, 4)	(-12, 2)	(-12, 6)	(-4, 6)	(-2, 4)