

Name: Key

Date: \_\_\_\_\_

M8-U2/3: Notes #6 – Dilations

Class: \_\_\_\_\_

\*You may talk about similarity and congruency but it's a focus in Lesson 8.

**Dilation** - transformation that produces an image that is the same shape as the original but not the same size

- A dilation is similar to the original figure.
- Dilations are centered around the origin (0, 0), unless otherwise stated.

**Scale factor** - is  $\frac{\text{image length}}{\text{pre-image length}}$ , which is a ratio.

- If the scale factor is greater than 1, the figure becomes larger.
- If the scale factor is between 0 and 1, the figure becomes smaller.

**Rule:**  $(x, y) \rightarrow (fx, fy)$  where  $f$  represents the scale factor.

**Example 1:**

Triangle  $ABC$  has vertices  $A(0, 2)$ ,  $B(4, 4)$ , and  $C(-1, 4)$ .

What are the vertices of its *image* with a scale factor of 2?

$A'(0, 4)$

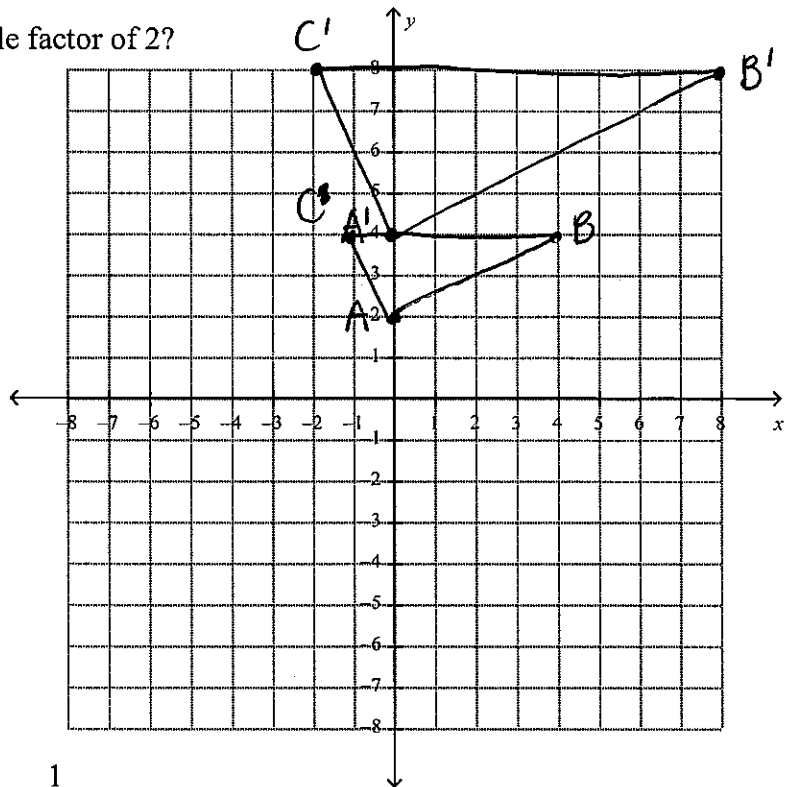
$B'(8, 8)$

$C'(-2, 8)$

What is the rule for this dilation?

$(x, y) \rightarrow (2x, 2y)$

Graph the triangle and its image.



Try it:

Triangle  $XYZ$  has vertices  $X(0, -2)$ ,  $Y(-1, 2)$ , and  $Z(2, 2)$ .

What are the vertices of its *image* with a scale factor of 3?  $\times 3$

$$X'(0, -6)$$

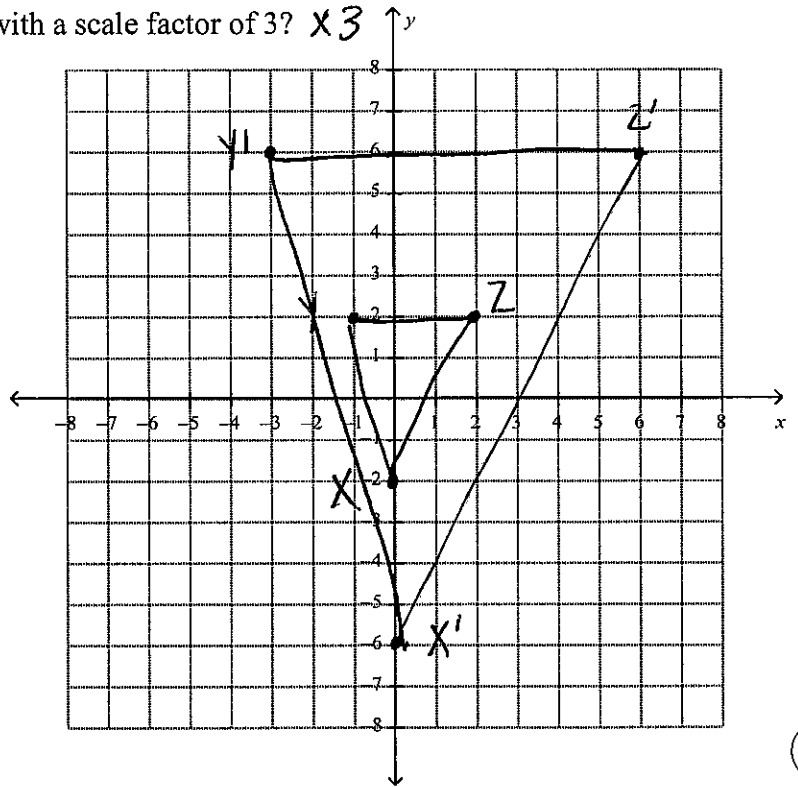
$$Y'(-3, 6)$$

$$Z'(6, 6)$$

What is the rule for this dilation?

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

Graph the triangle and its image.



**Example 2:**

Quadrilateral  $PQRS$  has vertices  $P(-2, 4)$ ,  $Q(4, 4)$ ,  $R(4, -2)$ , and  $S(-4, -4)$ . It is dilated by a scale factor of  $\frac{1}{2}$ .

What are the coordinates of the image?

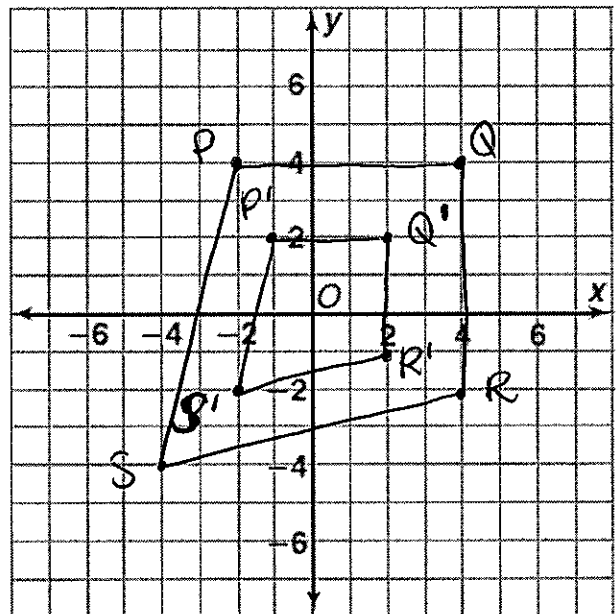
$$P'(-1, 2)$$

$$Q'(2, 2)$$

$$R'(2, -1)$$

$$S'(-2, -2)$$

Graph the quadrilateral and its image.

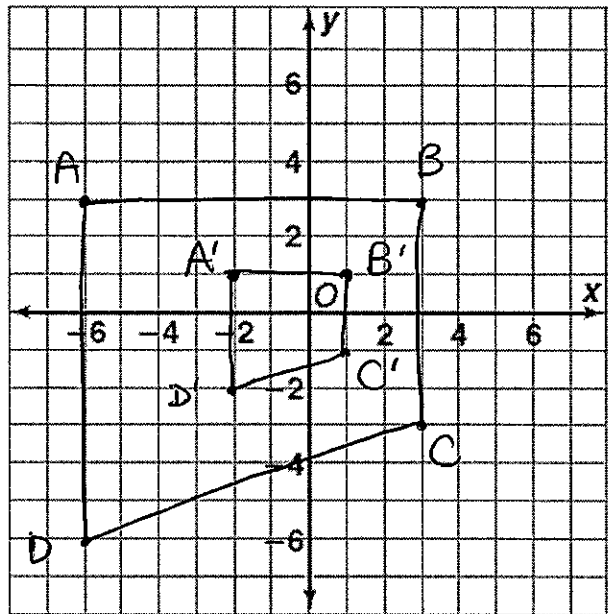


**Try It:** Quadrilateral  $ABCD$  has vertices  $A(-6, 3)$ ,  $B(3, 3)$ ,  $C(3, -3)$ , and  $D(-6, -6)$ .  
It is dilated by a scale factor of  $1/3$ .

What are the coordinates of the image?

$A'(-2, 1)$   
 $B'(1, 1)$   
 $C'(1, -1)$   
 $D'(-2, -2)$

Graph the quadrilateral and its image.



**PRACTICE:**

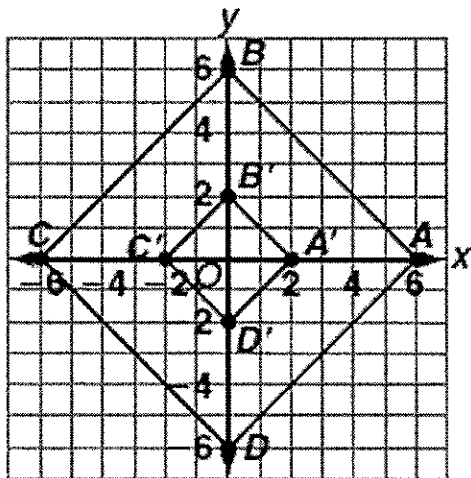
1. If a scale factor is  $\frac{5}{2}$ , how would you write the general rule?

Is this an enlargement or a reduction?

$(x, y) \rightarrow (\frac{5}{2}x, \frac{5}{2}y)$

2. Quadrilateral  $A'B'C'D'$  is a dilation of quadrilateral  $ABCD$ . Find the scale factor. Classify the dilation as an enlargement or a reduction.

It got smaller.

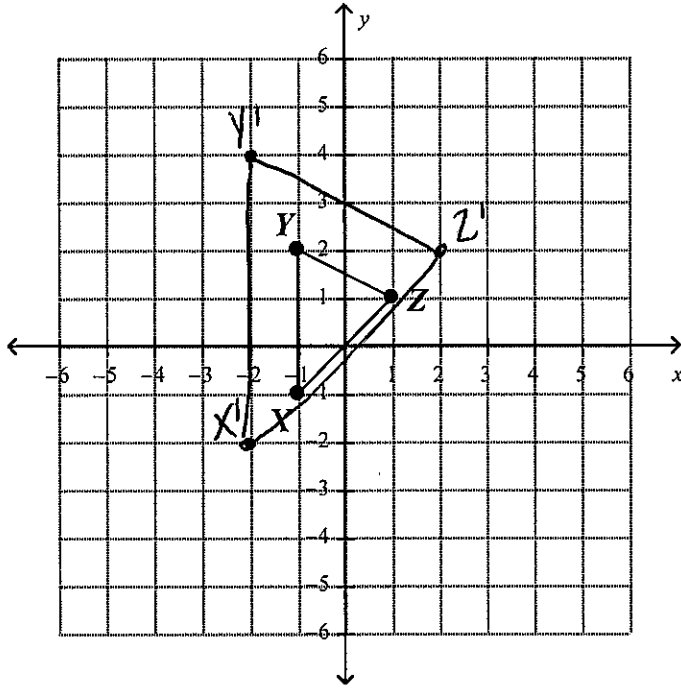


$A(6, 0) \rightarrow A'(2, 0)$

The scale factor must be  $1/3$ .

3. Triangle  $XYZ$  is graphed below.

Draw and label Triangle  $X'Y'Z'$  after a dilation using a scale factor of two. (x2)



$$X(-1, -1) \rightarrow X'(-2, -2)$$

$$Y(-1, 2) \rightarrow Y'(-2, 4)$$

$$Z(1, 1) \rightarrow Z'(2, 2)$$