



- I can draw the dilation image of a figure using both positive and negative scale factors.
- I can identify the scale factor of a dilation.
- I can find points on a dilation.

### Vocabulary

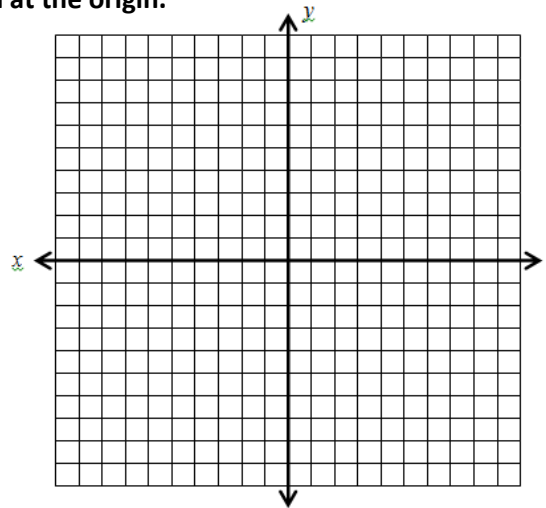
A **dilation** is a transformation that stretches or shrinks a figure to create a similar figure. In a dilation, the figure is enlarged or reduced with respect to a fixed point called the **center of dilation**. The **scale factor** describes how much the figure is enlarged or reduced.

On the coordinate plane, you can describe a dilation with respect to the origin with the notation  $(x, y) \rightarrow (kx, ky)$ , where  $k$  is the scale factor.

- ✓ If  $0 < k < 1$ , the dilation is a **reduction**.
- ✓ If  $k > 1$ , the dilation is an **enlargement**.

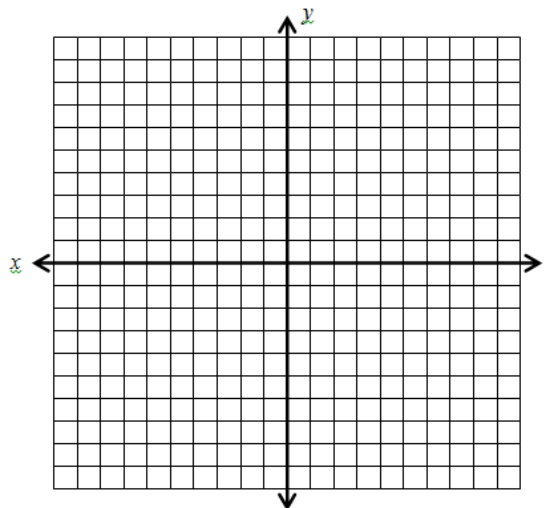
### Example 1: Draw a dilation on the coordinate plane centered at the origin.

- a) Draw a dilation of quadrilateral  $ABCD$  with vertices  $A(0, 3)$ ,  $B(2, 3)$ ,  $C(3, 1)$ , and  $D(2, 0)$  about the origin with a scale factor of 3.



→ Was this dilation a reduction or an enlargement?

- b) Triangle  $ABC$  has vertices  $A(0,0)$ ,  $B(2, 6)$ , and  $C(6, 4)$ . Find the coordinates of the vertices of the image after a dilation about the origin with a scale factor of  $\frac{1}{2}$ .



→ Was this dilation a reduction or an enlargement?

- c) Dilate the following with respect to the origin.  
 $(x, y) \rightarrow (-2x, -2y)$

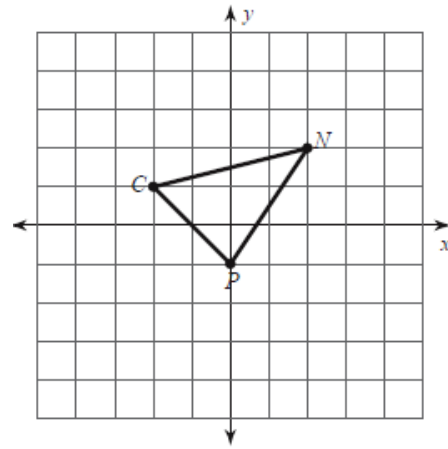
$P(0, -1) \rightarrow$

$C(-2, 1) \rightarrow$

$N(2, 2) \rightarrow$

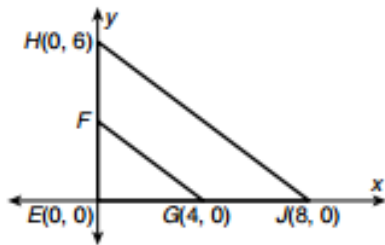
➔ Was this a reduction or an enlargement?

➔ What effect did the negative have on the dilation?



**Example 2: Use similar figures to find coordinates of dilation.**

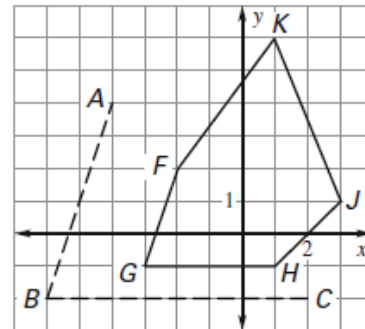
- a)  $\triangle FEG \sim \triangle HEJ$ . Find the coordinates of  $F$  and the scale factor.



- b) You want to create a pentagon  $ABCDE$  that is similar to pentagon  $FGHIK$  in the diagram below.

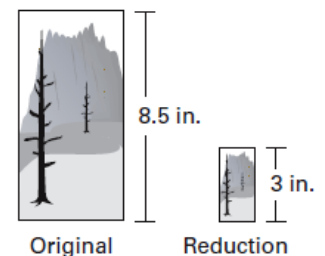
➤ What is the scale factor?

➤ What are the coordinates of  $D$  and  $E$ ?



**Example 3: Find a scale factor**

- a) A digital photograph has the height shown in the diagram. You want to reduce the size of the photograph to the height shown. What is the scale factor of the reduction?



- b) You find a picture that you want to enlarge for a poster. The original picture is 2.5 cm wide, and you want to enlarge it proportionally so that the new width is 7.5 cm. What is the scale factor of the enlargement?