4.5 Dilations:

Real World Thinking.

Have you ever gone to an eye doctor and they had to dilate your pupils? What is happening? Why are they doing this?

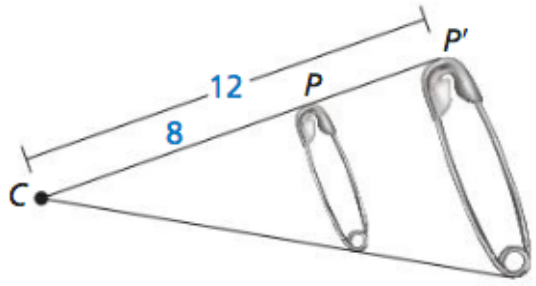
What is dilation?

A ***dilation*** is a transformation in which a figure is enlarged or reduced with respect to a fixed point known as the ***Center of dilation***, and a ***scale factor*** *k,* which is the ratio of lengths of the corresponding sides.

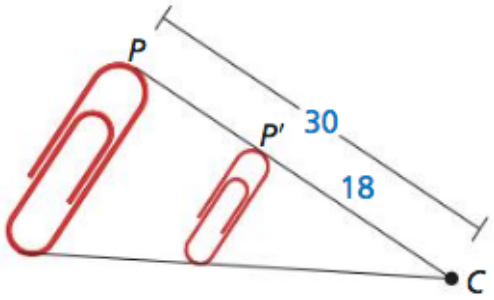
Example 1: Identifying Dilations

Find the scale factor of the dilation. Tell whether the dilation is a reduction or enlargement.

a.



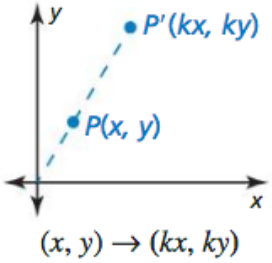
b.



Core Concept

Coordinate Rule for Dilations

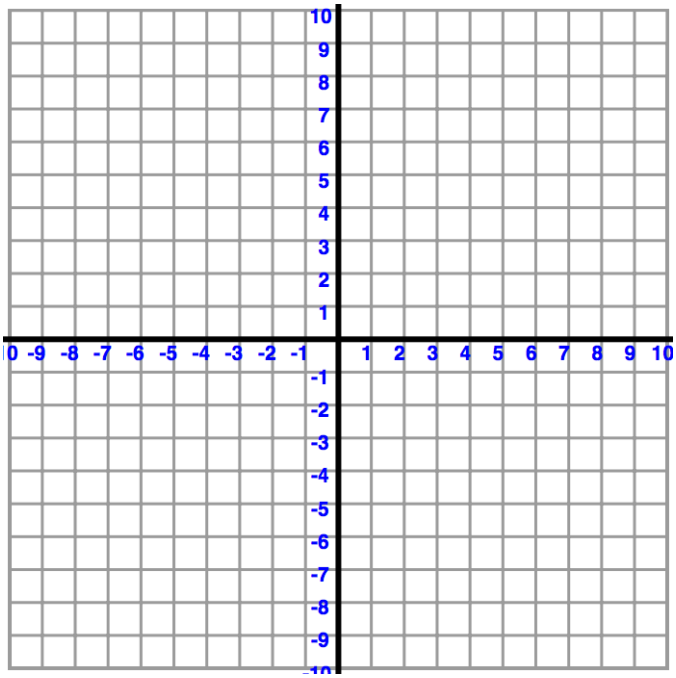
If $P(x, y)$ is the preimage of a point, then its image after a dilation centered at the origin (0, 0) with scale factor k is the point $P'(kx, ky)$.



$(x, y) \rightarrow (kx, ky)$

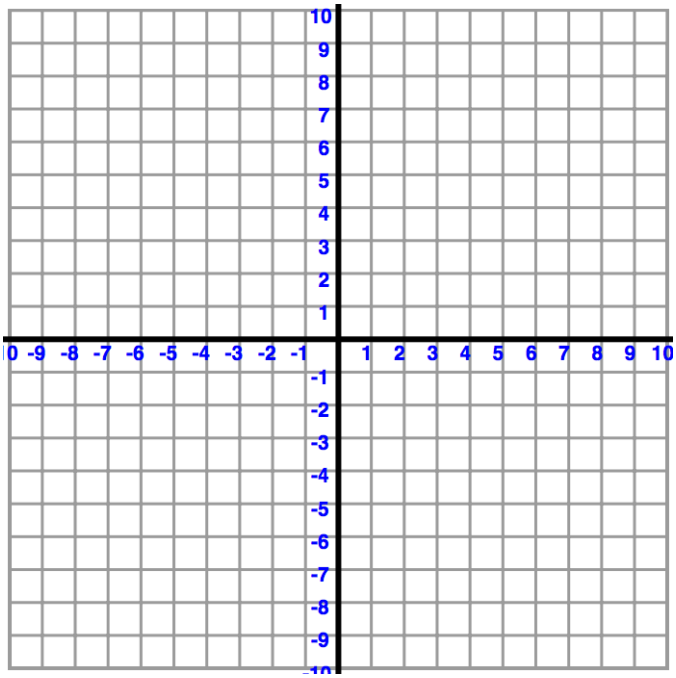
Example 2: Dilating a figure in the coordinate plane

Graph ΔABC with vertices $A(2,1), B(4,1), and\ C(4,-1)$ and its image after a dilation with a scale factor of 2



Example 3: Dilating a figure in the coordinate plane

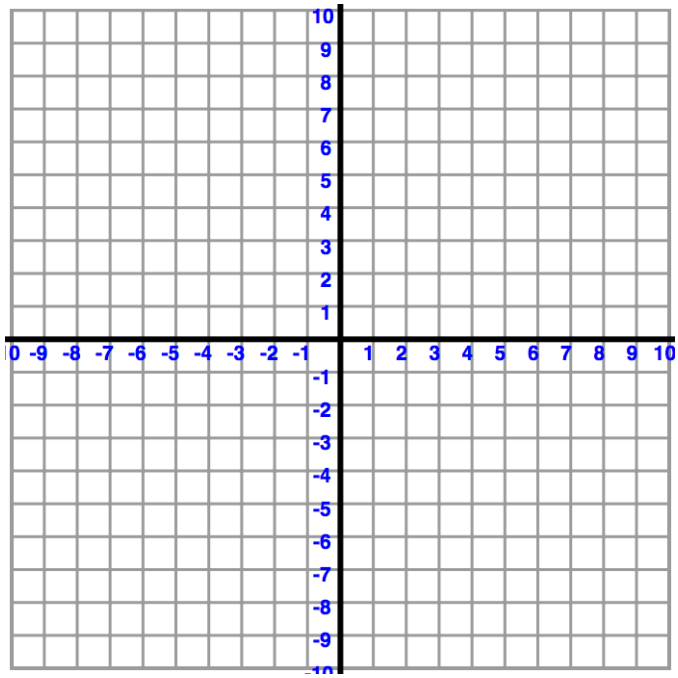
Graph quadrilateral $KLMN$ with vertices $K(-3,6), L(0,6), M(3,3)\ and\ N(-3,-3)$ and its image after a dilation with a scale factor of $\frac{1}{3}$



Example 3: *Constructions*

Example 4: Using a negative scale factor.

Graph ΔFGH with vertices $F(-4,-2), G(-2,4), and\ H(-2,-2)$ and its image after a dilation with a scale factor of -½



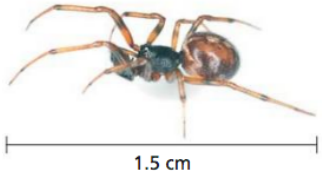
Before you graph!!!
What do you think the image will look like?

Example 5: Determining a scale factor

You are in your auto cad class when Mr. Maher asked you the following question. If the original figure is 4x4in long and you want the new figure to be 1.1x1.1in then what is the scale factor?

Example 6: Finding the length of an image.

You are using a magnifying class that shows the image of an object that is six times the objects actual size. Determine the length of the image of the spider through the magnifying glass.



Classwork/Homework: 3, 15, 16, 19, 25, 26, 32, 39