

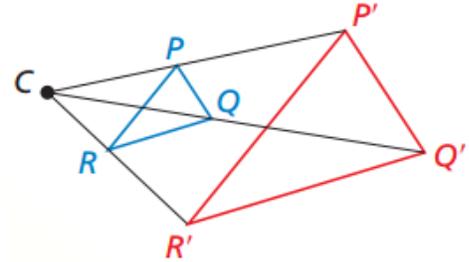
Dilations

Dilation: A dilation is a transformation in which a figure is _____ or _____ with respect to a fixed point, C , called the _____ and a *scale factor*, _____.

→ The scale factor is the _____ of the lengths of the _____ of the image and preimage

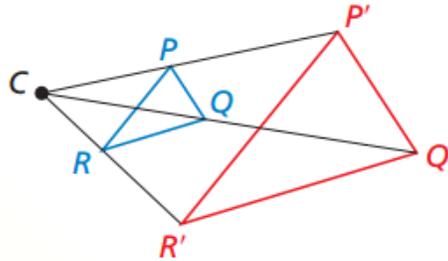
A dilation with center of dilation, C , and scale factor, k , maps every point P in a figure to P' so that the following are true:

1. If P is the center point C , then $P = P'$
2. If P is not the center point C , then the image point P' lies on \overrightarrow{CP}
3. The scale factor, k , is a *positive* number such that:
4. Angle measures are preserved



Also in the figure above (copied again at right):

1. $\overline{PR} \parallel \overline{P'R'}$
2. $\overline{PQ} \parallel \overline{P'Q'}$
3. $\overline{QR} \parallel \overline{Q'R'}$

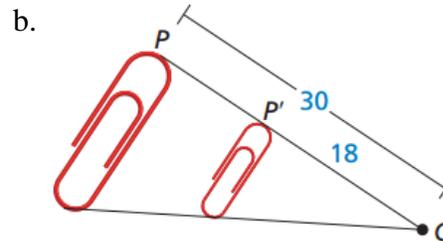
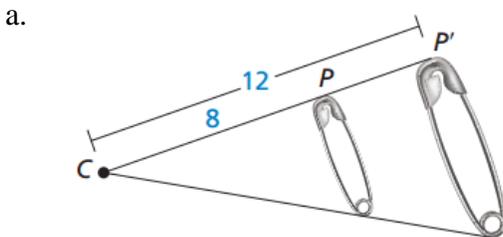


When the scale factor $k > 1$, the dilation is an _____.

When the scale factor $0 < k < 1$, the dilation is an _____.

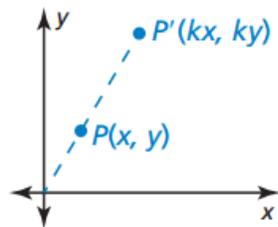
Example:

1. Find the scale factor of the dilation. Then tell whether the dilation is a *reduction* or an *enlargement*.



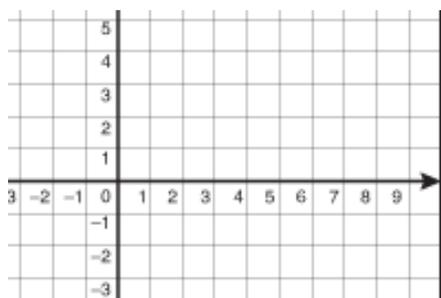
Coordinate Rule for Dilations

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

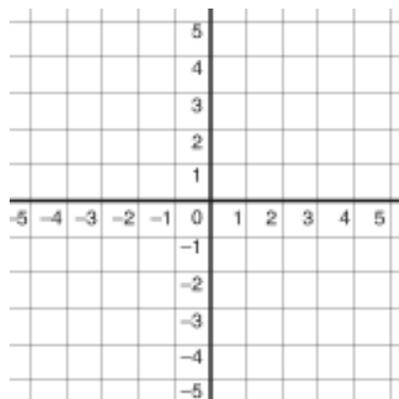


Example:

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



3. Graph $\triangle FGH$ with vertices $F(-4, -2)$, $G(-2, 4)$, and $H(-2, -2)$ and its image after a dilation with a scale factor of $-\frac{1}{2}$.

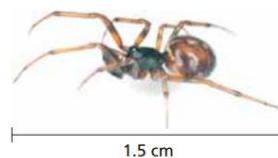


Solving Real-Life Problems (Examples)

4. You are making your own photo stickers. Your photo is 4 inches by 4 inches. The image on the stickers is 1.1 inches by 1.1 inches. Does this represent an enlargement or a reduction? What is the scale factor of this dilation?



5. You are using a magnifying glass that shows the image of an object that is six times the object's actual size. Determine the length of the image of the spider seen through the magnifying glass.



Dilations are _____, since the size of the image is different than that of the preimage.

There are other nonrigid transformations, such as vertical stretches and horizontal stretches:

