Chapter 9: Transformational Geometry

SECTION 7: DILATIONS

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I Can

- ❑ Identify and draw dilations

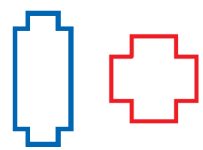
Dilations

Recall that a dilation is a transformation that changes the size of a figure but not the shape. The image and the preimage of a figure under a dilation are similar- NOT CONGUENT!

Dilation?

Tell whether each transformation appears to be a dilation. Explain.

A.



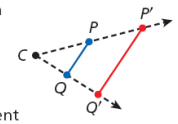
B.

Dilations

Dilations

A dilation, or *similarity transformation*, is a transformation in which the lines connecting every point P with its image P' all intersect at a point C, called the **center of dilation**. $\frac{CP'}{CP}$ is the same for every point P.

The scale factor k of a dilation is the ratio of a linear measurement of the image to a corresponding measurement of the preimage. In the figure, $k = \frac{P'Q'}{PQ}$.



Dilations

A dilation enlarges or reduces all dimensions proportionally.

A dilation with a scale factor greater than 1 is an **enlargement**, or *expansion*.

A dilation with a scale factor greater than 0 but less than 1 is a **reduction**, or *contraction.*

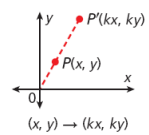
Dilations & Proportions

On a sketch of a flower, 4 in. represent 1 in. on the actual flower. If the flower has a 3 in. diameter in the sketch, find the diameter of the actual flower.

In the Coordinate Plane

Dilations in the Coordinate Plane

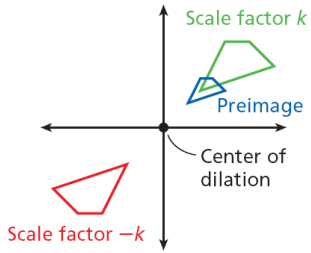
If $P(x, y)$ is the preimage of a point under a dilation centered at the origin with scale factor k, then the image of the point is $P'(kx, ky)$.



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

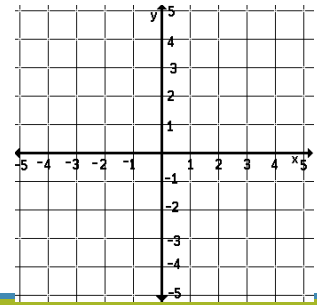
In the Coordinate Plane

If the scale factor of a dilation is negative, the preimage is rotated by 180°.



Dilations

Draw the image of the triangle with vertices $P(-4, 4)$, $Q(-2, -2)$, and $R(4, 0)$ under a dilation with a scale factor of $-\frac{1}{2}$ centered at the origin.



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