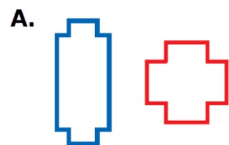


Recall that a dilation is a transformation that changes the of a figure but not the . The image and the preimage of a figure under a dilation are .

Because they change the size of the figure, dilations are NOT .

Example 1: Identifying Dilations

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



Check It Out! Example 1

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

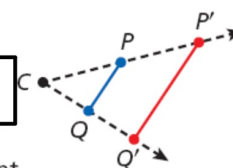




Dilations

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 . $\frac{CP'}{CP}$ is the same for every point P .

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



A dilation enlarges or reduces all dimensions proportionally. A dilation with a scale factor greater than 1 is an or *expansion*. A dilation with a scale factor greater than 0 but less than 1 is a or *contraction*.

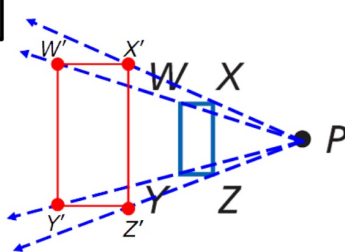
Example 2: Drawing Dilations

Copy the figure and the center of dilation P . Draw the image of $\triangle WXYZ$ under a dilation with a scale factor of 2.

Step 1 Draw a line through P and each .

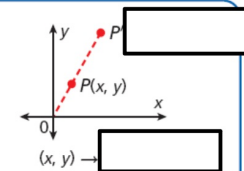
Step 2 On each line, mark twice the distance from P to the .

Step 3 Connect the of the image.

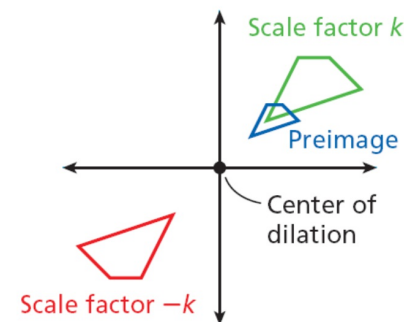


Dilations in the Coordinate Plane

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 .



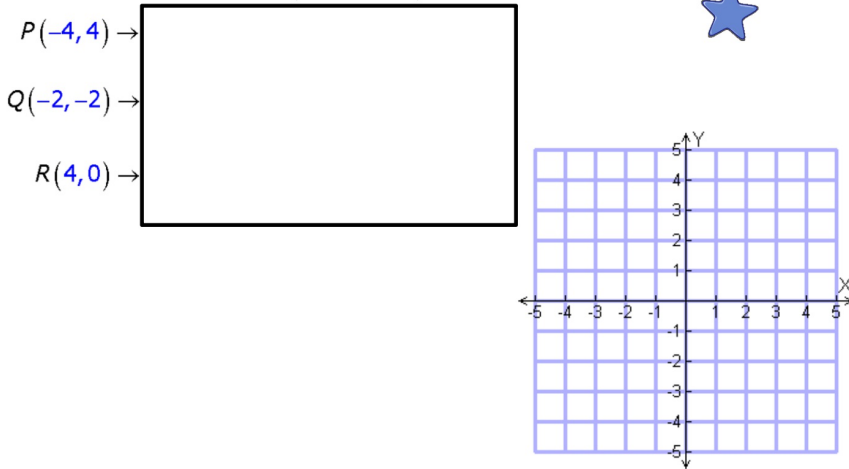
If the scale factor of a dilation is the preimage is by 180° . For $k > 0$, a dilation with a scale factor of $-k$ is equivalent to the composition of a dilation with a scale factor of k that is rotated 180° about the center of dilation.



Example 4: Drawing Dilations in the Coordinate Plane

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.

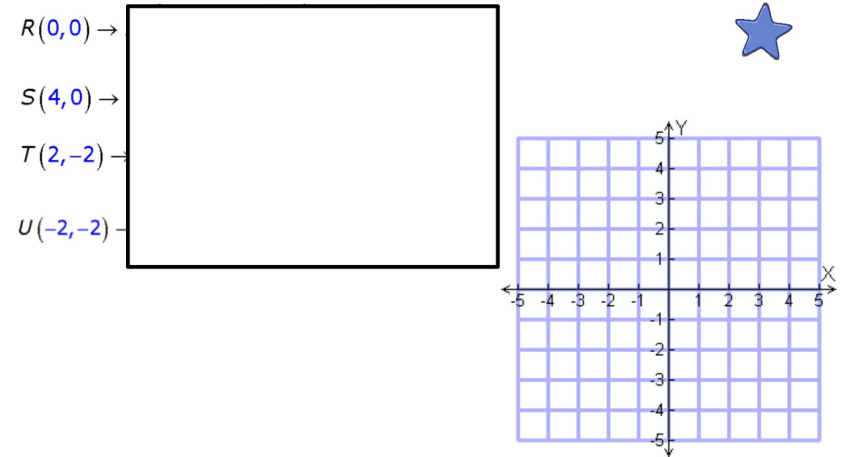
The dilation of (x, y) is $(-\frac{1}{2}x, -\frac{1}{2}y)$.



Check It Out! Example 4

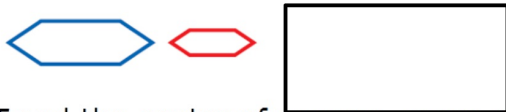
Draw the image of the triangle with vertices $R(0, 0)$, $S(4, 0)$, $T(2, -2)$, and $U(-2, -2)$ under a dilation centered at the origin with a scale factor of $-\frac{1}{2}$.

The dilation of (x, y) is $(-\frac{1}{2}x, -\frac{1}{2}y)$.

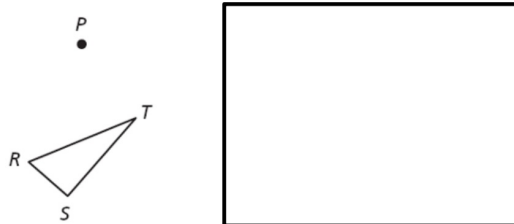


Lesson Quiz: Part I

1. Tell whether the transformation appears to be a dilation.

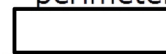


2. Copy $\triangle RST$ and the center of dilation. Draw the image of $\triangle RST$ under a dilation with a scale of $\frac{1}{3}$.



Lesson Quiz: Part II

3. A rectangle on a transparency has length 6 cm and width 4 cm and with 4 cm. On the transparency 1 cm represents 12 cm on the projection. Find the perimeter of the rectangle in the projection.



4. Draw the image of the triangle with vertices $E(2, 1)$, $F(1, 2)$, and $G(-2, 2)$ under a dilation with a scale factor of -2 centered at the origin.

