

Reteaching with Practice

For use with pages 506–513

GOAL

Identify dilations and use properties of dilations to create a perspective drawing

VOCABULARY

A **dilation** with center C and scale factor k is a transformation that maps every point P in the plane to a point P' so that the following properties are true.

1. If P is not the center point C , then the image point P' lies on \overrightarrow{CP} .

The scale factor k is a positive number such that $k = \frac{CP'}{CP}$, and $k \neq 1$.

2. If P is the center point C , then $P = P'$.

A dilation is a **reduction** if $0 < k < 1$.

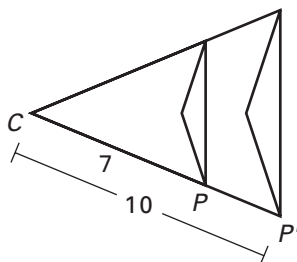
A dilation is an **enlargement** if $k > 1$.

EXAMPLE 1

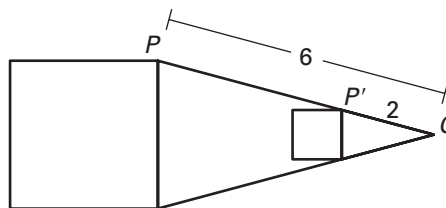
Identifying Dilations

Identify the dilation and find its scale factor.

a.



b.



SOLUTION

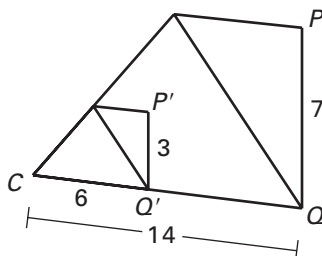
- a. Because $\frac{CP'}{CP} = \frac{10}{7}$, the scale factor is $k = \frac{10}{7}$. This is an enlargement.

- b. Because $\frac{CP'}{CP} = \frac{2}{6} = \frac{1}{3}$, the scale factor is $k = \frac{1}{3}$. This is a reduction.

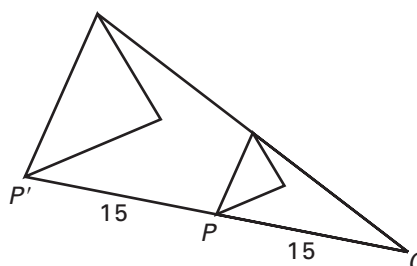
Exercises for Example 1

Identify the dilation and find its scale factor.

1.



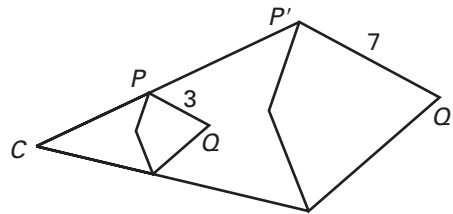
2.



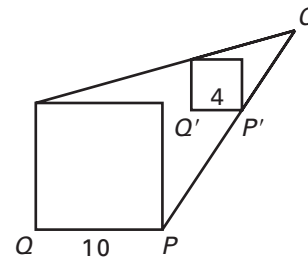
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3.



4.



EXAMPLE 2

Dilation in a Coordinate Plane

Draw a dilation of $\triangle ABC$ with $A(1, 2)$, $B(5, 0)$, and $C(3, 4)$. Use the origin as the center and use a scale factor of $k = 2$.

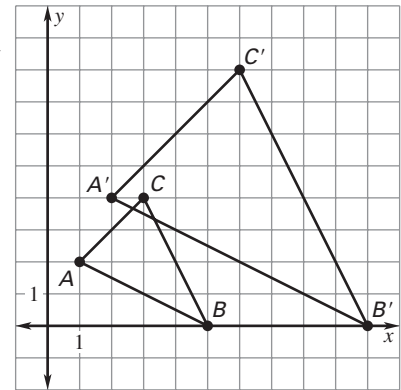
SOLUTION

Because the origin is the center, you can find the image of each vertex by multiplying its coordinates by the scale factor.

$$A(1, 2) \rightarrow A'(2, 4)$$

$$B(5, 0) \rightarrow B'(10, 0)$$

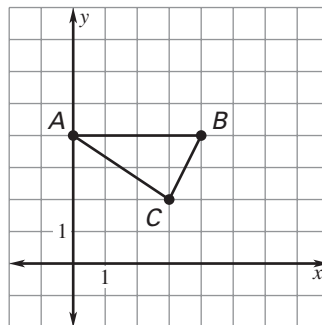
$$C(3, 4) \rightarrow C'(6, 8)$$



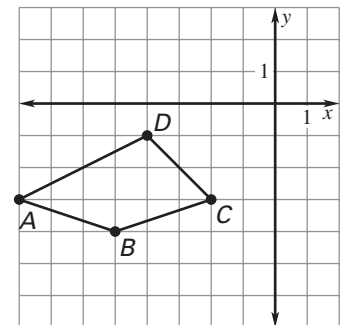
Exercises for Example 2

Use the origin as the center of the dilation and the given scale factor to find the coordinates of the vertices of the image of the polygon.

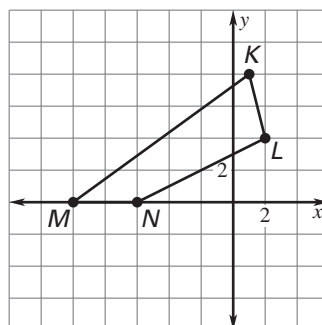
5. $k = \frac{3}{2}$



6. $k = 3$



7. $k = \frac{1}{2}$



8. $k = \frac{3}{4}$

