NAME _____ DATE _____

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 $k = \dfrac{CP'}{CP}$, and $k \neq 1$.

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

A dilation is a reduction if $0 < k < 1$.
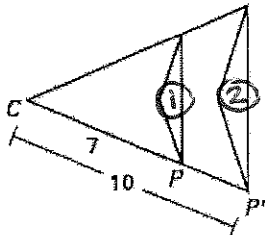
A dilation is an enlargement if $k > 1$.

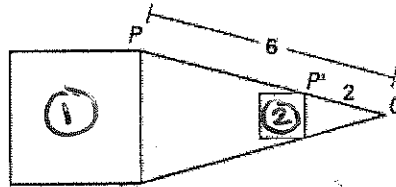**EXAMPLE 1** *Identifying Dilations*

Identify the dilation and find its scale factor.

a.

Dilation: enlargement

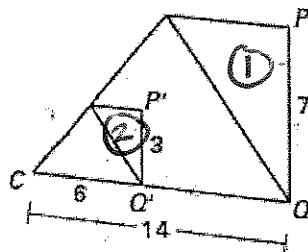Scale Factor: $K = \dfrac{P'}{P} = \dfrac{10}{7}$

b.

Dilation: reduction

Scale Factor: $K = \dfrac{P'}{P} = \dfrac{2}{6} = \dfrac{1}{3}$
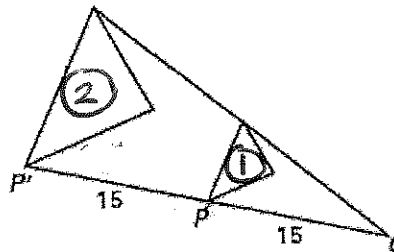
Exercises for Example 1

Identify the dilation and find its scale factor.

1.
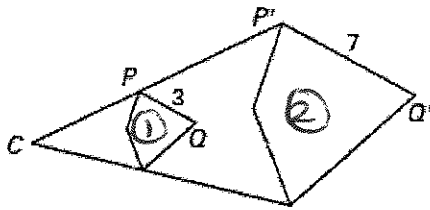

Dilation: reduction

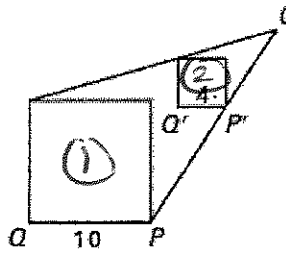Scale Factor: $K = \dfrac{P'}{P} = \dfrac{3}{7}$

2.

Dilation: enlargement

Scale Factor: $K = \dfrac{P'}{P} = \dfrac{30}{15} = 2$

3.

Dilation: __enlargement__

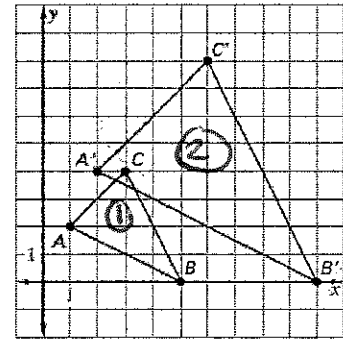Scale Factor: $K = \frac{P'}{P} = \boxed{\frac{7}{3}}$

4.

Dilation: __reduction__

Scale Factor: $K = \frac{P'}{P} = \frac{4}{10} = \boxed{\frac{2}{5}}$

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 $k = 2$.

$A\ (1, 2)$ $A'\ \underline{(2, 4)}$

$B\ (5, 0)$ $B'\ \underline{(10, 0)}$
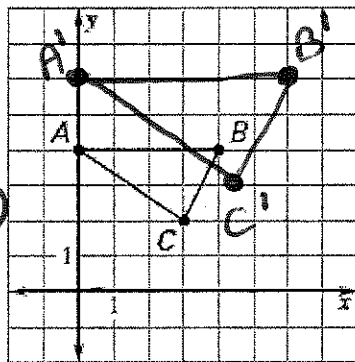
$C\ (3, 4)$ $C'\ \underline{(6, 8)}$

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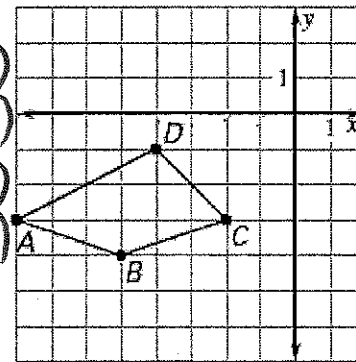
5. $k = \dfrac{3}{2}$

$A\ \underline{(0, 4)}$ $A'\ \underline{(0, 6)}$

$B\ \underline{(4, 4)}$ $B'\ \underline{(6, 6)}$

$C\ \underline{(3, 2)}$ $C'\ \underline{(\frac{9}{2}, 3)}$

6. $k = 3$

$A\ \underline{(-8, -3)}$ $A'\ \underline{(-24, -9)}$

$B\ \underline{(-5, -4)}$ $B'\ \underline{(-15, -12)}$

$C\ \underline{(-2, -3)}$ $C'\ \underline{(-6, -9)}$

$D\ \underline{(-4, -1)}$ $D'\ \underline{(-12, -3)}$

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

$K\ \underline{(1, 8)}$ $K'\ \underline{(.5, 4)}$

$L\ \underline{(2, 4)}$ $L'\ \underline{(1, 2)}$

$M\ \underline{(-10, 0)}$ $M'\ \underline{(-5, 0)}$

$N\ \underline{(-6, 0)}$ $N'\ \underline{(-3, 0)}$
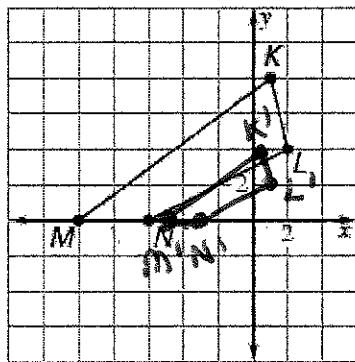
8. $k = \dfrac{3}{4}$

$X\ \underline{(-3, -2)}$ $X'\ \underline{(-2.25, -1.5)}$

$Y\ \underline{(8, 4)}$ $Y'\ \underline{(6, 3)}$

$Z\ \underline{(4, -4)}$ $Z'\ \underline{(3, -3)}$