

CCD: 6

3.  $y + \frac{2}{3} = \frac{5}{6}$

$$\begin{aligned}
 & \frac{2}{3} \quad \frac{2}{3} \\
 & \frac{2}{3} \\
 \hline
 & y = \frac{5}{6} - \frac{2}{3} \\
 & \phantom{y} = \frac{5}{6} - \frac{4}{6} \\
 & \phantom{y} = \frac{1}{6}
 \end{aligned}$$

7.  $\frac{3}{8}d = \frac{9}{16}$

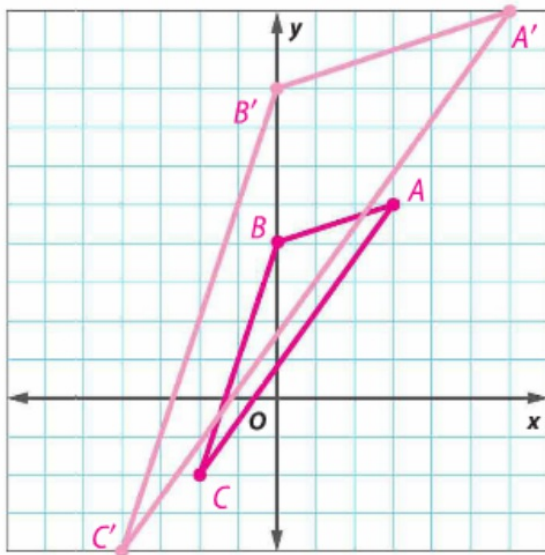
$$\begin{aligned}
 & \frac{3}{8} \cdot \frac{8}{8}d = \frac{9}{16} \cdot \frac{2}{2} \\
 & \frac{3}{1}d = \frac{9}{8} \\
 & d = \frac{9}{8} \cdot \frac{1}{3} \\
 & d = \frac{9}{24} \\
 & d = \frac{3}{8} \\
 & \text{or } 1\frac{1}{2}
 \end{aligned}$$

8.  $21 = \frac{h}{13}$

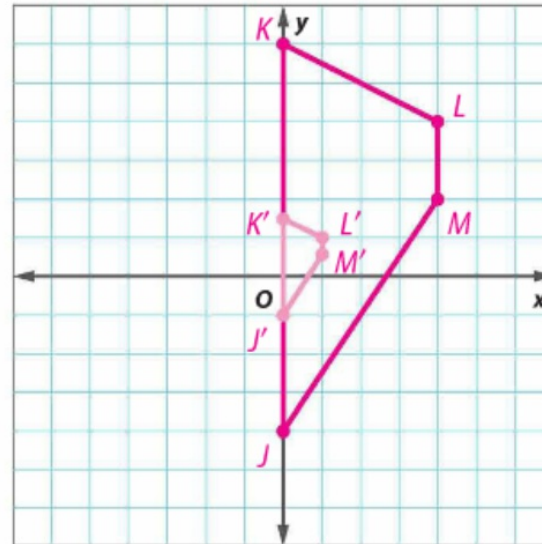
1.  $A(3, 5), B(0, 4), C(-2, -2); k = 2$

$A'(6, 10), B'(0, 8), C'(-4, -4)$

Show your work.



2.  $J(0, -4), K(0, 6), L(4, 4), M(4, 2); k = \frac{1}{4}$   
 $J'(0, -1), K'(0, 1\frac{1}{2}), L'(1, 1), M'(1, \frac{1}{2})$



3. **STEM** Mrs. Bowen's homeroom is creating a Web page for their school's Intranet site. They need to reduce a scanned photograph so it is 720 pixels by 320 pixels. If the scanned photograph is 1,080 pixels by 480 pixels, what is the scale factor of the dilation? (Example 3)  $\frac{2}{3}$

4. **e Building on the Essential Question** How are dilations similar to scale drawings?

**Sample answer: Both represent enlargements or reductions of other figures. Both use a scale factor to determine the size of the dilation or scale drawing.**

## Independent Practice

Go online for Step-by-Step Solutions

eHelp



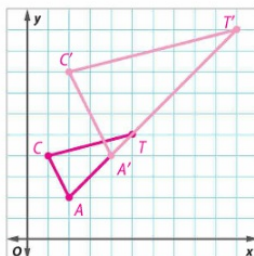
Find the coordinates of the vertices of each figure after a dilation with the given scale factor  $k$ . Then graph the original image and the dilation.

(Examples 1 and 2)

1.  $C(1, 4), A(2, 2), T(5, 5); k = 2$

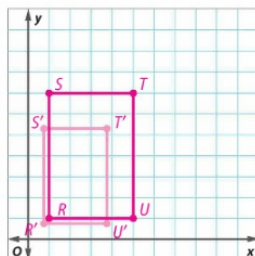
$C'(2, 8), A'(4, 4), T'(10, 10)$

Show your work



2.  $R(1, 1), S(1, 7), T(5, 7), U(5, 1); k = \frac{3}{4}$

$R'(\frac{3}{4}, \frac{3}{4}), S'(\frac{3}{4}, 5\frac{1}{4}), T'(3\frac{3}{4}, 5\frac{1}{4}), U'(3\frac{3}{4}, \frac{3}{4})$



3. A graphic designer created a logo on  $8\frac{1}{2}$ - by 11-inch paper. In order to be placed on a business card, the logo needs to be  $1\frac{7}{10}$  inches by  $2\frac{1}{5}$  inches.

What is the scale factor of the dilation? (Example 3)

$\frac{1}{5}$

4. Darian wants to build a regulation-size pool table that is 9 feet in length. The plans he ordered are 18 by 36 inches. What is the scale factor of the dilation he must use to build the regulation pool table? (Example 3)

3

5. A triangle has vertices  $A(-2, 3), B(0, 0)$ , and  $C(1, 1)$ .

- a. Find the coordinates of the triangle if it is reflected over the  $x$ -axis, then dilated by a scale factor of 3.

$A''(-6, -9), B''(0, 0), C''(3, -3)$


- b. Find the coordinates if the original triangle is dilated by a scale factor of 3, then reflected over the  $x$ -axis.

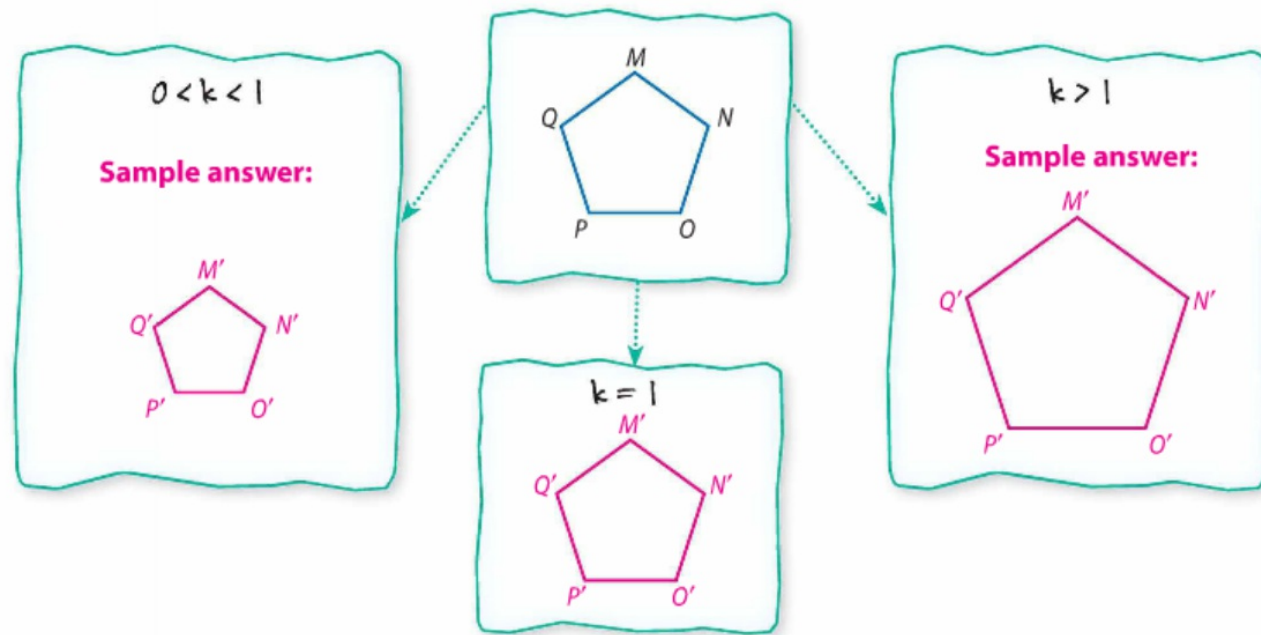
$A''(-6, -9), B''(0, 0), C''(3, -3)$

- c. Are the two transformations commutative? Explain.

**Yes; Sample answer: since the coordinates of the answers to Exercises a and b are the same, the order in which you perform them does not matter.**



6.  **Model with Mathematics** In each part of the graphic organizer, sketch an image of pentagon  $MNOPQ$  after a dilation within the given parameters.





## H.O.T. Problems Higher Order Thinking

7. **CCSS Make a Conjecture** A figure has a vertex at the point  $(-4, -6)$ . The figure is dilated with the center at the origin with a scale factor of 5. The resulting image is then dilated with a scale factor of  $\frac{3}{5}$ .

a. What are the coordinates of the vertex in the final image?  $(-12, -18)$

b. How do they compare with those of the original image?

The final coordinates are three times the original coordinates.

c. Can you predict the scale factor of a compound dilation? Explain.

Sample answer: Yes; multiply the scale factors of each dilation to

find the scale factor of the final dilation.

8. **CCSS Persevere with Problems** The coordinates of two triangles are shown in the table. Is  $\triangle WXY$  a dilation of  $\triangle ABC$ ? Explain.

No; Sample answer: both coordinates of all the points must be

multiplied by the same scale factor. The x-coordinates are

multiplied by 4, but the y-coordinates are only multiplied by 2.

WXY		ABC	
W	$(a, b)$	A	$(4a, 2b)$
X	$(a, c)$	B	$(4a, 2c)$
Y	$(d, b)$	C	$(4d, 2b)$

9. **CCSS Persevere with Problems** The algebraic representation of a dilation is  $(x, y) \rightarrow \left(\frac{1}{a}x, \frac{1}{a}y\right)$ . If the dilation is an enlargement, give three possible values of  $a$ . Sample answer:  $a = \frac{1}{3}$ ,  $a = \frac{1}{5}$ ,  $a = \frac{1}{2}$