

COORDINATE GEOMETRY Find the image of each polygon, given the vertices, after a dilation centered at the origin with a scale factor of 2. Then graph a dilation centered at the origin with a scale factor of $\frac{1}{2}$.

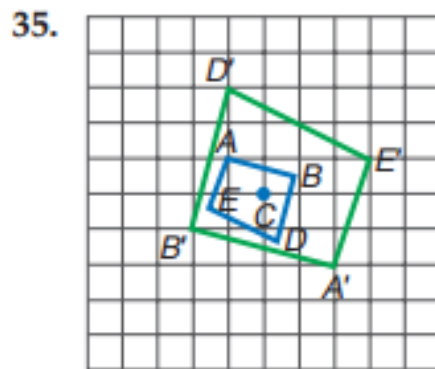
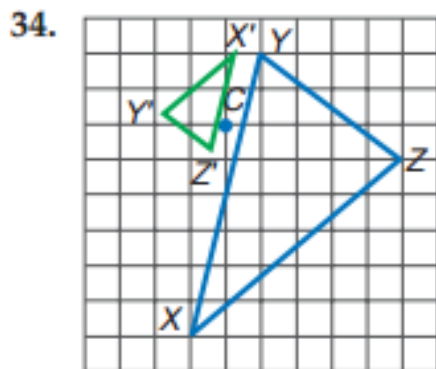
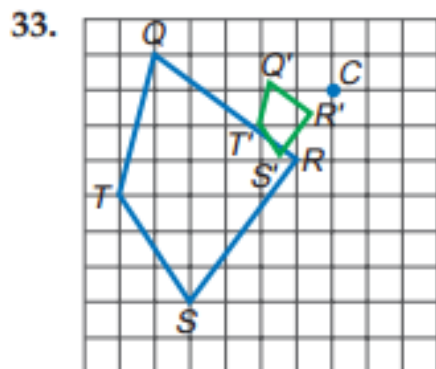
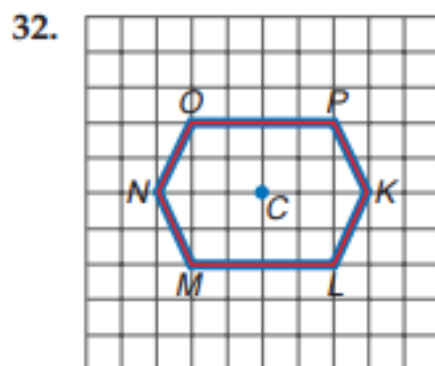
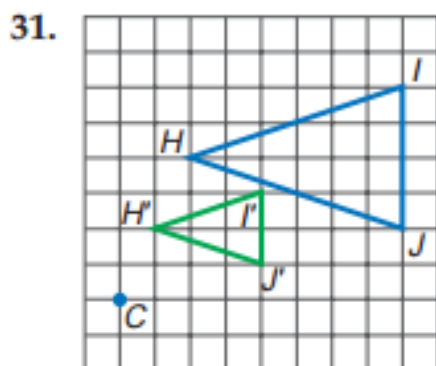
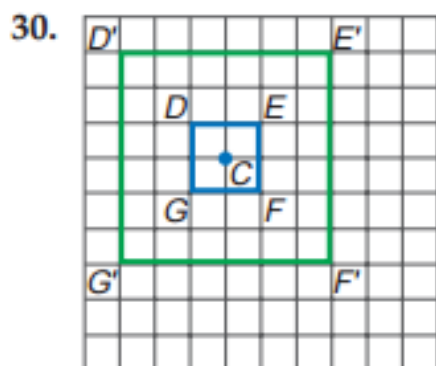
26. $F(3, 4), G(6, 10), H(-3, 5)$

27. $X(1, -2), Y(4, -3), Z(6, -1)$

28. $P(1, 2), Q(3, 3), R(3, 5), S(1, 4)$

29. $K(4, 2), L(-4, 6), M(-6, -8), N(6, -10)$

Determine the scale factor for each dilation with center C . Determine whether the dilation is an *enlargement*, *reduction*, or *congruence transformation*.



PHOTOCOPY For Exercises 37 and 38, refer to the following information. A 10-inch by 14-inch rectangular design is being reduced on a photocopier by a factor of 75%.

37. What are the new dimensions of the design?

38. How has the area of the preimage changed?

For Exercises 39 and 40, use the following information.

A dilation on a rectangle has a scale factor of 4.

39. What is the effect of the dilation on the perimeter of the rectangle?

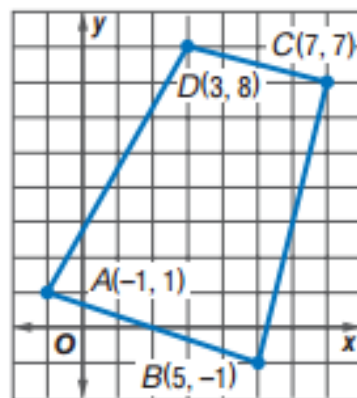
40. What is the effect of the dilation on the area of the rectangle?

DIGITAL PHOTOGRAPHY For Exercises 44–46, use the following information. Dinah is editing a digital photograph that is 640 pixels wide and 480 pixels high on her monitor.

- If Dinah zooms the image on her monitor 150%, what are the dimensions of the image?
 - Suppose that Dinah wishes to use the photograph on a web page and wants the image to be 32 pixels wide. What scale factor should she use to reduce the image?
 - Dinah resizes the photograph so that it is 600 pixels high. What scale factor did she use?
- 47. DESKTOP PUBLISHING** Grace is creating a template for her class newsletter. She has a photograph that is 10 centimeters by 12 centimeters, but the maximum space available for the photograph is 6 centimeters by 8 centimeters. She wants the photograph to be as large as possible on the page. When she uses a scanner to save the photograph, at what percent of the original photograph's size should she save the image file?

For Exercises 48–50, use quadrilateral $ABCD$.

- Find the perimeter of quadrilateral $ABCD$.
 - Graph the image of quadrilateral $ABCD$ after a dilation centered at the origin with scale factor -2 .
 - Find the perimeter of quadrilateral $A'B'C'D'$ and compare it to the perimeter of quadrilateral $ABCD$.
- 51.** Triangle TUV has vertices $T(6, -5)$, $U(3, -8)$, and $V(-1, -2)$. Find the coordinates of the final image of triangle TUV after a reflection in the x -axis, a translation with $(x, y) \rightarrow (x + 4, y - 1)$, and a dilation centered at the origin with a scale factor of $\frac{1}{3}$. Sketch the preimage and the image.

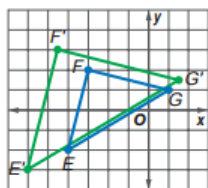


Concept Summary

- Dilations can be enlargements, reductions, or congruence transformations.

Triangle EFG has vertices $E(-4, -2)$, $F(-3, 2)$, and $G(1, 1)$. Find the image of $\triangle EFG$ after a dilation centered at the origin with a scale factor of $\frac{3}{2}$.

Preimage (x, y)	Image $(\frac{3}{2}x, \frac{3}{2}y)$
$E(-4, -2)$	$E'(-6, -3)$
$F(-3, 2)$	$F'(-\frac{9}{2}, 3)$
$G(1, 1)$	$G'(\frac{3}{2}, \frac{3}{2})$



Exercises Find the measure of the dilation image $\overline{C'D'}$ or preimage of \overline{CD} using the given scale factor. See Example 1 on page 491.

- $CD = 8, r = 3$
- $CD = \frac{2}{3}, r = -6$
- $C'D' = 24, r = 6$
- $C'D' = 60, r = \frac{10}{3}$
- $CD = 12, r = -\frac{5}{6}$
- $C'D' = \frac{55}{2}, r = \frac{5}{4}$

Find the image of each polygon, given the vertices, after a dilation centered at the origin with a scale factor of -2 . See Example 3 on page 492.

- $P(-1, 3), Q(2, 2), R(1, -1)$
- $E(-3, 2), F(1, 2), G(1, -2), H(-3, -2)$