

Dilations: Stretch/shrink of a figure by a given #.

Center of Dilation: location where a dilation happens.

Scale Factor: size of the stretch/shrink, k :

Enlargement: (stretch) $1 < k$

Reduction: (shrink) $0 < k < 1$

A figure and its dilated image are always similar. Congruent figures are figures dilated by a scale factor of 1.

Check for Understanding: Determine if the following transformations preserve similarity or congruency.

a. Reflection over x-axis followed by a translation up 3 units.

*congruency
(size unchanged)*

b. Dilation by a scale factor of 2 and then rotation of 180 degrees.

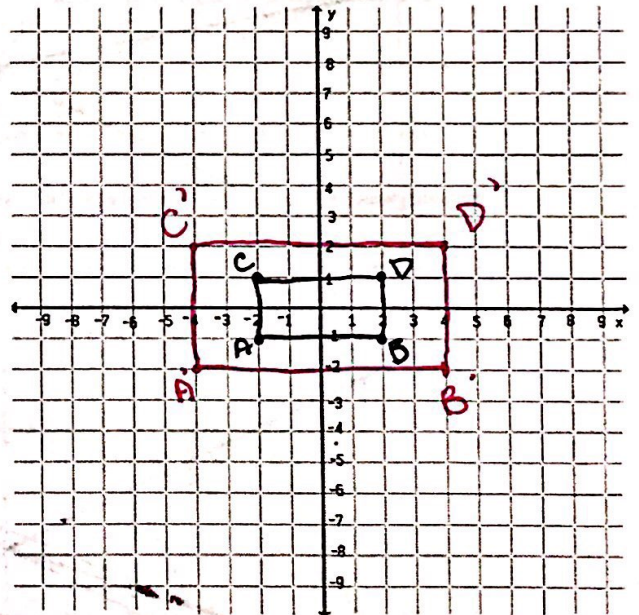
similarity

c. Dilation by scale factor of 3 and then another dilation by a scale factor of 1/3.

congruency

WE DO: Find the new coordinates of the pre-image after a dilation by a scale factor of 2.

Pre-Image	Process	Image
A (-2, -1)	$2(-2, -1)$	A' (-4, -2)
B (2, -1)	$2(2, -1)$	B' (4, -2)
C (-2, 1)	$2(-2, 1)$	C' (-4, 2)
D (2, 1)	$2(2, 1)$	D' (4, 2)



How did the following change?

A. Angle Measure:

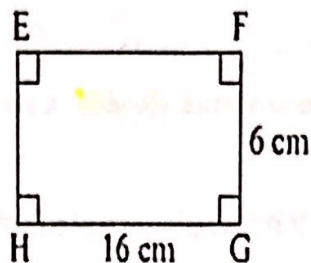
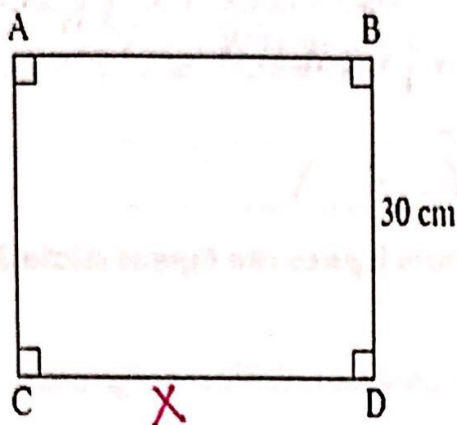
*They don't change.
4 \angle angles in pre-image and image.*

B. Length of Sides:

The sides are twice as long.

$\overline{AC} = 2 \quad \overline{A'B'} = 4$

Finding Scale Factors: To find the scale factor of your new figure (image), you want to compare the ratio of the sides from the new figure to the original figure (pre-image).



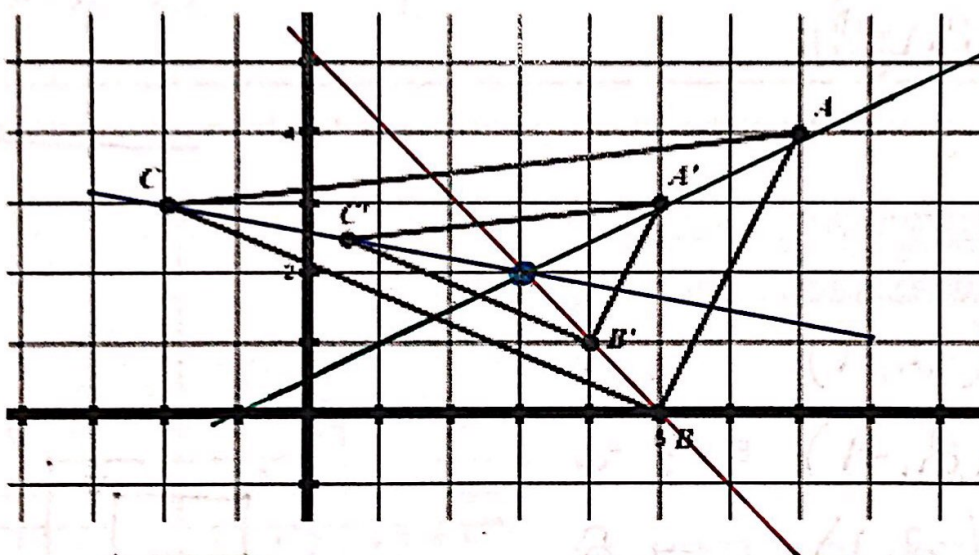
What is the length of side CD?

$$6 \times 5 = 30$$

$$\text{so } 16 \times 5 = X$$

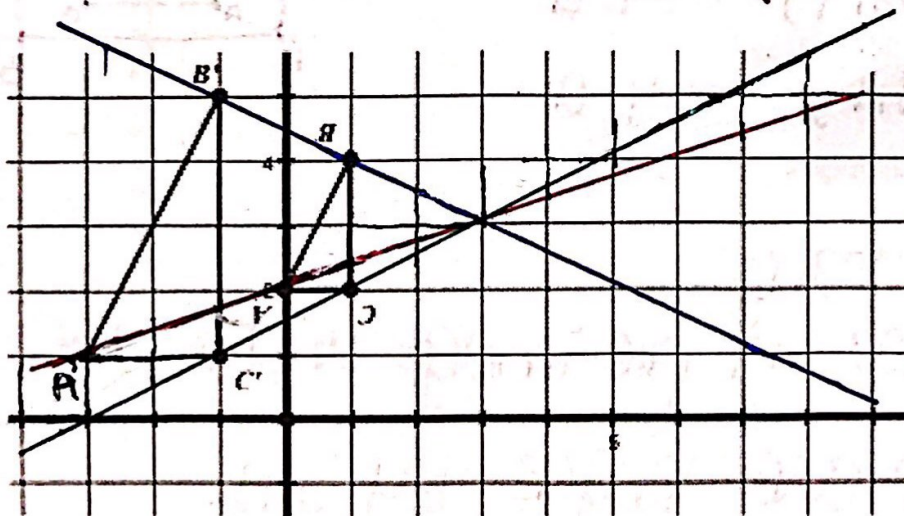
$$X = 80$$

How to find a center of dilation: Connect each corresponding vertex from the pre-image to the image. The lines all meet at the center of dilation.



Center of Dilation:
(3, 2)

Scale Factor:
1/2

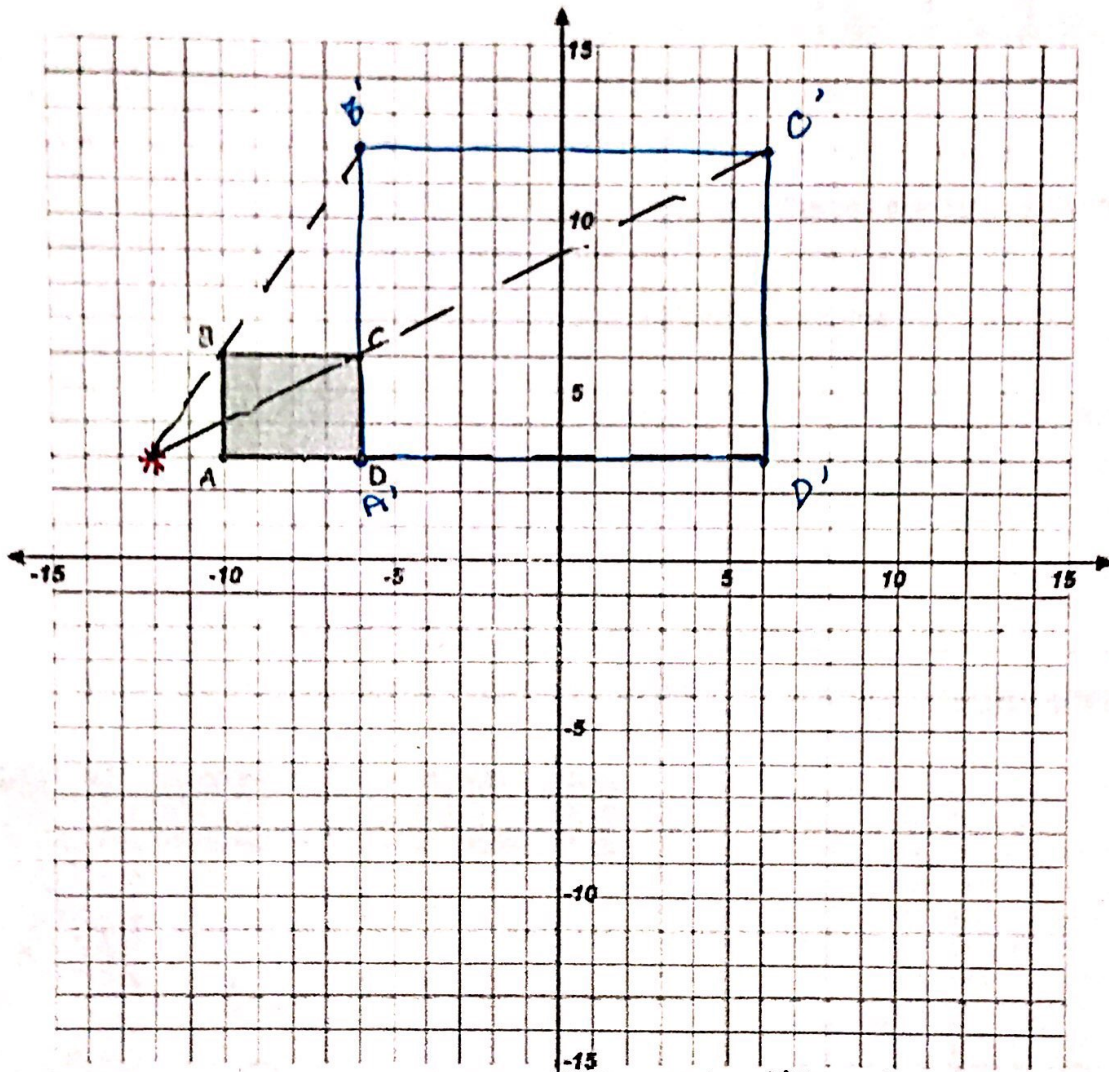


Center of Dilation:
(3, 3)

Scale Factor:
2

Dilation (not around the origin): Use direction, not coordinates!

Dilate rectangle ABCD by a scale factor of 3 around the point $(-12, 3)$.



start at center of dilation!

A $\rightarrow 2$ $\times 3$ $\rightarrow 6$ A' $(-6, 3)$

B $\uparrow 3$ $\times 3$ $\uparrow 9$ B' $(-6, 12)$
 $\rightarrow 2$ $\times 3$ $\rightarrow 6$

C $\uparrow 3$ $\times 3$ $\uparrow 9$ C' $(6, 12)$
 $\rightarrow 6$ $\times 3$ $\rightarrow 18$

D $\rightarrow 6$ $\times 3$ $\rightarrow 18$ D' $(6, 3)$