

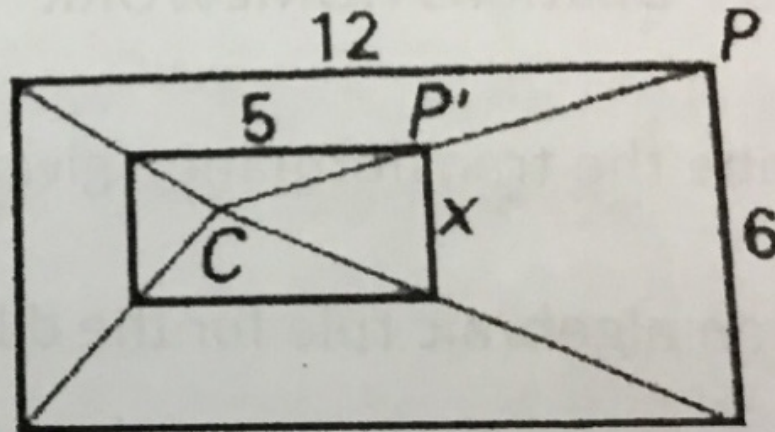
# Unit 1 Lesson 6

## Dilations and Similarity

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10:



y = Scale factor

reduction

$$\frac{12x}{12} = \frac{5}{12}$$

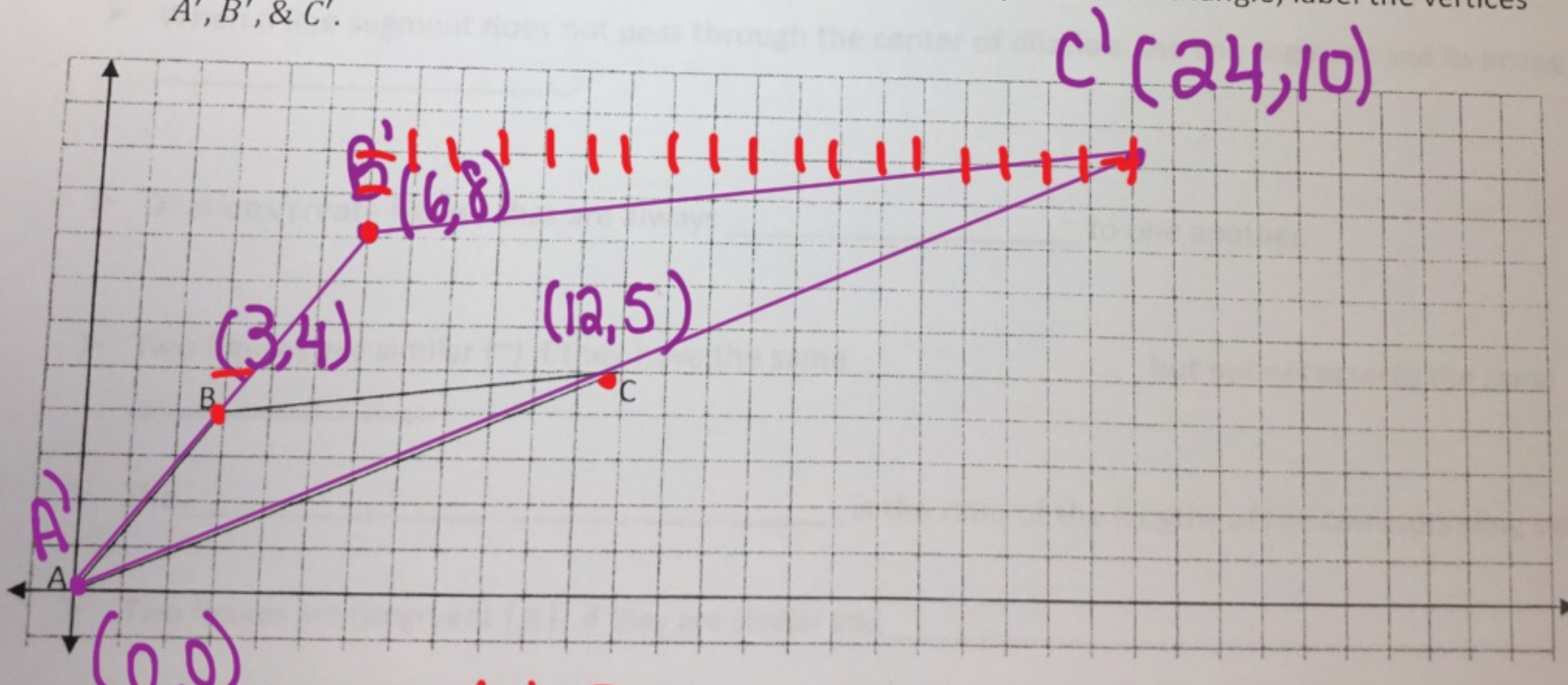
SF = 5/12

x = 6(5/12) = 2.5

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➤ Dilate  $\triangle ABC$  about the origin with a scale factor of 2. Graph the new triangle; label the vertices  $A'$ ,  $B'$ , &  $C'$ .



$$\frac{1}{9} BC$$

$$BC' = \frac{2}{18} = \frac{1}{9}$$

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➤ Complete the following using your dilation of  $\triangle ABC$  and  $\triangle A'B'C'$ .

1. What conclusion can you make about the measures of  $\angle A$  and  $\angle A'$ ?  $\angle B$  and  $\angle B'$ ?  $\angle C$  and  $\angle C'$ ?

$\cong$   $\cong$   $\cong$

2. What conclusion can you make about the lengths of  $\overline{AB}$  and  $\overline{A'B'}$ ?  $\overline{AC}$  and  $\overline{A'C'}$ ?  $\overline{BC}$  and  $\overline{B'C'}$ ?

Double

3. Dilations create **similar figures**. Based on your conclusions from 1 and 2, what can we say about similar figures?

Congruent angles, proportional corresponding sides

4. What do you notice about the placement of  $\overline{AB}$  and  $\overline{A'B'}$  on the coordinate plane?  $\overline{AC}$  and  $\overline{A'C'}$ ?  
Note that  $A$  and  $A'$  lie on the origin. What conclusion can you make about the segments of an image when the corresponding segments of the preimage pass through the center of dilation?

Vertex at origin  $\rightarrow$  Figures overlap

5. Using your prior knowledge about slope, find the slopes of  $\overline{BC}$  and  $\overline{B'C'}$ . What do you notice about the slopes? What does that tell you about the relationship of the lines to one another? What conclusion can you make about the segments of an image when the corresponding segments of the preimage do not pass through the center of dilation?

$BC = \frac{1}{9}$   $B'C' = \frac{1}{9}$  = slopes  $\implies$  Parallel

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➤ When a line segment passes through the center of dilation, the line segment and its image lie on the same line.

➤ When a line segment does not pass through the center of dilation, the line segment and its image are parallel.

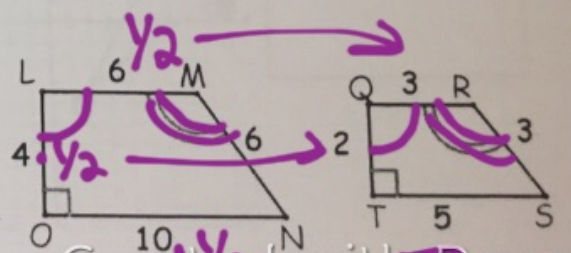
➤ Dilations create figures that are always similar to one another.

➤ Two figures are similar ( $\sim$ ) if they have the same shape but not necessarily the same size.

➤ The scale factor is the ratio of the lengths of the corresponding sides.

➤ Two figures are congruent ( $\cong$ ) if they are similar and have a scale factor of 1.

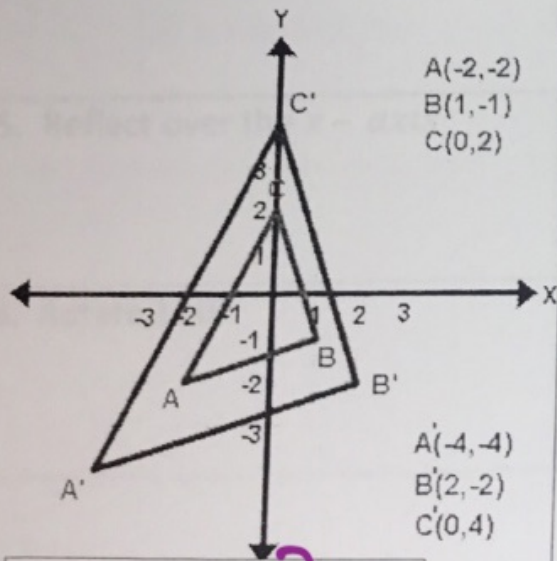
➤ Two polygons are similar if:  
 1) Corresponding sides are proportional  
 2) Corresponding Angles are  $\cong$



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Examples: Using the dilated figures below, name the scale factor used and find the slopes of the segments listed.



A(-2, -2)  
B(1, -1)  
C(0, 2)

A'(-4, -4)  
B'(2, -2)  
C'(0, 4)

Scale Factor: 2

Slopes:

$\overline{AB} = \frac{1}{3}$

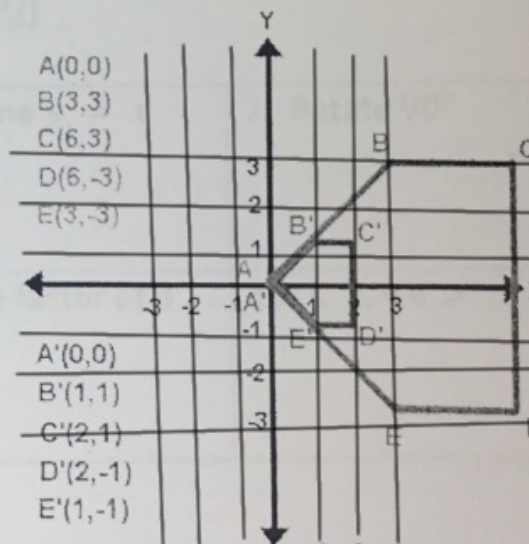
$\overline{A'B'} = \frac{1}{3}$

$\overline{AC} = 2$

$\overline{A'C'} = 2$

$\overline{BC} = -3$

$\overline{B'C'} = -3$



A(0, 0)  
B(3, 3)  
C(6, 3)  
D(6, -3)  
E(3, -3)

A'(0, 0)  
B'(1, 1)  
C'(2, 1)  
D'(2, -1)  
E'(1, -1)

Scale Factor: 1/3

Slopes:

$\overline{AB} = 1$

$\overline{A'B'} = 1$

$\overline{AE} = -1$

$\overline{A'E'} = -1$

$\overline{BC} = 0$

$\overline{B'C'} = 0$

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$$\frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{3x = 1}{3} \quad x = \frac{1}{3}$$

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To Study for Quiz

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