

Name: Kelly

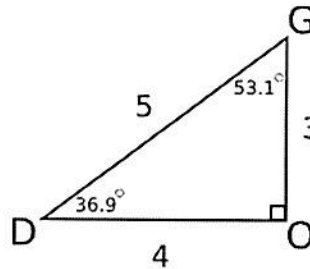
Date: _____

UNIT 5

LESSON 1

AIM: WHAT IS A DILATION? WHAT IS A SCALE FACTOR?

Do Now: If you put a magnifying glass over the triangle below and enlarged it 10 times the original size, what would the length of \overline{DG} be? What would the measure of $\angle D$ be?



$$\overline{DG} = 5 \times 10 = 50$$

$$\angle D = 36.9^\circ$$

What transformation is being represented by this description? A dilation!

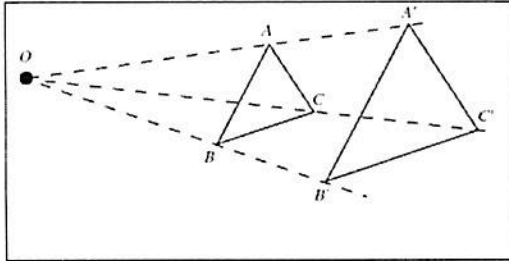
DEFINITION	CHARACTERISTICS
<p>Enlarging or shrinking a figure by a certain scale factor</p>	<p>- Angles are \cong - side measures are in <u>proportion</u></p>
<div style="border: 2px solid black; border-radius: 50%; width: 30%; margin: 0 auto; padding: 10px; font-size: 24px; font-weight: bold;">DILATION</div>	
EXAMPLE	NON-EXAMPLE

RECALL: RIGID MOTIONS

- **RIGID MOTIONS** are transformations that preserve side length and measure that produce congruent figures

<p>Translate</p>	<p>Reflect</p>	<p>Rotate</p>
<p>We TRANSLATE along <u>vectors</u> (UP, DOWN, LEFT or RIGHT)</p>	<p>We REFLECT over <u>lines</u></p>	<p>We ROTATE around <u>points</u> by a certain number of <u>degrees</u> in either a CLOCKWISE or COUNTER-CLOCKWISE direction</p>

- **DILATIONS** are transformations that preserve shape & measure but change side lengths that produce similar figures.



We **DILATE** about a center of dilation by a certain scale factor (k)

*** k cannot be negative! ***

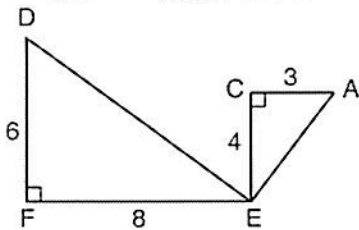
- $k > 1$: enlargement
- $k = 1$: stays the same
- $0 < k < 1$: reduction

EXAMPLES:

1. The vertices of $\triangle JKL$ have coordinates $J(5,1)$, $K(-2,-3)$, and $L(-4,1)$. Under which transformation is the image $\triangle J'K'L'$ not congruent to $\triangle JKL$?
- 1) a dilation with a scale factor of 1 centered at the origin
 - 2) a counterclockwise rotation of 180° around the origin
 - 3) a reflection over the x-axis
 - 4) a dilation with a scale factor of 2 and centered at the origin

2. The image of $\triangle DEF$ is $\triangle D'E'F'$. Under which transformation will the triangles not be congruent?
- 1) a reflection through the origin
 - 2) a dilation with a scale factor of 2, centered at the origin
 - 3) a translation 4 units right and 2 units up.
 - 4) A dilation with scale factor of 1, centered at D.

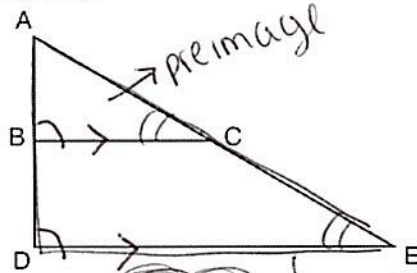
3. Given: $\triangle AEC$, $\triangle DEF$, and $\overline{FE} \perp \overline{CE}$



What is a correct sequence of similarity transformations that shows $\triangle AEC \sim \triangle DEF$?

- 1) a rotation of 180 degrees about point E followed by a horizontal translation
- 2) a counterclockwise rotation of 90 degrees about point E followed by a horizontal translation
- 3) a rotation of 180 degrees about point E followed by a dilation with a scale factor of 2 centered at point E
- 4) a counterclockwise rotation of 90 degrees about point E followed by a dilation with a scale factor of 2 centered at point E

4. The image of $\triangle ABC$ after a dilation of scale factor k centered at point A is $\triangle ADE$, as shown in the diagram below.



Which statement is always true?

- 1) $2AB = AD$
- 2) $\overline{AD} \perp \overline{DE}$
- 3) $AC = CE$
- 4) $\overline{BC} \parallel \overline{DE}$

image got bigger!
 $k > 1$

we do not know what k is so we cannot say AB is 2x bigger

but \angle 's are \cong , corresponding \angle 's are = making $\overline{BC} \parallel \overline{DE}$!

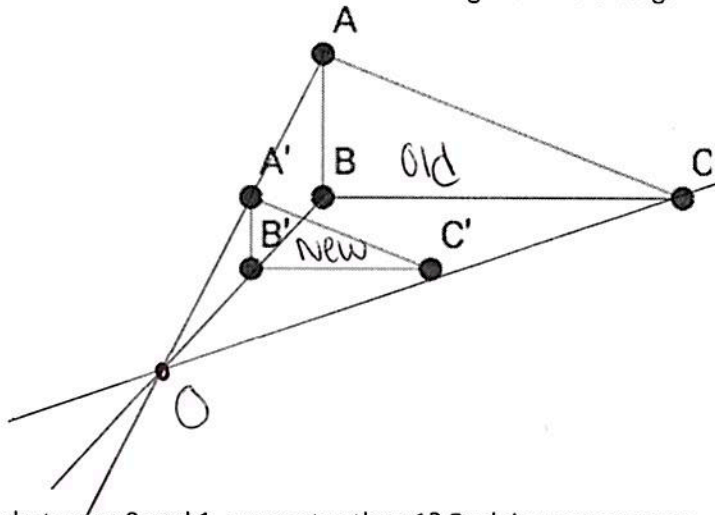
FINDING THE CENTER OF DILATION

FINDING THE SCALE FACTOR (k)

- Draw 2 lines through 2 pairs of corresponding points from big to small (PAST small).
- The intersection of these lines, is the center of dilation.

$$k = \frac{NEW}{OLD}$$

1. a) Determine the location of center O used for the following scaled drawing.



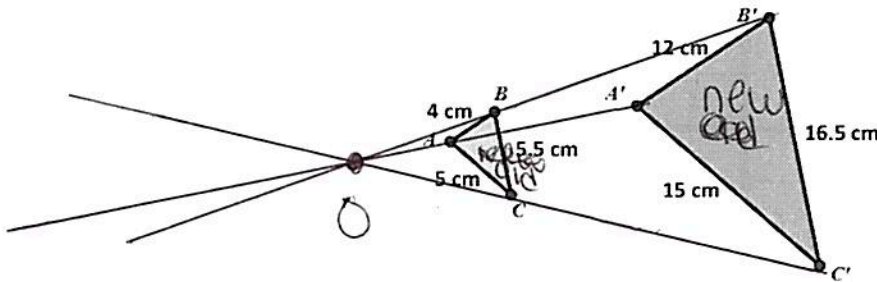
- b) Is the scale factor between 0 and 1, or greater than 1? Explain your answer.

$0 < k < 1$ b/c the image is smaller

- c) What is the scale factor? (Using corresponding side names)

$$\frac{A'C'}{AC} \text{ or } \frac{A'B'}{AB} \text{ or } \frac{B'C'}{BC}$$

2. a) Determine the location of center O used for the following scaled drawing.



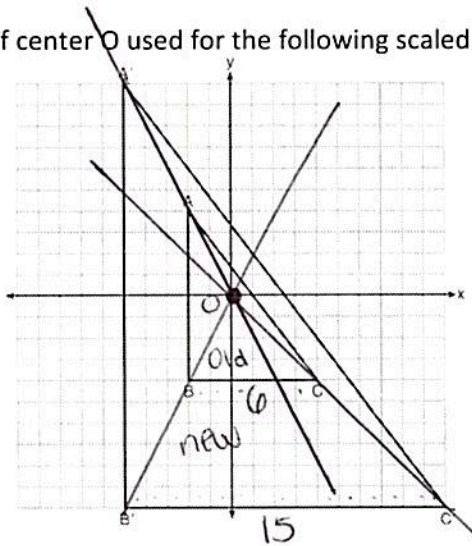
- b) Is the scale factor between 0 and 1, or greater than 1? Explain your answer.

$k > 1$ b/c the Δ is bigger!

- c) What is the exact scale factor? (Use corresponding side lengths to determine)

$$\frac{12}{4} = \frac{16.5}{5.5} = \frac{15}{5} = \boxed{\frac{3}{1} = k}$$

3. a) Determine the location of center O used for the following scaled drawing.



b) Is the scale factor between 0 and 1, or greater than 1? Explain your answer.

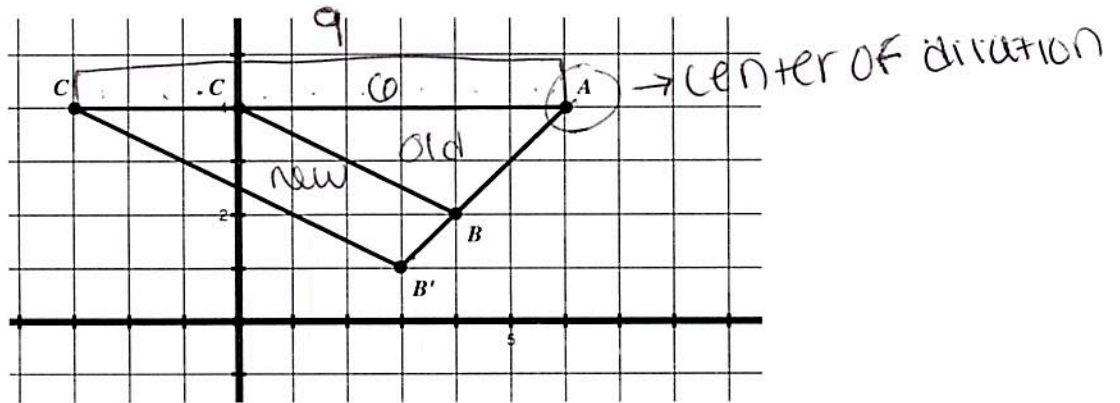
$k > 1$ b/c image gets BIGGER!

c) What is the exact scale factor? (Use corresponding side lengths to determine)

count boxes!

$$\frac{15}{6} = \frac{5}{2} \text{ or } 2.5$$

4. a) Determine the location of the center used for the following scaled drawing.



b) Is the scale factor between 0 and 1, or greater than 1? Explain your answer.

$k > 1$ b/c image gets BIGGER!

c) What is the exact scale factor? (Use corresponding side lengths to determine)

$$\frac{9}{3} = \frac{3}{1} \text{ or } 3$$

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UNIT 5

LESSON 1

HOMEWORK

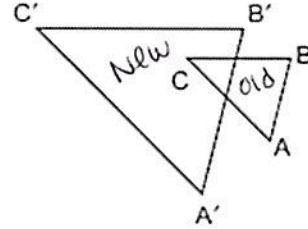
$(6(9) = 45 \checkmark)$

try it out! $A = l \cdot w$
2 $A = 6$ 3
6 $A = 45$ 9

1. A triangle is dilated by a scale factor of 3 with the center of dilation at the origin. Which statement is true?

- (1) The area of the image is nine times the area of the original triangle.
- (2) The perimeter of the image is nine times the perimeter of the original triangle. *should be 3x!*
- (3) The slope of any side of the image is three times the slope of the corresponding side of the original triangle. *slopes do not change*
- (4) The measure of each angle in the image is three times the measure of the corresponding angle of the original triangle.

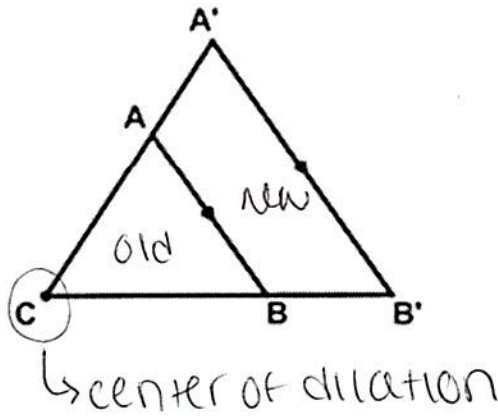
2. In the accompanying diagram, $\triangle ABC$ is similar to but not congruent to $\triangle A'B'C'$.



Which transformation is represented by $\triangle A'B'C'$?

- 1) rotation
- 2) translation
- 3) reflection
- (4) dilation

3. a) Determine the location of the center used for the following scaled drawing.



b) Is the scale factor between 0 and 1, or greater than 1? Explain your answer.

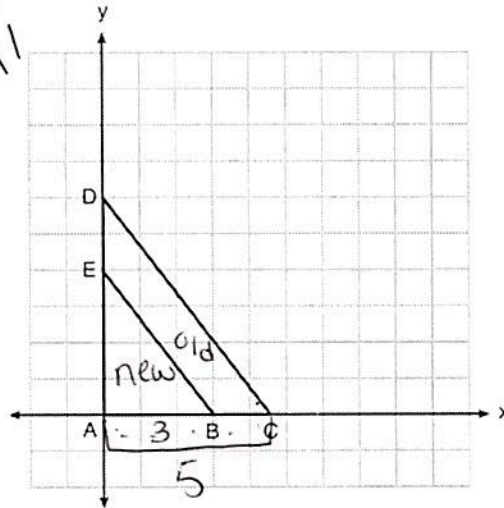
$k > 1$ b/c the image gets BIGGER

c) What is the scale factor? (Using corresponding side names)

$$\frac{A'B'}{AB}$$

4. a) $\triangle ADC$ is dilated and maps to $\triangle AEB$. Determine the location of the center used for the following scaled drawing.

Big \rightarrow small



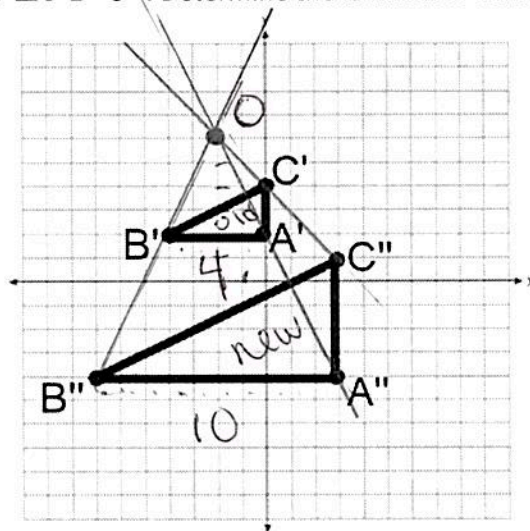
- b) Is the scale factor between 0 and 1, or greater than 1? Explain your answer.

$0 < k < 1$ b/c k gets smaller

- c) What is the exact scale factor? (Use corresponding side lengths to determine)

$$\frac{3}{5} = k$$

5. a) $\triangle A'B'C'$ maps to $\triangle A''B''C''$. Determine the location of center O used for the following scaled drawing.



center = $(-2, 6)$

- b) Is the scale factor between 0 and 1, or greater than 1? Explain your answer.

$k > 1$ b/c the image gets BIGGER

- c) What is the exact scale factor? (Use corresponding side lengths to determine)

$$k = \frac{10}{4} = \frac{5}{2} \text{ or } 2.5$$