

Geometry CC - Unit 7
Lesson 5: Dilations
M2 L 6 - 9

HW Answers 7-4

Geometry CC - Unit 7
Lesson 5: Dilations & Proofs of SAS
M2 L 6 - 9

1. If $EF = 9$, $BA = 15$, and $BF = 15$, what is FC ?

$$\frac{9}{15} = \frac{15}{15+x}$$

$$225 = 9(15+x)$$

$$25 = 15+x$$

$$\frac{25-15}{15} = \frac{15}{15+x}$$

$$\frac{10}{15} = \frac{15}{15+x}$$

$$\frac{2}{3} = \frac{15}{15+x}$$

$$2(15+x) = 3 \cdot 15$$

$$30 + 2x = 45$$

$$2x = 15$$

$$x = 7.5$$

2. In the accompanying diagram of $\triangle SRT$, $\overline{SR} \parallel \overline{ST}$, $\overline{LR} = 3$, and $\overline{RT} = 21$. Find LR .

$$\frac{3}{7} = \frac{3}{21}$$

$$\frac{7 \cdot 3}{7} = \frac{3 \cdot 21}{7}$$

$$x = 12$$

$$LR = 12$$

3) In the given diagram, lines r , s , and t are all parallel and are cut by transversals m and n . Find the value of x .

$$\frac{x}{4.125} = \frac{5.5}{5.5}$$

$$5.5x = 4.125 \cdot 5.5$$

$$5.5x = 22.6875$$

$$x = 4.125$$

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Dilation
Transformation that enlarges or reduces the size of the object

The preimage is enlarged or reduced by a scale factor.

Dilations Are Non-Rigid:
-The preimage and image are **similar figures**
-Congruent Angles
-Proportional Sides

QUICK REVIEW

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Scale Factor:
-The preimage is enlarged or reduced by a scale factor (k)
-The scale factor is determined by the distance from the center (C)

Reduction: $0 < k < 1$
Enlargement: $k > 1$

$k = \frac{\text{new}}{\text{old}}$

$k = \frac{3}{6} = \frac{1}{2}$
Reduction

$k = \frac{8}{2} = 4$
Enlargement

Extend Your Thinking:
1) What about $k=1$?
The pre-image would stay the same.
2) Can you have a negative scale factor?
Yes, it would reverse the scale factor

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Find the scale factor and determine if the dilation is an enlargement or a reduction.

1) $k = \frac{\text{new}}{\text{old}} = \frac{2}{3}$
Reduction

2) $k = \frac{9}{2}$
Enlargement

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Dilations in the Coordinate Plane:
-Origin is the center
-Multiply the coordinate by the scale factor ----- $k(x,y)$

$k = \frac{1}{2}$

Preimage
A(4, 4)
B(6, 3)
C(6, 8)

Image
A'(2, 2)
B'(3, 1.5)
C'(3, 4)

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1) Find the vertices and graph the image after a dilation centered at the origin with the given scale factor.

$k = 2$

Preimage
A(-4, -3)
B(2, 3)
C(3, -5)

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

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2) Find the vertices and graph the image after a dilation centered at the origin with the given scale factor.

$k = 2.5$

Preimage	Image
W(-2, 4)	
X(-2, -2)	
Y(-4, -2)	
Z(-4, 2)	

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3) Find the vertices and graph the image after a dilation centered at the origin with the given scale factor.

$k = \frac{1}{3}$

Preimage	Image
X(0, 6)	
Y(-6, -3)	
Z(6, -3)	

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Let's Talk About Dilation Properties...

How are dilations related to similar triangles?
The sides are Proportional by the Scale factor

A dilation can be looked at as an object made up of line segments.

Dilations take a line segment (not going through the center point) and creates a line segment that is parallel.

\overline{XZ} is dilated to $\overline{X'Z'}$
 $\overline{XZ} \parallel \overline{X'Z'}$

Dilations also have a line segment that does go through the center, and the image is on the same line.

\overline{CX} goes through the center (C)
 $\overline{C'X'}$ is on the line \overline{CX}

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