Unit 1 Day 7

Similarity continued

Warm Up

Given triangle CDE with C(2, 2), D(-6, 4) and E(-2, -6), write the points of the image under the following transformations.
For #1 and 2, write the description and the vertices. For #3 and 4, give the algebraic rule and the coordinate pairs.

1) $(x, y) \rightarrow (3x, 3y)$ Enlargement by scale factor of 3.
C'(6, 6), D'(-18, 12), E'(-6, -18)

2) $(x, y) \rightarrow \left(\frac{1}{4}x, \frac{1}{4}y\right)$ Reduction by a factor ¼.
C'(1/2, 1/2), D'(-3/2, 1), E'(-1/2, -3/2)

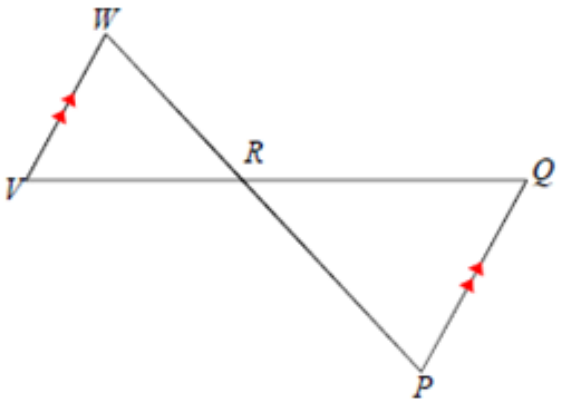
3) Dilation with a scale factor 2 (x, y) → (2x, 2y)
C'(4, 4), D'(-12, 8), E'(-4, -12)

4) Horizontal shrink with scale factor of 1/3, vertical shrink with a scale factor 1/3 (x, y) → (1/3x, 1/3y)
C'(2/3, 2/3), D'(-2, 4/3), E'(-2/3, -2)

5) Do you agree or disagree with Logan? Explain your reasoning.
Disagree! There is no common scale factor

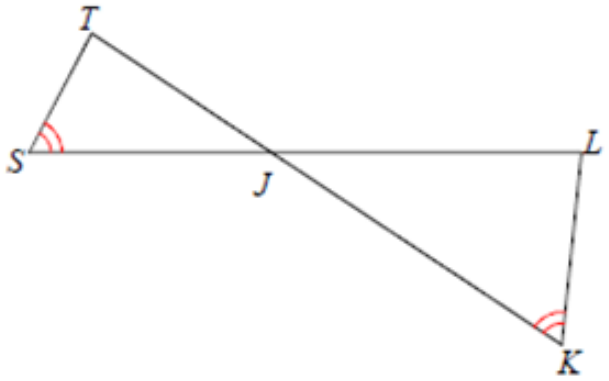
Day 6 Homework

2)



$\Delta RQP \sim$ **ΔRVW by AA~**

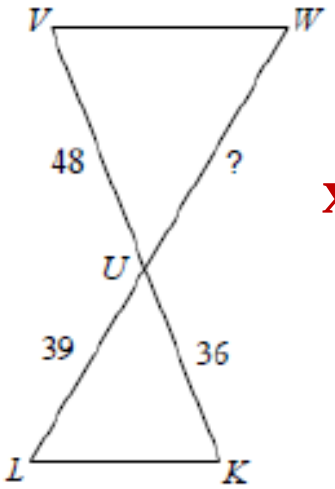
4)



$\Delta JKL \sim$ **Δ JST by AA~**

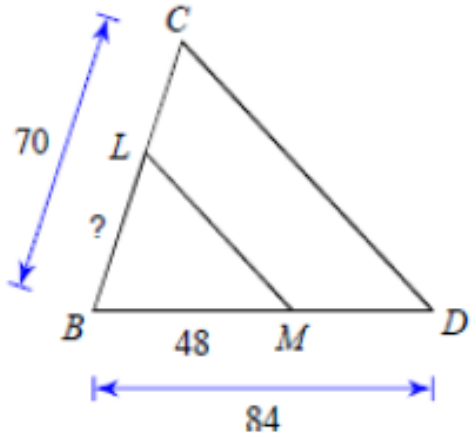
Given the information below, solve for the length of the missing segment in the similar triangles.

10) $\overline{VW}$ // $\overline{KL}$



x = 52

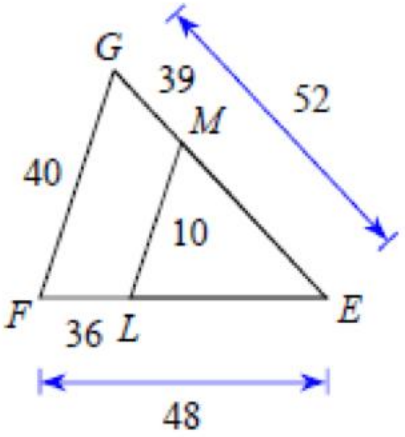
12) $\overline{LM}$ // $\overline{CD}$



x = 40

Day 6 Homework Continued

3)



$\Delta EFG \sim$ **ΔELM** by **SAS~**

Day 6 Homework Continued

13) Given **ΔCBA ~ ΔFED**. Find x, y, and the measure of each angle.

$m\angle A = 7x + 2y$

$m\angle D = 24°$

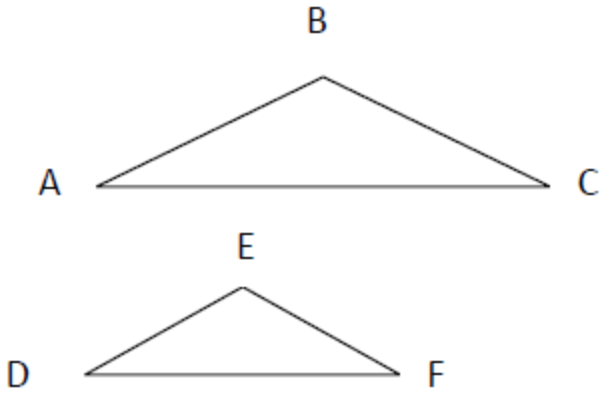
$m\angle C = 30°$

$m\angle F = 8x + 2y$

x = 6

y = -9

24, 30, 126



14) Given **ΔHIJ ~ ΔKLM**. Find x, y, and the measure of each angle.

Angle H = 20°

Angle K = 4x - y

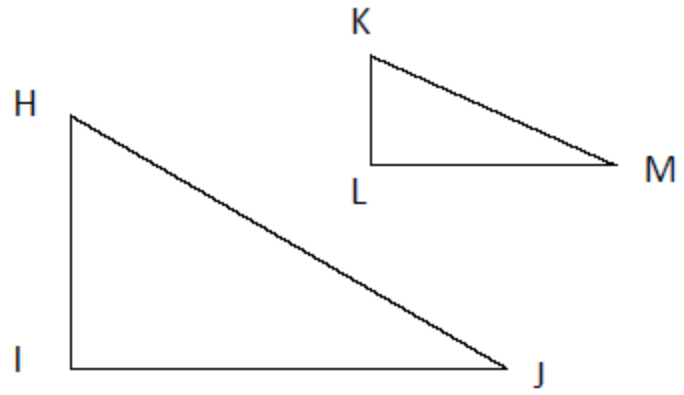
Angle J = -2x - 2y

Angle M = 10°

x = 3

y = -8

20, 10, 150

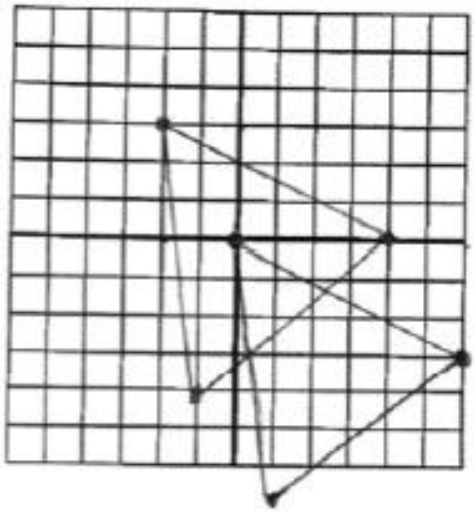


Day 6 Homework Continued

2. The coordinates of $\triangle ABC$ are A(-2, 3), B(4, 0), C(-1, -4). The coordinates of $\triangle A'B'C'$ are A'(0, 0), B'(6, -3), C'(1, -7).

Description: Translation 2 right and 3 down

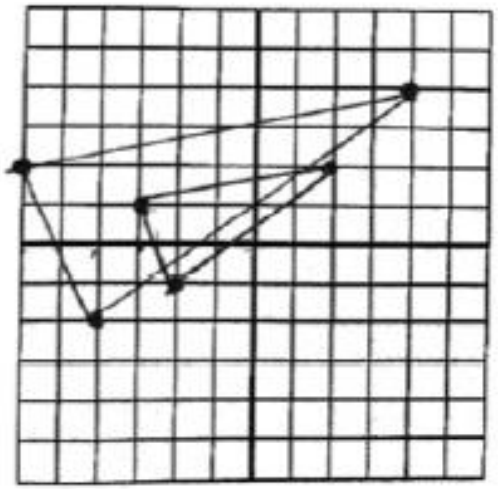
Algebraic Rule: $(x, y) \rightarrow (x + 2, y - 3)$



4. The coordinates of $\triangle ABC$ are A(-3, 1), B(-2, -1), C(2, 2). The coordinates of $\triangle A'B'C'$ are A'(-6, 2), B'(-4, -2), C'(4, 4).

Description Dilation by scale factor 2

Algebraic Rule: $(x, y) \rightarrow (2x, 2y)$

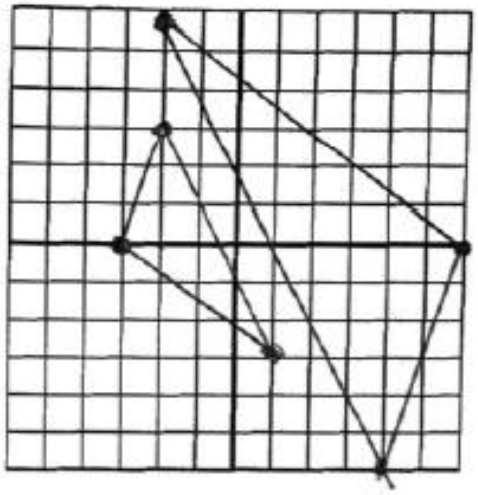


Day 6 Homework Continued

6. The coordinates of $\triangle ABC$ are A(-3, 0), B(-2, 3), C(1, -3). The coordinates of $\triangle A'B'C'$ are A'(6, 0), B'(4, -6), C'(-2, 6).

Description: Dilation by scale factor 2 AND 180° rotation (or reflect across both axes)

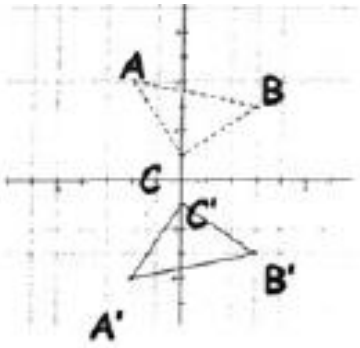
Algebraic Rule: $(x, y) \rightarrow (-2x, -2y)$



Day 6 Homework Continued

Part 2: Describe the transformations on the graph verbally and by writing an algebraic rule. Hint: The triangle with dotted lines is the preimage.

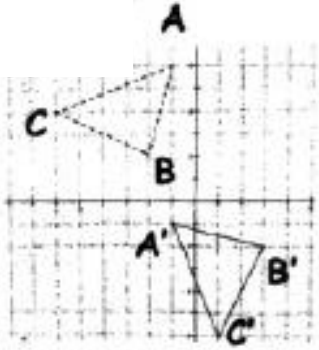
8.



Description: reflection over x-axis

Algebraic Rule: $(x, y) \rightarrow (x, -y)$

10.

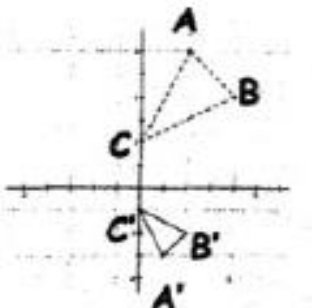


A(-1,6)
A'(-1,-1)
B(-2,2)
B'(3,-2)
C(-6,4)
C'(1,-6)

Description: Translation down 5 AND 90° rotation

Algebraic Rule: $(x, y) \rightarrow (-y + 5, x)$

12.



C(0,2)
C'(0,-1)
B(4,4)
B'(2,2)
A(2,6)
A'(1,-3)

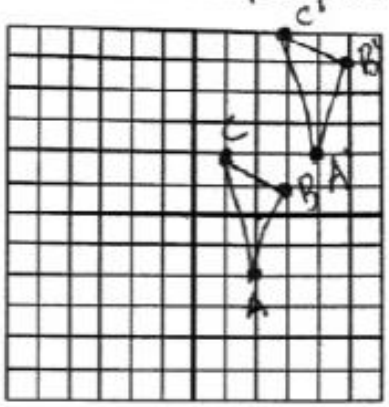
Description: reflected over x-axis, dilated by ½

Algebraic Rule: $(x, y) \rightarrow (\frac{1}{2}x, -\frac{1}{2}y)$

← Reflected over x-axis, dilated by $\frac{1}{2}$

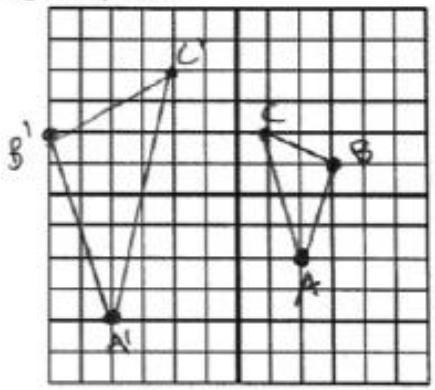
Day 6 Homework Continued

14) ΔABC is moved up 4 and 2 to the right



Algebraic Rule: $(x, y) \rightarrow (x + 2, y + 4)$

16) ΔABC is reflected over the y-axis then enlarged by two.



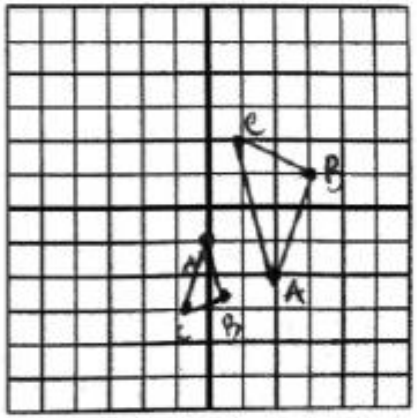
$A'(-4, -4)$

$B'(-6, 2)$

$C'(-2, 4)$

Algebraic Rule: $(x, y) \rightarrow (-2x, 2y)$

18) ΔABC is reflected over the x-axis, then dilated by $\frac{1}{2}$, then moved down 2 and left 1.



$A'(0, -1)$

$B'(.5, -2.5)$

$C'(-.5, -3)$

Algebraic Rule: $(x, y) \rightarrow (x, -y)$ for first part

$* (x, y) \rightarrow (\frac{1}{2}x - 1, -\frac{1}{2}y - 2) *$ overall

Tonight's Homework

Pages 23 – 24 ALL

Pages 13 – 14 ODDS (this *IS* back in the *first part* of the packet, the part we gave you!)

Print Out Third Portion of Unit One Homework by **Tomorrow** (bring both printed packets to class from Blackboard)!

*Packet Days 8-13

Similar Figures

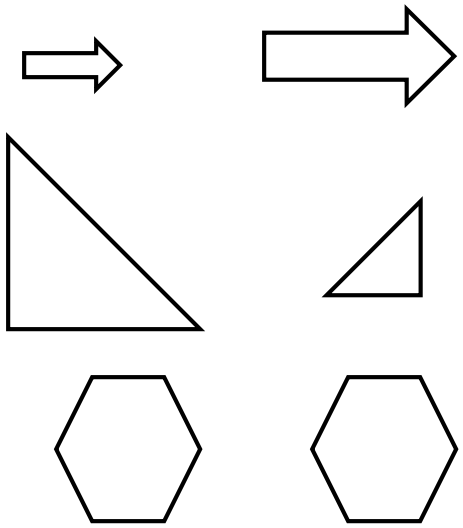
Definition

Figures with the same shape, but of a proportional size.

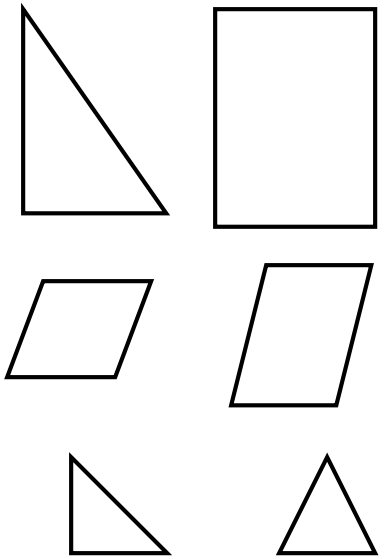
Characteristics

All angle pairs are congruent
All side pairs are proportional

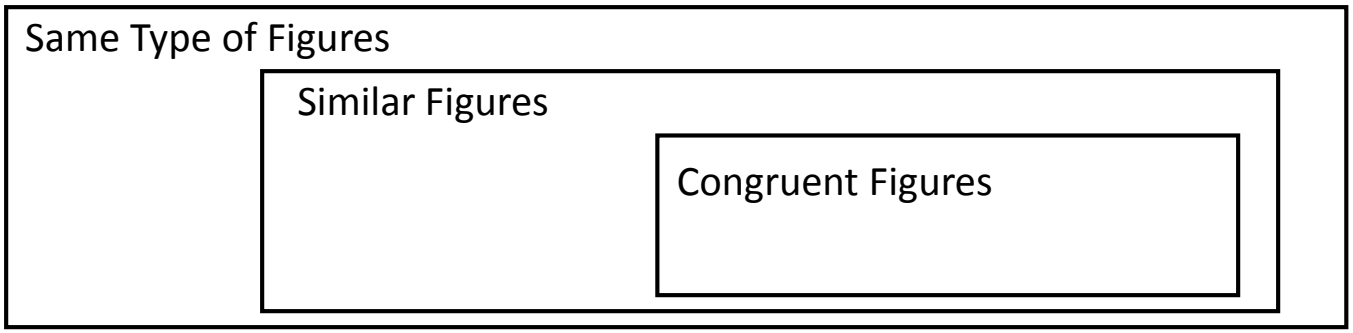
Examples



Non-Examples

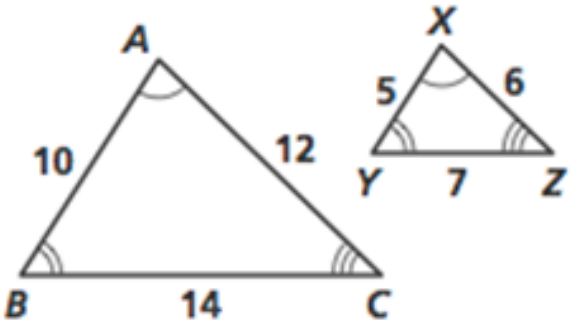


Venn Diagram



Foundational Practice

Are the polygons similar?? If so, write a similarity statement.

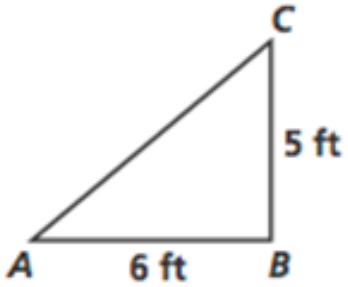


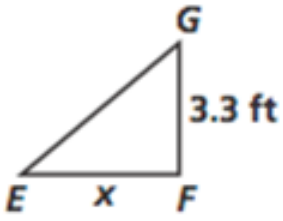
$$\frac{10}{5} = \frac{12}{6} = \frac{14}{7}$$

By: SSS ~
AA~
SAS~

$\Delta ABC \sim \Delta XYZ$

Given $\angle A \cong \angle E$ and $\angle C \cong \angle G$, are the polygons similar?? If so, explain why, write a similarity statement, and find x.





$$\frac{6}{x} = \frac{5}{3.3}$$

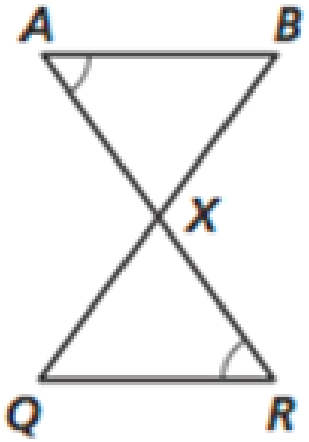
$$x = 3.96$$

By: AA~

$\Delta CAB \sim \Delta GEF$

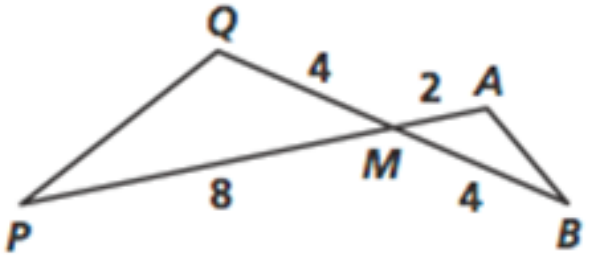
Foundational Practice Continued…

Explain why the triangles are similar and write a similarity statement.



By: AA ~

ΔABX ~ ΔRQX



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

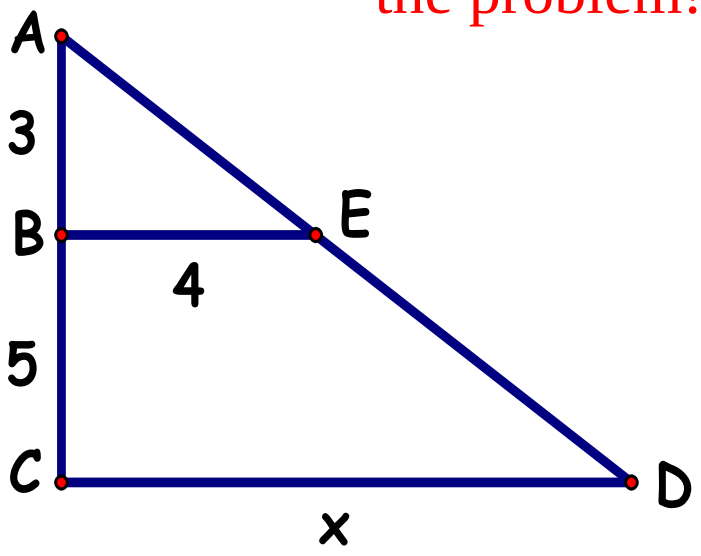
By: SAS ~

ΔQMP ~ ΔAMB

A Tough one….Let's try this together!

Explain why the triangles are similar and write a similarity statement. Then, solve for the variable, where appropriate.

$\overline{BE} \parallel \overline{CD}$ ←Remember to read the problem!! ☺



$\Delta ACD \sim \Delta ABE$

By: AA ~

Be careful! Drawing the small triangle separately can help!

Do $\frac{full\ side}{full\ side} = \frac{full\ side}{full\ side}$

$$\frac{3}{8} = \frac{4}{x}$$

x = 32/3 or 10 2/3

Some Word Problems

1) A 6 ft tall tent standing next to a cardboard box casts a 9 ft shadow. If the cardboard box casts a shadow that is 6 ft long then how tall is it?

$$\frac{6}{x}=\frac{9}{6} \quad OR \quad \frac{6}{9}=\frac{x}{6}$$

$$x = 4\ ft$$

2) A telephone booth that is 8 ft tall casts a shadow that is 4 ft long. Find the height of a lawn ornament that casts a 2 ft shadow.

$$\frac{8}{x}=\frac{4}{2} \quad OR \quad \frac{8}{4}=\frac{x}{2}$$

$$x = 4\ ft$$

You Try!

3) A map has a scale of 3 cm : 18 km. If Riverside and Smithville are 54 km apart then they are how far apart on the map?

4) Find the distance between Riverside and Milton if they are 12 cm apart on a map with a scale of 4 cm : 21 km.

7) A map has a scale of 2 in : 6 mi. If Clayton and Centerville are 10 in apart on the map then how far apart are the real cities?

8) A statue that is 12 ft tall casts a shadow that is 15 ft long. Find the length of the shadow that a 8 ft cardboard box casts.

You Try Answers!

3) A map has a scale of 3 cm : 18 km. If Riverside and Smithville are 54 km apart then they are how far apart on the map?

$$\frac{3}{18} = \frac{x}{54} \; OR \; \frac{18}{54} = \frac{3}{x}$$

$$x = 9 \; cm$$

4) Find the distance between Riverside and Milton if they are 12 cm apart on a map with a scale of 4 cm : 21 km.

$$\frac{4}{21} = \frac{12}{x} \; OR \; \frac{4}{12} = \frac{21}{x}$$

$$x = 63 \; km$$

You Try Answers!

7) A map has a scale of 2 in : 6 mi. If Clayton and Centerville are 10 in apart on the map then how far apart are the real cities?

$$\frac{2}{6}=\frac{10}{x} \quad OR \quad \frac{2}{10}=\frac{6}{x}$$

$$x = 30\ miles$$

8) A statue that is 12 ft tall casts a shadow that is 15 ft long. Find the length of the shadow that a 8 ft cardboard box casts.

$$\frac{12}{15}=\frac{8}{x} \quad OR \quad \frac{12}{8}=\frac{15}{x}$$

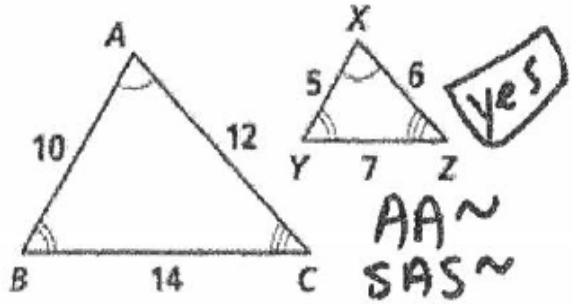
$$x = 10\ ft$$

Practice: Similar Figures

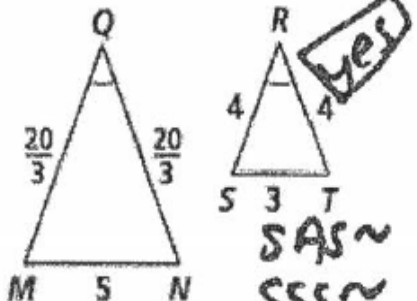
Notes p.27 - 28

Page 27 Solutions

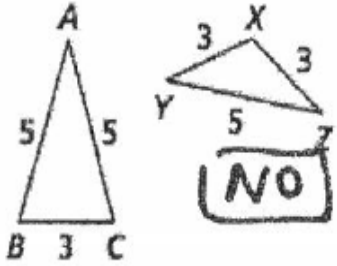
Are the polygons similar? If they are, write a similarity statement, and give the similarity ratio. If they are not, explain.

1. 

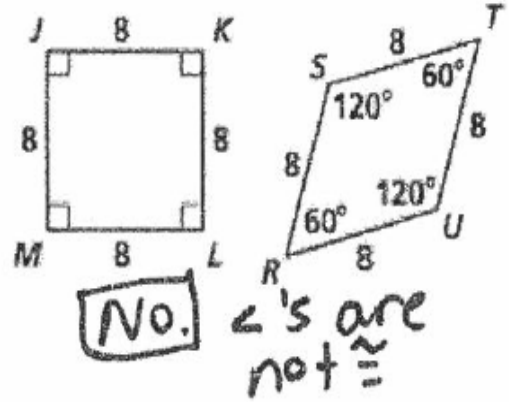
yes
AA~
SAS~
SSS~

2. 

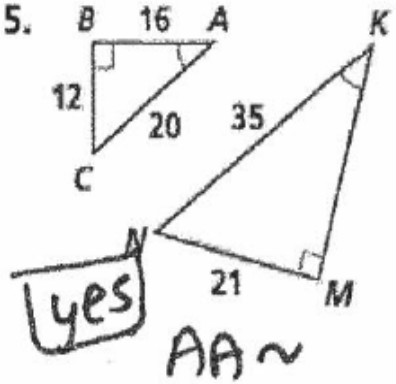
yes
SAS~
SSS~

3. 

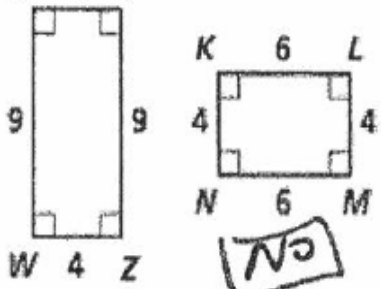
NO
$\frac{5}{3} \neq \frac{3}{5}$

4. 

No.
∠'s are not ≅

5. 

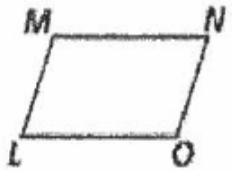
yes
AA~

6. 

No
sides not proportional

***LMNO ~ HIJK.* Complete the proportions and congruence statements.**

7. $\angle M \cong ?$ ∠I
8. $\angle K \cong ?$ ∠O
9. $\angle N \cong ?$ ∠J
10. $\frac{MN}{IJ} = \frac{?}{JK}$ NO
11. $\frac{HK}{?} = \frac{HI}{LM}$ LO
12. $\frac{IJ}{MN} = \frac{HK}{?}$ LO

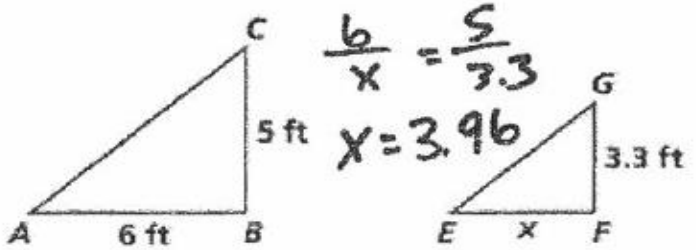


Page 27 Solutions Continued..

'Notes Packet'

Algebra **The polygons are similar. Find the values of the variables.**

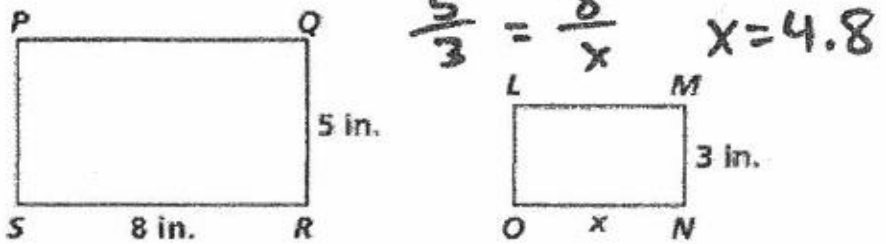
13.



$\frac{6}{x} = \frac{5}{3.3}$

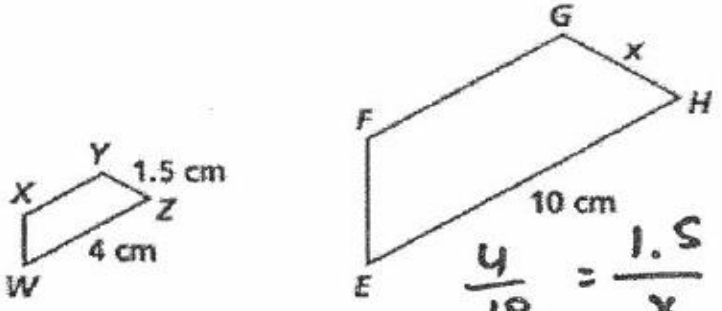
$x = 3.96$

14.



$\frac{5}{3} = \frac{8}{x}$ $x = 4.8$

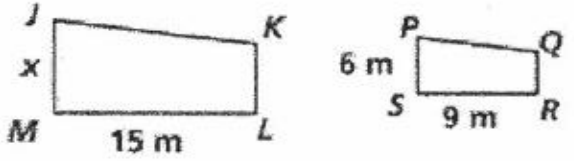
15.



$\frac{4}{10} = \frac{1.5}{x}$

$x = 3.75$

16.



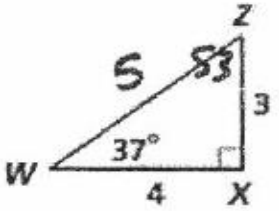
$\frac{15}{9} = \frac{x}{6}$ $x = 10$

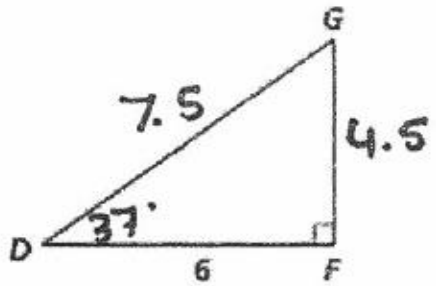
$\triangle WXZ \sim \triangle DFG$. Use the diagram to find the following.

17. the similarity ratio of $\triangle WXZ$ and $\triangle DFG$

18. $m\angle Z = 53^\circ$ **19.** $DG = 7.5$ **20.** $GF = 4.5$

21. $m\angle G = 53^\circ$ **22.** $m\angle D = 37^\circ$ **23.** $WZ = 5$





$a^2 + b^2 = c^2$

$\frac{4}{6} = \frac{3}{x}$

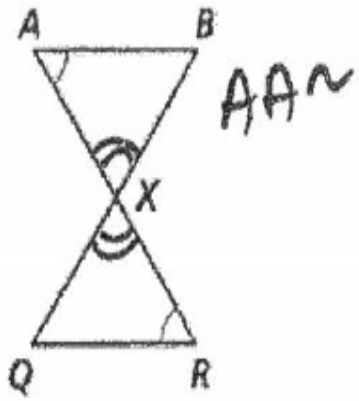
$4x = 18$

$x = 4.5$

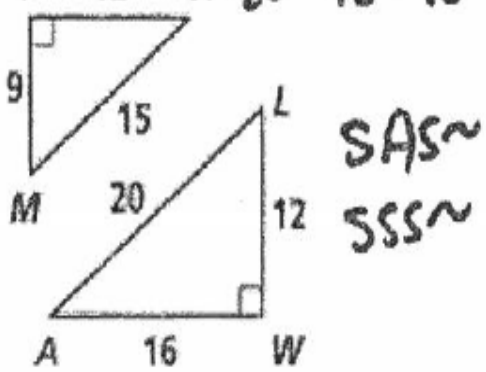
Page 28 Solutions

'Notes Packet'

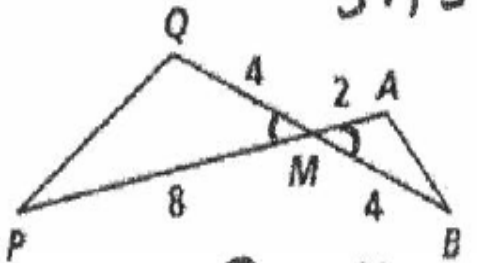
Explain why the triangles are similar. Write a similarity statement for each pair.

1. 

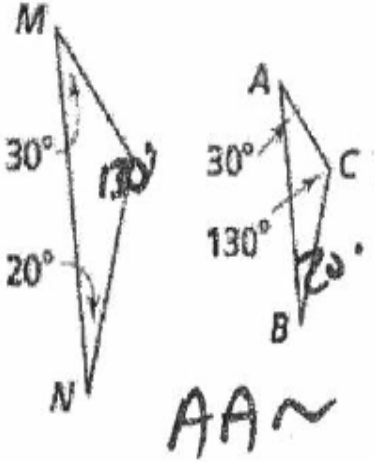
AA~

2. 

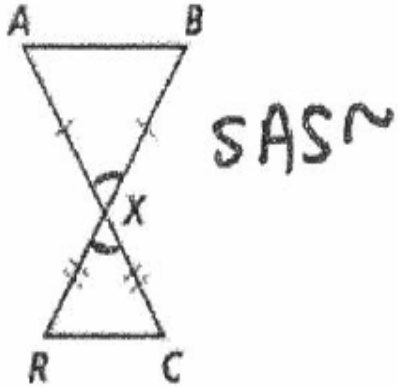
$\frac{15}{20} = \frac{9}{12} = \frac{12}{16}$
SAS~
SSS~

3. 

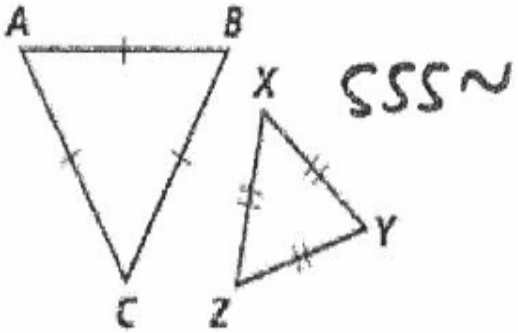
SAS~
$\frac{2}{4} = \frac{4}{8}$

4. 

AA~

5. 

SAS~

6. 

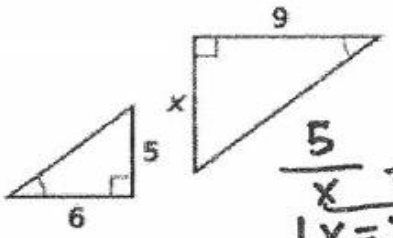
SSS~

Page 28 Solutions Continued..

'Notes Packet'

Algebra Find the value of x.

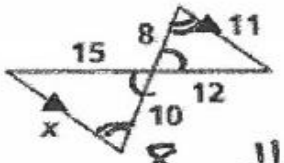
7.



$\frac{5}{x} = \frac{6}{9}$

$x = 7.5$

8.

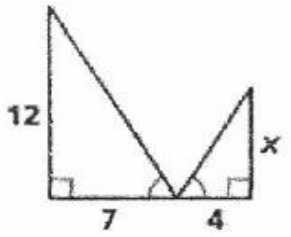


$\frac{8}{10} = \frac{11}{x}$

$8x = 110$

$x = 13.75$

9.

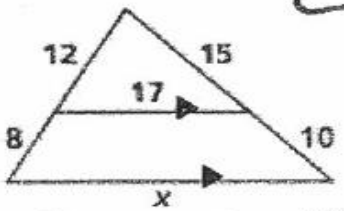


$\frac{4}{7} = \frac{x}{12}$

$48 = 7x$

$x = 6.86$

10.

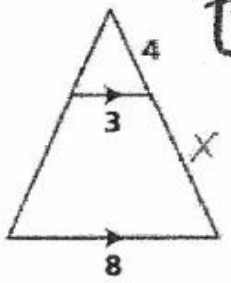


$\frac{12}{20} = \frac{17}{x}$

$12x = 340$

$x = 28.33$

11.



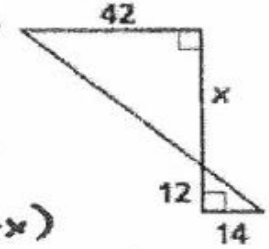
$\frac{3}{8} = \frac{4}{4+x}$

$32 = 3(4+x)$

$32 = 12 + 3x$

$x = 6.667$

12.

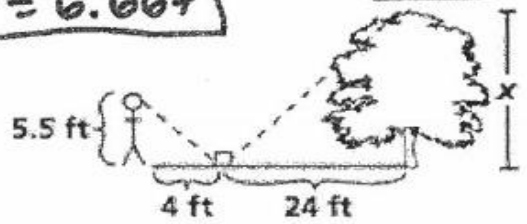


$\frac{42}{14} = \frac{x}{12}$

$14x = 504$

$x = 36$

13. Natasha places a mirror on the ground 24 ft from the base of an oak tree. She walks backward until she can see the top of the tree in the middle of the mirror. At that point, Natasha's eyes are 5.5 ft above the ground, and her feet are 4 ft from the image in the mirror. Find the height of the oak tree.



$\frac{4}{24} = \frac{5.5}{x}$

$4x = 132$

$x = 33$ ft

Kahoot!!

- https://play.kahoot.it/#/?quizId=e0bfb771-bf4a-402b-a409-8548c6b92df6

Tonight's Homework

Pages 23 – 24 ALL

Pages 13 – 14 ODDS (this *IS* back in the *first part* of the packet, the part we gave you!)

Print Out Third Portion of Unit One Homework by **Tomorrow** (bring both printed packets to class from Blackboard)!

*Packet Days 8-13