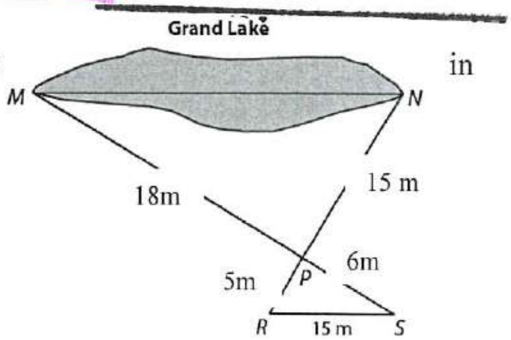
Topic 7 – Similarity: Unit Exam REVIEW **Name: CHRIS D. ADKISON**

Show all work. Attach any additional sheets of paper as needed.

1. Maya needed to determine the longest distance across Grand Lake. She in the diagram.



a. Provide an argument (a proof) to justify that $\triangle NPM \sim \triangle RPS$.

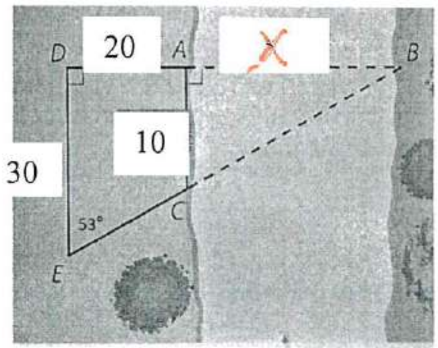
$\angle MPN \cong \angle SPR$	VAT
$\frac{SP}{MP} = \frac{RP}{NP}$	$\frac{6}{18} = \frac{5}{15}$
$\triangle MPN \sim \triangle SPR$	SAS

b. Determine *MN*, the longest distance across Grand Lake.

$\frac{5}{15} = \frac{15}{MN} \Rightarrow 5MN = 225$

$MN = 45m$

2. The CHS STEM Club decided to take a field trip to test what they were learning in math class. They decided to find the width of the Colorado River at a particular point A as shown in the image. Pacing from point A, they located points D, E, and C as shown in the diagram. Determine the width of the river.



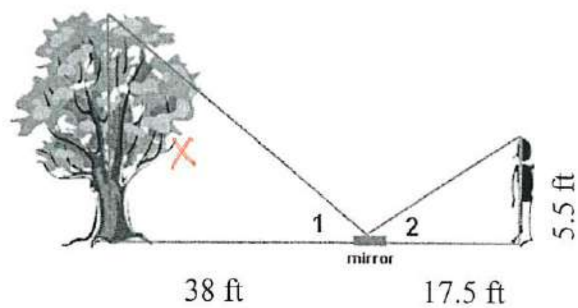
$\frac{10}{X} = \frac{30}{20+X} \Rightarrow 10(20+x) = 30x$

$200 + 10x = 30x$

$200 = 20x$

$10 = X$

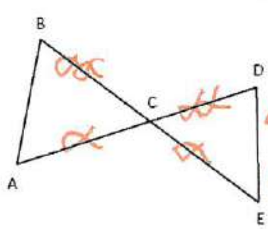
3. Bella needs to know how tall the tree is. Bella places a mirror on the ground to use similar triangles. Use the image at the right to determine the height of the tree.



$\frac{5.5}{17.5} = \frac{X}{38}$ $X = 11.9 ft$

4. a. Given $\frac{AC}{EC} = \frac{BC}{DC}$

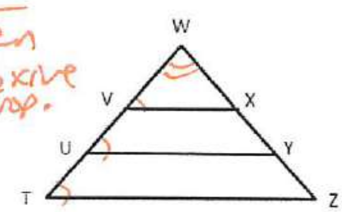
Prove $\triangle ACB \sim \triangle ECD$



S	R
$\frac{AC}{EC} = \frac{BC}{DC}$	Given
$\angle BCA \cong \angle ECD$	VAT
$\triangle ACB \sim \triangle ECD$	SAS

b. Given: $\overline{VX} \ || \ \overline{UY} \ || \ \overline{TZ}$

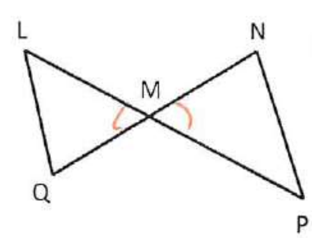
Prove: $\triangle VWX \sim \triangle UWY \sim \triangle TWZ$



S	R
$\overline{VX} \parallel \overline{UY} \parallel \overline{TZ}$	Given
$\angle W \cong \angle W \cong \angle W$	Reflexive prop.
$\angle T \cong \angle WUY \cong \angle WVX$	CAT
$\triangle VWX \sim \triangle UWY \sim \triangle TWZ$	AA

Given: $\overline{LQ} \ || \ \overline{NP}$

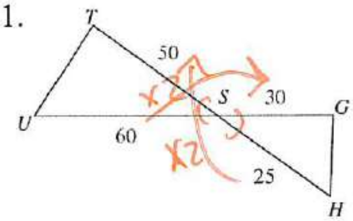
Prove: $\triangle LMQ \sim \triangle PMN$



S	R
$LQ \parallel NP$	Given
$\angle LMQ \cong \angle PMN$	VAT
$\angle Q \cong \angle N$	AIAT
$\triangle LMQ \sim \triangle PMN$	AA

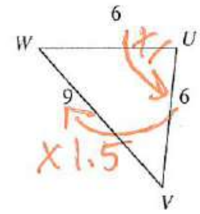
For problems 1-5 determine if the given information is enough to conclude that the two triangles are similar. If so, complete the similarity statement and state which similarity condition (AA, SAS, SSS) you used, if not, state "not similar". Be sure to show your work to justify your reasoning.

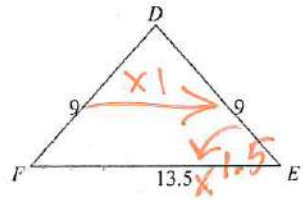
1.



Δ TSU $\sim \Delta$ HSG
by SAS

4.





Δ UWV $\sim \Delta$ DFF
by SSS

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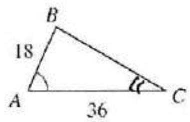
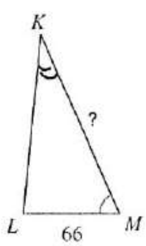
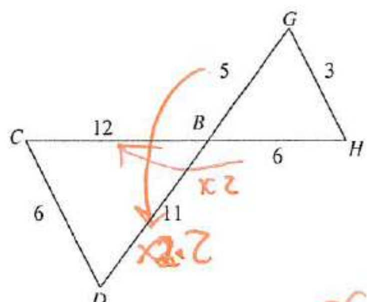
2.





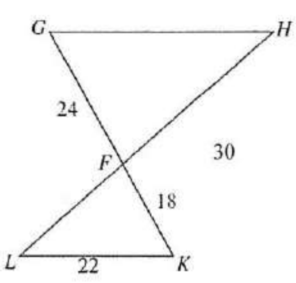
Δ ABC $\sim \Delta$ LMK
by AA

5.



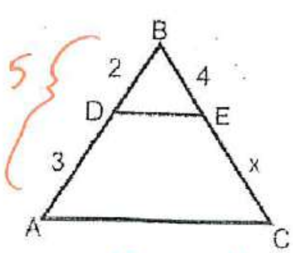
Δ NO $\sim \Delta$ ______ different or not SF (K) proportional
by ______

3.



Δ NO $\sim \Delta$ ______
by not enough info

For the following problems, the triangles are similar.
Solve for x. Show your work

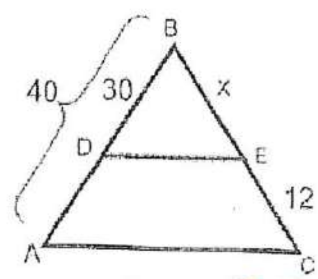


$\frac{2}{5} = \frac{4}{4+x}$

$20 = 2(4+x)$

$20 = 8+2x$

$12 = 2x \quad x = 6$



$\frac{40}{30} = \frac{12+x}{x}$

$40x = 360 + 30x$

$10x = 360$

$x = 36$

Directions: Solve for x, be sure to show your proportion.

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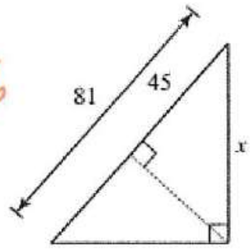
$\frac{x+36}{60} = \frac{60}{36}$

$3600 = 36x + 1296$

$2304 = 36x$

$64 = x$

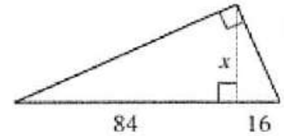


$\frac{81}{x} = \frac{x}{45}$

$x^2 = 3645$

$x = \pm 60.4$

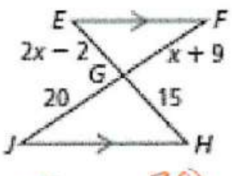
$x = 60.4$



$\frac{x}{84} = \frac{16}{x}$

$x^2 = 1344$

$x = 36.7$



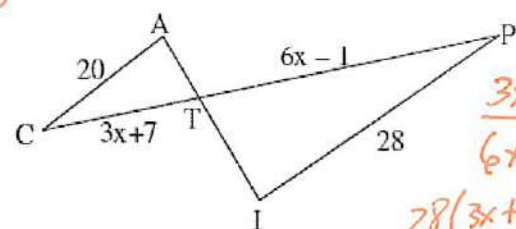
$\frac{15}{2x-2} = \frac{20}{x+9}$

$15(x+9) = 20(2x-2)$

$15x + 135 = 40x - 40$

$175 = 25x$

$7 = x$



$\frac{3x+7}{6x-1} = \frac{20}{28}$

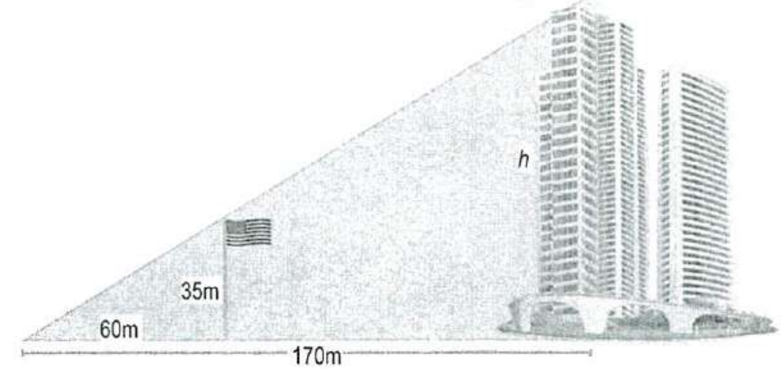
$28(3x+7) = 20(6x-1)$

$84x + 196 = 120x - 20$

$216 = 36x$

$6 = x$

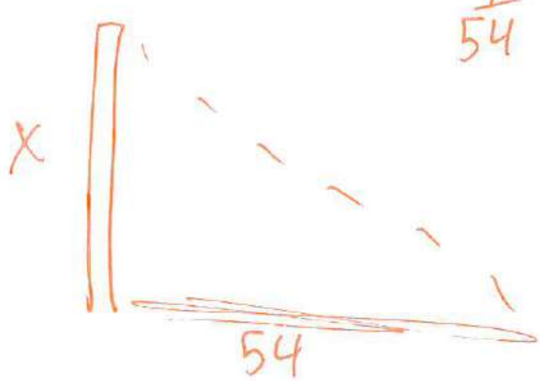
In the diagram, a large flagpole stands outside of an office building. Marquis realizes that when he looks up from the ground, 60 m away from the flagpole, that the top of the flagpole and the top of the building line up. If the flagpole is 35m tall, and Marquis is 170m from the building, how tall is the building?

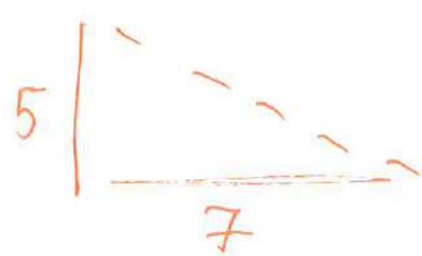


$\frac{35}{60} = \frac{h}{170}$ $h \approx 99m$

1. A tower casts a shadow of 54 feet. A 5-foot tall pole near the tower casts a shadow 7 feet long. How tall is the tower?

$\frac{x}{54} = \frac{5}{7}$ $x = 38.6 ft$





Solve for x:

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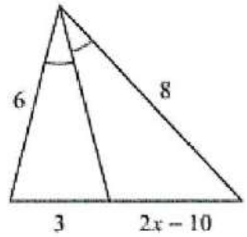
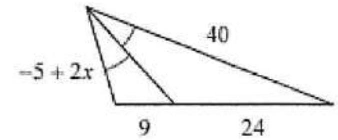


$\frac{6}{3} = \frac{8}{2x-10}$

$24 = 12x - 60$

$84 = 12x$

$7 = x$



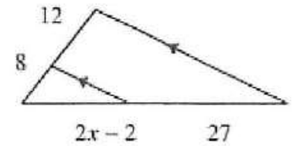
$\frac{-5+2x}{9} = \frac{40}{24}$

$24(-5+2x) = 360$

$-120 + 48x = 360$

$48x = 480$

$x = 10$



$\frac{8}{12} = \frac{2x-2}{27}$

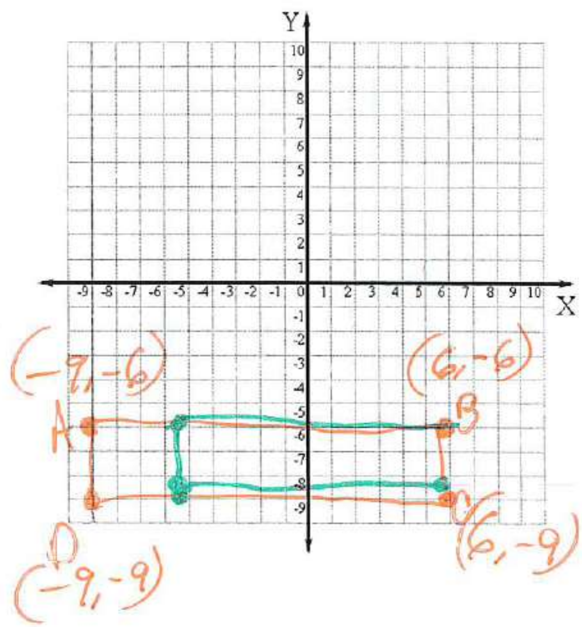
$24x - 24 = 216$

$24x = 240$

$x = 10$

1. A quadrilateral has vertices A(-9,-6) B(-9,-9) C(6,-6) D(6,-9).

	Length AB	Length BC	Length CD	Length DA	Perimeter	Area
Pre-image	15	3	15	3	36	45



a. Apply a dilation of $D_{(\frac{3}{4},\ B)}$. Give the new coordinates, and graph the image.

	Distance to center	New = k·dist	New Coord. = New dist. + center
A (-9,-6)	-15, 0	-11.25, 0	(-5.25, -6)
C(6, -9)	0, -3	0, -2.25	(6, -8.25)
D(-9, -9)	-15, -3	-11.25, -2.25	(-5.25, -8.25)

A'(,) B'(6 , -6) C'(,) D'(,)

(-5.25, -6) (6, -8.25) (-5.25, -8.25)

b. How does the image perimeter relate to the original perimeter and *k* ?

image P = k • orig. P

c. How does the image area relate to the original area and *k* ?

image A = k^2 • orig. A