Similarity Quiz Review

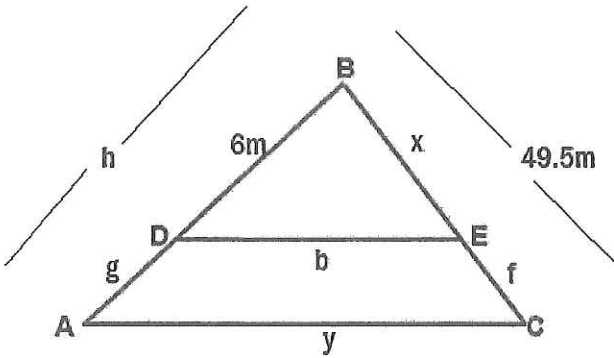*Key*

1. Given ΔABC~ΔDBE. If the perimeter of ABC is 108m and the perimeter of triangle DBE is 24m, find all variables.

$$PR = \frac{108}{24}$$

$$\frac{x}{49.5} = \frac{24}{108}$$

$$\boxed{x = 11m}$$

$$\frac{y}{7} = \frac{108}{24}$$

$$\boxed{y = 31.5m}$$

$$\frac{h}{6} = \frac{108}{24}$$

$$\boxed{h = 27m}$$

Find b:

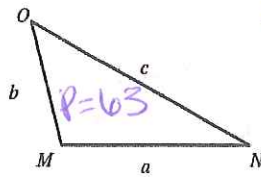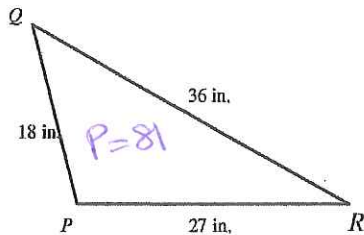$$6 + 11 + b = 24$$

$$\boxed{b = 7m}$$

Find f:

$$49.5 = 11 + f$$

$$\boxed{f = 38.5m}$$

2. ΔQPR ~ ΔOMN

Find a, b, and c if the perimeter of ΔMON is 63 inches. All measurements are in inches.

$$\frac{a}{27} = \frac{63}{81}$$
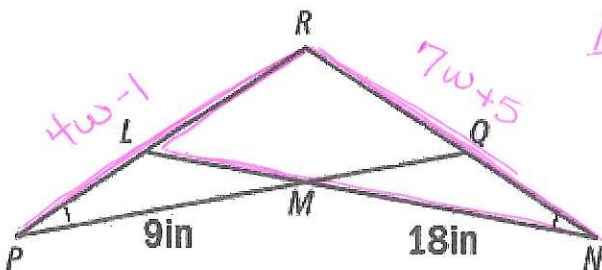
$$\boxed{a = 21in}$$

$$\frac{b}{18} = \frac{63}{81}$$

$$\boxed{b = 14in}$$

$$\frac{c}{36} = \frac{63}{81}$$

$$\boxed{c = 28in}$$

oops!

$LN = 18in$
$PQ = 9in$

3. Find w if $RM = 7w + 5$ and $RP = 4w - 1$. Show all work and show what two triangles are similar... and why!

ΔRNL ~ ΔRPQ

$$\frac{RN}{RP} = \frac{LN}{QP}$$

$$\frac{7w+5}{4w-1} = \frac{18}{9}$$

$$9(7w+5) = 18(4w-1)$$
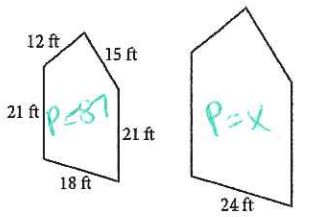$$63w + 45 = 72w - 18$$
$$45 = 9w - 18$$
$$63 = 9w$$
$$\boxed{7 = w}$$

Sorry this question is a hot mess! (w/ instructor)

4. . Find the perimeter of the larger pentagon if the two pentagons are similar.
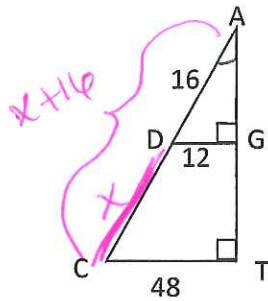
12 ft / 15 ft

21 ft P=87

21 ft

18 ft

P=x

24 ft

$$\frac{x}{87} = \frac{24}{18}$$

$$x = 116.$$

Perimeter = 116 ft

5. a). Explain why $\triangle CAT \sim \triangle DAG$.   b). What is the measurement of CD?

a.) $\angle A \cong \angle A$ reflexive $\begin{cases} \angle AGD = 90° \\ \angle ATC = 90° \end{cases}$ given

$\angle AGD \cong \angle ATC$ subs

$\triangle CAT \sim \triangle DAG$ by AA
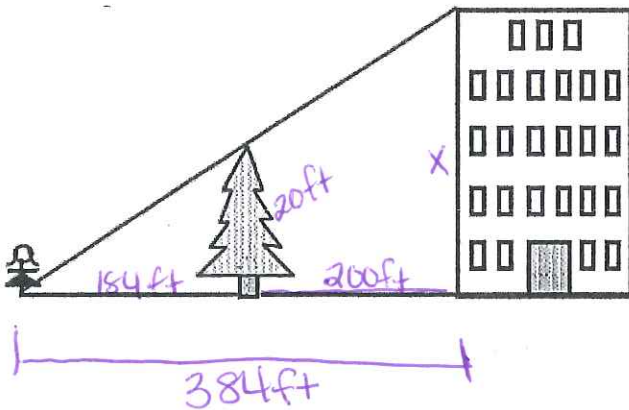
A

16

D   12   G

x+16

x

C   48   T

b.) $\frac{CT}{DG} = \frac{AC}{AD}$ 768 = 12(16+x) = 1

768 = 192 + 12x

$\frac{48}{12} = \frac{16+x}{16}$ 576 = 12x

48 = x

48

CD = 48 units

6. Anna wants to find the height of the tallest building in her city. She stands 384 feet away from the building. There is a tree 200 feet in front of a building that is 20 feet tall. How tall is the building to the nearest foot? **SHOW ALL YOUR WORK.**

20ft

x

184ft   200ft

384ft

$$\frac{x}{20} = \frac{384}{184}$$

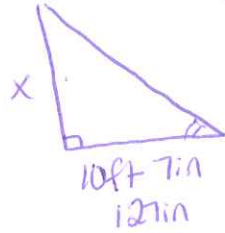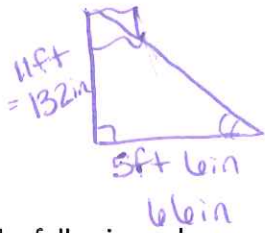$$184x = 7680$$

$$x = 41.739 ft$$

The Building is approx 42ft tall

7. A flagpole that is 11 feet tall casts a 5 and a half foot shadow. At the same time of day, a nearby building casts a 10 ft, 7 in shadow. How tall is the building?
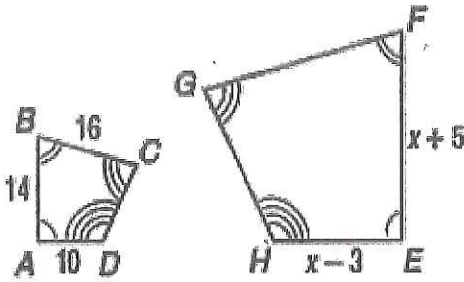
must convert to inches 1st!

11ft
= 132in

5ft 6in
66in

x

10ft 7in
127in

$$\frac{132}{x} = \frac{66}{127}$$

$$x = 254 \text{ in}$$
$$\div 12$$

the Building is __21 ft__ and __2in__

8. The following polygons are similar.
A. Write the similarity statement.
B. find x..

B 16 C
14
A 10 D

F
G
x+5
H x-3 E

a.) quadrilateral ABCD ~ quadrilateral EFGH

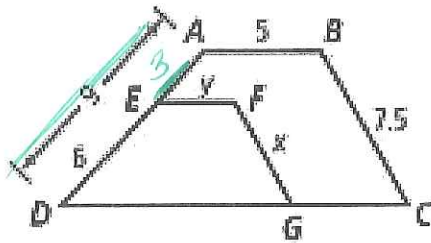b.) $\frac{FE}{BA} = \frac{EH}{AD}$

$$\frac{x+5}{14} = \frac{x-3}{10}$$

$$10(x+5) = 14(x-3)$$
$$10x+50 = 14x - 42$$
$$92 = 4x$$
$$\boxed{x = 23}$$

9. Find the value of x and y for similar Polygons Below.
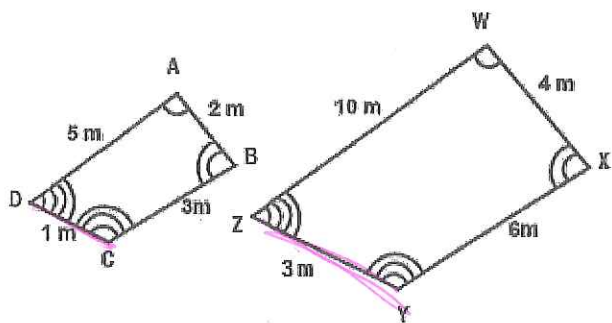
A 5 B
E 3 V F
x
6
D
G
7.5
C

$$\frac{9}{6} = \frac{5}{y}$$
$$\boxed{y = 3.3}$$

$$\frac{9}{6} = \frac{7.5}{x}$$
$$\boxed{x = 5}$$

10. Are the following polygons similar? Explain/show why or why not.
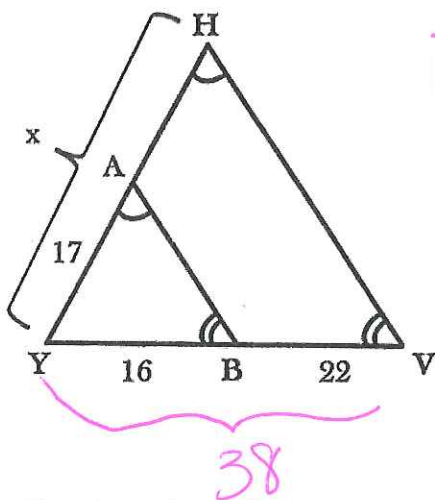
A
5 m 2 m
D
1 m 3m B
C

W
10 m 4 m
Z
3 m 6m X
Y

$$\frac{3}{1} = 3 \qquad \frac{6}{3} = 2$$
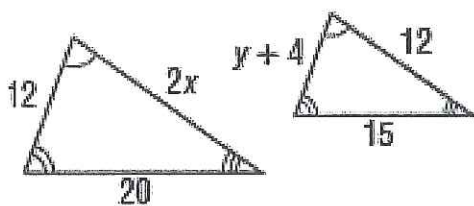
NO, SLRs are not equal.

11. Find x.

$$\frac{x}{17} = \frac{38}{16}$$

$$x = 40.375$$

38

12. a. State the similarity statement. b. Find the SLR (Scale Factor). c. Find x and y.

$$\frac{y+4}{12} = \frac{15}{20}$$

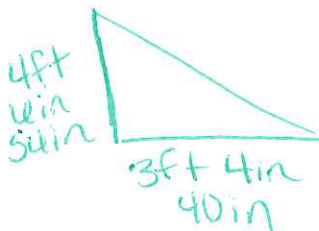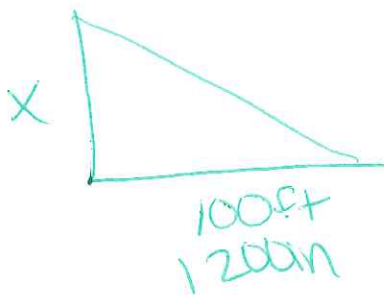$$20(y+4) = 180$$

$$20y + 80 = 180$$

$$20y = 100$$

$$y = 5$$

$$\frac{2x}{12} = \frac{20}{15}$$

$$30x = 240$$

$$x = 8$$

13. INDIRECT MEASUREMENT A cell phone tower in a field casts a shadow of 100 feet. At the same time, a 4 foot 6 inch post near the tower casts a shadow of 3 feet 4 inches. Find the height of the tower in feet and inches. (*Hint:* Make a drawing.)

x

100 ft
1200 in

4 ft
6 in
54 in

3 ft 4 in
40 in

$$\frac{x}{54} = \frac{1200}{40}$$

$$x = 1620 \text{ in}$$

$$x = 135 \text{ ft } 0 \text{ in}$$

14. Identify the similar triangles, find the SLR, find x, and the indicated sides.

AB and BC

A   x + 3
         B   3   D
E   5   2x - 8   C
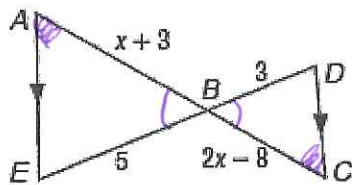
$$\triangle ABE \sim \triangle CBD$$

$$\frac{x+3}{2x-8} = \frac{5}{3}$$

$$3(x+3) = 5(2x-8)$$

$$3x + 9 = 10x - 40$$

$$49 = 7x$$

$$\frac{3}{5} = SLR$$
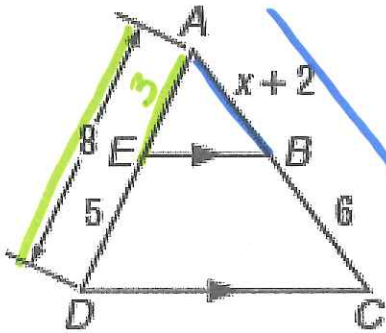
$$x = 7$$

$$AB = 10$$

$$BC = 6$$

15. Identify the similar triangles, find the SLR, find x, and the indicated sides. ✓ ✓ ✓

$\triangle ABE \sim \triangle ACD$

AB and AC

$$\frac{AB}{AC} = \frac{AE}{AD}$$

$$\frac{x+2}{x+8} = \frac{3}{8}$$

$$SLR = \frac{3}{8}$$
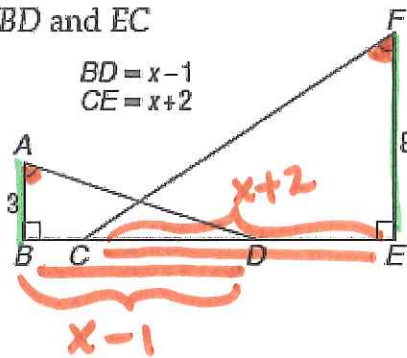
$$8(x+2) = 3(x+8)$$
$$8x+16 = 3x+24$$
$$5x = 8$$
$$x = 1.6$$

$$AB = 1.6 + 2$$
$$AB = 3.6$$
$$AC = 9.6$$

16. Identify the similar triangles, find the SLR, find x, and the indicated sides. ✓

BD and EC

$BD = x-1$
$CE = x+2$

$x+2$

$x-1$

$$\frac{BD}{CE} = \frac{AB}{FE}$$

$$\frac{x-1}{x-2} = \frac{3}{8}$$

$$8(x-1) = 3(x-2)$$
$$8x-8 = 3x-6$$
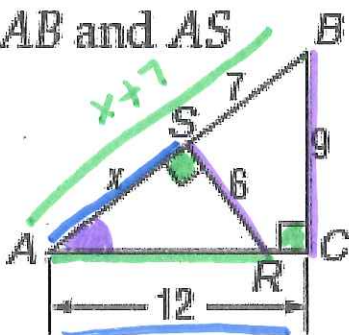$$5x = 14$$
$$x = 2.8$$

$\triangle DAB \sim \triangle CFE$

$$SLR = \frac{3}{8}$$

$$BD = 1.8$$
$$CE = 4.8$$

17. Identify the similar triangles, find the SLR, find x, and the indicated sides. ✓

AB and AS

$x+7$

x

12

$$\frac{AS}{AC} = \frac{SR}{CB}$$

$$\frac{x}{12} = \frac{6}{9}$$

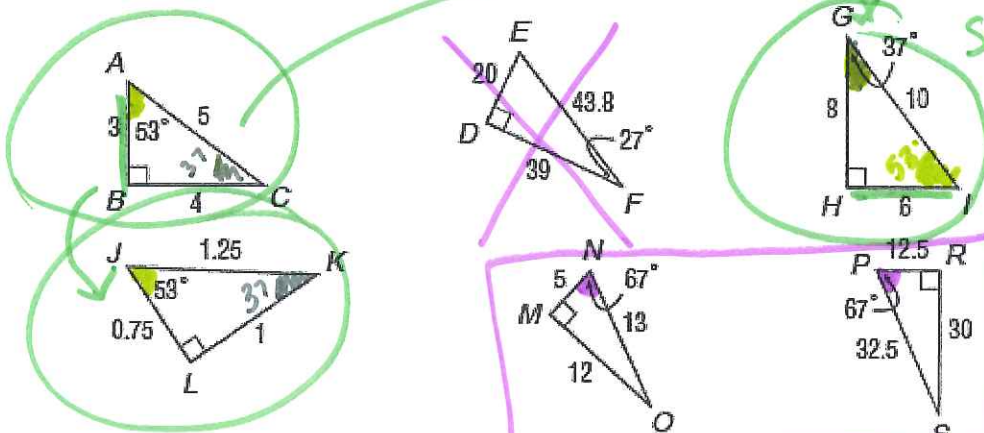$$x = 8$$

$\triangle ACB \sim \triangle ASR$

$$SLR = \frac{2}{3}$$

$$AB = 15$$
$$AS = 8$$

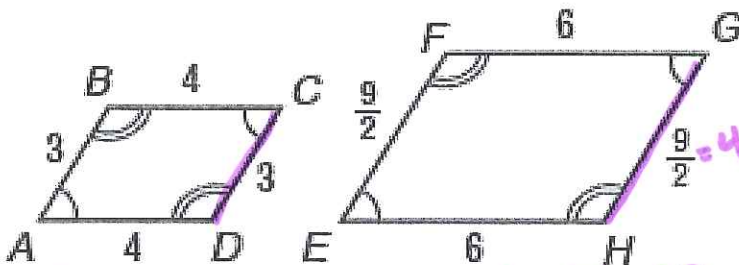**18.** Determine which of the following right triangles are similar. Justify your answer.

All 3 green are similar

Triangle ABC: A, B, C; sides 3, 5, 4; angle 53° at A, 37° at C

Triangle DEF: E, D, F; sides 20, 43.8, 39; angle 27°

Triangle GHI: G at top 37°, sides 8, 10, 6; H, I; angle 53°   **SF = 3**

Triangle JKL: J, K, L; 1.25, 0.75, 1; angle 53°, 37°

Triangle MNO: N, M, O; 5, 13, 12; 67° angle

Triangle PRS: P, R, S; 12.5, 32.5, 30; 67° angle

$$\frac{32.5}{13} = 2.5$$

$$\frac{12.5}{5} = 2.5$$

$$\frac{30}{12} = 2.5$$

19. Are the following polygons similar? Explain/show why or why not.

Parallelogram ABCD: B, C, A, D; sides 4, 3, 4, 3

Parallelogram EFGH: F, G, E, H; sides 6, $\frac{9}{2}$, 6, $\frac{9}{2}$; $\frac{9}{2} = 4.5$

$\angle A \cong \angle E$
$\angle B \cong \angle F$
$\angle C \cong \angle G$
$\angle D \cong \angle H$

$\frac{AB}{EF} = \frac{3}{4.5} = .\overline{6}$ $\frac{BC}{FG} = \frac{4}{6} = .\overline{6}$ $\frac{CD}{GH} = .\overline{6}$ $\frac{AD}{EH} = .\overline{6}$

Yes! ABCD ~ EFGH because corresponding angles are ≅ and side length ratios are equal.

20. Nicole wants to find out the height of her favorite pine tree so that she can fit it in her house for Christmas. She stands within the tree's shadow and walks until her shadow meets the trees shadow. Nicole is 152.4cm tall. Her feet are 91.44cm from the base of the tree. She also knows that the tree has a shadow of 274.32cm long at this time of day. Help Nicole find the height of her favorite tree. If she can fit a 250cm tree in her living room, will this tree fit for the holidays? Explain. Please leave final answer in cm and round to the nearest hundredth.

91.44 is NOT a △ side!

$$\frac{x}{152.4} = \frac{274.32}{182.88}$$

$$x \approx 228.7 \text{cm}$$

x

91.44   152.4   182.88

274.32cm
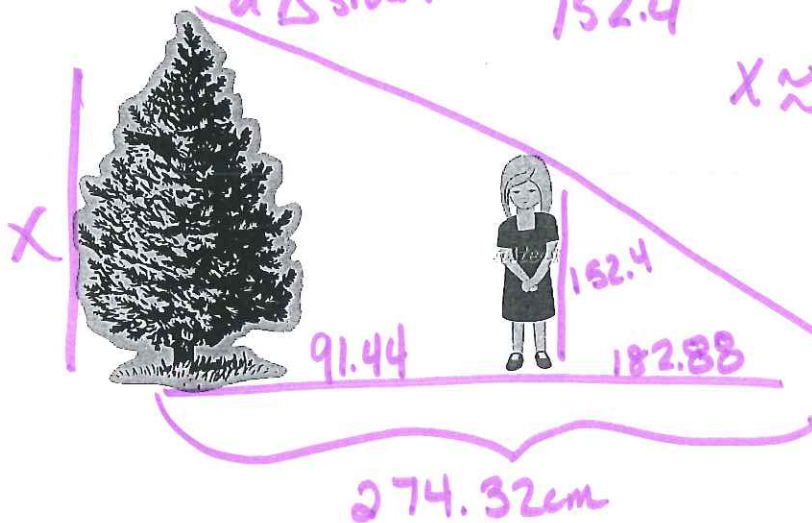
Height of tree: __228.7cm__

Can she use the tree for Christmas? __Yes!__   Explain.....

explain!.....