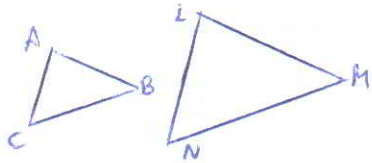
Geometry Ch 6-1 Exer., pg 362 #1-11, 19-20

1. Two polygons are similar if corresponding angles are <u>congruent</u> and corresponding side lengths are <u>proportional</u>.

2. If two polygons are $\cong$, must they be similar? Yes
If two polygons are similar, must they be $\cong$? No

List all pairs of congruent angles. Then write the ratios of corresponding sides in a proportionality statement.

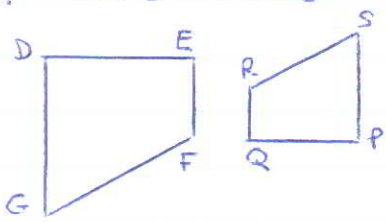
3. $\triangle ABC \sim \triangle LMN$



ANGLES: $\angle A \cong \angle L$, $\angle B \cong \angle M$, $\angle C \cong \angle N$

SIDES: $\frac{AB}{LM} = \frac{BC}{MN} = \frac{CA}{NL}$ OR $\frac{LM}{AB} = \frac{MN}{BC} = \frac{NL}{CA}$

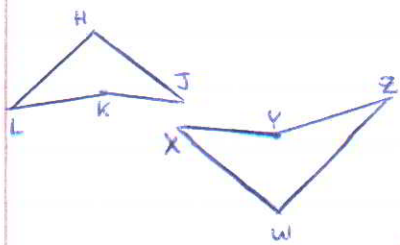
4. $DEFG \sim PQRS$



ANGLES: $\angle D \cong \angle P$, $\angle E \cong \angle Q$, $\angle F \cong \angle R$, $\angle G \cong \angle S$

SIDES: $\frac{DE}{PQ} = \frac{EF}{QR} = \frac{FG}{RS} = \frac{GD}{SP}$

5. $HJKL \sim WXYZ$



ANGLES: $\angle H \cong \angle W$, $\angle J \cong \angle X$, $\angle K \cong \angle Y$, $\angle L \cong \angle Z$

SIDES: $\frac{HJ}{WX} = \frac{JK}{XY} = \frac{KL}{YZ} = \frac{LH}{ZW}$

HINT: Use the similar names to write proportionality stmt. May be easier than interpreting the diagram.

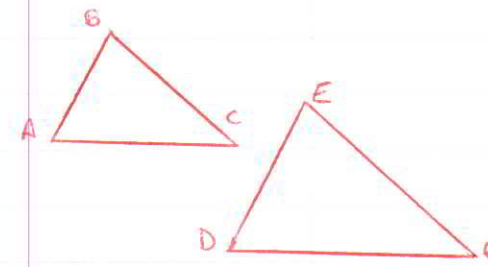
6. $\triangle ABC \sim \triangle DEF$. Which statement is not correct?

A. $\frac{BC}{EF} = \frac{AC}{DF}$ ok

B. $\frac{AB}{DE} = \frac{CA}{FD}$ ok

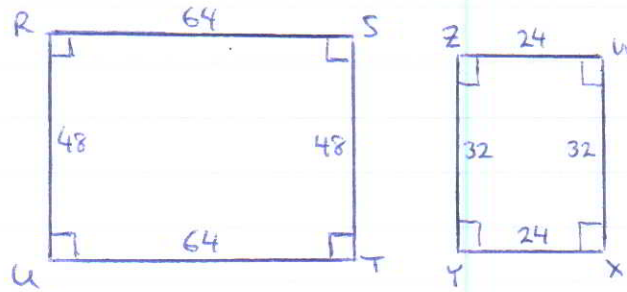
C. $\frac{CA}{FD} = \frac{BC}{EF}$ ok

D. $\cancel{\frac{AB}{EF} = \frac{BC}{DE}}$ No



Determine whether the polygons are similar. If so, write a similarity statement and a scale factor.

7.



$\frac{64}{24} = 2.67$, $\frac{48}{32} = 1.50$

Not similar from that direction

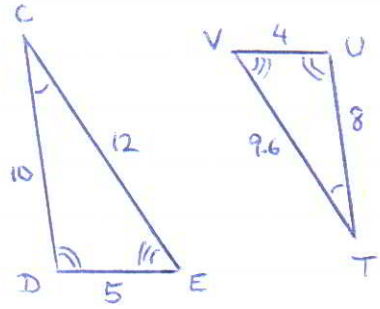
However: $\frac{64}{32} = 2$, $\frac{48}{24} = 2$

Yes!

Similarity Statement: RSTU ~ WXYZ, scale factor is $\frac{2}{1}$

OR Similarity Statement: XYZW ~ STRU, scale factor is $\frac{1}{2}$

8.



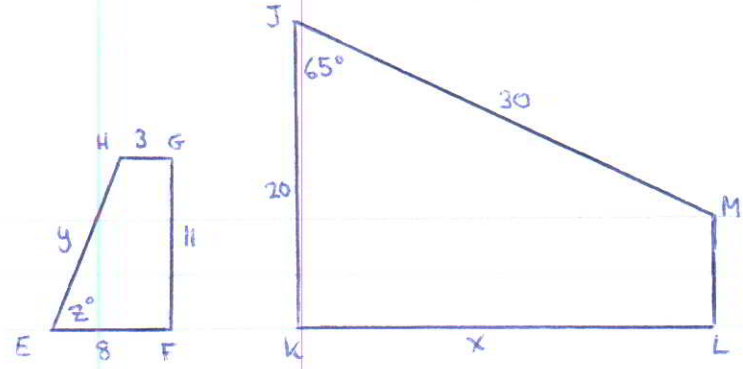
$\frac{12}{9.6} = 1.25$, $\frac{10}{8} = 1.25$, $\frac{5}{4} = 1.25$

Ratios equal; polygons are similar

Similarity Stmt: $\triangle CDE \sim \triangle TUV$, scale factor $= \frac{5}{4}$

OR Similarity Stmt: $\triangle VTU \sim \triangle ECD$, scale factor $= \frac{4}{5}$

Given: JKLM ~ EFGH



9. Find scale factor of JKLM to EFGH.

Find ratio of any pair of corresp. sides: $\frac{JK}{EF} = \frac{20}{8} = \boxed{\frac{5}{2}}$

10. Find the values of x, y, z.

KL corresponds with FG: $\frac{KL}{FG} = \frac{5}{2}$ $\quad \frac{x}{11} = \frac{5}{2}$ $\quad \boxed{x = \frac{55}{2}}$

JM corresponds with EH: $\frac{JM}{EH} = \frac{5}{2}$ $\quad \frac{30}{y} = \frac{5}{2}$ $\quad (30)(2) = 5y$

$\boxed{12 = y}$

$\angle J \cong \angle E$ $\quad 65° = \angle E$

$\boxed{65 = z}$

11. Find the perimeter of each polygon.

perimeter of EFGH = EF + FG + GH + HE

= 8 + 11 + 3 + 12

= $\boxed{34}$

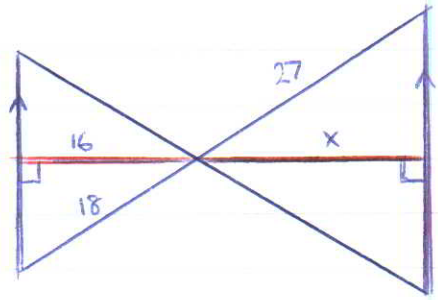
perimeter of JKLM: Calculate ML and sum the four sides, OR

$\frac{\text{perim JKLM}}{\text{perim EFGH}} = \frac{5}{2}$ $\quad \frac{\text{perim JKLM}}{34} = \frac{5}{2}$

perim JKLM = $\frac{(34)(5)}{2} = \boxed{85}$

The blue triangles are similar. Identify the type of special segment shown in red; then find the value of the variable.

19.



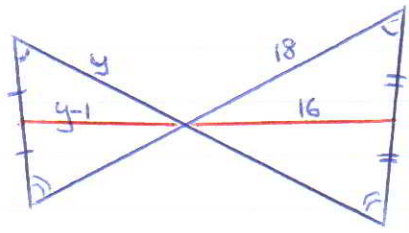
The segments in red are ALTITUDES; perp. from side to opposite vertex.

$$\frac{27}{18} = \frac{x}{16}$$

$$\frac{(16)(27)}{18} = x$$

$$24 = x$$

20.



The segments in red are MEDIANS; segment midpoint to opposite vertex.

$$\frac{18}{y} = \frac{16}{y-1}$$

$$18(y-1) = 16y$$
$$18y - 18 = 16y$$
$$2y = 18$$
$$y = 9$$