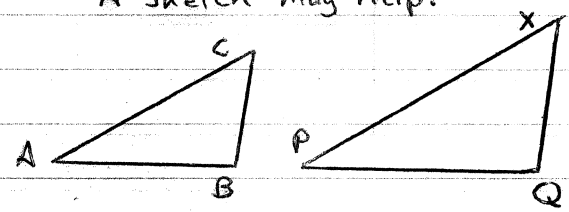
Geometry Ch 6-4, Exer, pg 385 #1-12

1. You plan to prove that $\triangle ACB$ is similar to $\triangle PXQ$ by the S-S-S Similarity Thm. Complete the proportion needed to use this theorem.

$$\frac{AC}{\boxed{PX}} = \frac{\boxed{CB}}{XQ} = \frac{AB}{\boxed{PQ}}$$

A sketch may help:

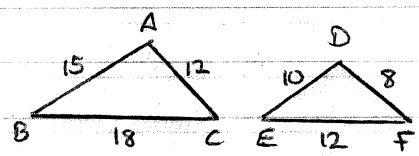


2. Two triangles are similar by S-A-S similarity. What additional info is needed to show triangle congruency?

There are two S-A-S theorems: one for Congruency and the other for Similarity. The similarity theorem only assures the sides are proportional. If that proportion value is 1, the sides are congruent, and so too would be the triangles.

Verify $\triangle ABC \sim \triangle DEF$. Write scale factor of $\triangle ABC$ to $\triangle DEF$.

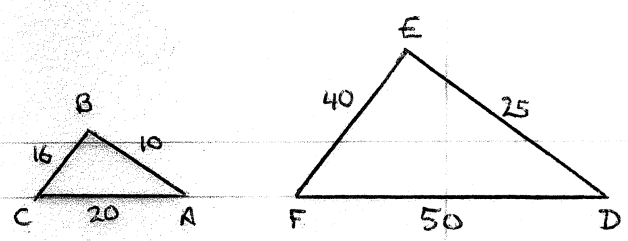
3. $BC = 18$, $AB = 15$, $AC = 12$
$EF = 12$, $DE = 10$, $DF = 8$



$$\frac{18}{12} = \frac{15}{10} = \frac{12}{8} = \boxed{\frac{3}{2}, \text{ Scale Factor}}$$

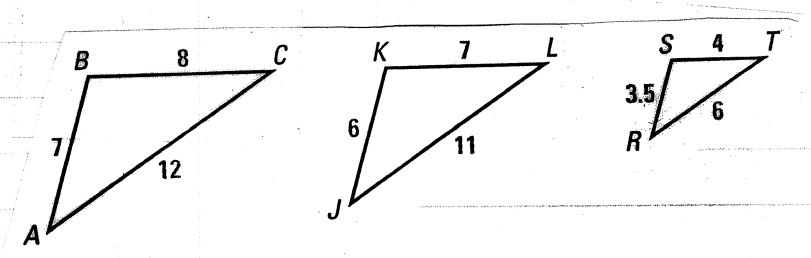
4. $AB = 10$, $BC = 16$, $CA = 20$

$DE = 25$, $EF = 40$, $FD = 50$



$$\frac{20}{50} = \frac{10}{25} = \frac{16}{40} = \boxed{\frac{2}{5}, \text{ Scale Factor}}$$

5. Is either ΔJKL or ΔRST similar to ΔABC?



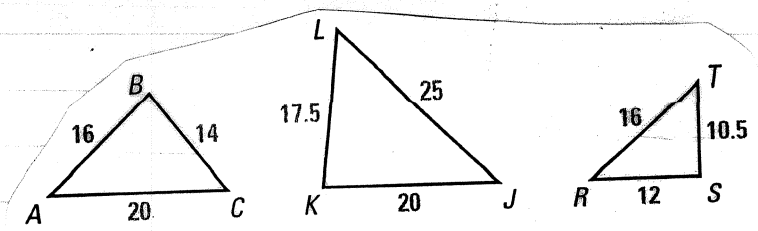
ΔJKL to ΔABC:

$$\left.\begin{aligned} \frac{JK}{AB} &= \frac{6}{7} = 0.86 \\ \frac{KL}{BC} &= \frac{7}{8} = 0.88 \\ \frac{LJ}{CA} &= \frac{11}{12} = 0.92 \end{aligned}\right\}$$ Not proportional; therefore Not similar

ΔRST to ΔABC:

$$\left.\begin{aligned} \frac{RS}{AB} &= \frac{3.5}{7} = 0.50 \\ \frac{ST}{BC} &= \frac{4}{8} = 0.50 \\ \frac{TR}{CA} &= \frac{6}{12} = 0.50 \end{aligned}\right\}$$ All proportional; therefore these triangles <u>are</u> similar

6. Is either ΔJKL or ΔRST similar to ΔABC?



ΔJKL to ΔABC:

$$\left.\begin{aligned} \frac{JK}{AB} &= \frac{20}{16} = 1.25 \\ \frac{KL}{BC} &= \frac{17.5}{14} = 1.25 \\ \frac{LJ}{CA} &= \frac{25}{20} = 1.25 \end{aligned}\right\}$$

All proportional; therefore these triangles <u>are</u> similar.

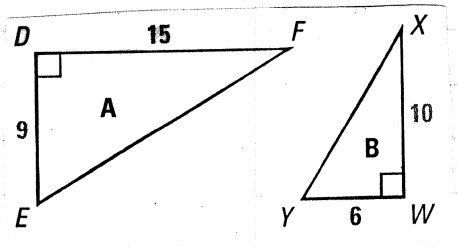
ΔRST to ΔABC:

$$\left.\begin{aligned} \frac{RS}{AB} &= \frac{12}{16} = 0.75 \\ \frac{ST}{BC} &= \frac{10.5}{14} = 0.75 \\ \frac{TR}{CA} &= \frac{16}{20} = 0.80 \end{aligned}\right\}$$

Not all sides proportional: therefore these triangles <u>are</u> <u>not</u> proportional

Are the two Δ's similar? If so, write similarity stmt, and B-to-A scale factor.

7.



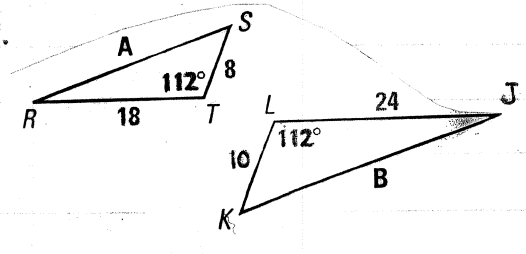
Sides are proportional

$\frac{10}{15} = \frac{2}{3}$ $\quad$ $\frac{6}{9} = \frac{2}{3}$

$\Delta XWY \sim \Delta FDE$, by S-A-S.

B-to-A scale factor is $\frac{2}{3}$

8.

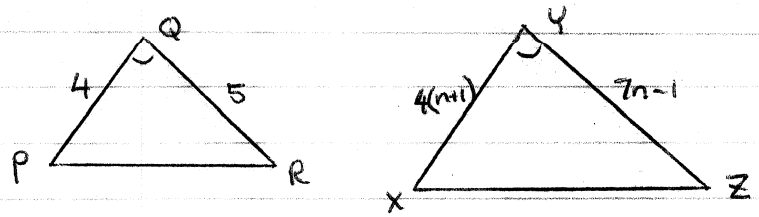


$\frac{24}{18} = \frac{4}{3}$ $\quad$ $\frac{10}{8} = \frac{5}{4}$

sides are not proportional

These triangles <u>are</u> <u>not</u> similar

9. **ALGEBRA**: Find the value of n that makes $\triangle PQR \sim \triangle XYZ$ when $PQ = 4$, $QR = 5$, $XY = 4(n+1)$, $YZ = 7n-1$, $\angle Q \cong \angle Y$



$$\frac{5}{7n-1} = \frac{4}{4(n+1)}$$

$$5 \cdot 4(n+1) = 4(7n-1)$$

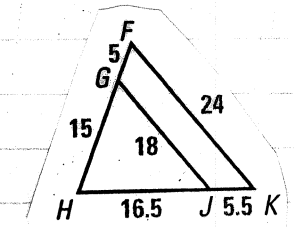
$$20n + 20 = 28n - 4$$

$$24 = 8n$$

$$\boxed{3 = n}$$

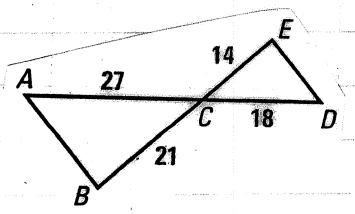
Show $\triangle$'s are similar; write a similarity stmt; justify/explain.

10.



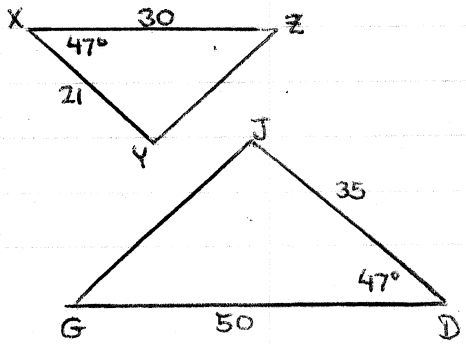
$$\left.\begin{aligned} \frac{HG}{HF} &= \frac{15}{20} = 0.75 \\ \frac{HJ}{HK} &= \frac{16.5}{22} = 0.75 \\ \frac{GJ}{FK} &= \frac{18}{24} = 0.75 \end{aligned}\right\} \triangle HGJ \sim \triangle HFK, \text{ S-S-S}$$

11.



$$\left.\begin{aligned} \frac{AC}{DC} &= \frac{27}{18} = 1.50 \\ \frac{BC}{EC} &= \frac{21}{14} = 1.50 \\ &\angle ACB \cong \angle DCE, \text{ Vertical} \end{aligned}\right\} \triangle ACB \sim \triangle DCE, \text{ S-A-S}$$

12.



$$\left.\begin{aligned} \frac{XZ}{DG} &= \frac{30}{50} = \frac{3}{5} \\ \frac{XY}{DJ} &= \frac{21}{35} = \frac{3}{5} \\ &\angle X \cong \angle D, \text{ Given} \end{aligned}\right\} \triangle ZXY \sim \triangle GDJ, \text{ S-A-S}$$