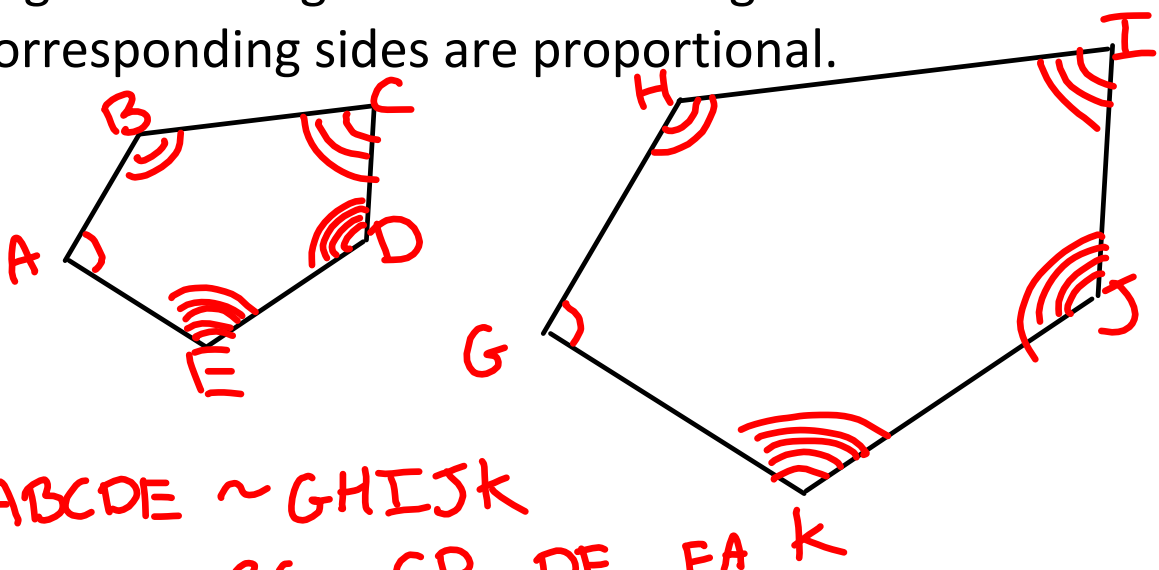
2 polygons are SIMILAR if their corresponding angles are congruent and the lengths of their corresponding sides are proportional.

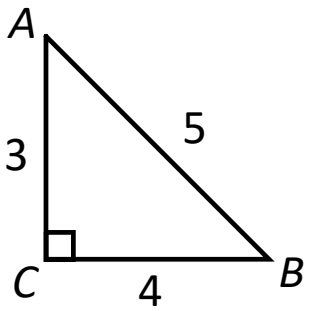


$ABCDE \sim GHIJK$

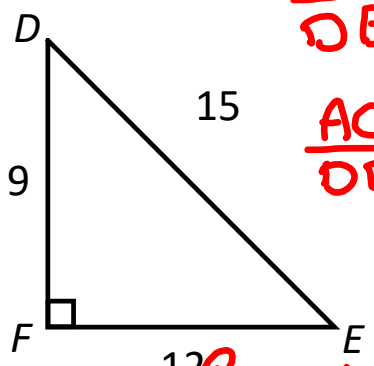
$$\frac{AB}{GH} = \frac{BC}{HI} = \frac{CD}{IJ} = \frac{DE}{JK} = \frac{EA}{KG}$$

Given: $\Delta ABC \sim \Delta DEF$

Show that the lengths of the corresponding sides are proportional



Perimeter = 12



Per = 36

$$\frac{AB}{DE} = \frac{5}{15} = \frac{1}{3}$$

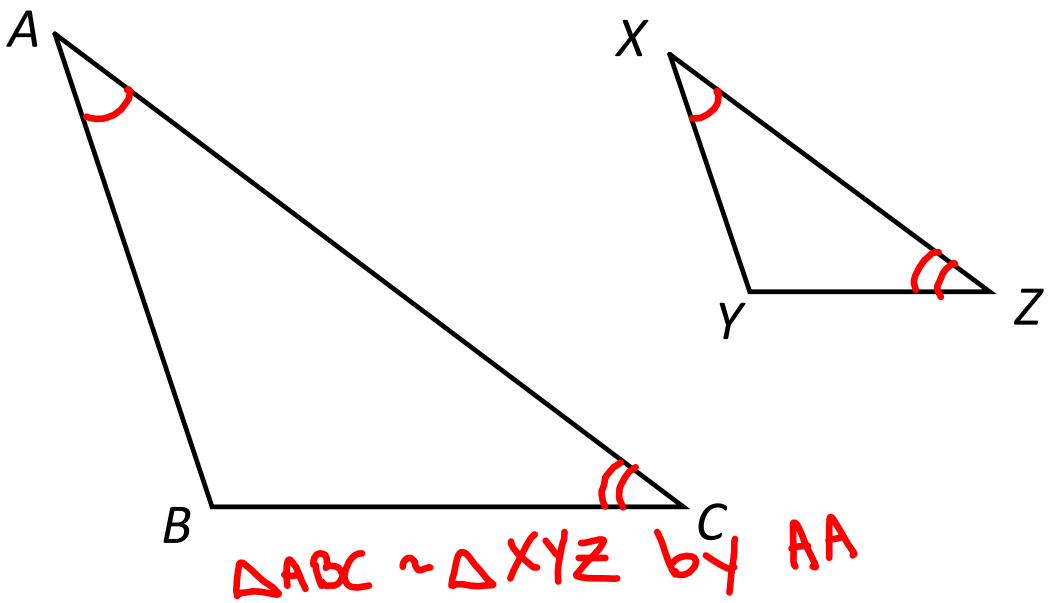
$$\frac{AC}{DF} = \frac{3}{9} = \frac{1}{3}$$

$$\frac{BC}{EF} = \frac{4}{12} = \frac{1}{3}$$

The common ratio of $\frac{1}{3}$ is called the SCALE FACTOR of ΔABC to ΔDEF
(also applies to Perimeter)

Angle-Angle Similarity Postulate

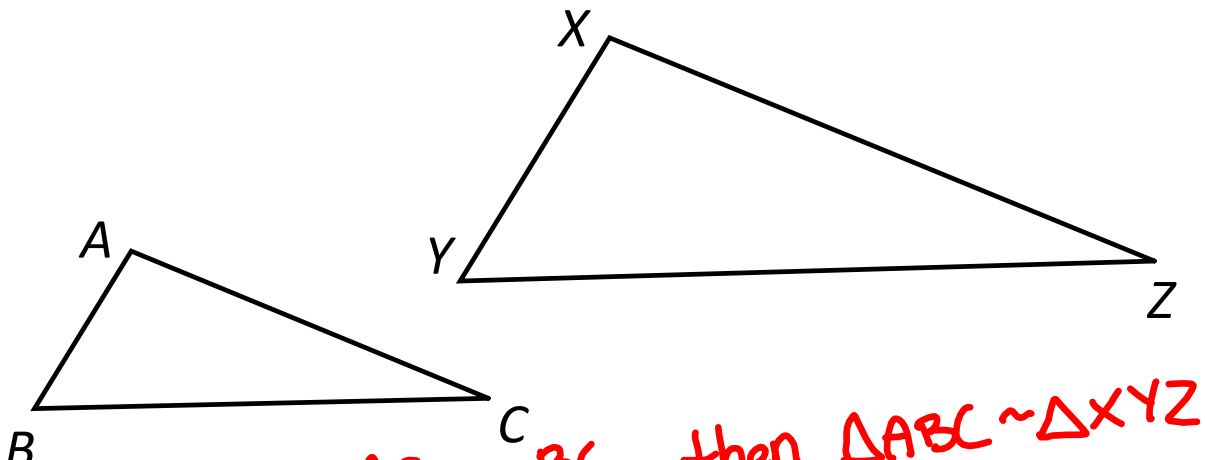
If 2 angles of one triangle are congruent to 2 angles of another triangle, then the two triangles are similar



$\Delta ABC \sim \Delta XYZ$ by AA

Side-Side-Side Similarity Postulate

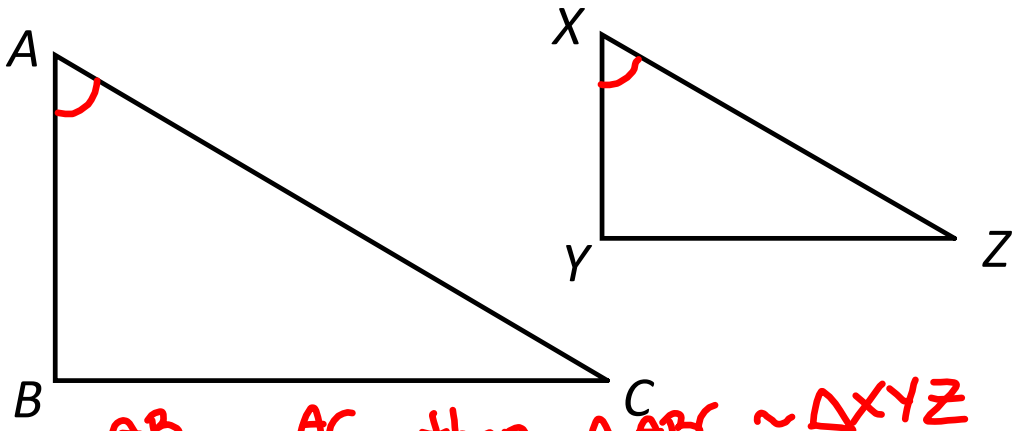
If all corresponding sides of two triangles are proportional, then the triangles are similar



If $\frac{AB}{XY} = \frac{AC}{XZ} = \frac{BC}{YZ}$, then $\Delta ABC \sim \Delta XYZ$ by SSS

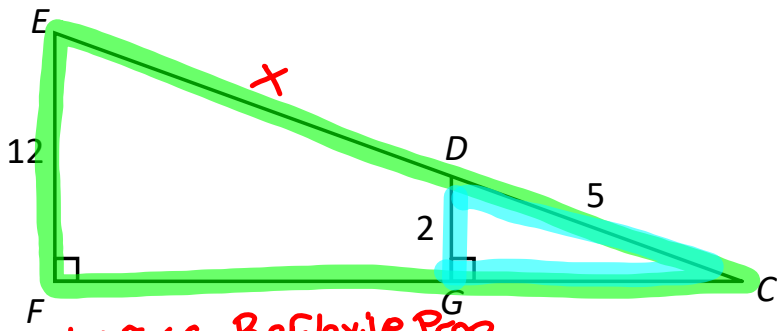
Side-Angle-Side Similarity Postulate

If the lengths of two pairs of corresponding sides of two triangles are proportional, and the angles include between them are congruent, then the triangles are similar



If $\frac{AB}{XY} = \frac{AC}{XZ}$, then $\Delta ABC \sim \Delta XYZ$ by SAS.

Explain why the triangles are similar, then find *DE*



$\angle C \cong \angle C$ Reflexive Prop.
$\angle F \cong \angle G$ All right $\angle$'s are $\cong$
$\Delta CEF \sim \Delta COG$ by AA

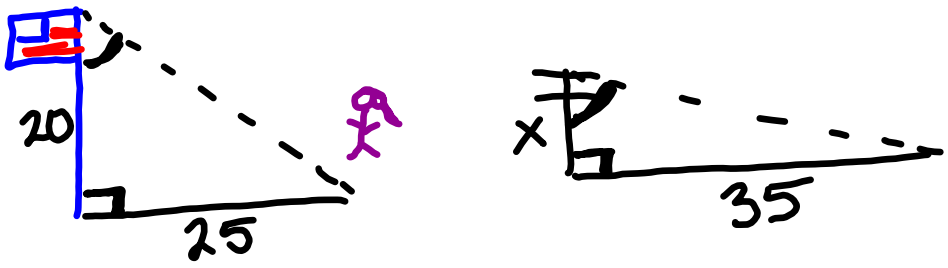
Find DE: $\frac{x+5}{5} = \frac{12}{2}$

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

$x+5 = 30$

$\boxed{x = 25}$

Maggie was standing outside and noticed that a 20 meter flagpole cast a shadow 25 meters long. Nearby was a telephone pole that cast a 35 meter shadow. How tall is the telephone pole?



$$\frac{25}{35} = \frac{20}{x} \qquad 25x = 700 \qquad \boxed{x = 28}$$

The altitudes of two equilateral triangles are in the ratio of 2 to 3. The length of a side of the smaller triangle is 12 cm.
Given that the area of an equilateral triangle can be found using the formula $\boxed{A = \frac{1}{4}s^2\sqrt{3}}$, find the ratio of their areas.

small $\triangle$: $A_\triangle = \frac{1}{4}(12)^2\sqrt{3} = \frac{1}{4}(144)\sqrt{3}$

$\boxed{= 36\sqrt{3}\ cm^2}$

larger $\triangle$: side length $\frac{2}{3} = \frac{12}{x}$ $x = 18$

$A_\triangle = \frac{1}{4}(18)^2\sqrt{3}$

$= \frac{1}{4}(324)\sqrt{3}$

$\boxed{= 81\sqrt{3}\ cm^2}$

ratio of areas? $\frac{36\sqrt{3}}{81\sqrt{3}} = \frac{36}{81} = \frac{4}{9} = \frac{2^2}{3^2}$

$\therefore$ The ratio of the areas is equal to the square of the ratio of the sides!