6.4 Prove Triangles Similar by SSS and SAS

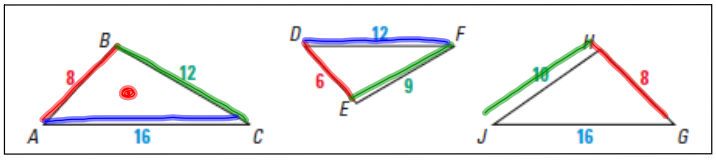
Before You used the AA Similarity Postulate to prove triangles similar.
Now You will use the SSS and SAS Similarity Theorems.
Why? So you can show that triangles are similar, as in Ex. 28.

SSS (Side-Side-Side) Similarity Theorem

If the three Sides of one triangle are proportional to the three Sides of another triangle, then the triangles are ~.

EXAMPLE 1:

Is either △DEF or △GHJ similar to △ABC?



△ABC ~ △DEF ?

$\frac{8}{6} = \frac{4}{3}$, $\frac{12}{9} = \frac{4}{3}$, $\frac{16}{12} = \frac{4}{3}$ Same ∴ ~

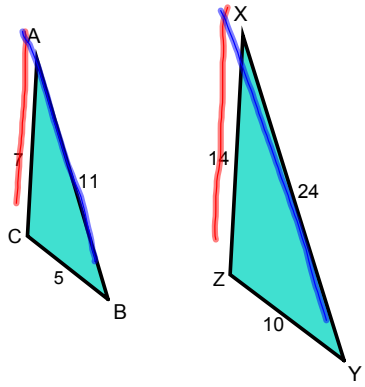
△ABC ~ △GHJ ?

$\frac{8}{8} = 1$, $\frac{12}{10} = \frac{6}{5}$ NOT THE SAME ∴ ≁

Example 2:

Are the triangles similar?

$\frac{7}{14} = \frac{1}{2}$, $\frac{11}{24}$ NOT THE SAME ∴ ≁



Example 3:

Find the value of x that makes △ABC ~ △DEF?

$\frac{12}{4} = \frac{18}{x-1}$

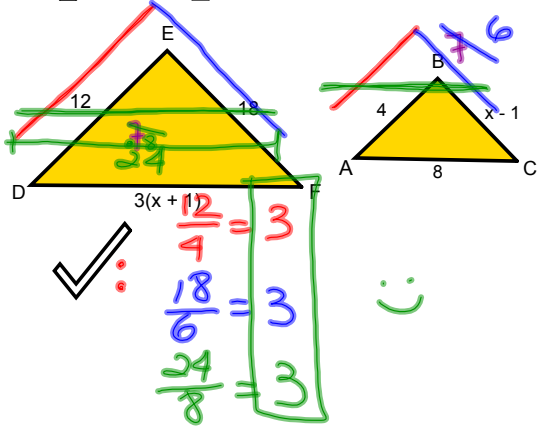
$12(x-1) = 72$

$12x - 12 = 72$

$+12 \quad +12$

$\frac{12x}{12} = \frac{84}{12}$

$x = 7$



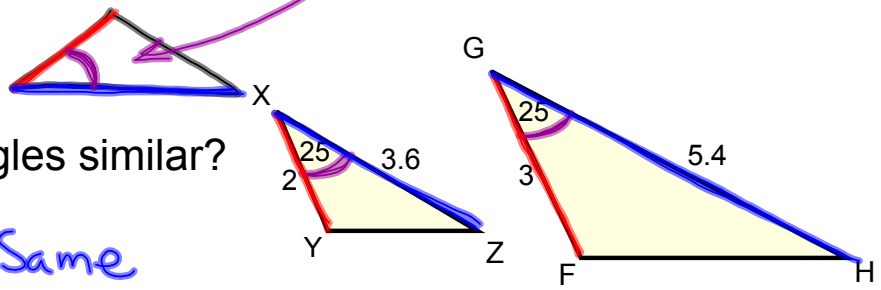
$\frac{12}{4} = 3$, $\frac{18}{6} = 3$, $\frac{24}{8} = 3$ ∴ ~

SAS (Side-Angle-Side) Similarity Theorem

If two Sides of one triangle are proportional to two Sides of another triangle and their "included" ∠s are congruent, then the triangles are ~.

Example 4:

Are the triangles similar?



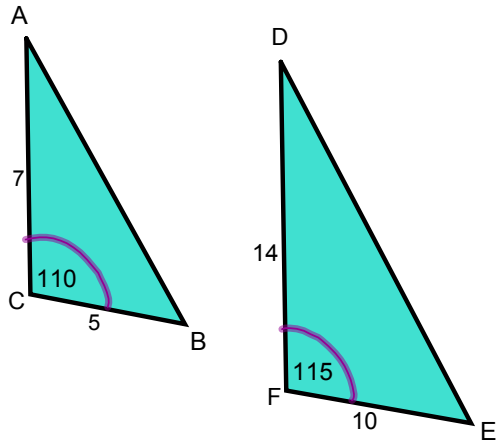
$\frac{2}{3}$ Same

$\frac{3.6}{5.4} = \frac{2}{3}$ and the included ∠s are ≅

$\therefore \triangle XYZ \sim \triangle GFH$

Example 5:

Are the triangles similar?



$\triangle ABC \not\sim \triangle DEF$

Questionnaire ☺