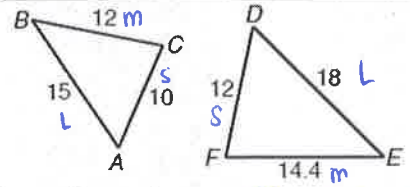
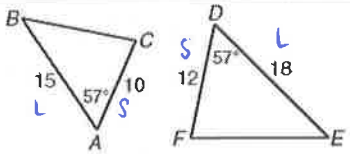
Geometry H
6.5 – SSS ~ and SAS~

Name: Key

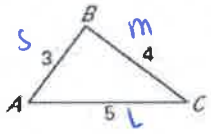
LEARNING TARGETS

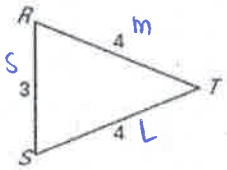
- I can SSS~, and SAS~ to show that triangles are similar.
- I can use SSS~ and SAS~ to find side lengths and angle measures.

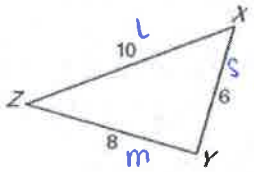
Theorem Name	What it says...	Example with explanation
Side-Side-Side Similarity SSS~	If the three sides of one triangle are proportional to the three sides of another triangle, then the triangles are similar. (Check to see if the ratios of the three corresponding sides are the same, if they are, the reduced fraction is your scale factor and the triangles are similar!)	 $\frac{short}{short}, \frac{medium}{medium}, \frac{long}{long} \Rightarrow \frac{10}{12}, \frac{12}{14.4}, \frac{15}{18}$ *the three fractions reduce to* $\frac{5}{6}$ $\Delta ABC \sim \Delta DEF$ *by SSS : with scale factor* $\frac{5}{6}$
Side-Angle-Side Similarity SAS~	If two sides of one triangle are proportional to two sides of another triangle and their included angles are congruent, then the triangles are similar. (Check to see if the ratios of two pairs of corresponding sides reduce to the same fraction and that the angles that joins the two sides are congruent)	 $\frac{short}{short}, \frac{long}{long} \Rightarrow \frac{10}{12}, \frac{15}{18}$ *both fractions reduce to* $\frac{5}{6}$ *and their included angles are both* 57° $\Delta ABC \sim \Delta DEF$ *by SAS : with scale factor* $\frac{5}{6}$

✓ **I can use the SSS~ to identify similar triangles.**

1) Is either ΔRST or ΔXYZ similar to ΔABC ?







$\frac{\Delta ABC}{\Delta RST}$: $\frac{3}{3}, \frac{4}{4}, \frac{5}{4}$ → not similar

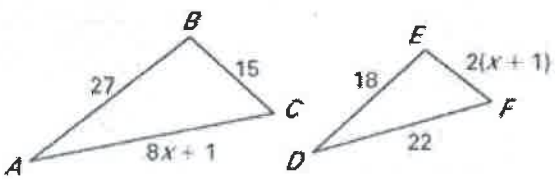
$\frac{\Delta ABC}{\Delta XYZ}$: $\frac{3}{6}, \frac{4}{8}, \frac{5}{10}$ → similar

$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$

$\Delta ABC \sim \Delta XYZ$ scale factor of $\frac{1}{2}$

✓ **I can use SSS~ to solve problems.**

2) Find the value of x that makes $\Delta ABC \sim \Delta DEF$



$\frac{\Delta ABC}{\Delta DEF}$: $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

$\frac{27}{18} = \frac{15}{2x+2} = \frac{8x+1}{22}$

$270 = 27(2x+2)$

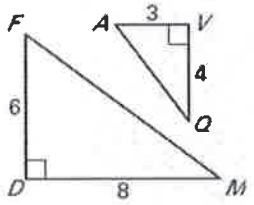
$270 = 54x + 54$

$216 = 54x \Rightarrow$ $x = 4$

✓ **I can use SAS~ to identify similar triangles.**

3) Are the triangles similar? If so, write a similarity statement and state the similarity postulate or theorem that justifies your answer.

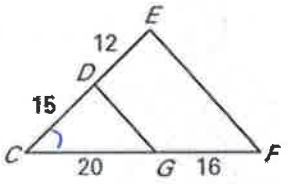
a)



$\frac{FD}{QV}, \frac{DM}{VA} \Rightarrow \frac{6}{4}, \frac{8}{3} \Rightarrow \frac{3}{2}, \frac{8}{3}$

not similar; corr. sides are not proportional

b)

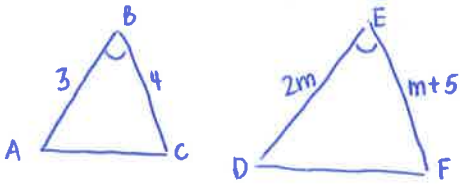


$\frac{CD}{CE}, \frac{CG}{CF} \Rightarrow \frac{15}{27}, \frac{20}{36} \Rightarrow \frac{5}{9}, \frac{5}{9}$

Yes, the sides are proportional and $\angle C$ (the included angle) is shared by both $\triangle$'s so $\triangle CDG \sim \triangle CEF$

✓ **I can use SAS~ to solve problems.**

4) Find the value of m that makes $\triangle ABC \sim \triangle DEF$ when $AB = 3$, $BC = 4$, $DE = 2m$, and $EF = m + 5$, $\angle B \cong \angle E$.

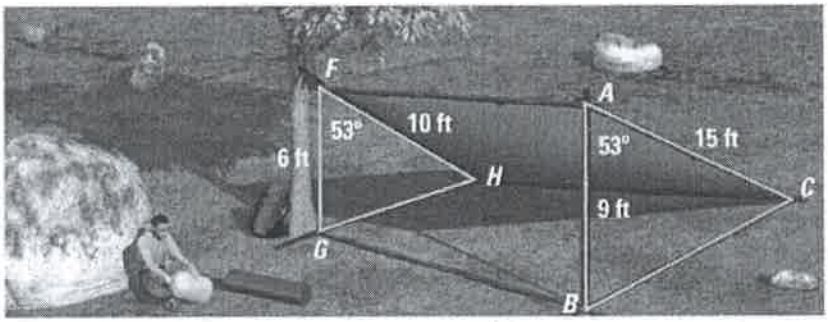


$\frac{AB}{DE} = \frac{BC}{EF} \Rightarrow \frac{3}{2m} = \frac{4}{m+5} \Rightarrow 8m = 3m + 15$

$5m = 15$

$\boxed{m = 3}$

5) You are building a lean-to shelter starting from a tree branch, as shown. Can you construct the right end so it is similar to the left end using the angle measures and lengths shown?



$\frac{FG}{AB} \stackrel{?}{=} \frac{FH}{AC}$

$\frac{6}{9} \stackrel{?}{=} \frac{10}{15}$

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

Yes, since the sides are proportional and the included angles are $\cong$, the two $\triangle$'s are similar