



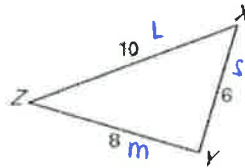
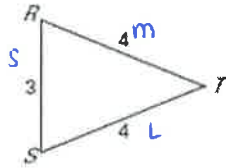
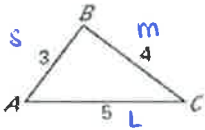
- I can use SSS~ and SAS~ to show that triangles are similar.
- I can use SSS~ and SAS~ to find side lengths and angle measures.

Theorem Name	What it says...	Example with explanation
Side-Side-Side Similarity SSS~	<p>If the three sides of one triangle are proportional to the three sides of another triangle, then the triangles are similar.</p> <p><i>(scale factors are the same)</i></p> <p>(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!)</p>	<p> <math>\frac{\text{short}}{\text{short}}, \frac{\text{medium}}{\text{medium}}, \frac{\text{long}}{\text{long}} \Rightarrow \frac{10}{12}, \frac{12}{14.4}, \frac{15}{18}</math> </p> <p>the three fractions reduce to <math>\frac{5}{6}</math></p> <p><math>\triangle ABC \sim \triangle DEF</math> by SSS: with scale factor <math>\frac{5}{6}</math></p>

mark the sides S, M, L to match up short, medium and long sides

✓ I can use SSS~ to identify similar triangles.

1. Is either  $\triangle RST$  or  $\triangle XYZ$  similar to  $\triangle ABC$ ?



$$\frac{\triangle ABC}{\triangle RST} : \frac{S}{S}, \frac{M}{M}, \frac{L}{L} = \frac{3}{3}, \frac{4}{4}, \frac{5}{4}$$

↓   ↓   ↓

1, 1, 1.25

Not similar; not the same scale factor

$$\frac{\triangle ABC}{\triangle XYZ} : \frac{S}{S}, \frac{M}{M}, \frac{L}{L} = \frac{3}{6}, \frac{4}{8}, \frac{5}{10}$$

↓   ↓   ↓

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

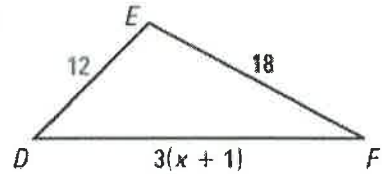
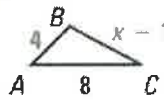
Similar

$\triangle ABC \sim \triangle XYZ$  by SSS~ with a scale factor of  $\frac{1}{2}$

✓ I can use SSS~ to solve problems.

1. Find the value of  $x$  that makes  $\triangle ABC \sim \triangle DEF$  then find the missing side lengths.

look at the order of the letters



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

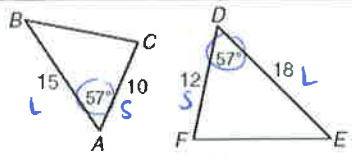
↓   ↓

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

$$72 = 12(x-1)$$

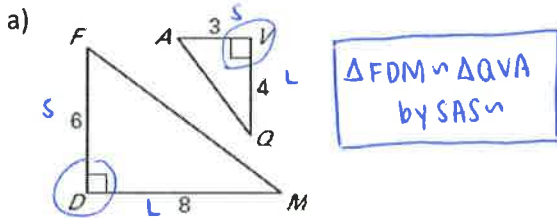
$$72 = 12x - 12$$

$$84 = 12x \Rightarrow \boxed{x = 7}$$

<p><b>Side-Angle-Side Similarity SAS~</b></p>	<p>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.</p> <p>(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)</p>	 <p> <math>\frac{\text{short}}{\text{short}}, \frac{\text{long}}{\text{long}} \Rightarrow \frac{10}{12}, \frac{15}{18}</math>  <i>both fractions reduce to <math>\frac{5}{6}</math> ← both have to be the exact same</i>  <i>and their included angles are both 57°</i>  <math>\triangle ABC \sim \triangle DEF</math> by SAS : with scale factor <math>\frac{5}{6}</math> </p>
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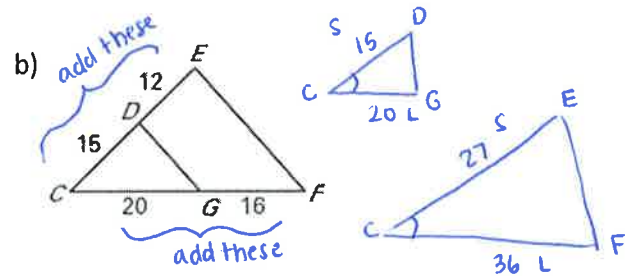
✓ I can use SAS~ to identify similar triangles.

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



$\angle D$  and  $\angle V$  are congruent included angles, check the proportionality of the sides:

$$\frac{\triangle FDM}{\triangle QVA} : \frac{6}{3} = \frac{8}{4} \Rightarrow \frac{2}{2} = \frac{2}{2} \quad (\checkmark)$$



$\angle C \cong \angle G$  and are both included angles. Check the sides:

$$\frac{\triangle CDG}{\triangle EGF} : \frac{15}{12} = \frac{20}{16} \Rightarrow \frac{5}{4} = \frac{5}{4} \quad (\checkmark)$$

$\triangle CDG \sim \triangle EGF$  by SAS~

✓ I can use SAS~ to solve problems.

1. Find the value of  $x$  that makes  $\triangle PQR \sim \triangle TSR$  then find the missing side lengths.

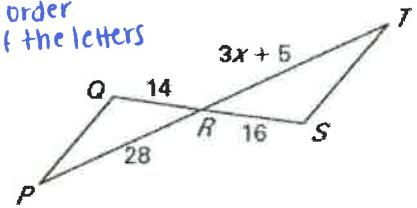
~~$\frac{PQ}{TS} = \frac{QR}{SR} = \frac{PR}{TR}$~~   
 no info

$$\frac{14}{16} = \frac{28}{3x+5}$$

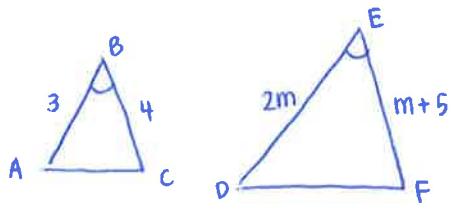
$$14(3x+5) = 448$$

$$42x + 70 = 448$$

$$42x = 378 \Rightarrow \boxed{x=9}$$



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



$$\frac{AB}{DE} = \frac{BC}{EF}$$

$$\frac{3}{2m} = \frac{4}{m+5}$$

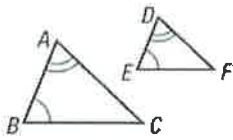
$$8m = 3(m+5)$$

$$8m = 3m + 15$$

$$5m = 15 \Rightarrow \boxed{m=3}$$

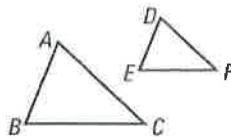
Triangle Similarity Postulate and Theorems

AA Similarity Postulate



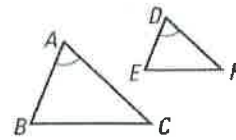
If  $\angle A \cong \angle D$  and  $\angle B \cong \angle E$ , then  $\triangle ABC \sim \triangle DEF$ .

SSS Similarity Theorem



If  $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$ , then  $\triangle ABC \sim \triangle DEF$ .

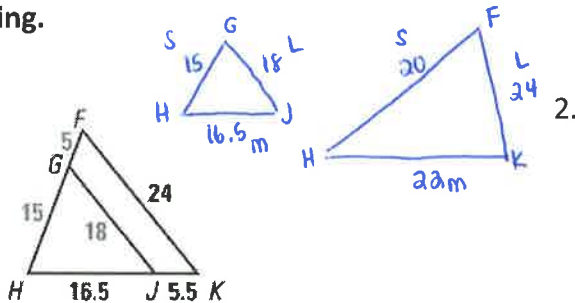
SAS Similarity Theorem



If  $\angle A \cong \angle D$  and  $\frac{AB}{DE} = \frac{AC}{DF}$ , then  $\triangle ABC \sim \triangle DEF$ .

✓ Show that the triangles are similar and write a similarity statement. Explain your reasoning.

1.



$$\frac{\triangle HGJ}{\triangle HFK} : \frac{5}{20} = \frac{16.5}{22} = \frac{18}{24}$$

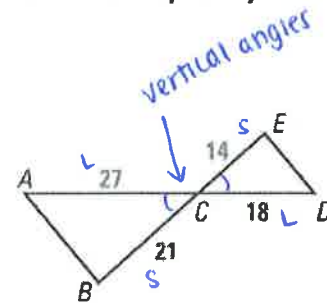
$$\downarrow \quad \downarrow \quad \downarrow$$

$$\frac{3}{4} \quad \frac{3}{4} \quad \frac{3}{4} \quad (\checkmark)$$

$\triangle HGJ \sim \triangle HFK$  by SSS  $\sim$

\* SAS  $\sim$  could work here too \*

2.



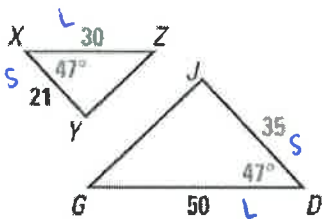
$$\frac{\triangle ABC}{\triangle DEC} : \frac{21}{14} = \frac{27}{18}$$

$$\downarrow \quad \downarrow$$

$$\frac{3}{2} = \frac{3}{2} \quad (\checkmark)$$

$\triangle ABC \sim \triangle DEC$  by SAS  $\sim$

3.



$$\frac{\triangle XYZ}{\triangle DJG} : \frac{21}{35} = \frac{30}{50}$$

$$\downarrow \quad \downarrow$$

$$\frac{3}{5} = \frac{3}{5} \quad (\checkmark)$$

$\triangle XYZ \sim \triangle DJG$  by SAS  $\sim$