

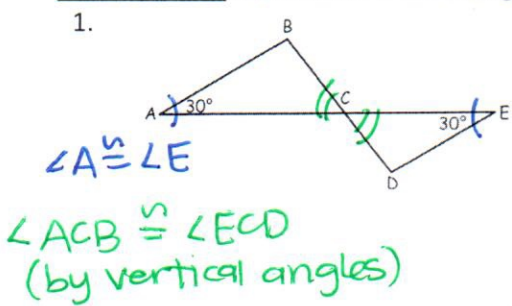
**Objectives:**

- Students will be able to determine if two triangles are similar using Triangle Similarity Statements.

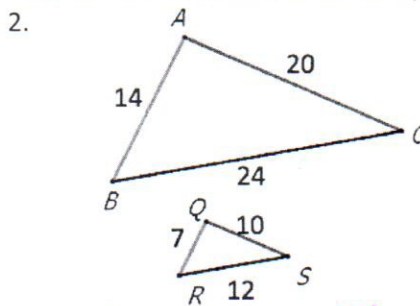
**Vocabulary: (POSTULATES)**

1. **Angle-Angle Similarity (AA~):** If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.
2. **Side-Side-Side Triangle Similarity Statement (SSS~):** If the measures of the corresponding sides of two triangles are proportional, then the triangles are similar.
3. **Side-Angle-Side Triangle Similarity Statement (SAS~):** If the measures of two sides of a triangle are proportional to the measures of two corresponding sides of another triangle and the included angles are congruent, then the triangles are similar.

**Example Set 1:** Determine if the triangles are similar. If so, write a similarity statement.

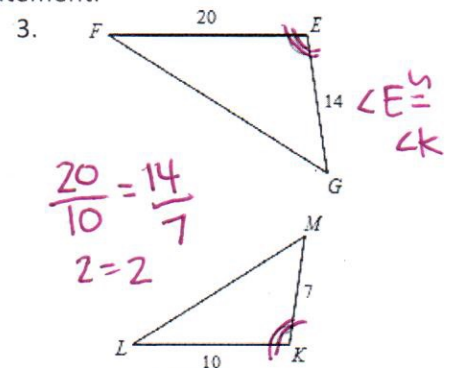


$\triangle ABC \sim \triangle ECD$   
 by AA~



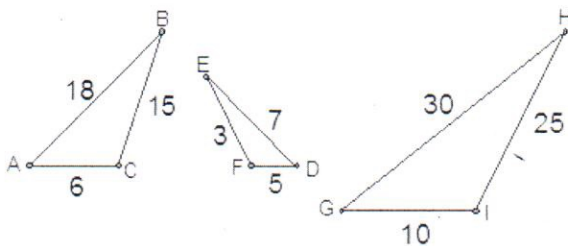
$\frac{14}{7} = \frac{20}{10} = \frac{24}{12}$   
 $2 = 2 = 2$

$\triangle ABC \sim \triangle QRS$  by SSS~



$\triangle FEG \sim \triangle LKM$   
 by SAS~

**Example 2:** Are any of the following three triangles similar? If so, write a similarity statement. If not, why is it not similar?

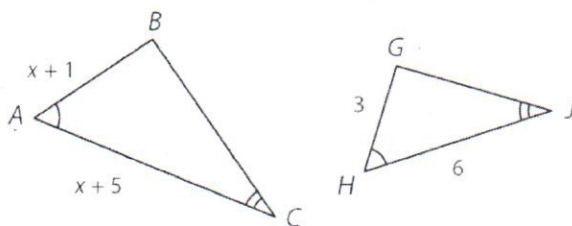


~~$\frac{5}{10} = \frac{3}{25} = \frac{7}{30}$~~   $\triangle EFD \not\sim \triangle HIG$

$\frac{6}{10} = \frac{15}{25} = \frac{18}{30}$

$\triangle ABC \sim \triangle GHI$   
 by SSS~

**Example 3:** The following triangles are similar by AA~. Write the similarity statement and then solve for x.



$\triangle ABC \sim \triangle HGT$

$\angle A \cong \angle H$   
 $\angle C \cong \angle T$

$\frac{x+1}{3} = \frac{x+5}{6}$   
 $6(x+1) = 3(x+5)$   
 $6x+6 = 3x+15$   
 $-3x \quad -3x$   
 $3x+6 = 15$   
 $-6 \quad -6$   
 $3x = 9$   
 $\frac{3x}{3} = \frac{9}{3}$   
 $x = 3$

**Example 4:** A meter stick casts a shadow 0.65 meters long. At the same time, a tree casts a shadow 2.6 meters long. How tall is the tree? (Draw a picture and discuss why these two triangles are similar)



SAS~

$\frac{1}{x} = \frac{0.65}{2.6}$

$\frac{0.65x}{0.65} = \frac{2.6}{0.65}$   
 $x = 4 \text{ m}$

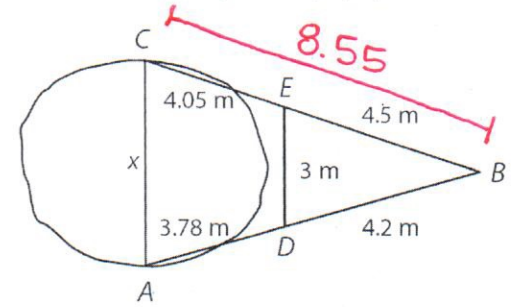
**Practice Set:** Decide whether the following triangles are similar. If they are, write a similarity statement

<p>1. <math>SSS \sim</math></p> <p><math>\frac{36}{60} = \frac{42}{70} = \frac{24}{40}</math>  <math>\frac{3}{5} = \frac{3}{5} = \frac{3}{5}</math></p> <p><math>\triangle UVT \sim \triangle SRT</math> by <math>SSS \sim</math></p>	<p>2. <math>AA \sim</math></p> <p><math>\triangle ACB \sim \triangle ASR</math> by <math>AA \sim</math></p>	<p>3. <math>SAS \sim</math></p> <p><math>\angle HFG \cong \angle TFS</math></p> <p><math>\frac{8}{16} = \frac{10}{20}</math>  <math>\frac{1}{2} = \frac{1}{2}</math></p> <p><math>\triangle GHF \sim \triangle STF</math> by <math>SAS \sim</math></p>	<p>4. <math>SSS \sim</math></p> <p><math>\frac{18}{25} = \frac{21}{28} = \frac{30}{40}</math>  <math>0.72 \neq 0.75 \neq 0.75</math></p> <p><math>\triangle ABC \not\sim \triangle MLK</math></p>
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5. To measure  $\overline{AC}$ , the distance across a crater, an archeologist stands at point A and locates points B, C, D, and E. If  $\triangle ABC \sim \triangle DBE$  what is the distance across the lake?

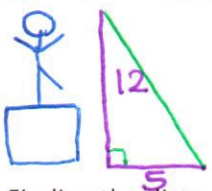
$SAS \sim$   
 $SSS \sim$

$\frac{x}{3} = \frac{8.55}{4.5}$   
 $\frac{4.5x}{4.5} = \frac{25.65}{4.5}$   
 $x = 5.7 \text{ m}$



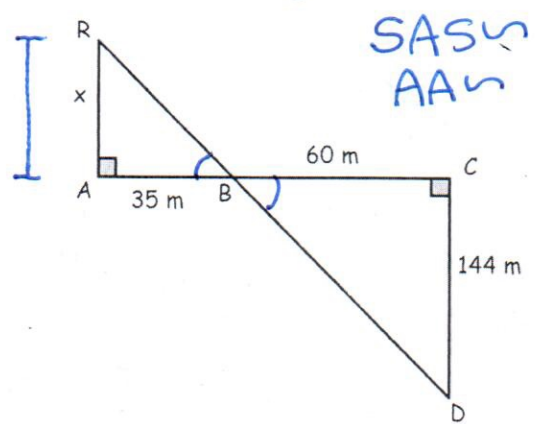
6. A 12-foot statue casts a shadow that is 5 feet long. At the same time a fence post casts a shadow that is 1.25 feet long. What is the height of the fence post?

$SAS \sim$



$\frac{12}{x} = \frac{5}{1.25}$   
 $\frac{5x}{5} = \frac{15}{5}$   
 $x = 3 \text{ ft}$

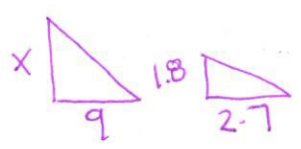
7. Finding the distance across a canyon can often be difficult. A drawing of similar triangles can be used to make this task easier. Use the diagram to determine AR, the distance across the canyon.



$SAS \sim$   
 $AA \sim$

$\frac{35}{60} = \frac{x}{144}$   
 $\frac{60x}{60} = \frac{5040}{60}$   
 $x = 84 \text{ m}$

8. A mini statue of liberty casts a shadow that is 9 meters long. At the same time a 1.8-meter lamppost casts a shadow that is 2.7 meters long. What is the height of the statue?



$\frac{x}{1.8} = \frac{9}{2.7}$   
 $2.7x = 16.2$   
 $x = 6 \text{ m}$