

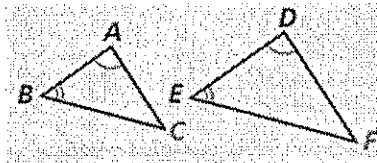
**Objectives:** Prove triangles are similar.

Use triangle similarity to solve problems.

❖ To prove triangles **congruent**, we use the following theorems/postulates: SSS, SAS, ASA, AAS, HL

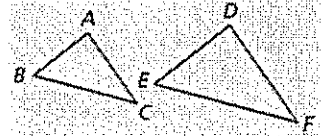
**Angle-Angle Similarity:** If 2  $\angle$ s of a triangle are congruent to 2  $\angle$ s of another, then the triangles are similar.

- $\angle A \cong \angle D$ , and  $\angle B \cong \angle E$ , so  $\angle C \cong \angle F$  by the 3rd  $\Delta$ s Theorem.
- ALL 3 angles  $\cong$  = similar triangles
- $\Delta CBA \sim \Delta FED$



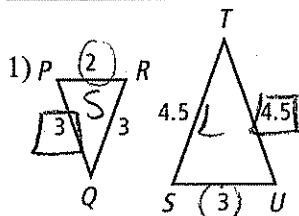
**Side-Side-Side Similarity:** If 3 sides of one triangle are proportional to 3 sides of another triangle, then the triangles are similar.

- When comparing side lengths, be sure they are matched up with corresponding sides.
- If  $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$ , then  $\Delta ABC \sim \Delta DEF$



**Side-Angle-Side Similarity:** If 2 sides of one triangle are proportional to two sides of another triangle, and the included angles are congruent, then the triangles are similar.

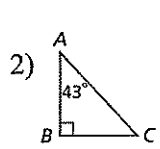
**Examples 1-4:**



a) Are the triangles similar?  
 Try SSS  
 $\frac{S}{T} = \frac{3}{4.5} = 0.67$   
 $\frac{S}{L} = \frac{3}{4.5} = \frac{2}{3} = 0.67$

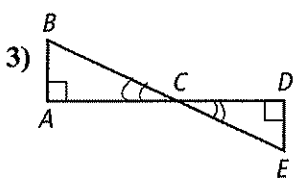
a) yes b) SSS

b) If so, by which theorem/postulate from above?



$\frac{180}{-90} = \frac{90}{-47} = \frac{43}{43}$   
 $A(\angle B \cong \angle E)$   
 $A(\angle A \cong \angle D)$

a) yes b) AA



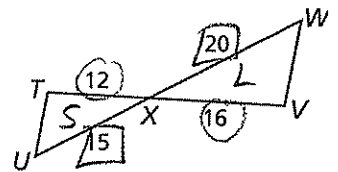
$A(\angle A \cong \angle D)$   
 $A(\text{vertical } \Delta s)$

a) yes b) AA

4)  $A(\text{vertical } \Delta s)$

check sides

$\frac{S}{L} = \frac{12}{16} = \frac{3}{4}$



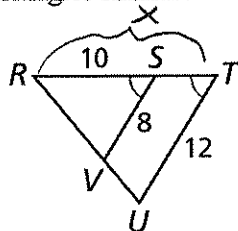
$\frac{S}{L} = \frac{15}{20} = \frac{3}{4}$

a) yes b) SAS

**EX 5:** By what theorem are the two triangles similar? Find RT.

$\frac{S}{L} = \frac{10}{x} = \frac{8}{12}$

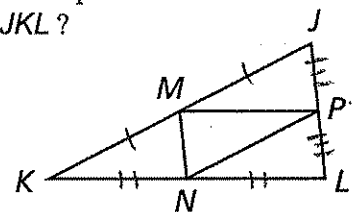
$\frac{8x}{8} = \frac{120}{8}$   
 $x = 15$



SAS,  $RT = 15$

**EX 6:** Points M, N, and P are the midpoints of the sides of  $\Delta JKL$ . Is  $\Delta MNP$  similar to  $\Delta JKL$ ?

$MN = \frac{1}{2} JL$   
 $MP = \frac{1}{2} KL$   
 $NP = \frac{1}{2} JK$



$\Delta MNP : \Delta LJK$   
 1 : 2

yes  
 by SSS