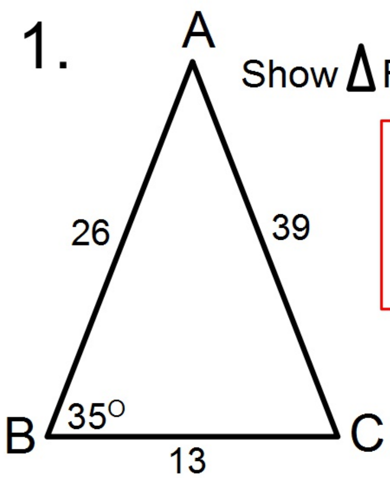
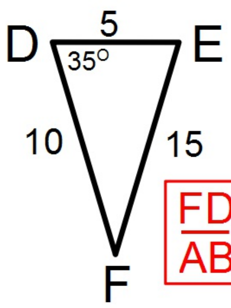
Bellwork

Write a Similarity Statement for the following:

1.





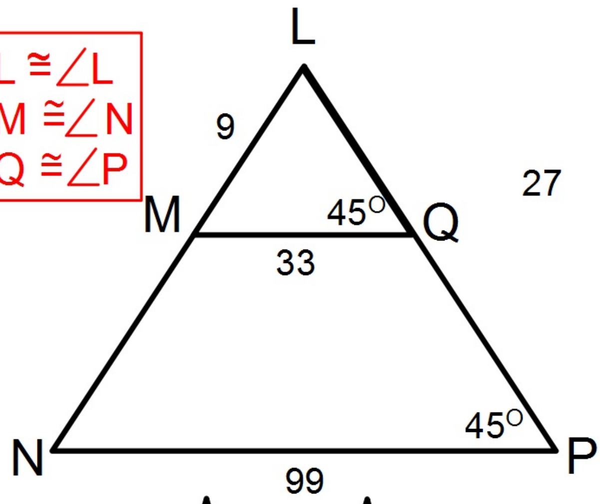
Show $\Delta FDE \sim \Delta ABC$

$\angle F \cong \angle A$
$\angle D \cong \angle B$
$\angle E \cong \angle C$

$$\frac{FD}{AB} = \frac{DE}{BC} = \frac{FE}{AC} = \frac{5}{13}$$

2.

$\angle L \cong \angle L$
$\angle M \cong \angle N$
$\angle Q \cong \angle P$



Show $\Delta LMQ \sim \Delta LNP$

$$\frac{LM}{LN} = \frac{MQ}{NP} = \frac{LQ}{LP} = \frac{1}{3}$$

Proving Triangle Similarity

Throughout this unit we will be focusing on several methods of proving two triangles are similar including:

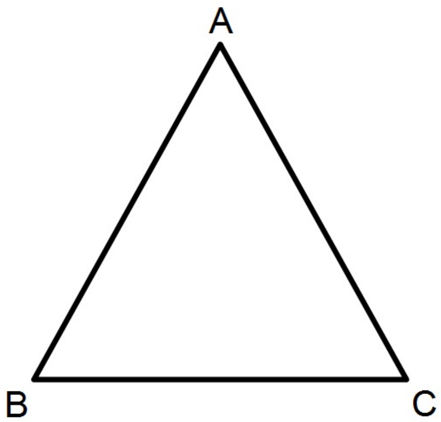
1. Angle-Angle (AA)
   [This is the main focus of this lesson]
2. Side-Side-Side (SSS)
3. Side-Angle-Side (SAS)

Similarity by Angle-Angle

Angle-Angle Similarity Postulate (AA) -

If two angles of one triangle are congruent to two angles of another triangle,

Then the two triangles are similar.



Show $\triangle ABC \sim \triangle DEF$

$\angle A \cong \angle D$

$\angle B \cong \angle E$

OR

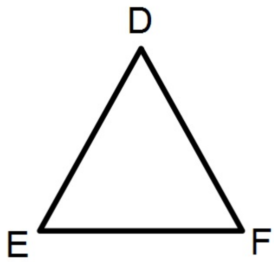
$\angle B \cong \angle E$

$\angle C \cong \angle F$

OR

$\angle A \cong \angle D$

$\angle C \cong \angle F$



Useful Theorems

Triangle Sum Theorem:

All the angles in a triangle add up to 180^{o}

Right Angle Congruence Theorem:

All right angles are congruent

Useful Definition to use:

Congruence - If two things are equal,
Then they are also congruent.

Recall Useful Angles

Does not need mention of PARALLEL lines:

Vertical Angles:

Angles that are opposite of each other when 2 lines cross

(Visually create a bow-tie I've heard some of you saying)

REQUIRES PARALLEL lines:

Corresponding Angles:

Angles in the same placement, but different locations.

(Ex. above the transversal and left of both other lines)

Alternate Interior Angles:

Angles between the two lines going in similar directions, but on opposite sides of the transversal and not touching.

Alternate Exterior Angles:

Angles outside of the two lines going in similar directions, but on opposite sides of the transversal.

Recall Useful Properties

Reflexive Property:

For angles - $\angle A \cong \angle A$

For sides - $\overline{AB} \cong \overline{AB}$

Transitive Property:

In general...

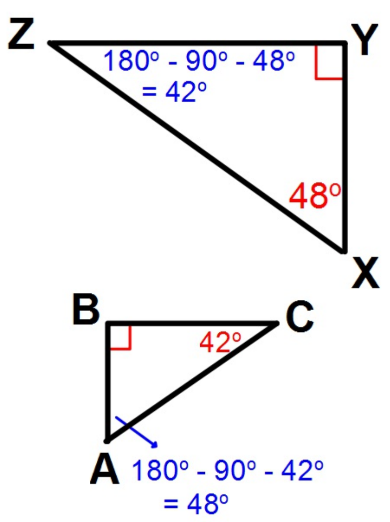
IF a = b and b = c

THEN a = c

Example

Given: XY ⊥ YZ
AB ⊥ BC
$\angle X = 48^\circ$
$\angle C = 42^\circ$

Prove: $\Delta XYZ \sim \Delta ABC$

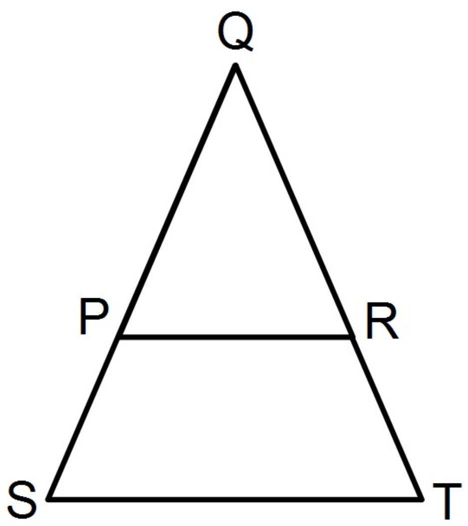


Statements	Reasons
1. XY ⊥ YZ; AB ⊥ BC; $\angle X = 48^\circ$; $\angle C = 42^\circ$	1. Given
2. $\angle B$ & $\angle Y$ are Rt $\angle$'s	2. Definition of ⊥ (Perpendicular)
3. $\angle B \cong \angle Y$	3. Right Angle ≅ Theorem
4. $\angle Z = 42^\circ$; $\angle A = 48^\circ$	4. Triangle Sum Theorem
5. $\angle Z = \angle C$; $\angle A = \angle X$	5. Transitive Property
6. $\angle Z \cong \angle C$; $\angle A \cong \angle X$	6. Definition of ≅
7. $\triangle XYZ \sim \triangle ABC$	7. AA

Example

Given: $\overline{PR} \parallel \overline{ST}$

Prove: $\Delta PQR \sim \Delta SQT$



Statements	Reasons
1. PR | | ST	1. Given
2. $\angle S \cong \angle QPR$ $\angle T \cong \angle QRP$	2. Corresponding Angles
3. $\angle Q \cong \angle Q$	3. Reflexive Property
4. $\triangle PQR \sim \triangle SQT$	4. AA