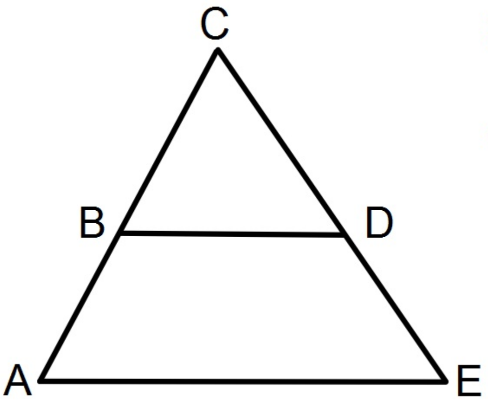
Bellwork

Given: $\angle C = 60^{o}$
$\angle E = 35^{o}$
BD | | AE

Prove: ΔCBD ~ ΔCAE



Statements	Reasons
1. $\angle C = 60^{O}$; $\angle E = 35^{O}$ BD | | AE	1. Given
2. $\angle C = \angle C$	2. Reflexive Property
3. $\angle E = \angle CDB$ $\angle A = \angle CBD$	3. Corresponding Angles
4. ΔCBD ~ ΔCAE	4. AA

Proving Triangle Similarity

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

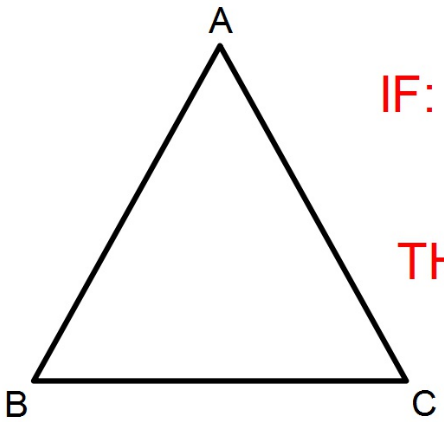
1. Angle-Angle (AA)
2. Side-Side-Side (SSS)
   [This is the main focus of this lesson]
3. Side-Angle-Side (SAS)

Similarity by Side-Side-Side

Side-Side-Side (SSS) Similarity Theorem:

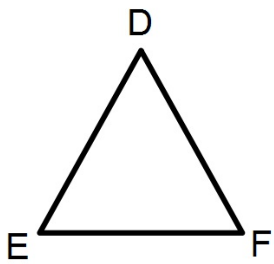
If the corresponding side lengths of two triangles are proportional,

Then the triangles are similar.



IF: $\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$

THEN: $\Delta ABC \sim \Delta DEF$

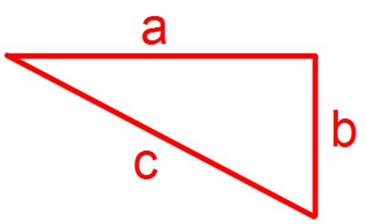


Useful Information

Pythagorean Theorem:

Given a right triangle with legs of length a and b, and hypotenuse of length c...

$a^2 + b^2 = c^2$



Use this equation to find missing sides after stating the triangles are right triangles.

Comparing Sides:

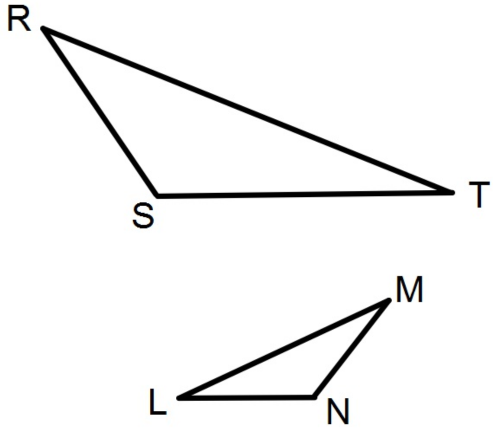
When comparing sides in triangles that are not right triangles, compare each side separately and state what you did to reduce as your reason .

(Ex. Divided top/bottom by 3 to reduce)

Example

Given: RS = 9
ST = 15
RT = 27
LM = 18
MN = 6
LN = 10

Prove: $\Delta RST \sim \Delta MNL$

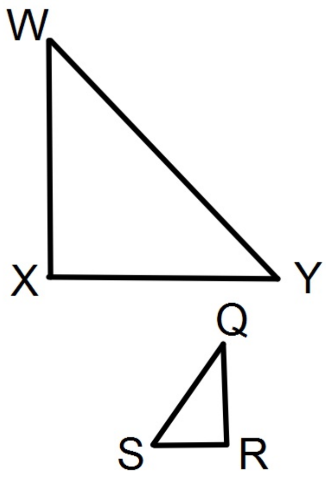


Statements	Reasons
1. RS = 9; ST = 15; RT = 27; LM = 18; MN = 6; LN = 10	1. Given
2. $\frac{RS}{MN} = \frac{9}{6} = \frac{3}{2}$	2. Divide by 3 to reduce.
3. $\frac{ST}{NL} = \frac{15}{10} = \frac{3}{2}$	3. Divide by 5 to reduce.
4. $\frac{RT}{ML} = \frac{27}{18} = \frac{3}{2}$	4. Divide by 9 to reduce.
5. $\frac{RS}{MN} = \frac{ST}{NL} = \frac{RT}{ML} = \frac{3}{2}$	5. Transitive Property
6. $\Delta RST \sim \Delta MNL$	6. SSS

Example

Given: $\overline{WX} \perp \overline{XY}$
$\overline{QR} \perp \overline{RS}$
WX = 20
QR = 5
XY = 48
RS = 12

Prove: $\Delta WXY \sim \Delta QRS$



Statements	Reasons
1. WX = 20; QR = 5; XY = 48; RS =12; $WX \perp XY$; $QR \perp RS$	1. Given
2. $\angle X$ and $\angle R$ are right angles	2. Definition of perpendicular.
3. $\angle X \cong \angle R$	3. Right Angles Congruence Theorem
4. $\frac{WX}{QR} = \frac{20}{5} = \frac{4}{1}$	4. Divide by 5 to reduce.
5. $\frac{XY}{RS} = \frac{48}{12} = \frac{4}{1}$	5. Divide by 12 to reduce.
6. $\frac{WX}{QR} = \frac{XY}{RS} = \frac{4}{1}$	6. Transitive Property
7. $\Delta WXY \sim \Delta QRS$	7. SSS