Congruent Triangles (Year 8)

Thursday, 25 April 2019 8:47 pm

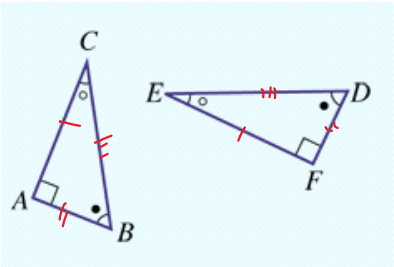
By the end of the lesson I would hope that you have an understanding of the following. I would also hope that you can apply the understanding to a number of different questions and question types:

- Know what it means to be congruent
- Know that when we look at congruence in triangles we have a number of rules we need to consider to describe the type of congruence:
  - SSS
  - SAS
  - AAS
  - RHS
- Be able to explain congruence using a congruence identity and supporting statements.

RECAP

In a previous lesson we looked at what congruence was.
We decided that this meant that two shapes were identical. They could have a different orientation, but that the size of the sides and angles inside must be exactly the same.

The following was an example of congruence:



$\triangle ABC \equiv \triangle FDE$

Whilst, in a previous lesson, we looked at all types of shapes, we are now going to limit our work to using just **triangles**.

The important things about triangles

The most important thing about triangles is they have three sides and three angles.
We can call sides S and angles A.

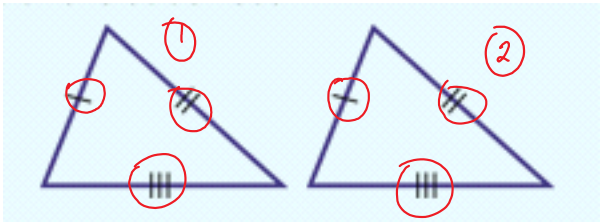
Hence, if we now look at the rules we can use to **prove** congruence, we might have an idea of what SSS, SAS, AAS and RHS means!

S

A

Three sides are the same: SSS

Let's start with the easiest and most obvious!
SSS: When all three sides are the same



SSS

We can clearly see here that the marks on the side of the triangles show which sides are the same length. With three sides marked the same, it has to be the case the triangles are congruent.

be the case the triangles are congruent.

Two sides and one angle are the same: SAS

I am always asked why can't I write ASS or SSA.
Well, the important thing to note, is that the order of the letters is really **important**!

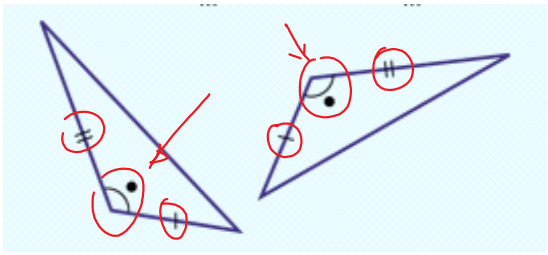
SIDE -> ANGLE -> SIDE

Note that the word ANGLE is between the two sides.

Well this tells us when we can uses the SAS rule.

When the angle (which falls between the two sides) are identical. The sides are also identical.

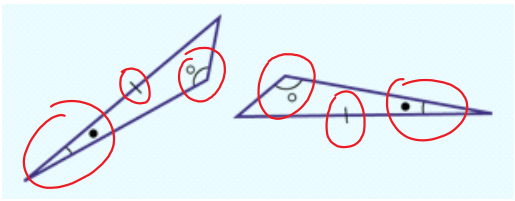
We call the angle which falls between two sides the **included angle.**



When two angles and one side are the same: AAS

The good news is, with this rule, the order of the letters are not important.
So, we can write this rule as AAS, ASA or SAA.

So, we are looking here for **two angles** and **one side** to be the same.



The final rule: RHS

This is one of the easiest to try and find.
It means:

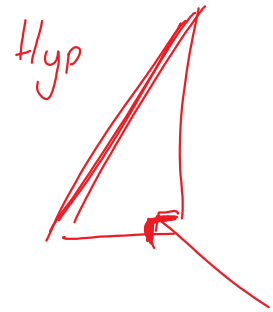
RIGHT ANGLE -> HYPOTENUSE -> SIDE

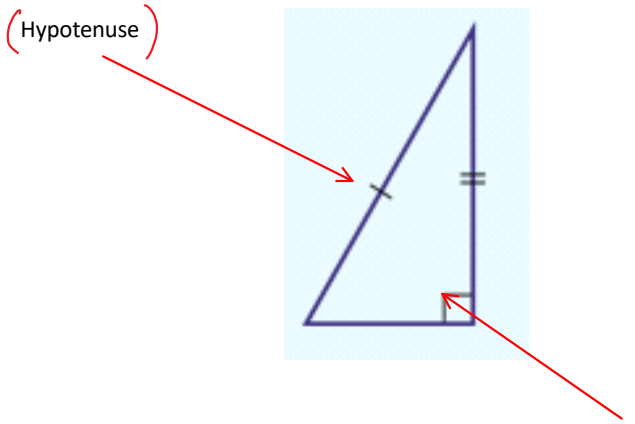
What is this Hypotenuse we speak of?

The sides of triangles will, later in Year 9, have names.
The names of the triangles are defined by the position of one angle and the longest side.

The longest side in a triangle is called the **HYPOTENUSE.**

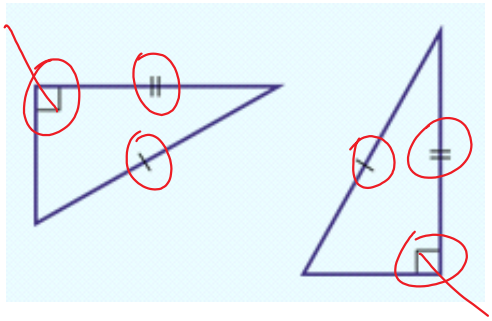
When we get to Trigonometry you will be using this word a lot.





So, back to congruence …

RHS



These triangles have two right angles.
Their hypotenuses are the same length.
They have one other matching side.

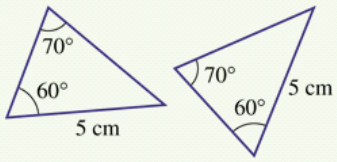
So … with any question, all you need to do is look and decide which rule to fits and then explain it.

Remember the congruence sign: ≡

Examples:
The following examples have been extracted, with permission, from the Cambridge Essentials Textbook Series.

Which of the tests (SSS, SAS, AAS or RHS) would you choose to test the congruence of these pairs of triangles?

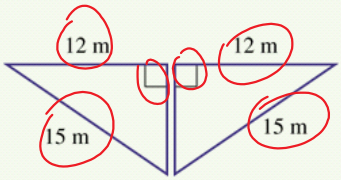
a



AAS

~~SSS~~
~~SAS~~
AAS
~~RHS~~

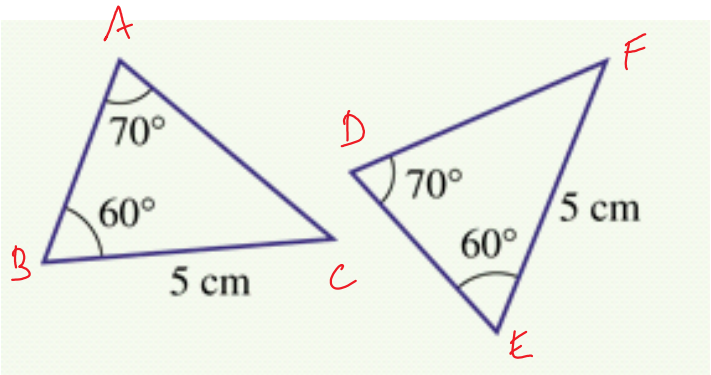
b



~~SSS~~
SAS
~~AAS~~
RHS

Later on, in later years, it's going to be important to write **supporting statements** which should how you have proven congruence.

Looking at the above example again, we would need to have letters places on each of the triangles:



$\triangle ABC \equiv \triangle DEF$

AAS

$\angle A \equiv \angle D$ (A)

$\angle B \equiv \angle E$ (A)

$BC \equiv EF$ (S)

We would then be able to write statements to prove the congruence: