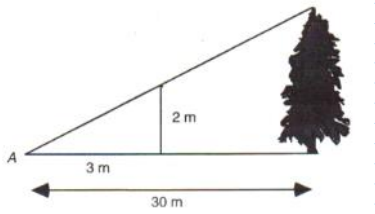
Proving Similar Triangles

Tuesday, 17 April 2018 5:36 pm

By the end of the lesson I would like the following work started and completed for homework:

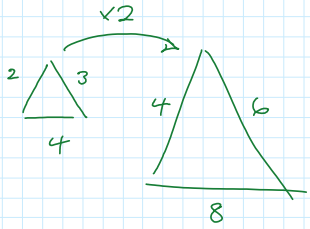
2E Proving similar triangles Let's start: *How far did the chicken travel?* Key ideas Example 8, 9	Exercise 2E Page 119	Understanding 1-3	3	
		Fluency 4-6	4-6(½)	4-6(½)
		Problem-solving 7-10	8, 9	9, 10
		Reasoning 11-13	11, 12	11-13
		Enrichment 14	—	



RECAP:

Last lesson we looked at the idea of **Similar Figures**. Previously we had looked at the work for **Congruent Triangles**.
These were triangles which were exactly the same.
We had a number of ways in which we could identify them:

- **SSS**: All three sides are the same
- **SAS**: Two sides are the same and one angle
- ~~**AAA**~~: Two angles and one side are the same
- **RHS**: A right angle, the hypotenuse and one other pair of sides are the same

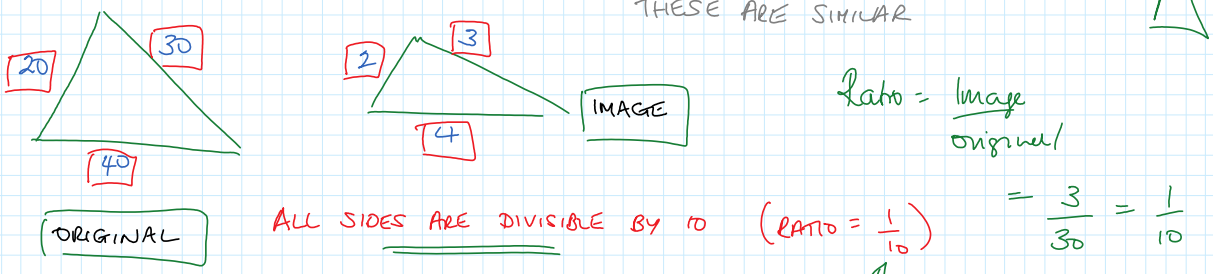


This lesson we will look at two different concepts, the first being **Prove Similar Triangles**.

RECAP: Side, Side, Side SSS

For triangles to be congruent, they must be able to have three sides lengths which are the same.
For triangles to be similar, they need to have three sides lengths which are the same ratio to each other.

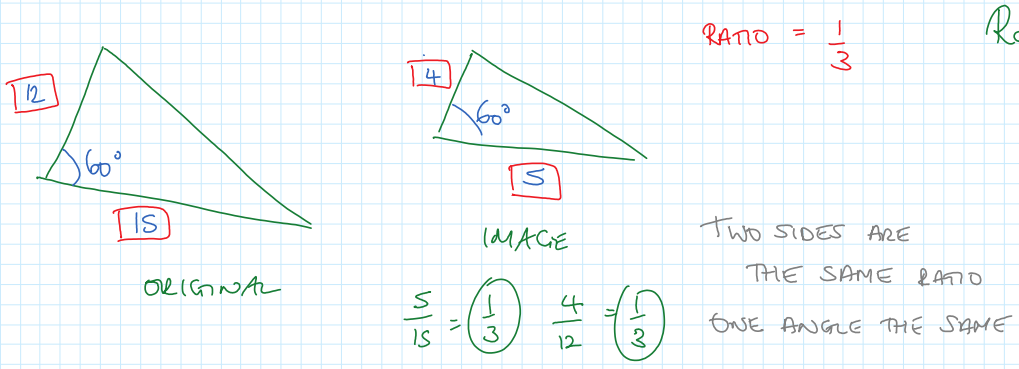
Example



RECAP: Side, Angle, Side SAS

For triangles to be congruent, they need to have two sides which are the same length and share one angle which is the same size.
For triangles to be similar, they need to have two sides which are in the same ratio and share one common angle.

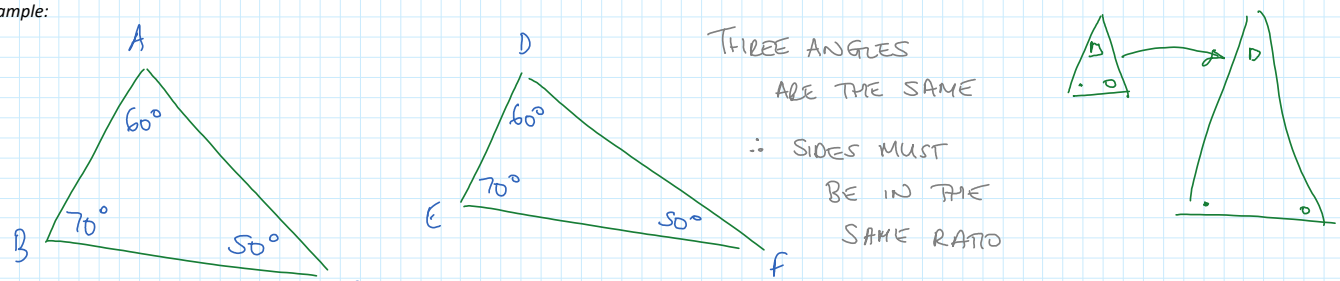
Example:

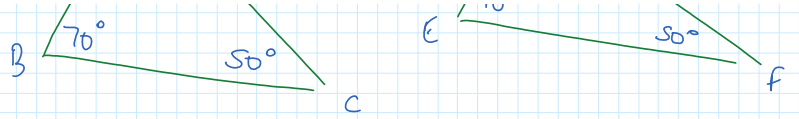


RECAP: Angle, Angle, Angle ~~AAA~~

For triangles to be congruent, they need to have three angles which are the same size.
For triangles to be similar, they need to have three angles which are the same size.

Example:

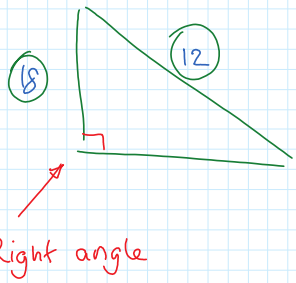


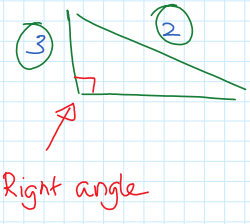


SAME RATIO

RECAP RHS

For triangles to be congruent, a right angle, the hypotenuse and one other pair of sides have to be the same.
For triangles to be similar, a right angle, the hypotenuse and one other pair of sides have to be of the same ratio.



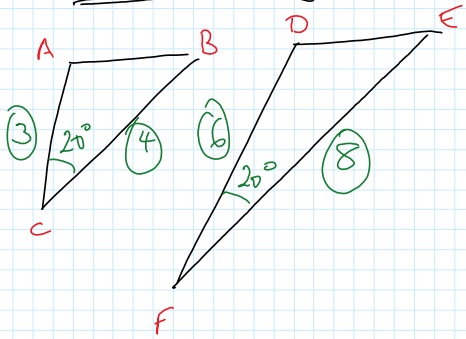


$\frac{2}{12} = \frac{1}{6}$ $\frac{3}{18} = \frac{1}{6}$

TWO SIDES ARE IN THE SAME RATIO AND THE RIGHT ANGLE

Examples:

Prove similarity:



4 statements

⇒ S
⇒ S
⇒ S

Similarity Statement

✓ S	DF/AC = 2
A	∠ACB = ∠DFE
✓ S	EF/BC = 2
SS	Using SSA we know △ABC ||| △DEF

Ratio of DF/AC is 2 (**Ratio of corresponding sides)**

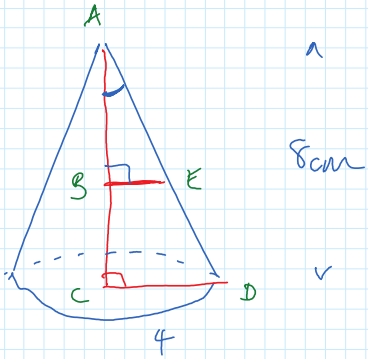
Ratio of EF/BC is 2 (**Ratio of corresponding sides**)

Hence, two sides have corresponding ratios.

Angle ACB and DFE are the same hence they have a corresponding angle.

Using rule SSA we know that ABC ||| DEF

Prove similarity



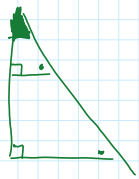
RHS

A
A
A

Work out which rule might work for this shape to prove similarity: RHS, SSS, SAS, AAA

⇒ Two triangles share an angle, hence they must be the same: **BAE** and **DAC**
Lines BE and CD are parallel. Hence, ABE = ACD. Two more angles are the same.
Which would suggest that AEB and ADC are the same.

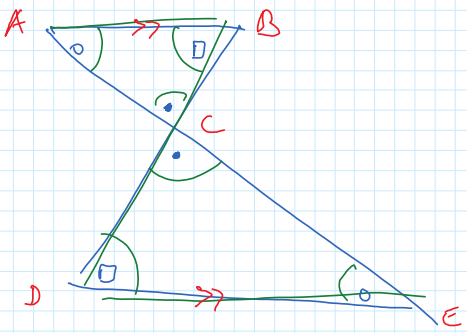
⇒ Hence, using rule AAA, the triangles are similar: ABE ||| ACD



Prove similarity

∠ACB = DCE (A)

Prove similarity

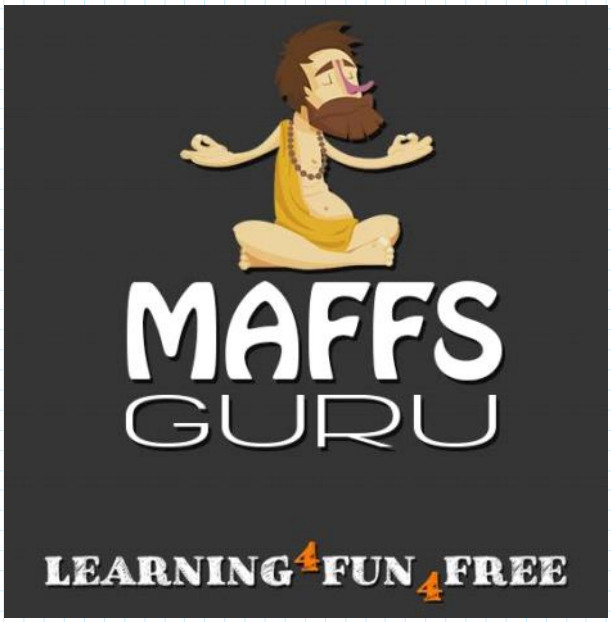


$\angle ACB = DCE$ (A)

$\angle ABC = \angle CDE$ A

$\angle BAC = \angle DEC$ A

Using AAA, $\triangle ABC \equiv \triangle CDE$



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