



Proving and applying similar figures

Year 9 Mathematics
Mainstream

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Learning Objectives

By the end of the lesson I hope that you understand and can apply the following to a range of questions from the Year 9 Mathematics course.

- To be able to prove a pair of similar triangles is similar giving reasons
- To be able to identify a pair of similar triangles
- To know how to use similarity to solve a problem



RECAP

In the previous lesson we looked at what it means for two triangles (or figures) to be similar. When two figures have the same sized angles but all corresponding sides have been multiplied by the same ratio, we say they are similar.

There are 4 tests for similarity which we shouldn't confuse with the similar ones (pun intended) we did in congruence.

The 4 tests are:

- SSS
- SAS
- AAA
- RHS

$$\triangle ABC \cong \triangle DEF$$

This lesson we are going to look at how we can prove and apply similar triangles.



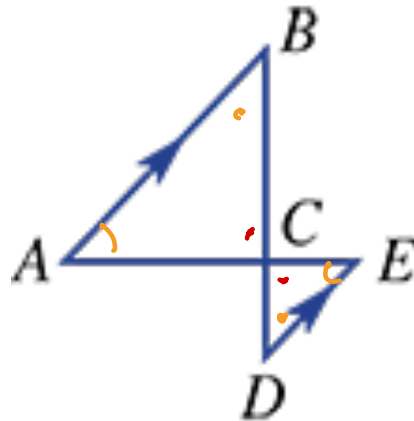
Proving triangles are similar

To prove triangles are similar, list any pairs of corresponding equal angles or pairs of sides in a given ratio.

- Give reasons at each step
- Write a similarity statement
- Write the triangle similarity test in abbreviated form.

An example is given below.

Prove that each pair of triangles is similar.



Follow the steps given above.

$$\angle BAC = \angle DEC \text{ (Alternate angles)}$$

$$\angle ABC = \angle EDC \text{ (Alternate angles)}$$

$$\angle ACB = \angle ECD \text{ (Vertically opposite angles)}$$

$$\therefore \triangle ABC \sim \triangle EDC \text{ (AAA)}$$

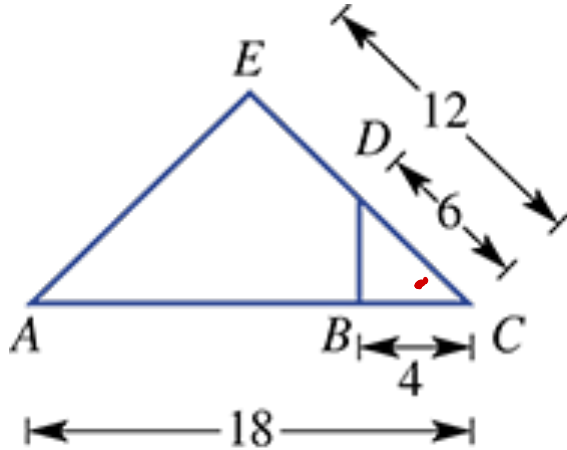
$\angle ABC$

$$\triangle ABC \sim \triangle EDC \text{ (AAA)}$$



Example: Proving two triangles are similar

Prove that the following pairs of triangles are similar



Again, let's follow the steps making sure we list the corresponding sides (or angles), state the ratio or angle rule, write a statement of similarity.

$$\angle ACE = \angle DCB \text{ (Common angle)}$$

$$\frac{AC}{DC} = \frac{18}{6} = 3$$

$$\frac{EC}{BC} = \frac{12}{4} = 3$$

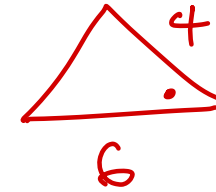
Hence, corresponding sides are the same ratio.

$$\therefore \triangle ACE \sim \triangle DCB \text{ (SAS)}$$

~~SSS~~
~~AAA~~

SAS

~~RHS~~



$$\triangle ACE \sim \triangle DCB$$

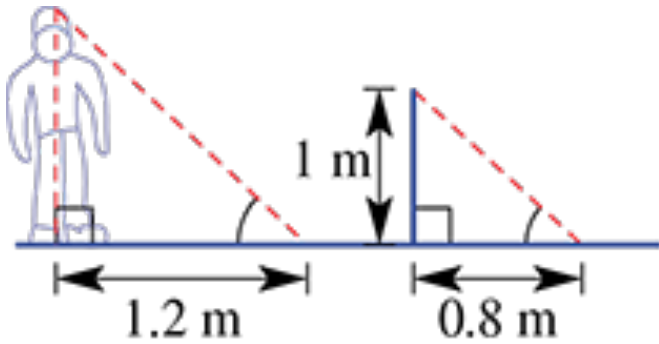
(SAS)



Example: Applying similarity

Chris' shadow is 1.2 m long when a 1 m vertical stick has a shadow 0.8 m long.

- a) Give a reason why the two triangles are similar
- b) Determine Chris' height



Firstly, all angles are the same (AAA)

Use the rule from the last time:

$$\frac{1.2}{0.8} = \frac{x}{1}$$

$$h = \frac{1.2}{0.8} = \underline{\underline{1.5}}$$

RHS



Questions to complete:

The questions I would like you to complete for this lesson are:

Exercise 7H Proving and applying similar figures

Questions: 1, 3, 4, 5, 7, 9, 10

Extension: 12a



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