Applications of right-angled triangles

Year 11 General Maths
Units 1 and 2

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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 Unit 1 and 2 General Mathematics course.

- Know how to apply SOHCAHTOA to find the missing side lengths and angles in application style problems

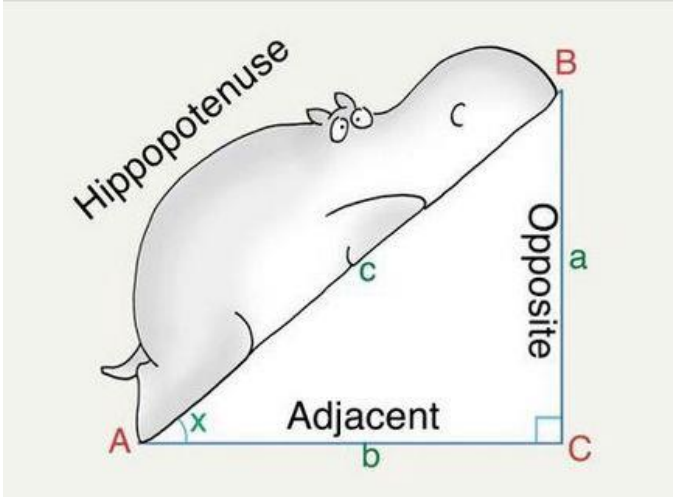
Recap of past learning

A lot of people, for some reason, find this section of work really complicated. The questions are word based and rely on your comprehension to be able to answer the question.

Hopefully, with each question, they provide you with a diagram. This is the key to all question as you simply need to **find the right angled triangle** and then do what you did in the previous sections of this course.

$$\sin\theta = \frac{opposite}{hypotenuse} \qquad cos\,\theta = \frac{adjacent}{hypotenuse} \qquad \tan\theta = \frac{opposite}{adjacent}$$

The ratio and SOHCAHTOA will only work if we have labelled the right-angled triangle correctly!



FIND A RIGHT-ANGLED TRIANGLE

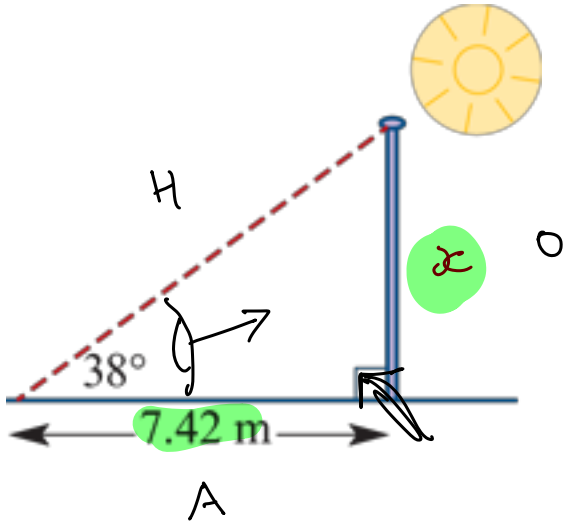
If we look at the following example, we can see the words are there to simply describe the picture they have provided:

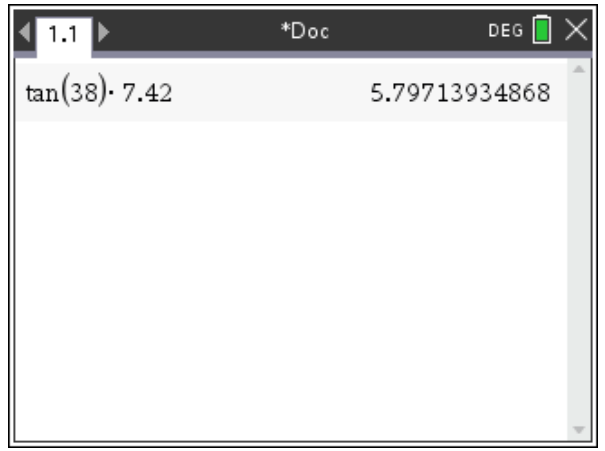
A flagpole casts a shadow 7.42 m long. The sun's rays make an angle of 38° with the level ground. Find the height of the flagpole, correct to ***two decimal places****.*

All we need to do is label the side length they want us to find out.

Then use SOHCAHTOA and the CAS to find the correct answer.

Don't forget to round the answer to the correct number of decimal places.





OA

SOH CAH TOA

$\tan\theta = \frac{O}{A}$ F S

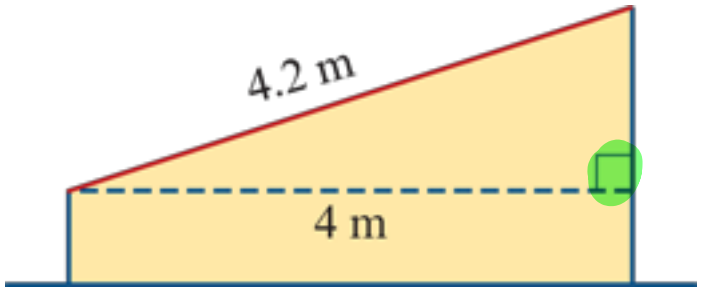
$\tan 38 = \frac{x}{7.42}$

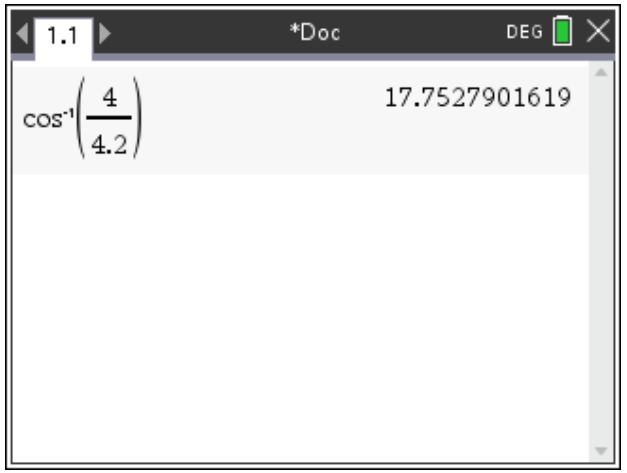
$x = 7.42 \times \tan 38^\circ = 5.80\text{ m}$

FIND A RIGHT-ANGLED TRIANGLE

Here is another example … again the wording is used to describe the shape they have given us.

A sloping roof uses sheets of corrugated iron 4.2 m long on a shed
4 m wide. There is no overlap of the roof past the sides of the walls. Find the angle the roof makes with the horizontal, correct to ***one decimal place****.*





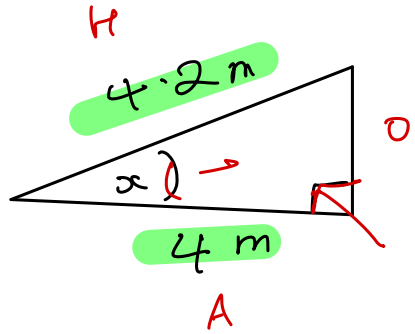
This question wants us to find the angle.
They have given us two sides.
Use the correct Trig ratio and you're good to go!

$\cos x = \frac{A}{H}$ F

$\cos x = \frac{4}{4.2}$ S

$x = \cos^{-1}\left(\frac{4}{4.2}\right)$ S

$= 17.8^\circ$



SOH CAH TOA

Learning Objectives: Revisited

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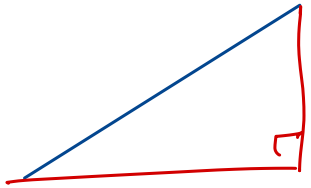

What if there is no diagram …

You're going to have to draw one.

But the key is to making sure that you have a right angled triangle somewhere in the diagram and you have labelled the sides correctly.

Example:
A 3 m ladder rests against an internal wall. The foot of the ladder is 1 m from the base of the wall. Find the angle the ladder makes with the floor, correct to one decimal place.