

Solving for the denominator

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.

- Know how to use the trigonometric ratios to help you find the lengths of missing sides of a right angled triangle which is located on the denominator of a fraction.
- Be able to find a trigonometric value on your calculator

$\cos(20) = \frac{3}{x}$

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$x = \frac{3}{\cos 20}$

$x \times \cos(20) = 3 \quad \div \cos 20$

$x = \frac{3}{\cos 20}$



RECAP

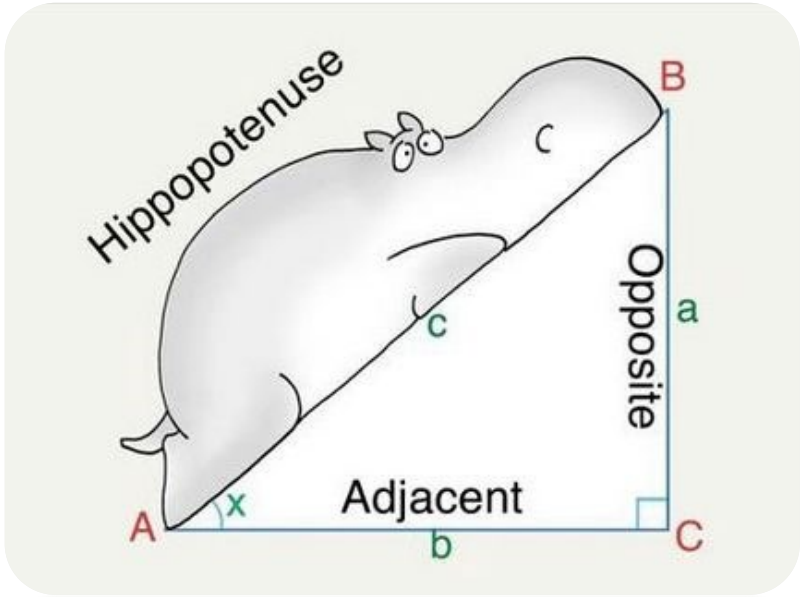
In a previous lesson we looked at how an angle can be related to the ratio of the side lengths of a right angled triangle using trigonometry.

SOHCAHTOA became our friend.

Rather than writing a ratio, we can actually use trigonometry to find missing side lengths (and angles!) when given the correct information.

To find a missing side length you always need an angle and one other side.

This lesson is going to show you how to find the missing side length which is given on the denominator of a fraction when given an angle and one other side.





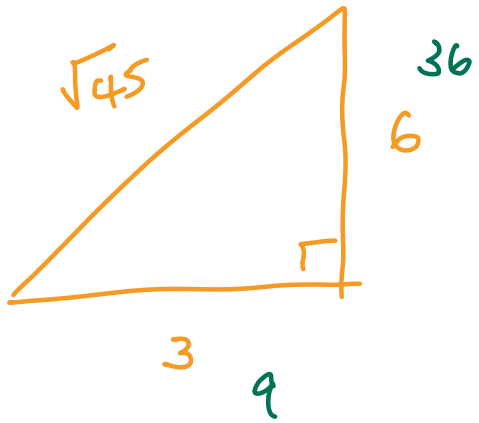
RECAP: Pythagoras' theorem

A reminder that we **may** have to use Pythagoras' Theorem for this topic.

This only works on right angled triangles.

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

This helps us find missing side lengths when **given two other sides of a right angled triangle**.





RECAP: SURDS

We will also will need to use SURDS in this topic.

When we are asked to write something as an **exact value** this means we are not to write any answers as a decimal.

We may be expected to simply surds.

We like surds for trigonometry and Pythag. as they make the calculations a lot easier for us and we don't end up with round errors.

$\sqrt{3}$ $\sqrt{5}$ $\sqrt{7}$ $\sqrt{11}$

$\sqrt{9} = \underline{\underline{3}}$



Is this much harder than what we've been doing?

Not in the slightest.

If you remember to label the sides of the triangle which have been given and use the correct ratio from SOHCAHTOA then it's no different.

The only thing which tricks people is a lack of understanding of the algebra!

Let's look at an example using algebra first:

Solve for x in the following equation expressing your answer correct to two decimal places.

$$\cos 35 = \frac{2}{x}$$

$\cos 35 = \frac{x}{2}$

$\cos 35 = \frac{2}{x}$

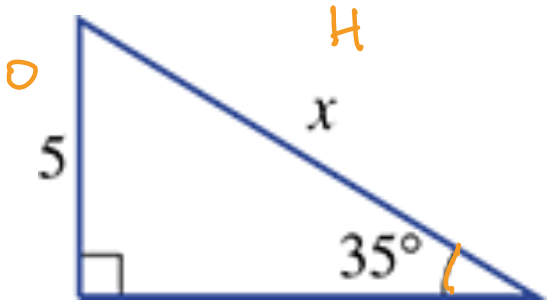
$x = 2.44$

$x = \frac{2}{\cos 35}$



Examples

Find the value of the pronumeral in the following question correct to two decimal places



H

O

F. $\sin\theta = \frac{O}{H}$

S. $\sin 35^\circ = \frac{5}{x}$

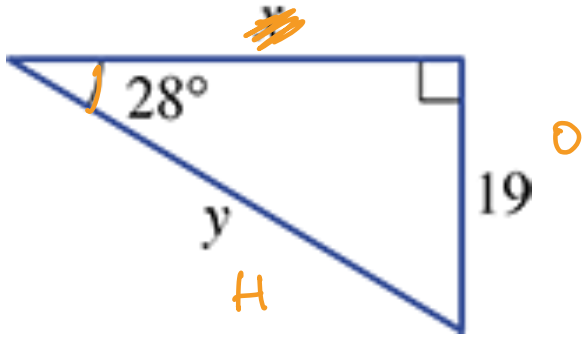
$x = \frac{5}{\sin 35}$

$x = 8.72$



Examples

Find the value of the pronumeral in the following question correct to two decimal places



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

$\tan 28 = \frac{19}{x}$

$x = \frac{19}{\tan 28}$

$= 35.73$

$\sin\theta = \frac{O}{H}$

$\sin 28 = \frac{19}{y}$

$y = \frac{19}{\sin 28}$

$= 40.47$



Questions to complete:

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

Exercise 3G: Solving for the denominator
Questions: 1, 3bdfhk, 4bdf, 6, 7, 8

Extension: 9





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