

EB Education Revision Guide



How to work with Trigonometry

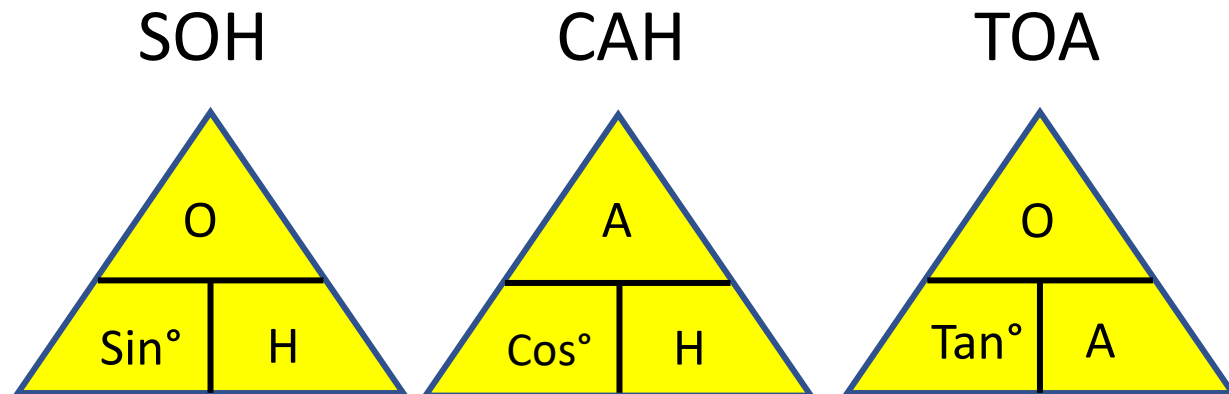
Trigonometry

What is it?

Trigonometry can be used on right angled triangles to find an unknown side, so long as you know a side and an angle; or to find an angle if you know two lengths.

You need to remember the 3 trigonometry formulas.

Formulas:



$$\sin x = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

$$\cos x = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

$$\tan x = \frac{\text{Opposite}}{\text{Adjacent}}$$

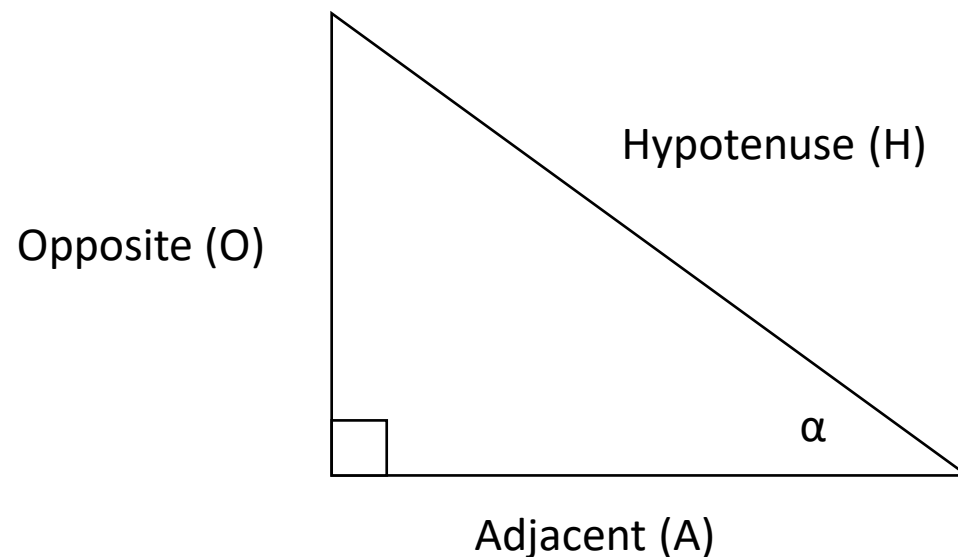
Trigonometry

How to label the triangle

The longest side is the HYPOTENUSE (H). This is always opposite the right angle.

The side opposite the angle being used (α) is the OPPOSITE side (O).

The remaining side, the side next to the angle being used (α) is the ADJACENT side (A).



Using trigonometry

How to use trigonometry formulas

1. Write down SOH CAH TOA
2. Label the sides of the triangle **O**, **A** and **H**.
3. Decide which two sides are involved to choose which formula you need
4. Put the equation you are using into a formula triangle and cover up the one you want to find with your finger and use the equation it shows.
5. Put the numbers in and use your calculator to work out the answer.

You will use A – as it gives you the length (9cm), and H (x), as this is the side you are finding the length of.

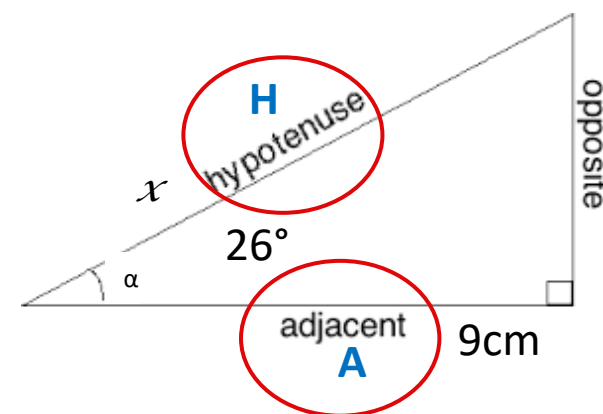
The formula with A and H in is

$$\cos \alpha = \frac{A}{H}$$

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

$$x = \frac{9}{\cos 26}$$

$$x = 10.01$$



O

This is opposite the angle being used

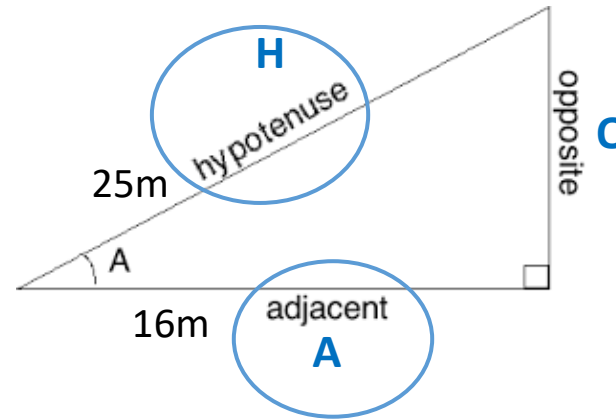
This is adjacent to the angle being used.

Using trigonometry

Finding the angle

If you are finding the angle instead of a side, you need to follow the same steps, then use the inverse on your calculator. To do this press SHIFT followed by sin, cos or tan. On your calculator you should see \sin^{-1} , \cos^{-1} or \tan^{-1} .

Example



The formula with A and H in is:

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

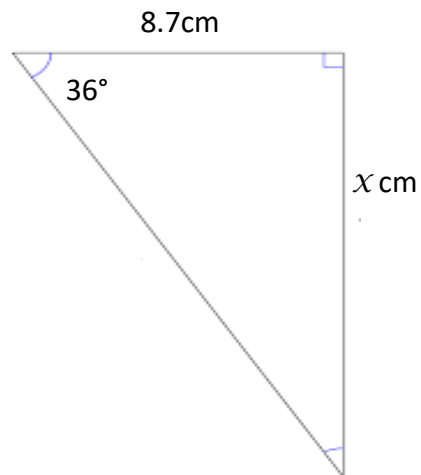
$$\cos x = \frac{16}{25} = 0.64$$

$$x = \cos^{-1}(0.64)$$

$$x = 50.2^\circ$$

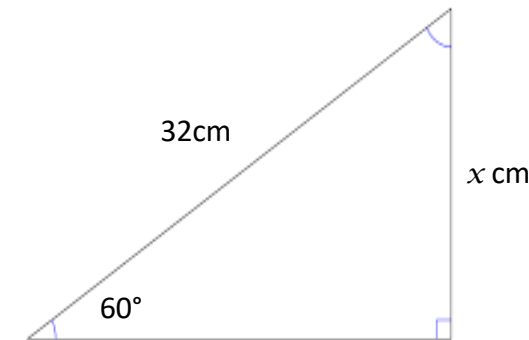
TOP TIP: Remember to close the brackets on your calculator

1. This right-angled triangle is not drawn to scale.
Work out the length of the side labelled x .
Give your answer correct to 3 significant figures.



2. This right-angled triangle is not drawn to scale.
Work out the length of the side labelled x .
Give your answer correct to 3 significant figures.

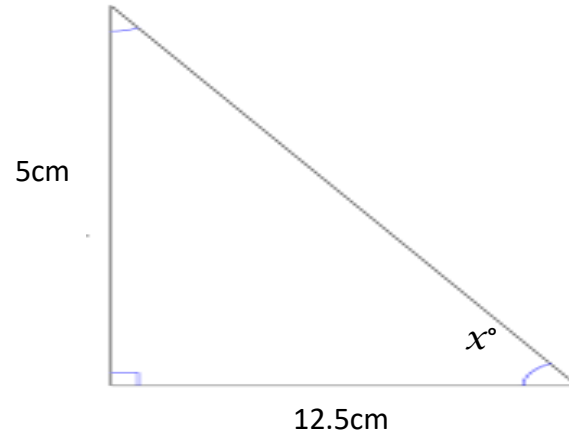
Your turn:



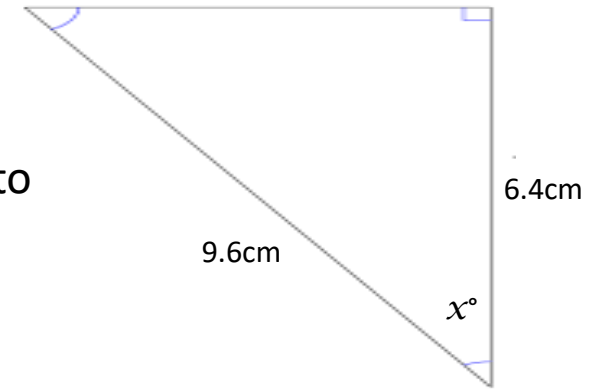


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3. This right-angled triangle is not drawn to scale.
Work out the size of the angle labelled x .
Give your answer correct to 1 decimal place.



4. This right-angled triangle is not drawn to scale.
Work out the size of the angle labelled x .
Give your answer correct to 1 decimal place.

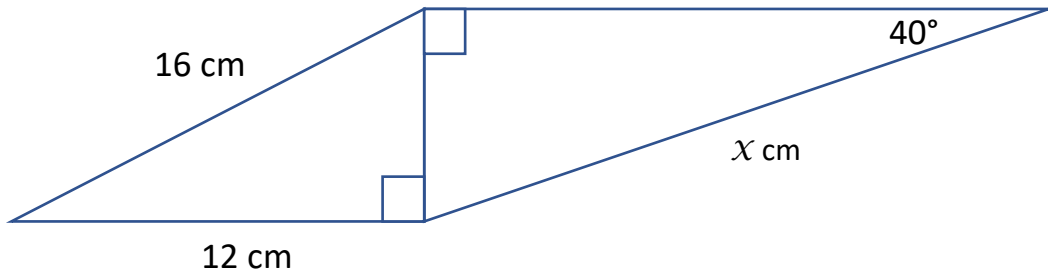


Your turn:



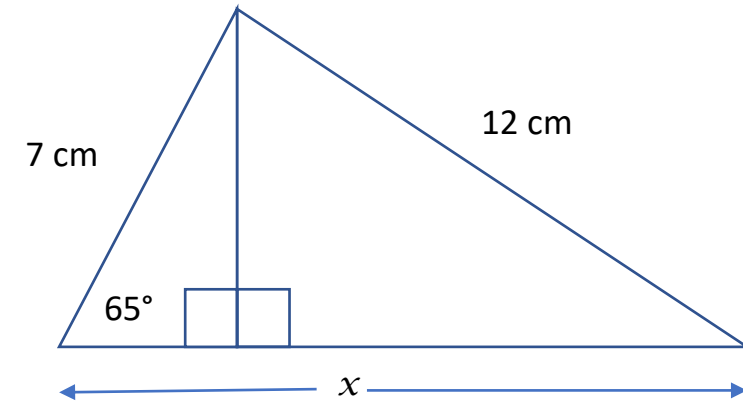
Your turn:

5. The diagram below shows a quadrilateral.



Calculate the length of the side labelled x .
Give your answer correct to 3 significant figure.

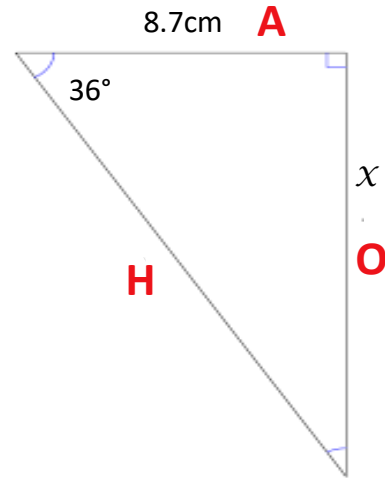
6. Calculate the length of the side labelled x .



Give your answer correct to 3 significant figures.

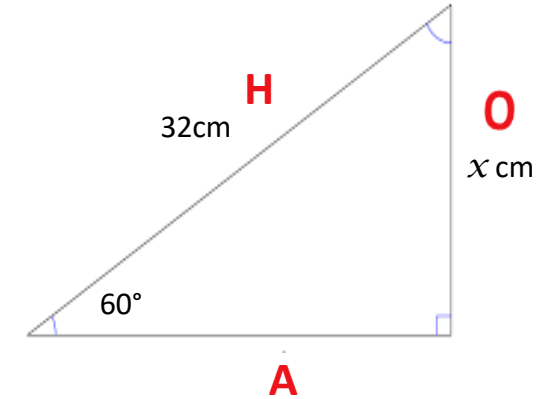


1. This right-angled triangle is not drawn to scale.
Work out the length of the side labelled x .
Give your answer correct to 3 significant figures.



$$\begin{aligned}\text{Tan} &= \frac{\text{O}}{\text{A}} \\ \text{Tan } (36) &= \frac{\text{O}}{8.7} \\ \text{O} &= 8.7 \times \text{Tan } (36) \\ \text{O} &= 6.32\text{cm}\end{aligned}$$

2. This right-angled triangle is not drawn to scale.
Work out the length of the side labelled x .
Give your answer correct to 3 significant figures.



$$\begin{aligned}\text{Sin} &= \frac{\text{O}}{\text{H}} \\ \text{Sin } (60) &= \frac{x}{32} \\ x &= 32 \times \text{Sin } (60) \\ x &= 27.7 \text{ cm}\end{aligned}$$

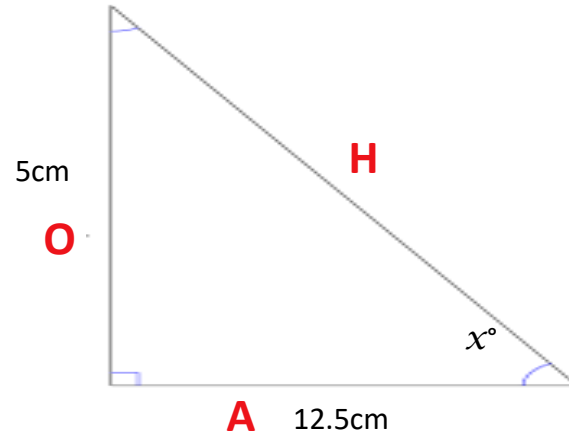
Answers:



3. This right-angled triangle is not drawn to scale.

Work out the size of the angle labelled x .

Give your answer correct to 1 decimal place.



$$\text{Tan} = \frac{\text{O}}{\text{A}}$$

$$\text{Tan}(x) = \frac{5}{12.5}$$

$$x = \tan^{-1}\left(\frac{5}{12.5}\right)$$

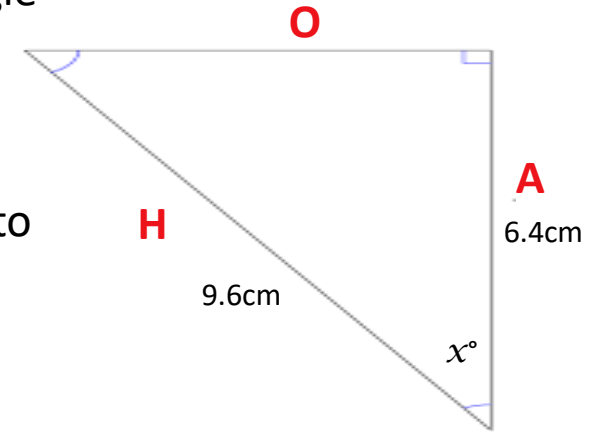
$$x = 21.8^\circ$$

Answers:

4. This right-angled triangle is not drawn to scale.

Work out the size of the angle labelled x .

Give your answer correct to 1 decimal place.



$$\text{Cos} = \frac{\text{A}}{\text{H}}$$

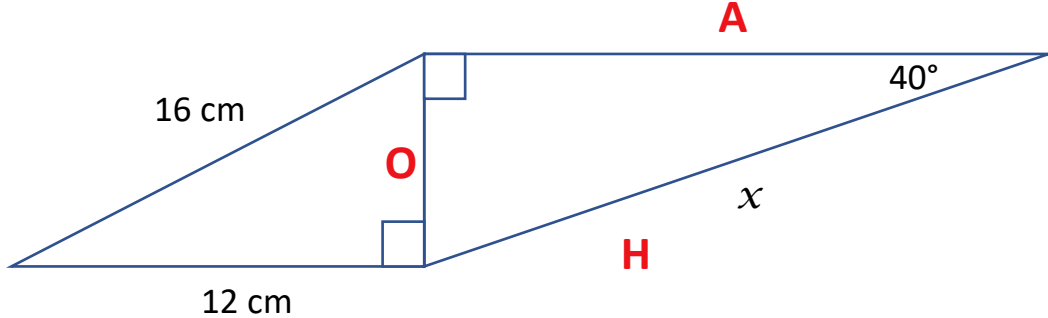
$$\text{Cos}(x) = \frac{6.4}{9.6}$$

$$x = \cos^{-1}\left(\frac{6.4}{9.6}\right)$$

$$x = 48.2^\circ$$



5. The diagram below shows a quadrilateral.



Calculate the length of the side labelled x.
Give your answer correct to 3 significant figure.

$$BD = 16^2 - 12^2$$

$$= 4\sqrt{7}$$

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

$$\sin(40) = \frac{4\sqrt{7}}{H}$$

$$H = \frac{4\sqrt{7}}{\sin(40)}$$

$$H = 16.5\text{cm}$$

Answers:

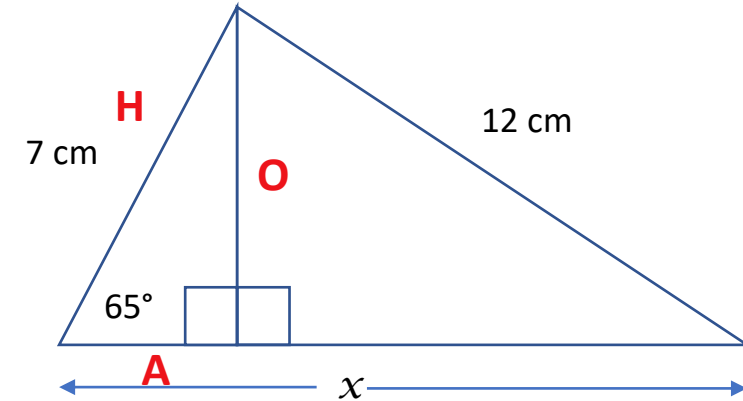
6. Calculate the length of the side labelled x.

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

$$\sin(65) = \frac{O}{7}$$

$$H = 7 \times \sin(65)$$

$$H = 6.344154509$$



Give your answer correct to 3 significant figures.

$$AD = \sqrt{7^2 - 6.344154509^2}$$

$$= 2.958327832 \text{ cm}$$

$$CD = \sqrt{12^2 - 6.344154509^2}$$

$$= 10.18585807 \text{ cm}$$

$$AC = AD + CD$$

$$= 13.1 \text{ cm}$$

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