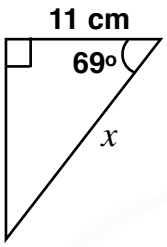
Finding angles using trigonometry

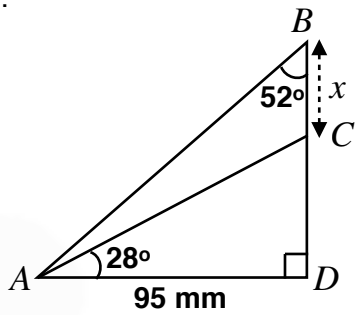
Starter

1. **(Review of last lesson)** Calculate the value of x:

(a)



(b)



Notes

The Greek letter theta, θ, is often used for unknown angles. When asked to calculate an angle using trigonometry, the substitution could look like:

$$\sin\theta = \frac{3}{5}$$

The opposite function of ***sine*** is ***inverse sine*** which is given the notation $\sin^{-1}$. So the next line of working is: $\theta = \sin^{-1}\frac{3}{5}$

To get $\sin^{-1}$ on a calculator press SHIFT then sin: $\theta = \sin^{-1}\frac{3}{5} = 36.9°$ (3 s.f.)

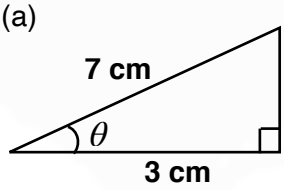
Success criteria — finding an angle using trigonometry

The method to find an angle is similar to finding a side.

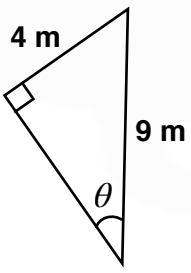
1. Label the relevant sides (ignore the unmarked side).
2. Choose whether to use sin, cos or tan.
3. Write out the formula.
4. Substitute the numbers into the formula.
5. Do $\sin^{-1}$, $\cos^{-1}$ or $\tan^{-1}$ of the fraction.

E.g. 1 Calculate the size of the marked angle to 3 s.f..

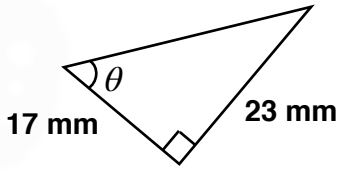
(a)



(b)



(c)

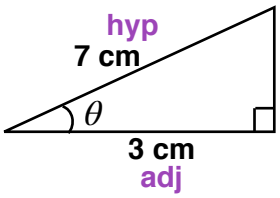


Working: (a) adj and hyp ⇒ cos

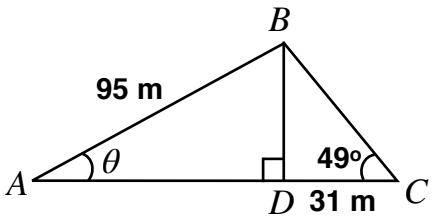
$\cos\theta = \frac{\text{adj}}{\text{hyp}}$: $\cos\theta = \frac{3}{7}$

$\theta = \cos^{-1}\frac{3}{7}$

$\theta = 64.6°$ (3 s.f.)



E.g. 2 Find the size of the marked angle, θ, in the diagram.



E.g. 3 An isosceles has sides 13 cm, 13 cm and 10 cm. Find the angle between the sides which are the same length.

Video: Trigonometry - missing angles

Solutions to Starter and E.g.s

Exercise

9-1 class textbook:	p324 M10.9 Qu 1-14 Draw all diagrams
A*-G class textbook:	p289 M10.9 Qu 1-15 Draw all diagrams
9-1 homework book:	p112 M10.9 Qu 1-12 Draw all diagrams
A*-G homework book:	p82 M10.9 Qu 1-12 Draw all diagrams

Summary

$$\sin\theta = \frac{3}{5} \quad \Rightarrow \quad \theta = \sin^{-1}\frac{3}{5} = 36.9^\circ \text{ (3 s.f.)}$$

To get $\sin^{-1}$ on a calculator press SHIFT then sin:

Success criteria — finding an angle using trigonometry:

1. Label the relevant sides (ignore the unmarked side).
2. Choose whether to use sin, cos or tan.
3. Write out the formula.
4. Substitute the numbers into the formula.
5. Do $\sin^{-1}$, $\cos^{-1}$ or $\tan^{-1}$ of the fraction.