

# Trigonometry

## Do Now...

Find the value of the following to 3dp.

- $\sin 15^\circ = 0.259$
- $\cos 35^\circ = 0.819$
- $\tan 65^\circ = 2.145$
- $\tan 42^\circ = 0.900$
- $\sin 34^\circ = 0.559$
- $\sin 49^\circ = 0.755$
- $\tan 34^\circ = 0.675$
- $\cos 62^\circ = 0.469$
- $\cos 2^\circ = 0.999$
- $\sin 83^\circ = 0.993$

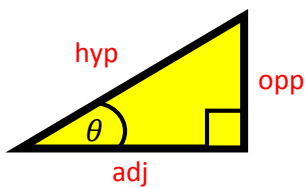
Find the value of the following to 1dp.

- $\tan^{-1}(2.47) = 68.0$
- $\sin^{-1}(0.82) = 55.1$
- $\tan^{-1}(0.0699) = 4.0$
- $\sin^{-1}(0.258) = 15.0$
- $\cos^{-1}(0.258) = 75.0$
- $\sin^{-1}(1) = 90$
- $\cos^{-1}(0) = 90$
- $\cos^{-1}(0.978) = 12.0$
- $\tan^{-1}(4.70) = 78.0$
- $\tan^{-1}(0.158) = 9.0$

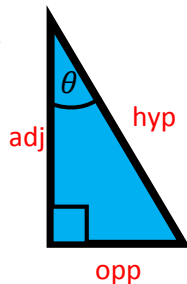
## Labelling Triangles

Label the sides of the triangles below in relation to the angle  $\theta$ .

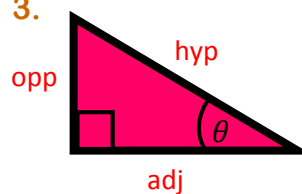
1.



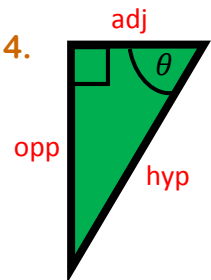
2.



3.



4.



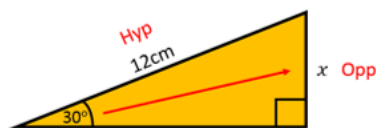
## Using Sine



$$\sin \theta^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{opposite} = \sin \theta^\circ \times \text{hypotenuse}$$

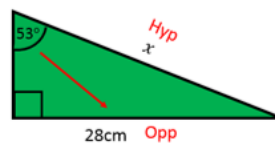
$$\text{hypotenuse} = \frac{\text{opposite}}{\sin \theta^\circ}$$



$$\text{opposite} = \sin \theta^\circ \times \text{hypotenuse}$$

$$\text{opposite} = \sin 30^\circ \times 12$$

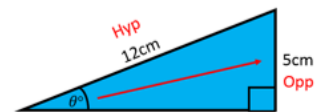
$$x = 6\text{cm}$$



$$\text{hypotenuse} = \frac{\text{opposite}}{\sin \theta^\circ}$$

$$\text{hypotenuse} = \frac{28}{\sin 53^\circ}$$

$$x = 35.06\text{cm}$$



$$\sin \theta^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin \theta^\circ = \frac{5}{12}$$

$$\sin \theta^\circ = 0.4166666\dots$$

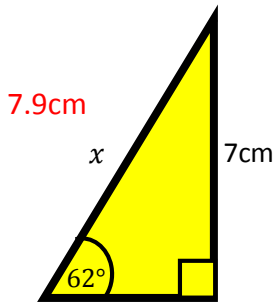
$$\theta^\circ = \sin^{-1}(0.416666\dots)$$

$$\theta = 24.6^\circ$$

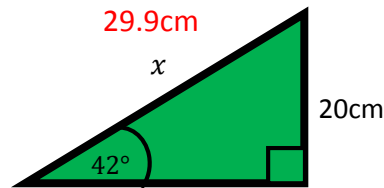
# Consolidation 1

In each of these questions find the length of the side marked  $x$  to 1 decimal place.

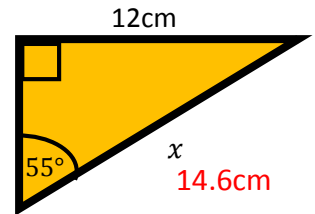
1.



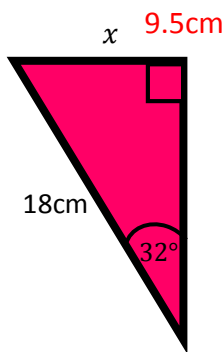
2.



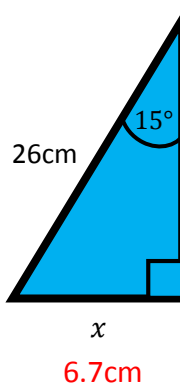
3.



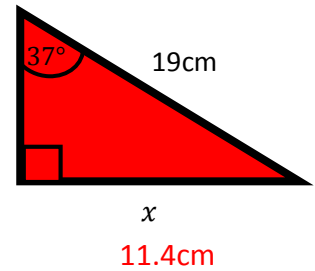
4.



5.

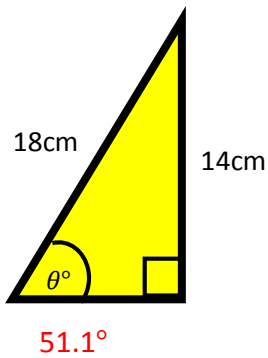


6.

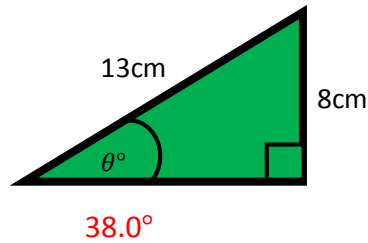


In each of these questions find the size of the angle marked  $\theta$  to 1 decimal place.

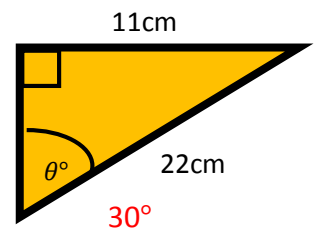
7.



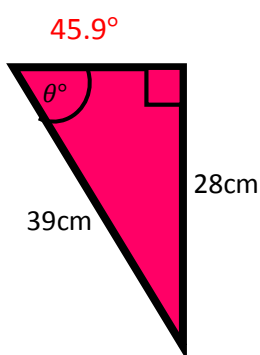
8.



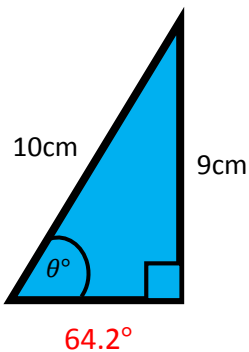
9.



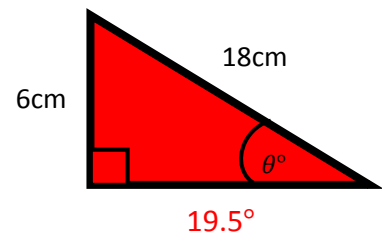
10.



11.



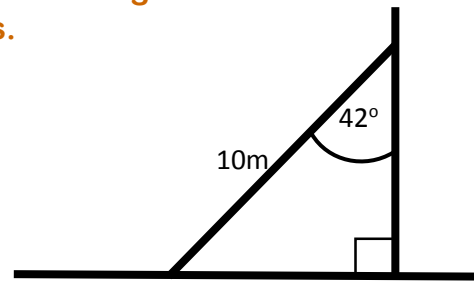
12.



## Extension 1

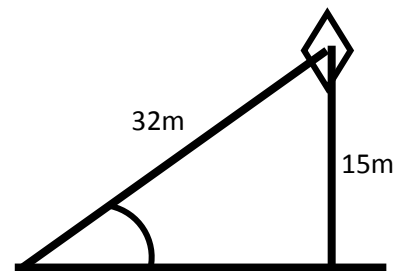
1. A 10m ladder is placed against a wall making a  $42^\circ$  angle with the wall. Calculate how far from the wall the base of the ladder is.

6.69m



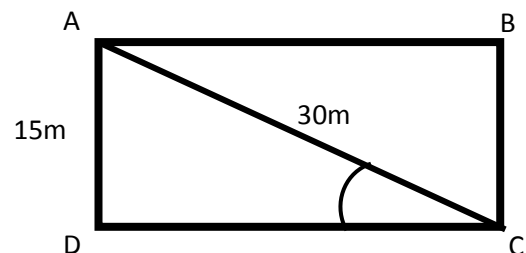
2. A boy is flying a kite in the park. He has let out 32m of string when he gets it stuck around a lamppost. The boy knows the lamppost is 15m high. What angle has the string made with the lamppost?

$28.0^\circ$

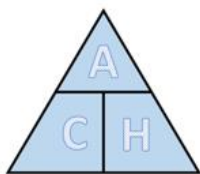


3. ABCD is a rectangular garden. The garden is 15m long and its diagonal is 30m. Work out the size of angle ACD.

$30^\circ$



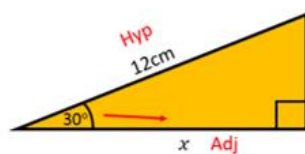
## Using Cosine



$$\cos\theta^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{adjacent} = \cos\theta^\circ \times \text{hypotenuse}$$

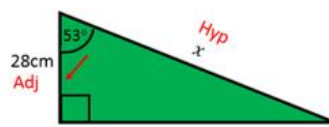
$$\text{hypotenuse} = \frac{\text{adjacent}}{\cos\theta^\circ}$$



$$\text{adjacent} = \cos 30^\circ \times \text{hypotenuse}$$

$$\text{adjacent} = \cos 30^\circ \times 12$$

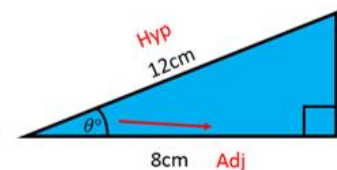
$$x = 10.4\text{cm}$$



$$\text{hypotenuse} = \frac{\text{adjacent}}{\cos\theta^\circ}$$

$$\text{hypotenuse} = \frac{28}{\cos 53^\circ}$$

$$x = 46.5\text{cm}$$



$$\cos\theta^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\cos\theta^\circ = \frac{8}{12}$$

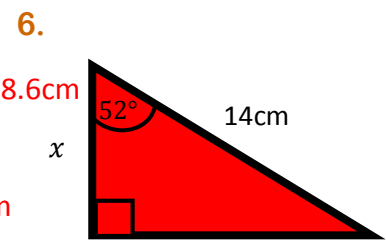
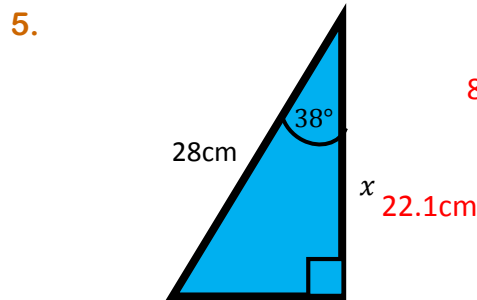
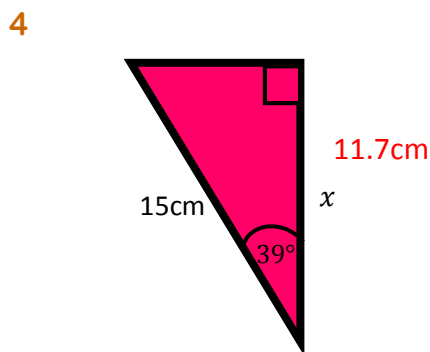
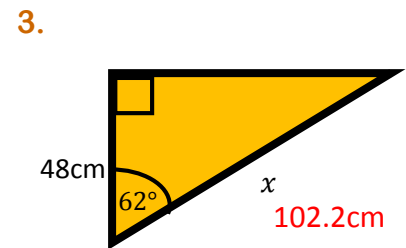
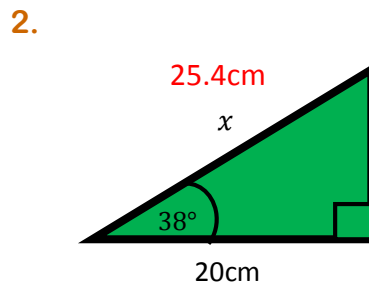
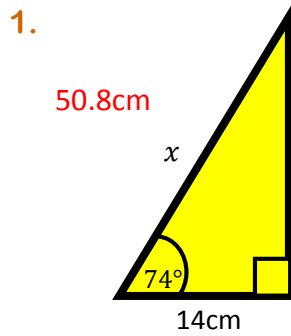
$$\cos\theta^\circ = 0.6666666\dots$$

$$\theta^\circ = \cos^{-1}(0.666666\dots)$$

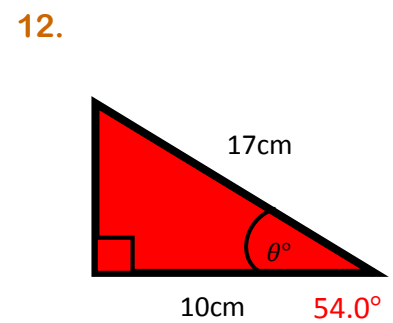
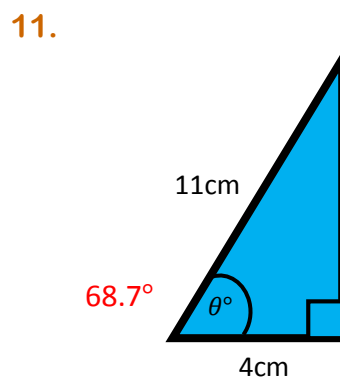
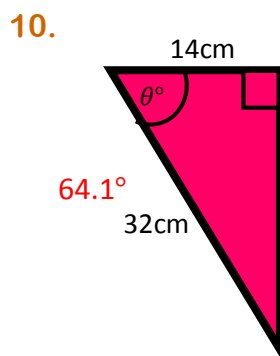
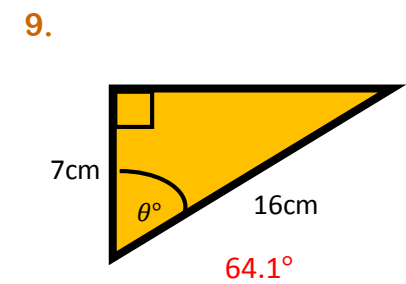
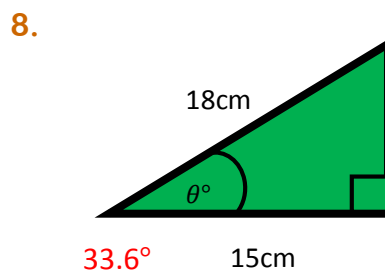
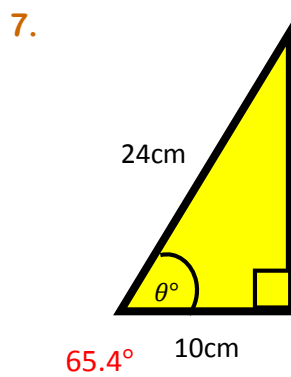
$$\theta = 48.2^\circ$$

## Consolidation 2

In each of these questions find the length of the side marked  $x$  to 1 decimal place.



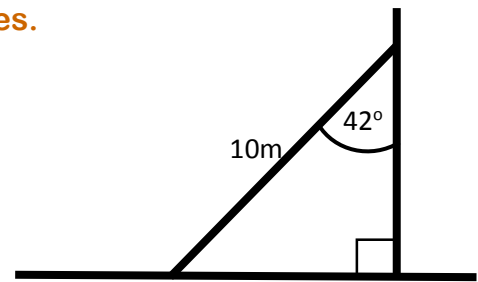
In each of these questions find the size of the angle marked  $\theta$  to 1 decimal place.



## Extension 2

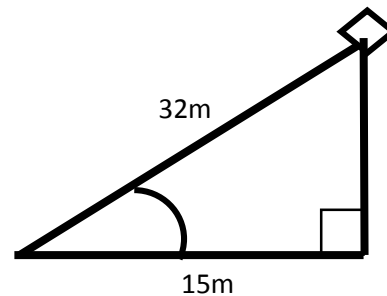
1. A 10m ladder is placed against a wall making a  $42^\circ$  angle with the wall. Calculate how high up the wall the ladder reaches.

7.4m



2. A boy is flying a kite in the park. He has let out 32m of string when he gets it stuck around a lamppost. The boy is 15m away from the lamppost. What angle does the string make with the ground?

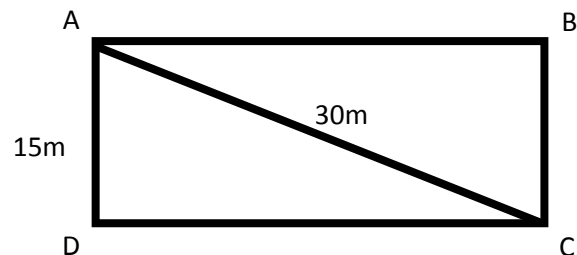
$62.0^\circ$



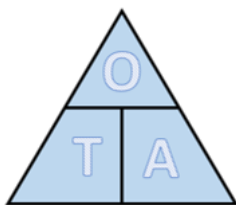
4. ABCD is a rectangular garden. The garden is 15m long and its diagonal is 30m. Work out the size of angle ACD and use this to work out the width of the garden.

$30^\circ$

26.0m



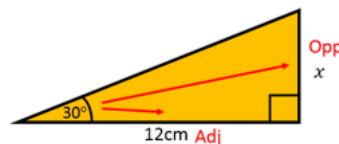
## Using Tangent



$$\tan \theta^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\text{opposite} = \tan \theta^\circ \times \text{adjacent}$$

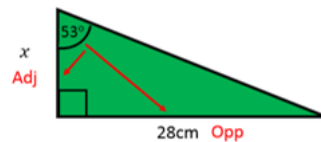
$$\text{adjacent} = \frac{\text{opposite}}{\tan \theta^\circ}$$



$$\text{opposite} = \tan \theta^\circ \times \text{adjacent}$$

$$\text{opposite} = \tan 30^\circ \times 12$$

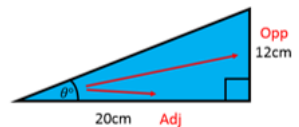
$$x = 6.9\text{cm}$$



$$\text{adjacent} = \frac{\text{opposite}}{\tan \theta^\circ}$$

$$\text{adjacent} = \frac{28}{\tan 53^\circ}$$

$$x = 21.1\text{cm}$$



$$\tan \theta^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\tan \theta^\circ = \frac{12}{20}$$

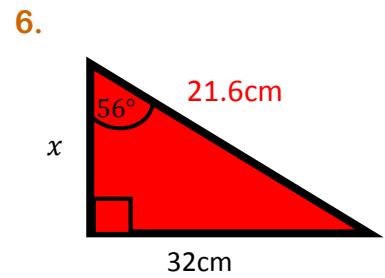
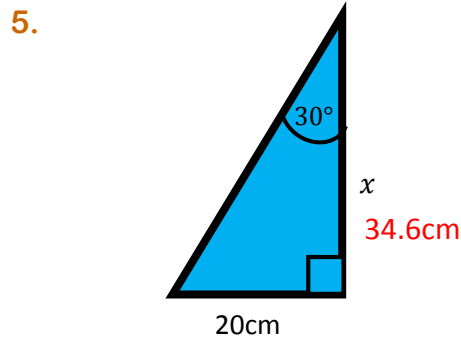
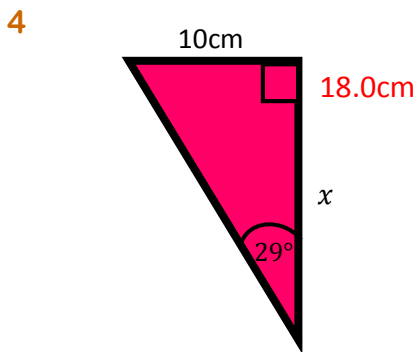
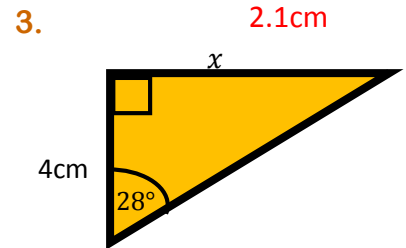
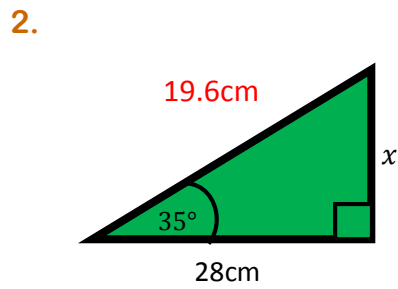
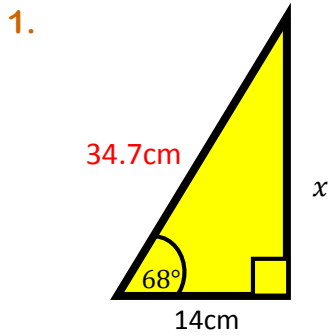
$$\tan \theta^\circ = 0.6$$

$$\theta^\circ = \tan^{-1}(0.6)$$

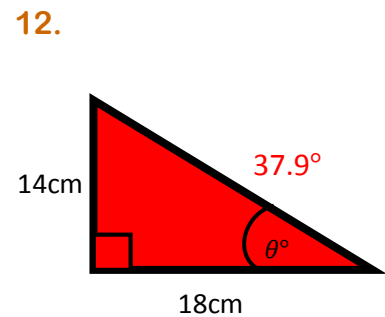
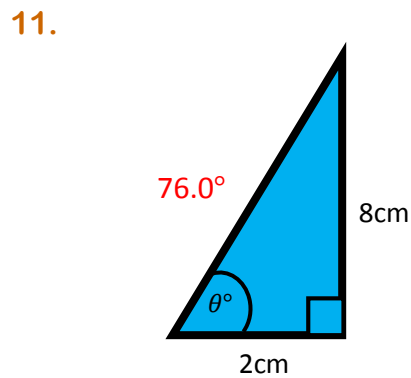
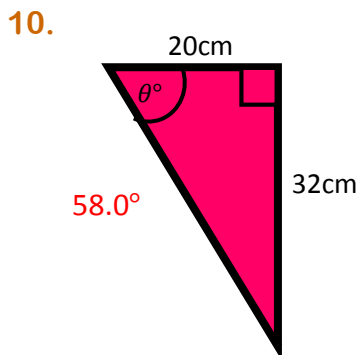
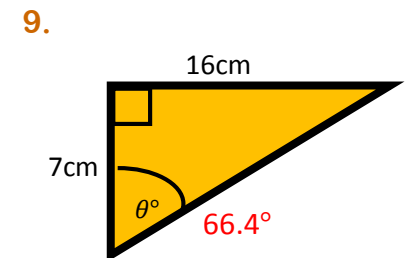
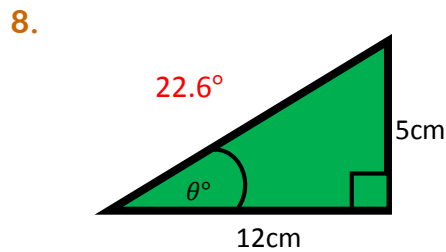
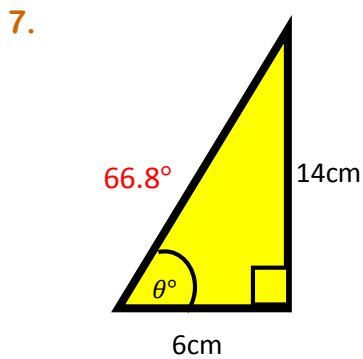
$$\theta = 31.0^\circ$$

# Consolidation 3

In each of these questions find the length of the side marked  $x$  to 1 decimal place.

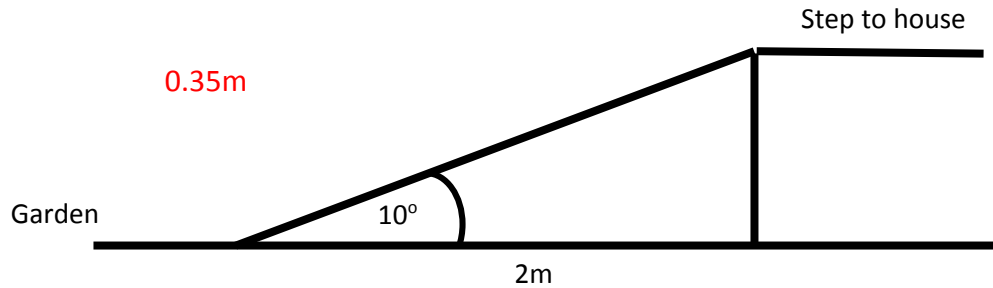


In each of these questions find the size of the angle marked  $\theta$  to 1 decimal place.

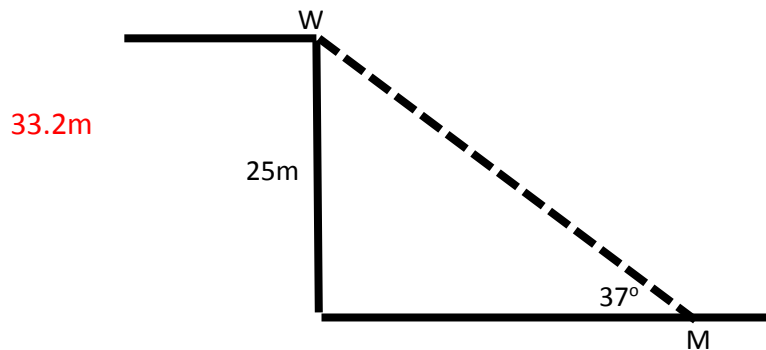


## Extension 3

1. An access ramp is needed to get up the step of a person's house. The ramp makes an angle of  $10^\circ$  with the horizontal of the garden and is 2m away from the base of the step. Calculate the height of the ramp.

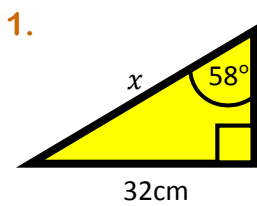


2. A man stands on the beach facing towards a cliff. At the top of the cliff the man sees his wife. The angle of elevation from the man to his wife is  $37^\circ$ . The height of the cliff is 28m. Find the distance between the man and the base of the cliff.

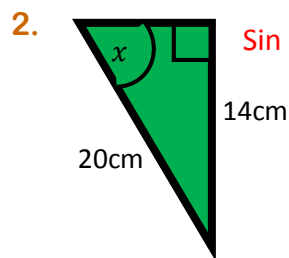


## Which One?

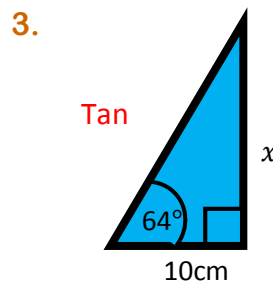
Write down which trig formula you would use to work out  $x$  in each of these:



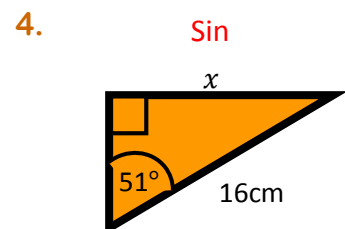
Sin



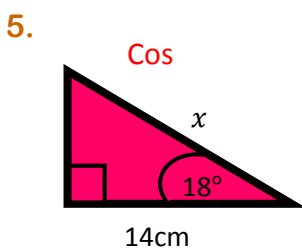
Sin



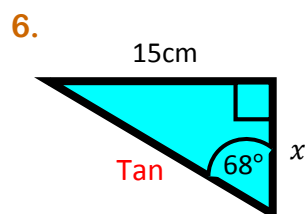
Tan



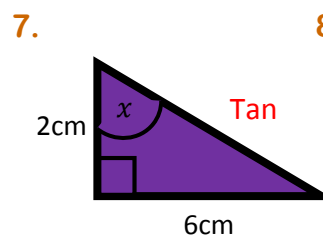
Sin



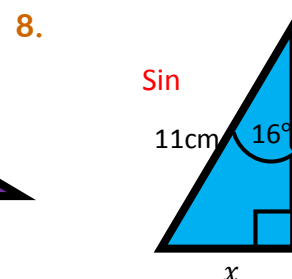
Cos



Tan



Tan

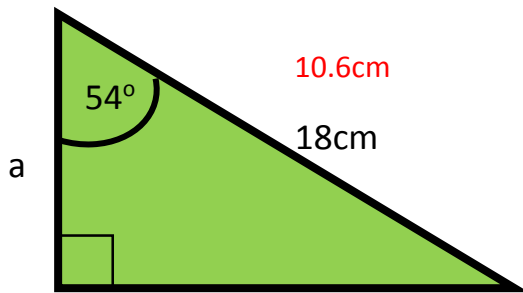


Sin

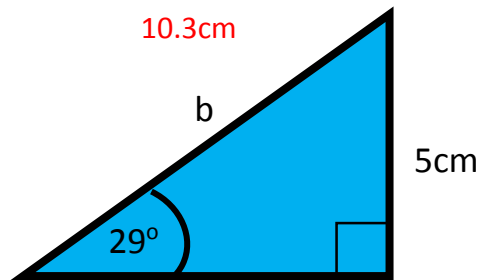
# Mixed Practise

In each of the questions below, calculate either the missing angle or side stated. Give your answer correct to 1 decimal place.

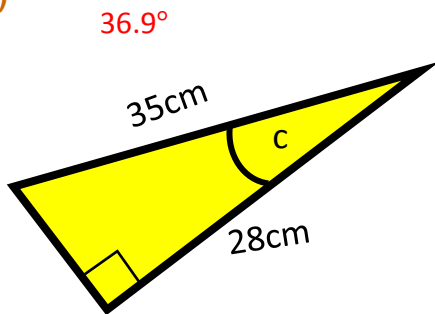
1)



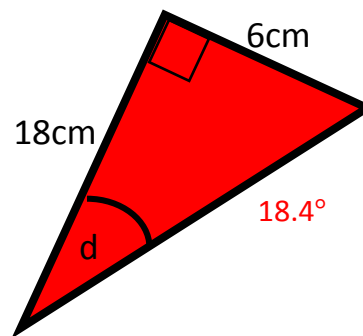
2)



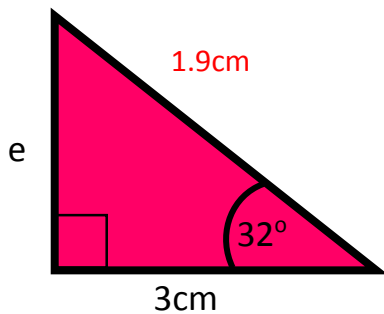
3)



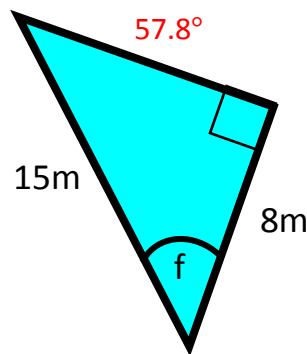
4)



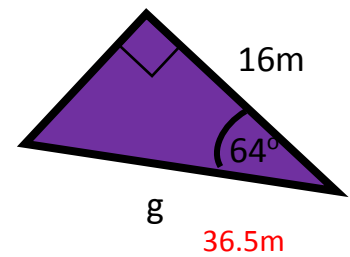
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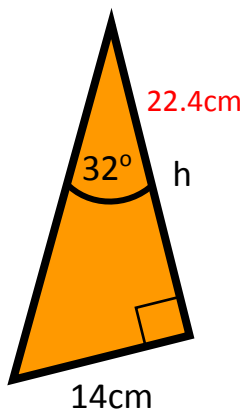
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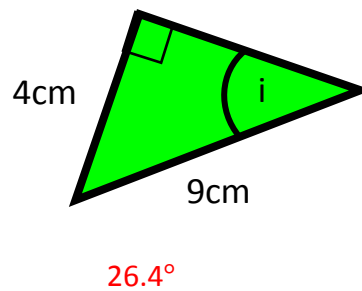
7)



8)



9)



10)

