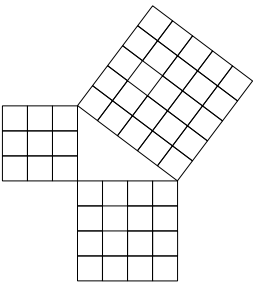
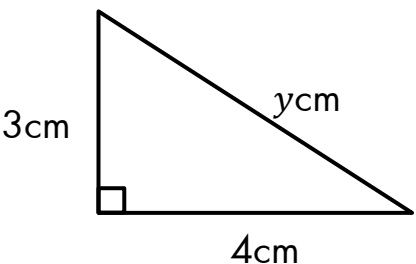
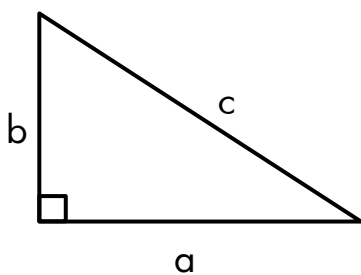


# TRIGONOMETRY - WORKSHEET

A right angled triangle has one angle of  $90^\circ$ . Right angled triangles have many interesting properties. If we know the length of two sides of the triangle, we are able to work out the length of the other side, using Pythagoras' theorem. In the Pythagoras theorem, the sides are defined as  $a$ ,  $b$  and  $c$ , where  $c$  is the hypotenuse (the sloped side):

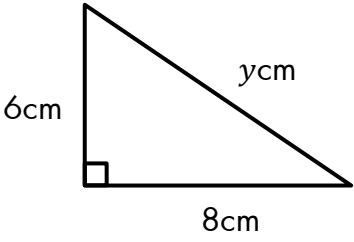
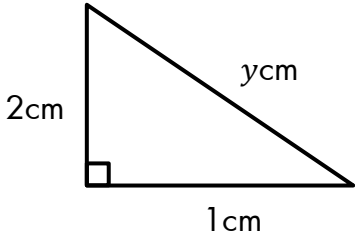
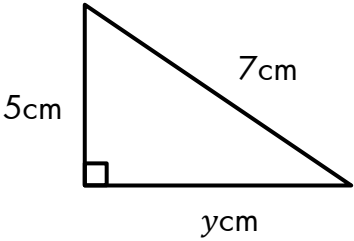
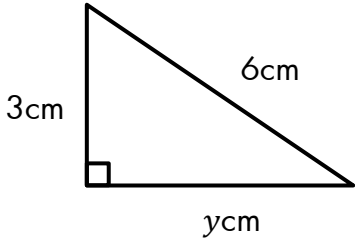
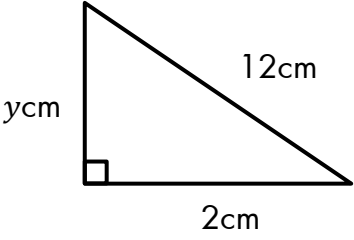
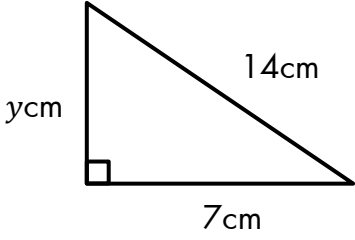
$$a^2 + b^2 = c^2$$

For example, to find  $y$ :  $4^2 + 3^2 = y^2$   
 $16 + 9 = 25$   
 $y = \sqrt{25} = 5$



## TASK A

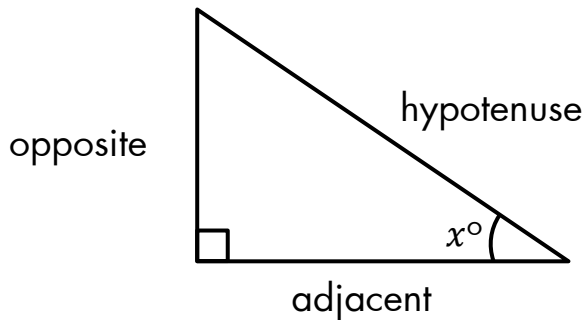
Find the length of the side  $y$ . Note: Triangles are not to scale.

1. 	2. 
3. 	4. 
5. 	6. 

# TRIGONOMETRY - WORKSHEET

--	--

If we only know the length of one side of the right angled triangle, but we know the angles of the corners, we can work out the lengths of the missing sides. We can do this by remembering: SOH, CAH, TOA.



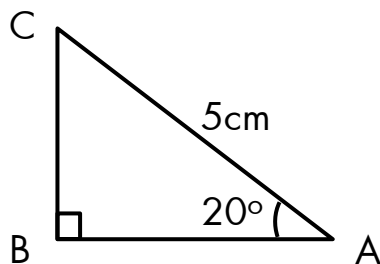
$$\sin(x) = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos(x) = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan(x) = \frac{\text{opposite}}{\text{adjacent}}$$

Let's find the length of BC on the triangle below:

If we look at the  $20^\circ$  angle, BC is opposite this and we have the length of the hypotenuse. Remembering the acronym, we need to use the sine formula, as sine uses opposite over hypotenuse. Let's try:



$$\sin(20) = \frac{BC}{5}$$

$$5 \times \sin(20) = BC = 1.710\text{cm} \approx 1.7\text{cm} (1\text{dp})$$

If we hadn't already found BC, to find AB, we would use the cosine formula:

$$\cos(20) = \frac{AB}{5}$$

$$5 \times \cos(20) = AB = 4.698\text{cm} \approx 4.7\text{cm}$$

Let's check this using Pythagoras' theorem:

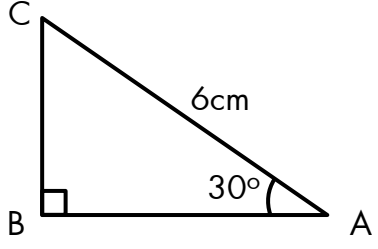
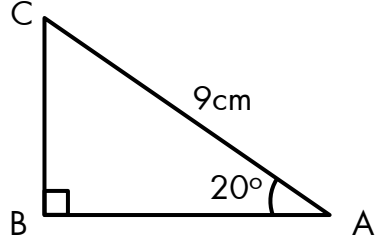
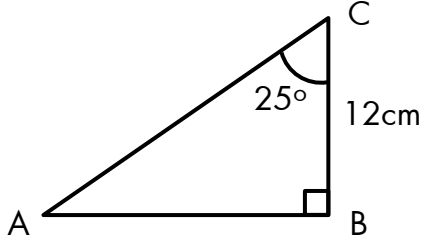
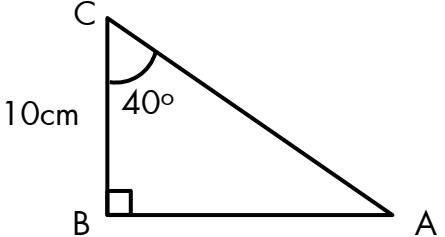
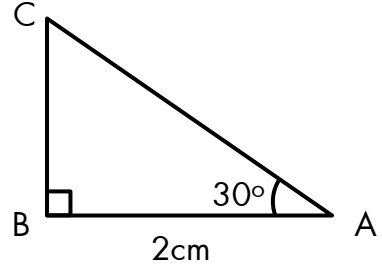
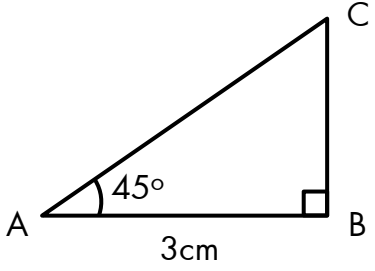
$$AC^2 = 1.710^2 + 4.698^2 = 24.995$$

# TRIGONOMETRY - WORKSHEET

$$AC = \sqrt{24.995} = 5$$

## TASK B

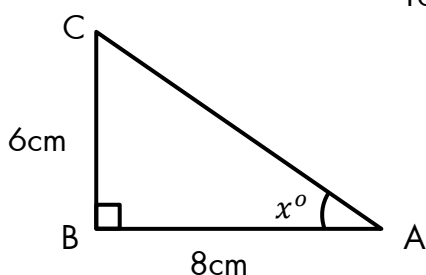
Find the missing lengths of the sides on each of the triangles, without using Pythagoras.  
Note: Triangles are not to scale.

1. 	2. 
3. 	4. 
5. 	6. 

If we are given the lengths of at least two of the sides of a right-angled triangle, we can find the angles of the two remaining angles using the same formulas. You will need to use the  $\sin^{-1}$ ,  $\cos^{-1}$  and  $\tan^{-1}$  functions on your calculator.

To find angle  $x$ :  $\tan(x) = \frac{6}{8} = 0.75$

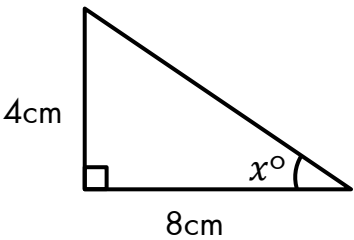
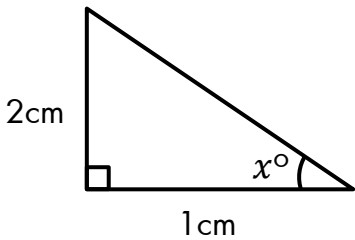
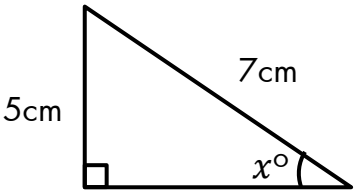
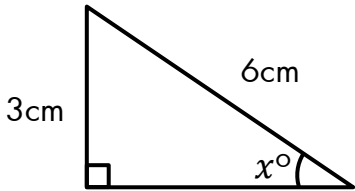
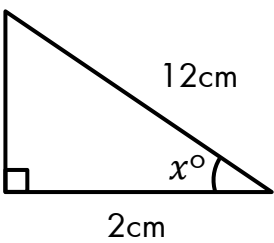
$$x = \tan^{-1}(0.75) = 36.9 \text{ (1dp)}$$



# TRIGONOMETRY - WORKSHEET

## TASK C

Find angle  $x$ .

1. 	2. 
3. 	4. 
5. 	6. 