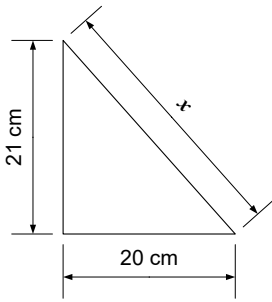


## Pythagoras' Theorem and Trigonometry

Some Officers Have  
 Curley Auburn Hair  
 'Til Old Age

### Worked Example

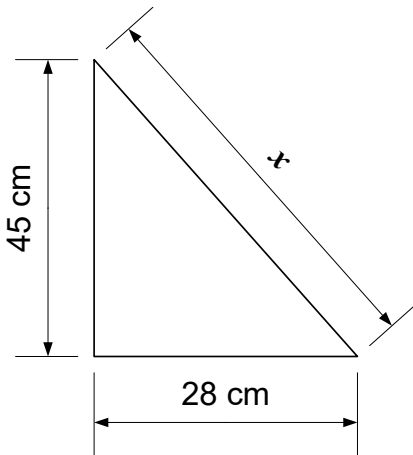


By Pythagoras' Theorem,  $c^2 = a^2 + b^2$ .

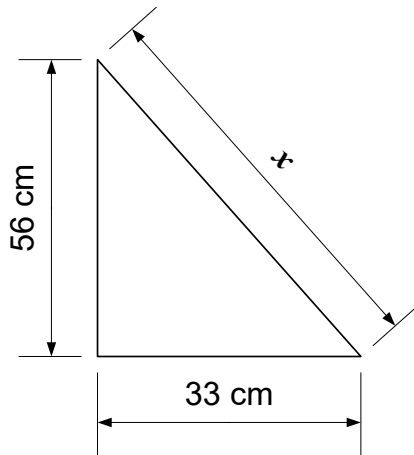
$$\begin{aligned}\therefore x^2 &= 20^2 + 21^2 \\ &= 400 + 441 \\ &= 841 \\ \therefore x &= \sqrt{841} \\ &= 29 \text{ cm}\end{aligned}$$

Follow the worked example to answer the following questions

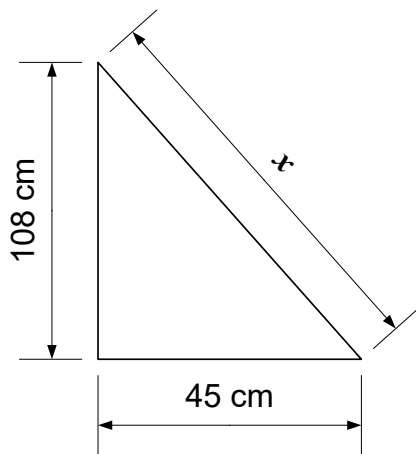
1



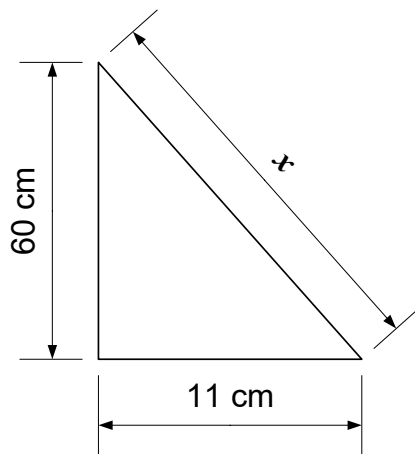
2



3

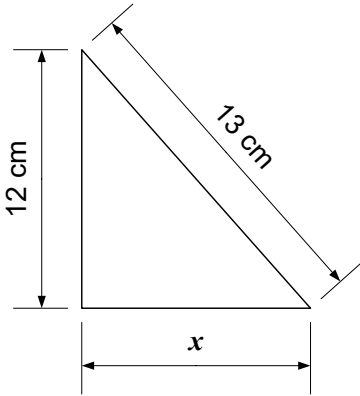


4



### Worked Example

Sometimes, we have to calculate the length of one of the sides which is not the hypotenuse.



By Pythagoras' Theorem,  $c^2 = a^2 + b^2$ .

$$a^2 = c^2 - b^2$$

$$\therefore x^2 = 13^2 - 12^2$$

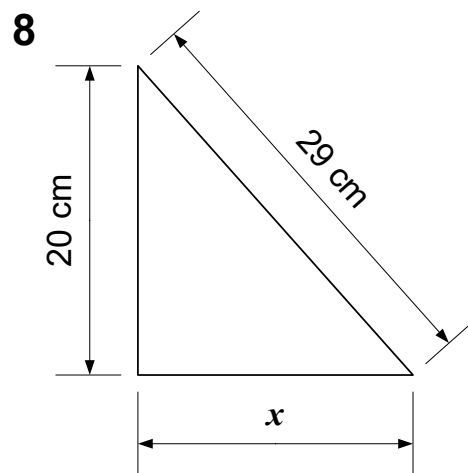
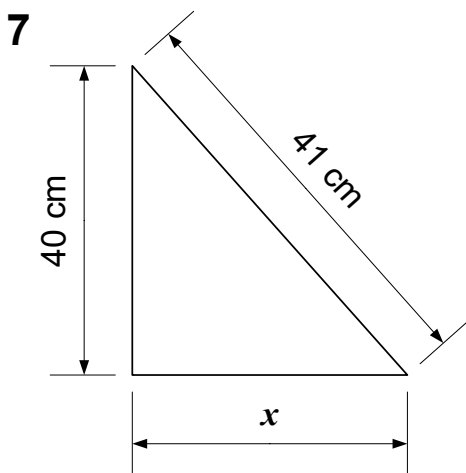
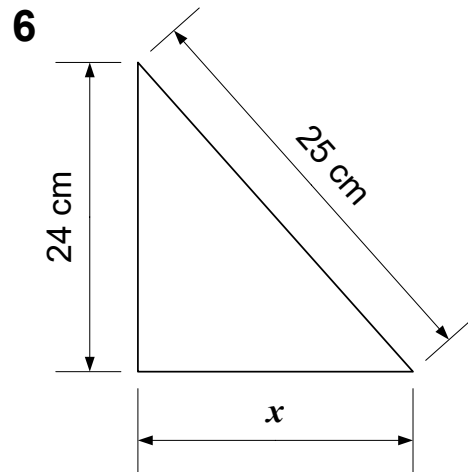
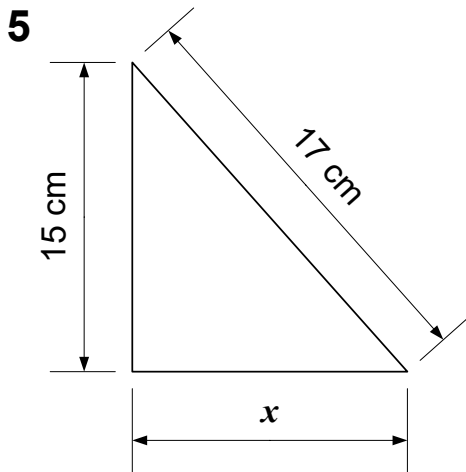
$$= 169 - 144$$

$$= 25$$

$$\therefore x = \sqrt{25}$$

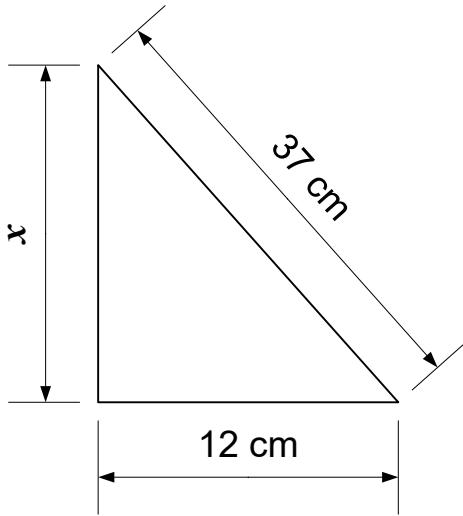
$$= 5 \text{ cm}$$

Follow the worked example to find the answers to the following questions

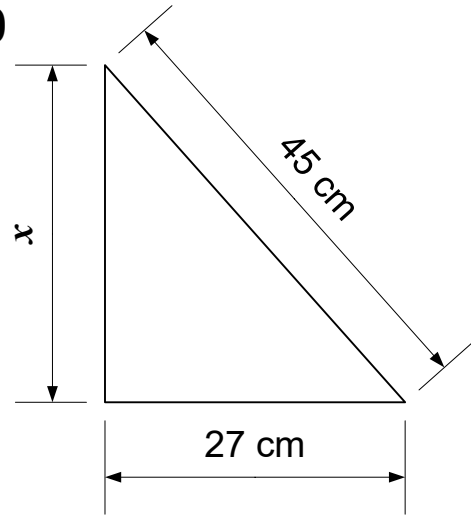


Select the most appropriate method to calculate the following:

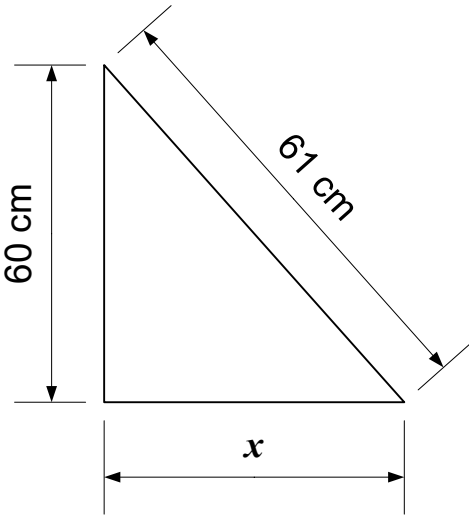
9



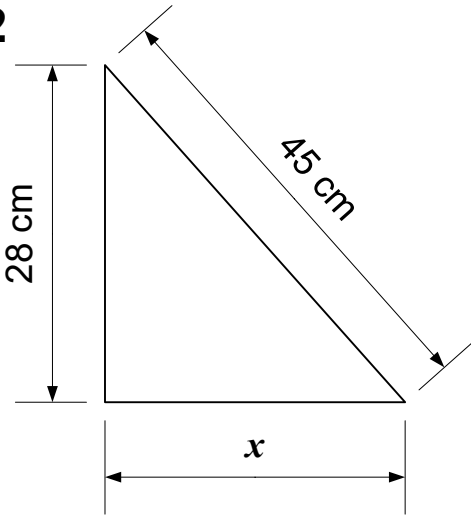
10



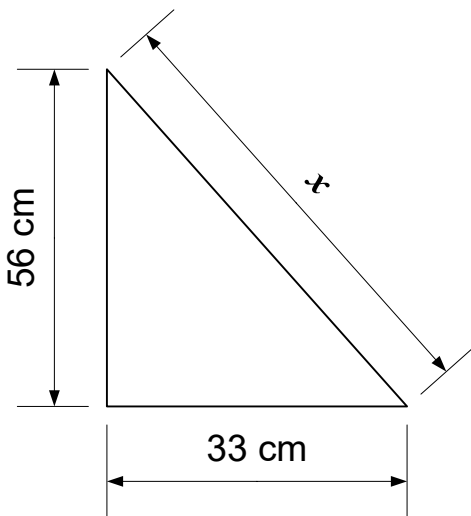
11



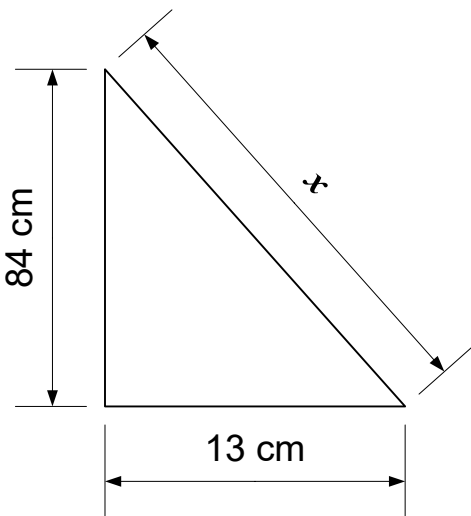
12



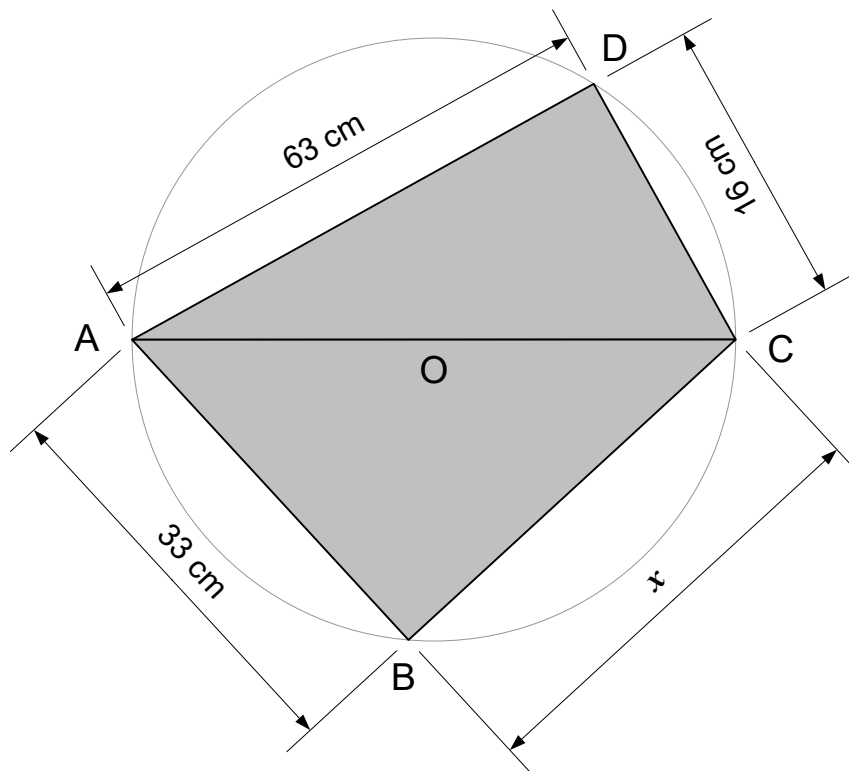
13



14



Use Pythagoras' Theorem to solve this problem



AOC is a diameter in the circle.

Angle ABC and Angle ADC are angles subtended by the diameter (which means that they are right angles).

AD = 63 cm.

DC = 16 cm.

**Use this information to find the diameter of the circle.**

AB = 33 cm.

**Use this and the information you have found to find the length of BC.**

A quadrilateral where all the vertices rest on the circumference of a circle is called a cyclic quadrilateral.

**Find the area of the cyclic quadrilateral by adding the area of each triangle together.**

**Find the radius of the circle.**

**Find the area of the *unshaded* part of the circle.**

## Trigonometry

$$\sin \theta = \frac{\textit{Opposite}}{\textit{Hypotenuse}}$$

$$\cos \theta = \frac{\textit{Adjacent}}{\textit{Hypotenuse}}$$

$$\tan \theta = \frac{\textit{Opposite}}{\textit{Adjacent}}$$

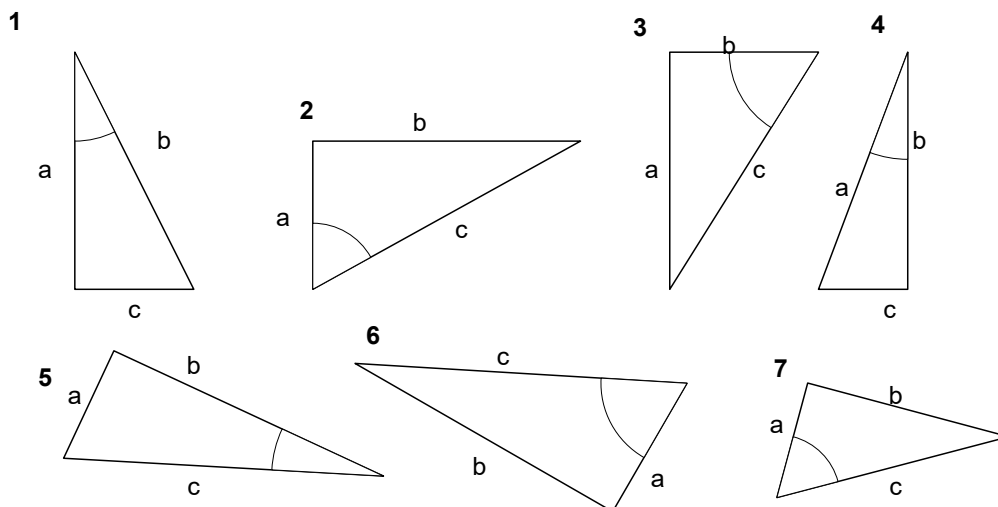
Remember that when you are finding a **side**, use Sin, Cos or Tan on your calculator.

When you are finding an **angle**, use  $\text{Sin}^{-1}$ ,  $\text{Cos}^{-1}$  and  $\text{Tan}^{-1}$  on your calculator.

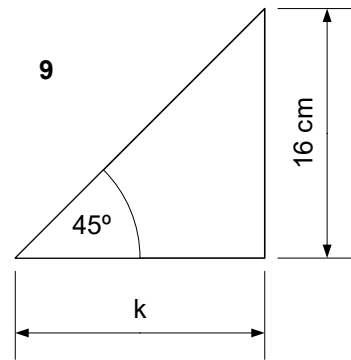
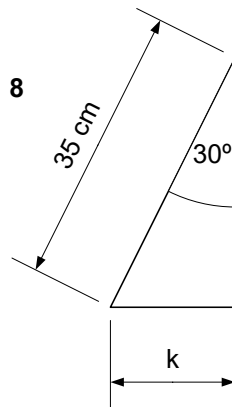
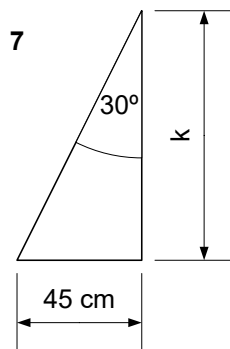
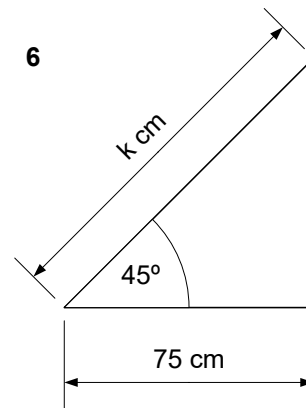
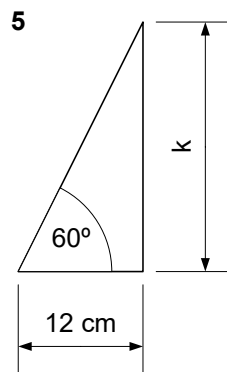
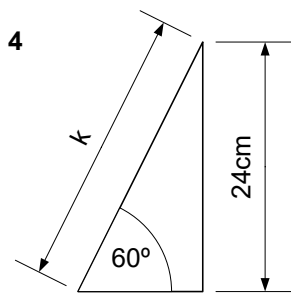
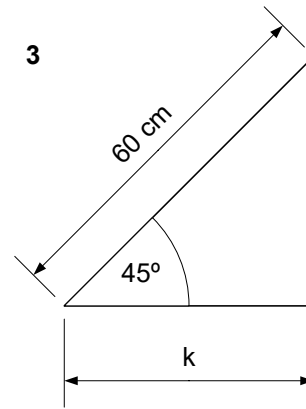
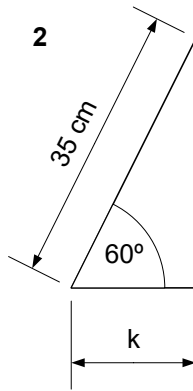
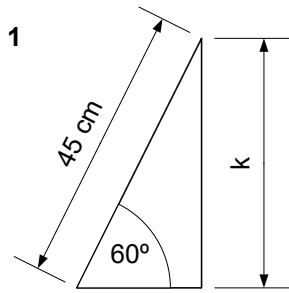
- Copy and fill in the table below with the exact values. Do NOT use a calculator as you may get asked these questions on the Non-Calculator paper.

Angle	Sin	Cos	Tan
$0^\circ$			
$30^\circ$			
$45^\circ$			
$60^\circ$			
$90^\circ$			

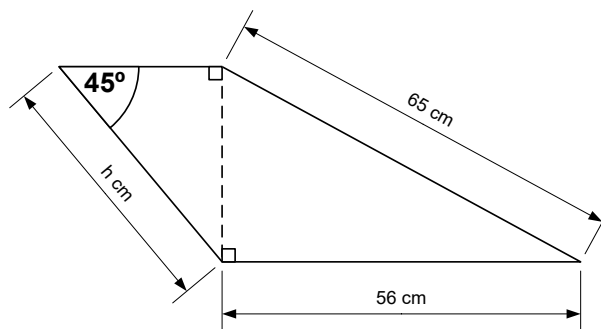
- Label the sides in relation to the angles marked.



Without using a calculator, find the exact values of  $k$ .

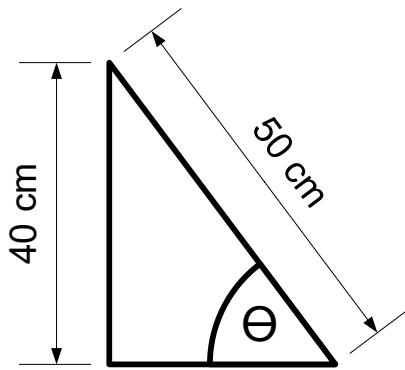


10 Combine your knowledge of Pythagoras and Trigonometry to calculate the value of  $h$ .



Use your calculator to answer the following questions.

Worked Example



Some Officers Have

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

$$\therefore \theta = \sin^{-1} \frac{\text{Opposite}}{\text{Hypotenuse}}$$

$$= \sin^{-1} \left( \frac{40}{50} \right)$$

$$= 53.13010235$$

$$= 57^{\circ} 7' 48.368''$$

Follow the worked example to calculate the following angles.

