Pythagoras and Trigonometry - Class 12

Pythagoras and Trigonometry: to do with right angle triangles. You will get 3 types of questions

1. You are given two sides of the triangle and need to find the 3rd side (Pythagoras)
2. You are given a side and an angle and need to find another side (Trigonometry: input numbers and rearrange to get the unknown on its own)
3. You are given two sides and need to find an angle (Trigonometry: input the numbers and use the inverse function for Sin, Cos or Tan on your calculator)

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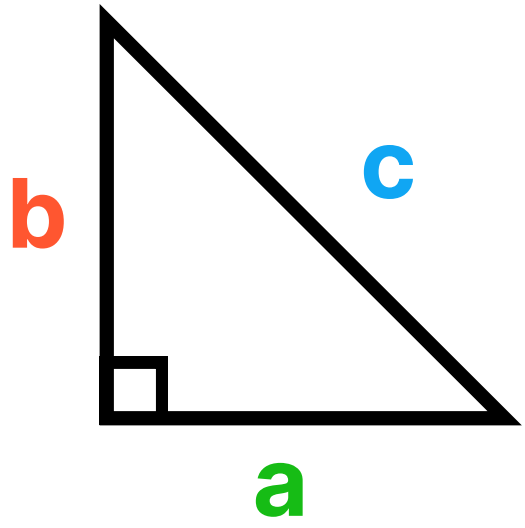
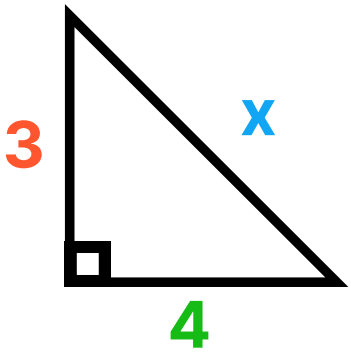
PYTHAGORAS

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



c is the hypotenuse, **a** and **b** are the other two sides. The **hypotenuse** is found opposite the right angle and alwyas the **longest** length of the triangle

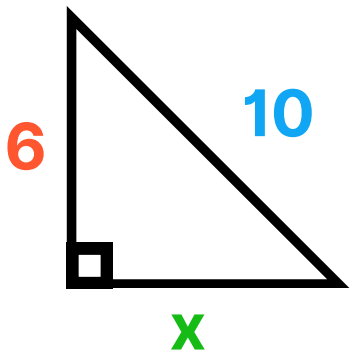
Examples:



$$4^2 + 3^2 = x^2$$

$$16 + 9 = x^2$$

$$x = \sqrt{25} = 5$$



$$x^2 + 6^2 = 10^2$$

$$x^2 + 36 = 100$$

$$x^2 = 64$$

$$x = \sqrt{64} = 8$$

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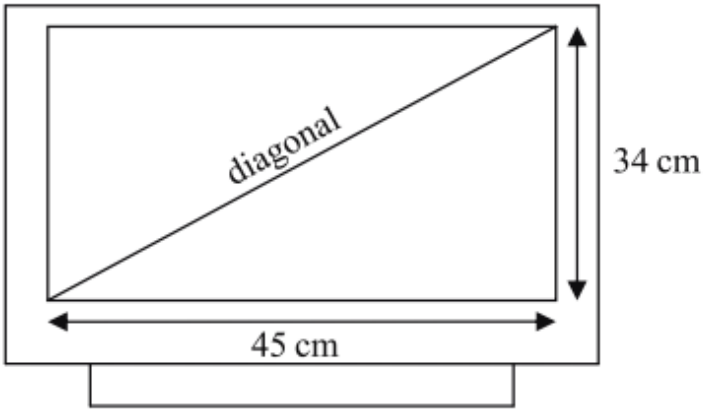

Diagram **NOT** accurately drawn

A rectangular television screen has a width of 45 cm and a height of 34 cm.

Work out the length of the diagonal of the screen.
Give your answer correct to the nearest centimetre.

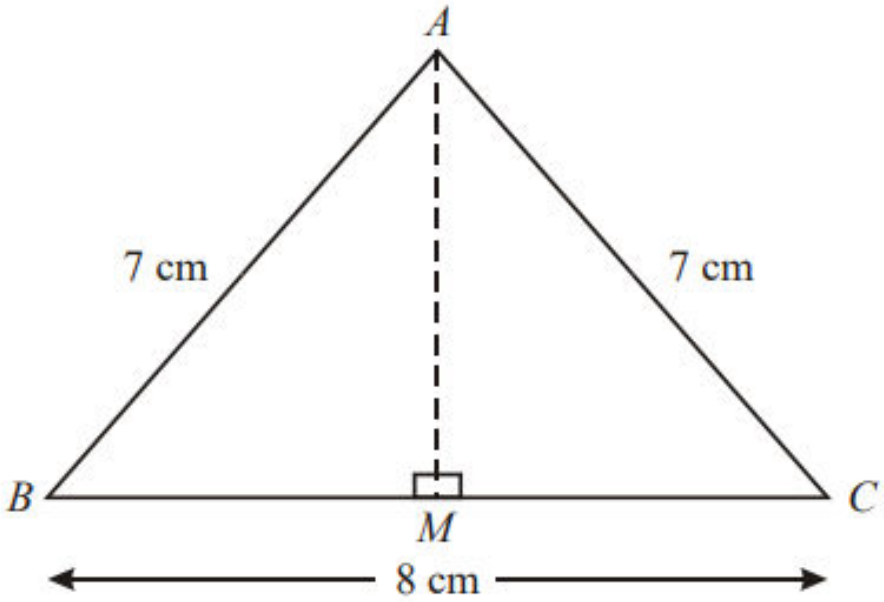

Diagram **NOT** accurately drawn

Work out the length, in centimetres, of AM.
Give your answer correct to 2 decimal places.

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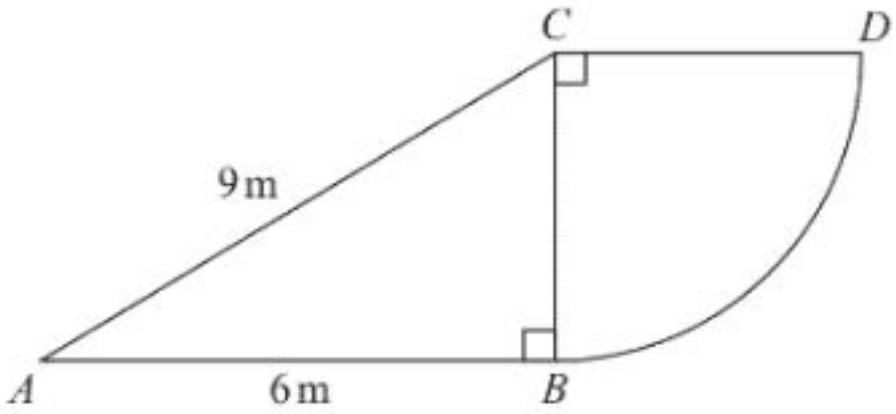
The diagram shows a right-angled triangle and a quarter circle.



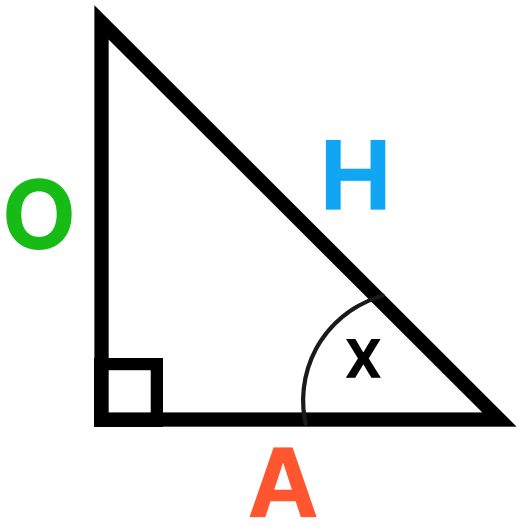
The right-angled triangle ABC has angle $ABC = 90°$
The quarter circle has centre C and radius CB.

Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.
You must show all your working.

SOHCAHTOA - TRIGONOMETRY

First we need to be able to label each side of a right-angled triangle:

- The **hypotenuse (H)** is always the longest side; it is the one opposite the right angle
- The **opposite (O)** side is the side that is opposite to the angle.
- The **adjacent (A)** side is the side that is adjacent (next to) the angle.



$$\sin(x) = \frac{O}{H}$$

$$\cos(x) = \frac{A}{H}$$

$$\tan(x) = \frac{O}{A}$$

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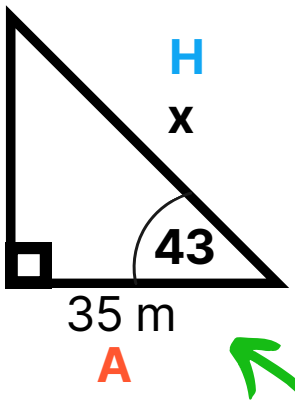
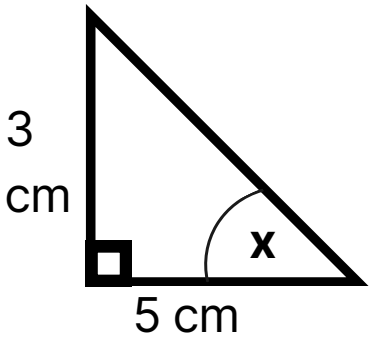
Examples:



$$\cos(x) = \frac{A}{H} \longrightarrow \cos(43) = \frac{35}{x}$$

$$x = \frac{35}{\cos(43)} = 47.9 \text{ (1 decimal place)}$$

finding a missing length



$$\tan(x) = \frac{3}{5} \longrightarrow x = \tan^{-1}\left(\frac{3}{5}\right)$$

$$x = 30.96 \text{ (2 decimal places)}$$

finding a missing angle

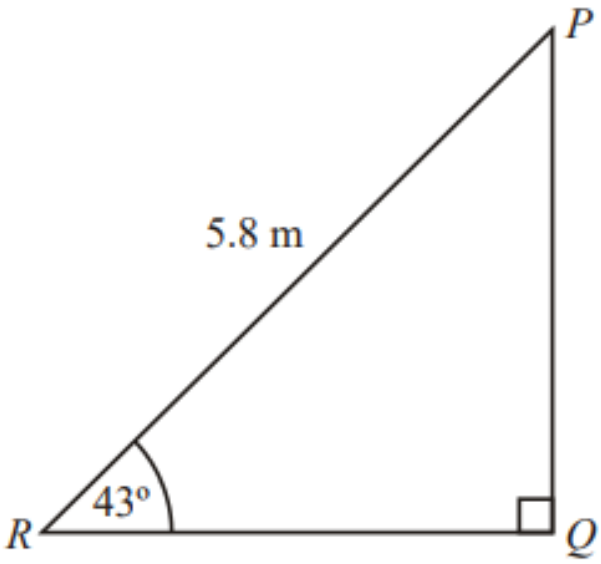


Diagram **NOT** accurately drawn

PQR is a triangle.
Angle $Q = 90°$.
Angle $R = 43°$.
$PR = 5.8$ m.

Calculate the length of QR.
Give your answer correct to 3 significant figures.

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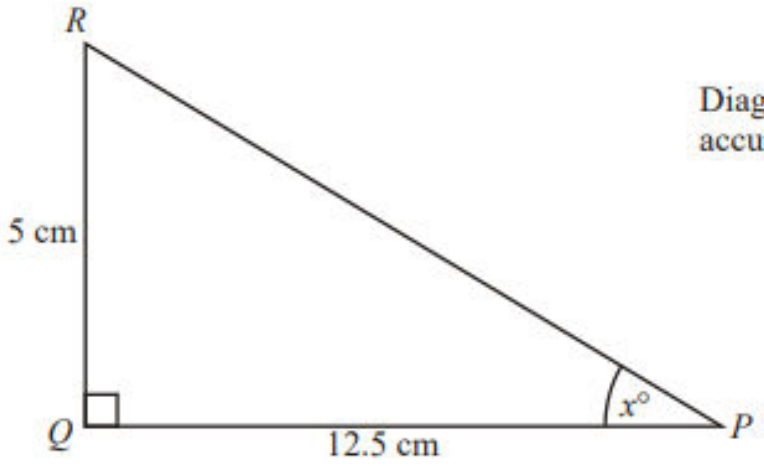
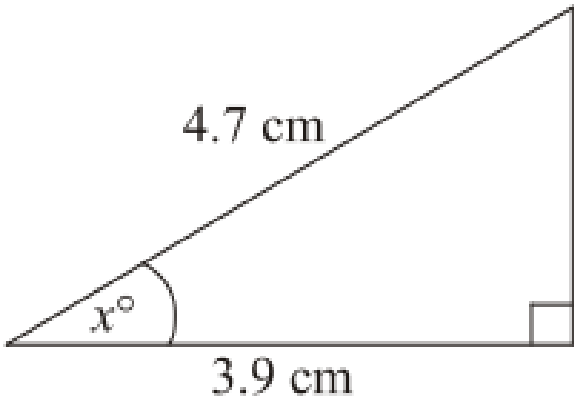


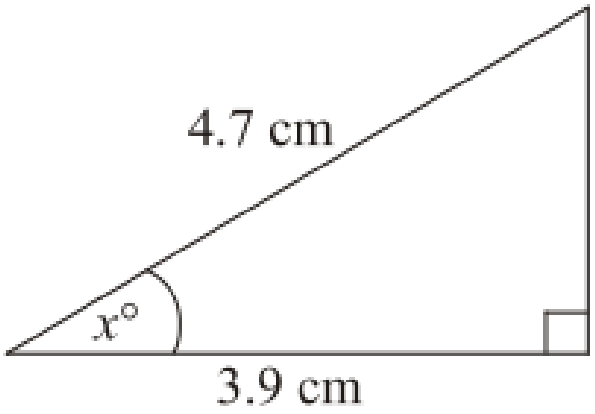
Diagram **NOT** accurately drawn

PQR is a triangle.
Angle $PQR = 90^0$.
$PQ = 12.5$ cm.
$QR = 5$ cm.

Calculate the value of x.
Give your answer correct to 1 decimal place.



Work out the value of x.
Give your answer correct to 1 decimal place.



Work out the value of x.
Give your answer correct to 1 decimal place.