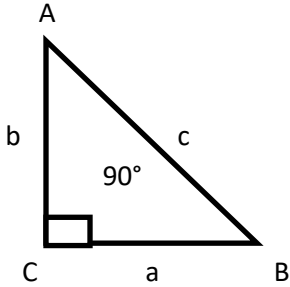


PYTHAGORA'S RULE (THEOREM)

1. Pythagoras theorem is all about right-angled triangle.
2. In a right angled triangle, the hypothesis is the longest side and it is the side opposite the right angle (90°).



The other two sides are referred to as “Sides adjacent to the right angle”. Small letters are usually used to represent the sides of a triangle.

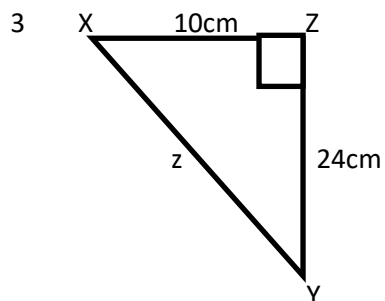
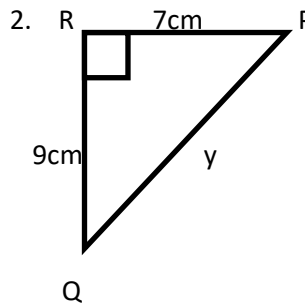
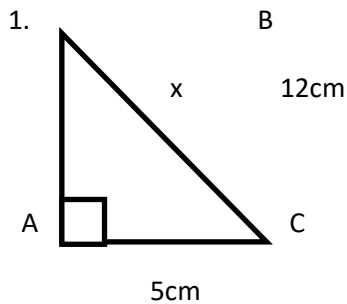
3. The Pythagoras theorem states that “In a right angled triangle, the square of the hypotheses are equal to the sum of the squares of the other two sides”. i.e From the above diagram

$$C^2 = a^2 + b^2$$

C Squared = a squared + b squared

Find the length of the hypotenuse in a right angled triangle.

Example: Calculate the length of the sides marked x, y and z (hypotenuse) in the diagrams below.



Solution

1. In triangle ABC, the marked side x is the hypotenuse

Therefore $AB^2 = AC^2 + BC^2$ (Pythagoras theorem)

$$X^2 = 5^2 + 12^2$$

$$X^2 = 25 + 144$$

$$X^2 = 169$$

To obtain the square root of the both side

$$\sqrt{X^2} = \sqrt{169}$$

$$x = \pm 13$$

Since distance will always be positive, we ignore B, therefore $x = 13\text{cm}$

2. In $\triangle PQR$, the marked side y be the hypotenuse

Therefore $PQ^2 = PR^2 + QR^2$

$$Y^2 = 7^2 + 9^2$$

$$Y^2 = 49 + 81 = 130$$

$$\sqrt{Y^2} = \sqrt{130}$$

$$y = 11.4\text{cm}$$

3. In $\triangle XYZ$, the marked side z is the hypotenuse.

Therefore $XY^2 = XZ^2 + YZ^2$ (Pythagoras theorem)

$$Z^2 = 10^2 + 24^2$$

$$Z^2 = 100 + 576 = 676$$

$$\sqrt{Z^2} = \sqrt{676}$$

$$Z = 26\text{cm}$$

Assignment

Calculate the length of the sides marked a, b, c, d, e in the following diagrams. All units are in cm.

