NICKS & TRICKS

LCOL Guide to – Trigonometry – Part 1

1. Sine, Cos & Tan

$$Sin\ A = \frac{a}{c} \quad Cos\ B = \frac{b}{c} \quad Tan\ A = \frac{a}{b}$$

SOH – CAH – TOA

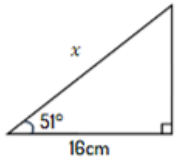
$$\text{Sin} = \frac{\text{Opp}}{\text{Hyp}} \quad \text{Cos} = \frac{\text{Adj}}{\text{Hyp}} \quad \text{Tan} = \frac{\text{Opp}}{\text{Adj}}$$

Sin/Cos/Tan are just buttons on your calculator! Do not be intimidated by them!

These formulas are on the bottom of page 16.

Use these when you have an angle and one side and you want to find the length of another side!

Which formula you use depends on which side you know and which side you are trying to find.



Here we have "b" and want to find "c" so we will use Cos!

$$Cos\ 51° = \frac{16}{x}$$

$$x = \frac{16}{Cos\ 51°}$$

$$x = 25.4cm$$

We use Sine, Cos, or Tan when we either have an angle and are looking for the length of a side, or we have sides and we're looking for an angle!

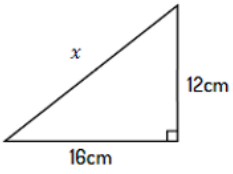
2. Pythagoras Theorem

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

This formula is on the bottom of page 16.

Use it when you know the length of 2 sides of a triangle and you want to find the length of the 3rd side!

For this formula, it does not matter which side you call "a" and which side you call "b", but "c" will always be the hypotenuse



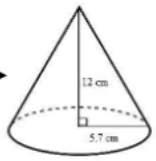
$$x^2 = 16^2 + 12^2$$

$$x^2 = 400$$

$$x = \sqrt{400}$$

$$x = 20$$

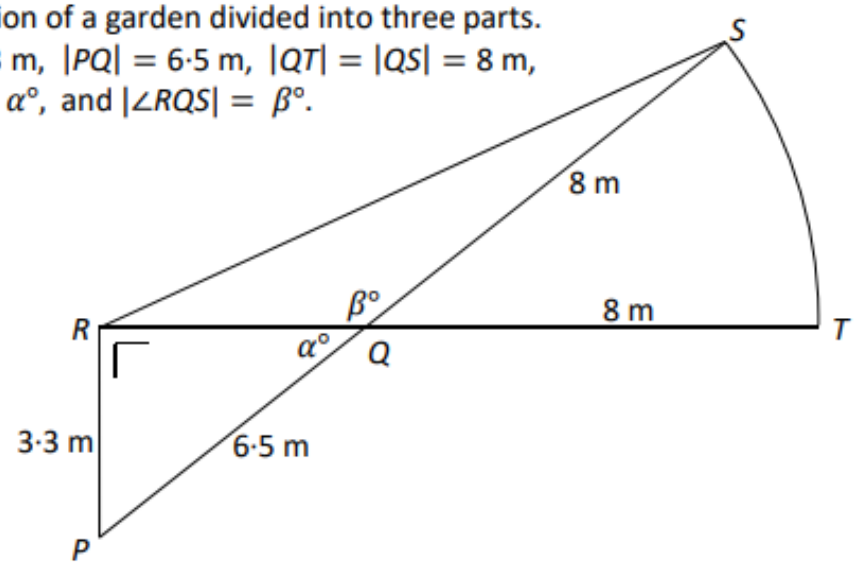
Watch out for this formula being needed for 3D shapes such as cones too!



Worked Example

Question:

The diagram shows a section of a garden divided into three parts.
In the diagram: $|PR| = 3{\cdot}3$ m, $|PQ| = 6{\cdot}5$ m, $|QT| = |QS| = 8$ m, $|\angle QRP| = 90°$, $|\angle PQR| = \alpha°$, and $|\angle RQS| = \beta°$.



(a) Use the theorem of Pythagoras to find $|RQ|$.

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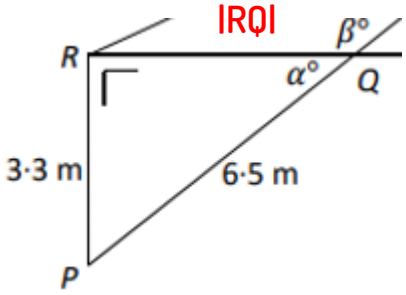
a) Pythagoras
$c^2 = a^2 + b^2$

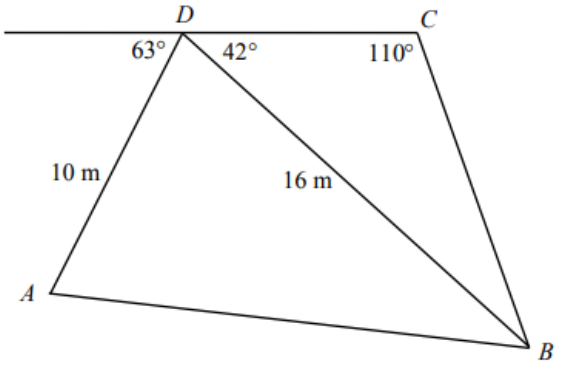
$6.5^2 = 3.3^2 + |RQ|^2$
$42.25 = 10.89 + |RQ|^2$
$42.25 - 10.89 = |RQ|^2$
$31.36 = |RQ|^2$
$|RQ| = \sqrt{31.36}$
$|RQ| = 5.6$



2 Questions – Time yourself!

Question 1

The diagram shows the triangles BCD and ABD, with some measurements given. Find $|BC|$, correct to two decimal places.



Question 2

Find the area of the triangle BCD, correct to two decimal places.