

NICKS & TRICKS

LUKE'S GUIDE TO JUNIOR CERT HL MATHS

Topic 2 - Trigonometry

Trigonometry is your section in Junior Cert involving triangles! Junior Cert focuses primarily on **right-angled triangles**. Learn the nicks & tricks below to help you find any angle or any side of the triangles on your exam!

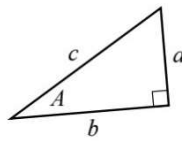
- (i) Page 16 Log Tables
- (ii) Pythagoras
- (iii) Sin/Cos/Tan
- (iv) Similar Triangles

(i) PAGE 16 LOG TABLES

The bottom half of page 16 of the Log Tables is **KEY** for trigonometry.

Triantán dronuilleach

Right-angled triangle



$$\sin A = \frac{a}{c}$$

$$\cos A = \frac{b}{c}$$

$$\tan A = \frac{a}{b}$$

teoirim Phiotagaráis

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

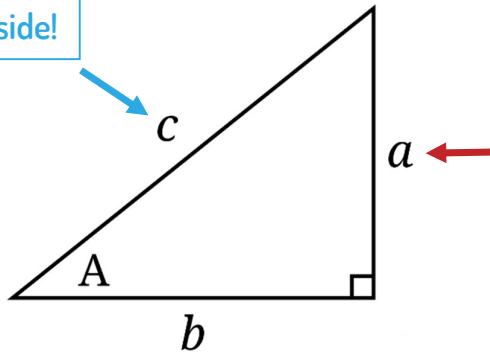
Pythagoras' theorem

- 16 -

These formulas come up **at least once every year!** If you understand the diagram of the triangle it shows, then you will understand how to sub things correctly into all the formulas. **"a" is the opposite**, **"b" is the adjacent**, **"c" is the hypotenuse** and **"A" is the angle in the triangle**.

TO REMEMBER THESE, REMEMBER:

"c" is always the longest side!



"a" is always opposite the labelled angle!

"b" is always the last side!

If no angle is labelled, it does not matter which side you call "a" and which you call "b"!

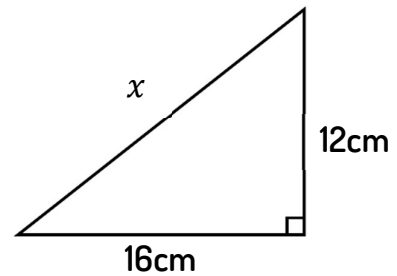
(ii) PYTHAGORAS

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

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



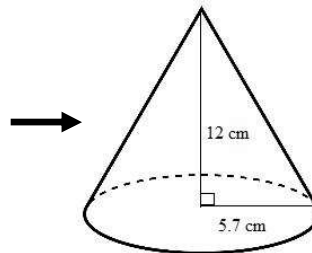
$$x^2 = 16^2 + 12^2$$

$$x^2 = 400$$

$$x = \sqrt{400}$$

$$x = 20$$

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



(iii) SIN/COS/TAN

$$\sin A = \frac{a}{c} \quad \cos B = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

SOH – CAH – TOA

$$\sin = \frac{\text{Opp}}{\text{Hyp}} \quad \cos = \frac{\text{Adj}}{\text{Hyp}} \quad \tan = \frac{\text{Opp}}{\text{Adj}}$$

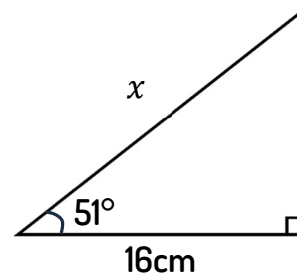
Sin/Cos/Tan are just buttons on your calculator! Do not be intimidated by them!

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**.

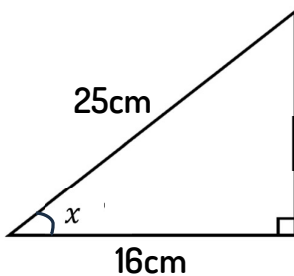
Here we have “b” and want to find “c” so we will use Cos!



$$\cos 51^\circ = \frac{16}{x}$$

$$x = \frac{16}{\cos 51^\circ}$$

$$x = 25.4\text{cm}$$



Sometimes, you may **know 2 sides** of the triangle and **want to find an angle**.

Here is where we use
 \sin^{-1} , \cos^{-1} , \tan^{-1}

$$\begin{aligned} \cos x &= \frac{16}{25} \\ x &= \cos^{-1}\left(\frac{16}{25}\right) \\ x &= 50.2^\circ \end{aligned}$$

Sub into your formula as normal, and then bring the Sin/Cos/Tan over to the other side of the equals using $\sin^{-1}/\cos^{-1}/\tan^{-1}$. This will give you the angle!

Do not fear $\sin^{-1}/\cos^{-1}/\tan^{-1}$, they are just different buttons the calculator!

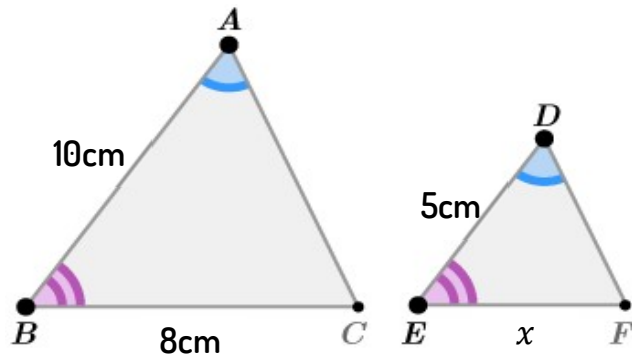
(iv) SIMILAR TRIANGLES

2 triangles are similar if they have the **same angles**, but **different length sides**.

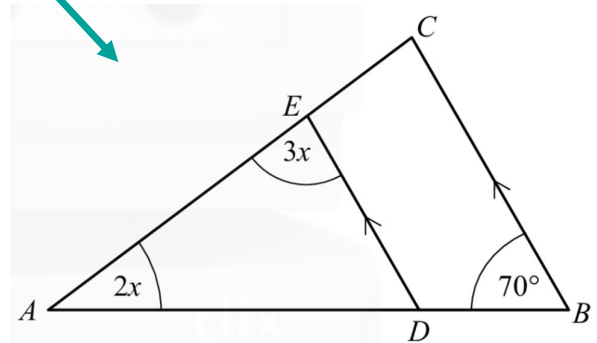
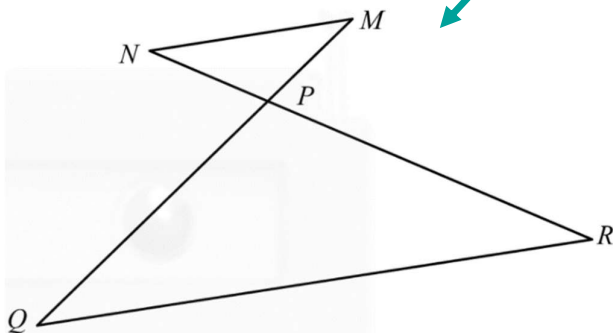
The **KEY** to these questions is to remember that the **sides of the triangles are proportional** to each other!

$$\frac{\text{Side 1 in Triangle A}}{\text{Side 2 in Triangle A}} = \frac{\text{Corresponding Side 1 in Triangle B}}{\text{Corresponding Side 2 in Triangle B}}$$

$$\frac{8}{10} = \frac{x}{5}$$
$$5\left(\frac{8}{10}\right) = x$$
$$x = 4\text{cm}$$



Sometimes the orientation of the triangles might be different or the triangles might be inside each other, but this does not change the way you do the question! They like to do this so **WATCH OUT!**



LUKE'S EXAM PREDICTIONS

- **Pythagoras** has come up at least once every year for the past 5 years!
 - **Sin/Cos/Tan** have come up at least once every year for the past 5 years!
 - **$\text{Sin}^{-1}/\text{Cos}^{-1}/\text{Tan}^{-1}$** have come up 3 out of the past 5 years!
 - **Similar Triangles** have come up 3 out of the past 5 years!
-

If you study this guide, you will **ace** any trigonometry question on your exam! As trigonometry comes up every year, this is **free marks!**

“How do you eat an elephant? One bite at a time!”