

## Topic 9: Trigonometry

### 1) The Basics:

#### a) Calculator Use:

##### Notes:

- Make sure your calculator is in 'Degree' mode i.e. there is a 'DEG' or a 'D' on the top of your screen.
- If you know the angle, and you want to find Sin, Cos or Tan of it, you can just type it in straight.  
e.g.  $\sin 52 = \text{SIN } 52 = 0.788$
- When looking for an angle, then you need to use the SHIFT or 2ndF button in the top left corner of the calculator.  
e.g.  $\cos A = 0.4534$   
 $\Rightarrow A = \text{SHIFT } \text{COS } 0.4534 = 63.04^\circ$
- To change between degrees and degrees and minutes as well. The button on the Casio calculator for doing that is:



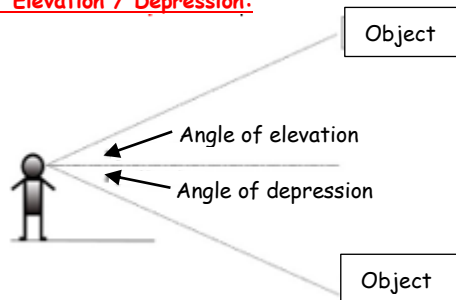
Press this after getting the answer.

#### b) Clinometer

- We can measure angles of elevation / depression using a **clinometer**, as shown below:



#### c) Angles of Elevation / Depression:



### 2) Right Angled Triangles:

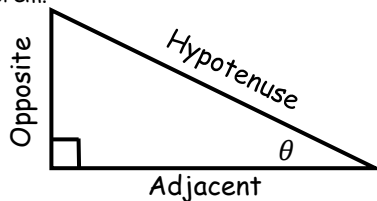
#### a) Pythagoras' Theorem:

##### Notes:

- We can use **Pythagoras' Theorem** if we know two sides of a right-angled triangle and we want to find the third side i.e.  

$$H^2 = O^2 + A^2$$

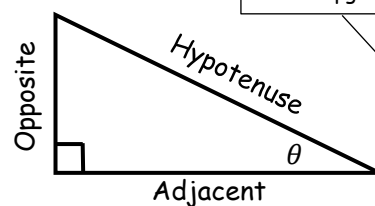
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- Make sure and label the hypotenuse correctly when using this theorem.



#### b) Sine, Cosine, Tan Ratios:

##### Notes:

- 'θ' is a Greek letter called 'theta'. It is often used to represent angles.
- Another way to remember the sin, cos and tan ratios is **Silly Old Harry, Caught A Herring, Trawling Off America** (SOHCAHTOA)



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$$\sin \theta = \frac{OPP}{HYP}$$

$$\cos \theta = \frac{ADJ}{HYP}$$

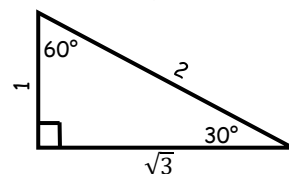
$$\tan \theta = \frac{OPP}{ADJ}$$

### 3) Special Angles:

- Use the table below (pg 13 of Tables) to write down the sin, cos or tan of the angles shown, in the form  $\frac{a}{b}$

A (degrees)	0°	90°	180°	270°	30°	45°	60°
cos A	1	0	-1	0	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$
sin A	0	1	0	-1	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$
tan A	0	-	0	-	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$

- Useful to know the right-angled triangles these ratios come from. e.g.



$$\sin 30 = \frac{OPP}{HYP} = \frac{1}{2}$$

$$\cos 30 = \frac{ADJ}{HYP} = \frac{\sqrt{3}}{2}$$

$$\tan 60 = \frac{OPP}{ADJ} = \frac{\sqrt{3}}{1}$$

- Can also to simplify expressions into surd form  
**Example:** Write  $\cos 30 + \sin 30$  in surd form.

$$\cos 30 + \sin 60 = \frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{\sqrt{3} + 1}{2}$$