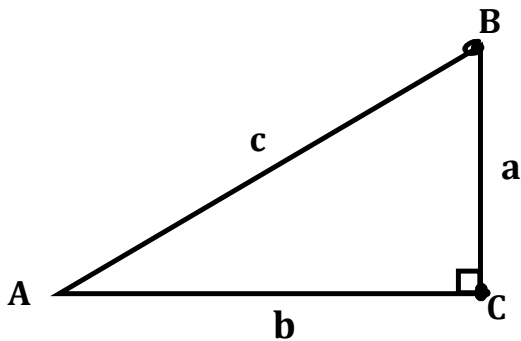


Primary Trig Ratios

Conventions:



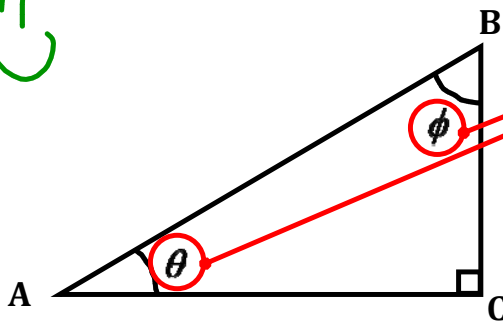
Vertices are always labelled with:

UPPER CASE LETTERS

Sides are always labelled with:

lower case letters

that correspond to their opposite angle



Angles are usually labelled with:

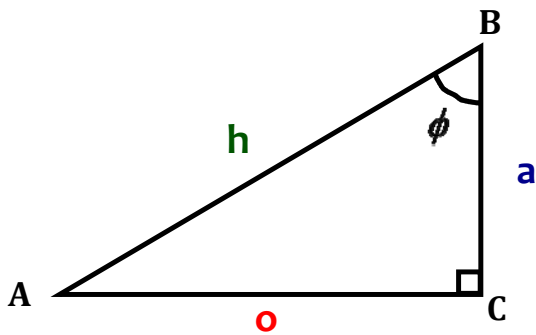
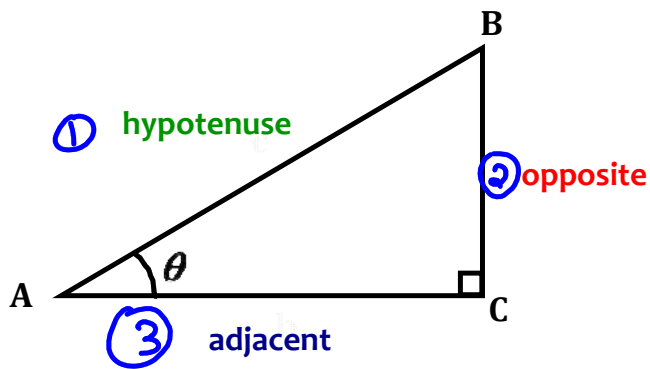
Greek letters

theta θ phi ϕ

or

the **UPPER** case letter of their **vertex**

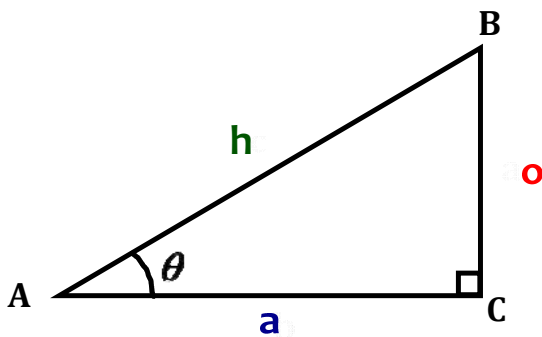
Primary Trig Ratios



Types of Side
- depend on the
angle you
choose.

Primary Trig Ratios

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



cosine

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Relationship between
angles and sides

Sine

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

Tangent

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin \theta = \frac{o}{h}$$

$$\cos \theta = \frac{a}{h}$$

$$\tan \theta = \frac{o}{a}$$

SOH CAH TOA

- 214

2-2-05-14

X-2-1-2-2-14

05-2-14

0-1-2-14

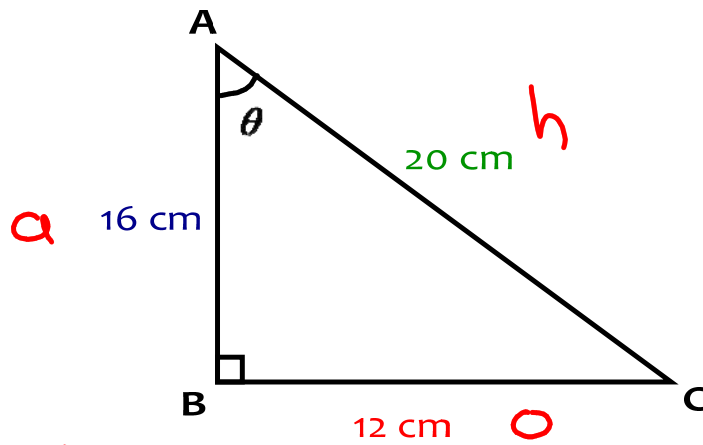
X-2-1-2-2-14

0-2-1-2-14

0-2-1-2-14

0-2-1-2-14

Ex. 1 State the primary trigonometric ratios for angle θ



SOH CAH TOA

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin \theta = \frac{a}{h}$$

$$\sin \theta = \frac{16}{20}$$

$$\sin \theta = \frac{4}{5}$$

$$\cos \theta = \frac{o}{h}$$

$$\cos \theta = \frac{12}{20}$$

$$\cos \theta = \frac{3}{5}$$

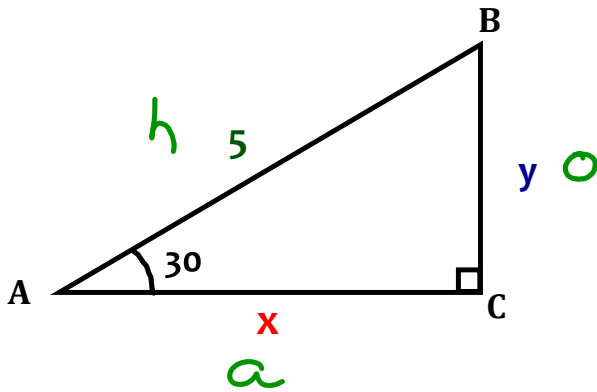
$$\tan \theta = \frac{a}{o}$$

$$\tan \theta = \frac{16}{12}$$

$$\tan \theta = \frac{4}{3}$$

Primary Trig Ratios - Finding a side

SOH CAH TOA



Find sides x and y.

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

X

$$\cos(30) = \frac{a}{5}$$

$$\cos(30) = \frac{x}{5}$$

$$0.87 = \frac{x}{5}$$

$$5(0.87) = x$$

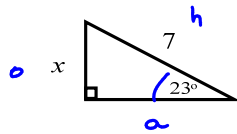
$$4.33 = x$$

$$\sin 30 = \frac{y}{5}$$

$$0.5 = \frac{y}{5}$$

$$2.5 = y$$

Ex 3. Solve for the unknown variable

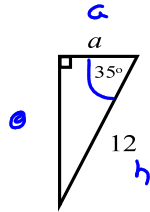


$$\sin(23) = \frac{x}{7}$$

$$0.39 = \frac{x}{7}$$

$$7(0.39) = x$$

$$x = 2.74$$

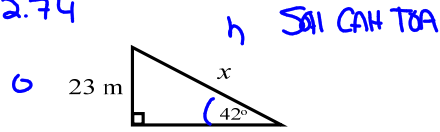


$$\cos(35) = \frac{a}{12}$$

$$0.82 = \frac{a}{12}$$

$$12(0.82) = a$$

$$a = 9.84$$



$$\sin(42) = \frac{23}{x}$$

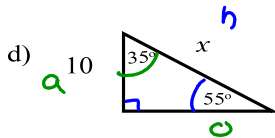
$$0.67 = \frac{23}{x}$$

$$x(0.67) = 23$$

$$x = \frac{23}{0.67}$$

$$x = 34.33$$

$$x = \frac{23}{0.67}$$



$$\sin(55) = \frac{10}{x}$$

$$0.82 = \frac{10}{x}$$

$$x(0.82) = 10$$

$$x = \frac{10}{0.82}$$

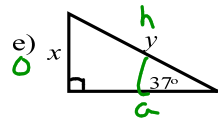
$$x = 12.2$$

$$\cos(35) = \frac{10}{x}$$

$$0.82 = \frac{10}{x}$$

$$x = \frac{10}{0.82}$$

$$x = 12.2$$



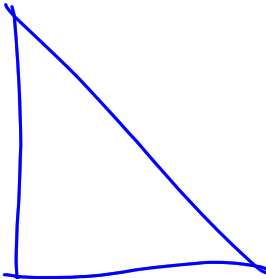
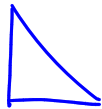
$$\sin(37) = \frac{x}{y}$$

$$\cos(37) = \frac{a}{y}$$

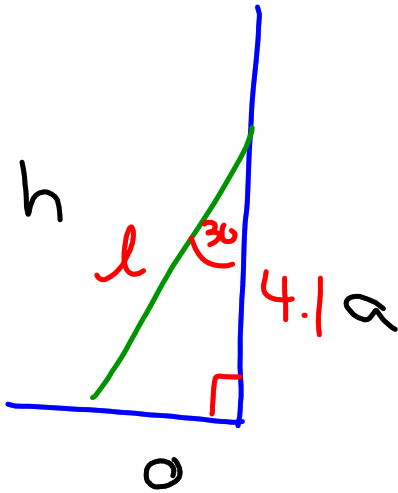
$$\tan(37) = \frac{x}{a}$$

To solve you need:

2 sides
or
1 angle / 1 side.



Ex. 3 A ladder leans against a wall forming a 30° angle with the wall. If the ladder reaches 4.1 m up the wall, how long is the ladder?



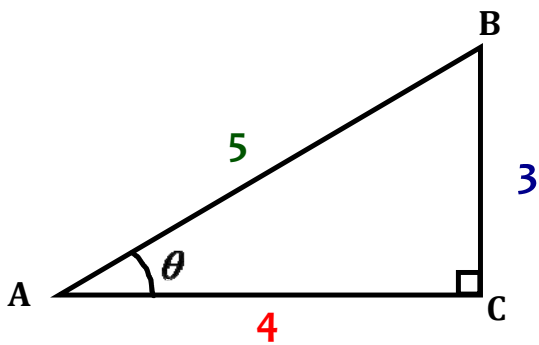
$$\cos(30) = \frac{a}{h} \quad l = 4.71 \text{ m}$$

$$\cos(30) = \frac{4.1}{l}$$

$$0.87 = \frac{4.1}{l}$$

$$l = \frac{4.1}{0.87}$$

Primary Trig Ratios - Finding an Angle



Find angle **theta**.

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

Ex 4. Solve for the unknown variable

