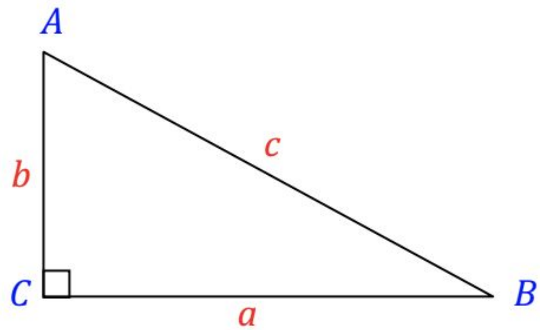
Pythagoras Theorem and Trigonometry

Pythagoras Theorem

In a right-angled triangle (one of the angles is 90°), the longest side is known as the hypotenuse. The other two shorter sides are known as the leg of the right-angled triangle.

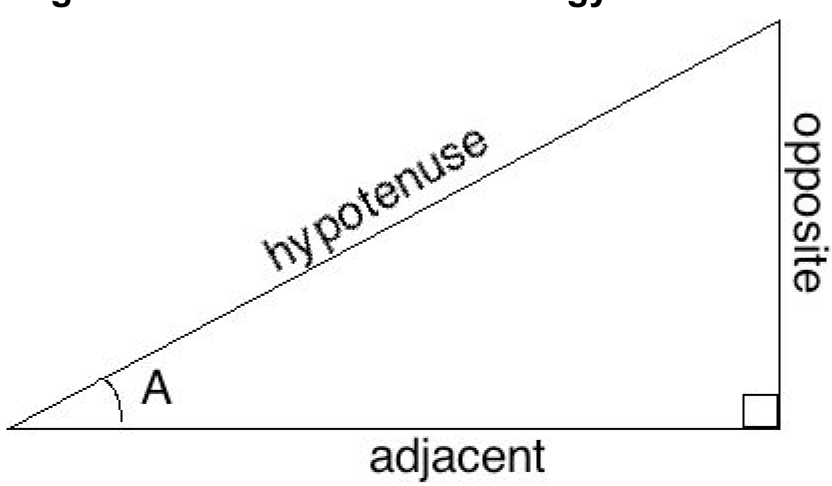


$C^2 = b^2+a^2$

Trigonometry

Trigonometry refers to the mathematical discipline dealing with the relationships between the sides and
angles of triangles.

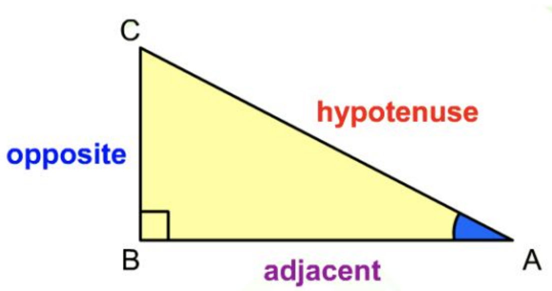
Trigonometric: Basic Terminology



Adjacent is adjacent(next to) the angle A
Opposite is opposite the angle A
The longest side is the hypotenuse

Trigonometric ratios:Sin,Cos,Tan

The 3 basic Trigonometric Ratios are namely, **Sine** Ratio, **Cosine** Ratio and **Tangent** Ratio.



Sin A= CB(opp) / CA(HYP)
Cos A= BA(adj) / CA(HYP)
Tan A= CB(opp) / BA(adj)

Finding Unknown Angles in Right-Angled Triangles Given Trigonometric Ratios

$\sin^{-1}$(inverse sine goes the other way oppose to sine.It takes in the ratio of "Opposite/hypotenuse" and give us an angle
$\sin^{-1}$(...) takes a ratio whereas sin(...) takes an angle. So x can be the input of both $\sin^{-1}$ (...) and sin(...) at the same time.

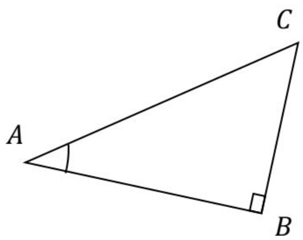


Diagram 1

The ratio $\frac{Opposite}{Hypotenuse}$ is also known as the ***sine*** *of angle A* or sin *A.*

The ratio $\frac{Adjacent}{Hypotenuse}$ is also known as the ***cosine*** *of angle A* or cos *A.*

The ratio $\frac{Opposite}{Adjacent}$ is also known as the ***tangent*** *of angle A* or tan *A.*

From Diagram 1

$$\tan A = \frac{opp.}{adj} = \frac{BC}{AB}$$ **TOA**

$$\cos A = \frac{adj.}{hyp.} = \frac{AB}{AC}$$ **CAH**

$$\sin A = \frac{opp.}{hyp.} = \frac{BC}{AC}$$ **SOH**

Note:
Angles sum of triangle = 90^0

similarly …

$$\tan(90 - A) = \frac{opp.}{adj} = \frac{AB}{BC}$$ **TOA**

$$\cos(90 - A) = \frac{adj.}{hyp.} = \frac{BC}{AC}$$ **CAH**

$$\sin(90 - A) = \frac{opp.}{hyp.} = \frac{AB}{AC}$$ **SOH**

Note:
$90^o - A = C$