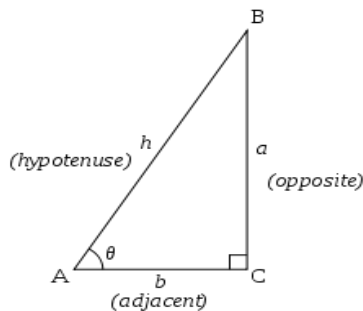


TRIGONOMETRIC RATIOS

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Introduction to Trig Ratios

In the adjoining figure, we have $\triangle ABC$ right angled at C.



We have six [trigonometric ratios](#) with respect to $\angle BAC = \theta$, and they are as follows:

- [Sine \$\theta\$](#)
- [Cosine \$\theta\$](#)
- [Tangent \$\theta\$](#)
- Cosecant θ
- Secant θ
- Cotangent θ

Let the Hypotenuse in $\triangle ABC = h$

Adjacent in $\triangle ABC = b$

Opposite in $\triangle ABC = a$

Now, we define the above mentioned trigonometric ratios:

- Sine θ or $\sin \theta = \text{Opposite} / \text{Hypotenuse} = a / h$
- Cosine θ or $\cos \theta = \text{Adjacent} / \text{Hypotenuse} = b / h$
- Tangent θ or $\tan \theta = \text{Opposite} / \text{Adjacent} = a / b$
- Cosecant θ or $\csc \theta = \text{Hypotenuse} / \text{Opposite} = h / a$
- Secant θ or $\sec \theta = \text{Hypotenuse} / \text{Adjacent} = h / b$

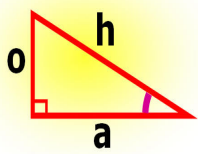
- Cotangent ? or Cot ? = Adjacent / Opposite = b / a

From the above discussion, it is clear that the last three trigonometric ratios are opposite of the first three trigonometric ratios respectively.

That is,

- Cosecant ? or Cosec ? = 1 / Sine ?
- Secant ? or Sec ? = 1 / Cosine ?
- Cotangent ? or Cot ? = 1 / Tangent ?

Trigonometry



Soh Cah Toa

SOH CAH TOA

There is one short method for remembering all six [trigonometric ratios](#).

SOH

‘S’ stands for Sine

‘O’ stands for Opposite

‘H’ stands for Hypotenuse

Sine = Opposite / Hypotenuse

CAH

‘C’ stands for Cosine

‘A’ stands for Adjacent

‘H’ stands for Hypotenuse

Cosine = Adjacent / Hypotenuse

TOA

'T' stands for Tangent

'O' stands for Opposite

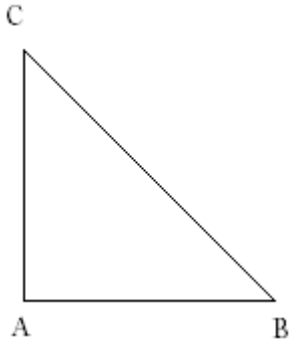
'A' stands for Adjacent

Tangent = Opposite / Adjacent

As discussed above, that Cosecant, Secant, and Cotangent are opposites of Sine, Cosine and Tangent respectively.

Let's solve few problems based on the above discussion:

In $\triangle ABC$, right angled at A, if $AB = 12$, $AC = 5$ and $BC = 13$, find all the six trigonometric ratios of angle B.



With reference to above $\triangle ABC$ we have,

Opposite = $AC = 5$

Adjacent = $AB = 12$

Hypotenuse = $BC = 13$

Using the definitions of trigonometric ratios, we have

Sine B = Opposite / Hypotenuse = $AC / BC = 5 / 13$

Cosine B = Adjacent / Hypotenuse = $AB / BC = 12 / 13$

Tangent B = Opposite / Adjacent = $AC / AB = 5 / 12$

Cosecant B = Hypotenuse / Opposite = $BC / AC = 13 / 5$

Secant B = Hypotenuse / Adjacent = $BC / AB = 13 / 12$

Cotangent B = Adjacent / Opposite = $AB / AC = 12 / 5$

Now try it yourself! Should you still need any help, [click here](#) to schedule live online session with e Tutor!

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Reference Links:

- <http://www.purplemath.com/modules/basirati.htm>
- <http://en.wikipedia.org/wiki/Sine>
- http://en.wikipedia.org/wiki/Trigonometric_functions#Sine.2C_cosine.2C_and_tangent
- <http://en.wikipedia.org/wiki/Tangent>
- <http://en.wikipedia.org/wiki/Trigonometry>

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