Trigonometry

Although trigonometry does not have any direct application its application in our daily lives cannot be neglected. It is an indispensable aspect of many areas of studies and industries. Its most common application is to measure the height of a building, mountain or a tall object at a distance. The only two information required to find out the height is the angle of elevation and distance from the object. There are some other branches where trigonometry has contributed immensely in its growth and development. Some of its fields of application are ;

- In music: It can be used to develop music digitally, through computer music.
- In aviation: it is of vital importance to lead an aircraft in the right direction. For instance, if the wind speed and the angle of the aircraft are known, it can be used to determine the direction of the aircraft.
- In criminology – trigonometry can also be used in criminology where it is used to calculate various important determinants of a crime scene, such as the trajectory of a projectile, how an object falls, etc.
- Mathematics: Trigonometry is one of the most important branches of mathematics, without which some other vital branches couldn't have existed. For example, calculus is purely based upon trigonometry and algebra.

What is a Mathematical Identity?

In mathematics, an identity is an equation which is always true. These can be "trivially" true like "$x = x$" or usefully true, such as the Pythagorean Theorem "$a^2 + b^2 = c^2$" for right triangles.

There are a load of trigonometric identities, but the ones on the next pager are the ones you are most likely to use for evaluating trig limits and when taking the derivatives of trigonometric functions.

Trigonometry Function Identities

Quotient Identities

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

$$\cot\theta = \frac{\cos\theta}{\sin\theta}$$

Reciprocal Indentities

$$\sin\theta = \frac{1}{\csc\theta} \qquad \csc\theta = \frac{1}{\sin\theta}$$

$$\cos\theta = \frac{1}{\sec\theta} \qquad \sec\theta = \frac{1}{\cos\theta}$$

$$\tan\theta = \frac{1}{\cot\theta} \qquad \cot\theta = \frac{1}{\tan\theta}$$

Pythagorean Identities

$$\sin^2\theta + \cos^2\theta = 1$$

$$\sec^2\theta - \tan^2\theta = 1$$

$$\csc^2\theta - \cot^2\theta = 1$$

Even/Odd Indentities

$$\sin(-\theta) = -\sin\theta \qquad \cos(-\theta) = \cos\theta$$

$$\tan(-\theta) = -\tan\theta \qquad \cot(-\theta) = -\cot\theta$$

$$\csc(-\theta) = -\csc\theta \qquad \sec(-\theta) = \sec\theta$$