

Trigonometry

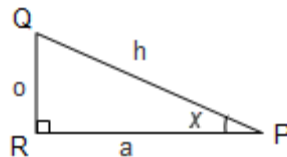
There are six functions that are the core of trigonometry. There are three primary ones that you need to understand completely:

- Sine (sin)
- Cosine (cos)
- Tangent (tan)

The other three are not used as often and can be derived from the three primary functions. Because they can easily be derived, calculators and spreadsheets do not usually have them.

- Secant (sec)
- Cosecant (csc)
- Cotangent (cot)

All six functions have three-letter abbreviations (shown in parentheses above).



Consider the right triangle above. For each angle P or Q, there are six functions, each function is the ratio of two sides of the triangle. **The only difference between the six functions is which pair of sides we use.**

In the following table

- **a is the length of the side adjacent to the angle (x) in question.**
- **o is the length of the side opposite the angle.**
- **h is the length of the hypotenuse (longest side of a triangle)**

"x" represents the measure of their angle in either degrees or radians.

$$\sin x = o/h$$

$$\cos x = a/h$$

$$\tan x = o/a$$

In the following table, note how each function is the reciprocal of one of the basic functions sin, cos, tan

$$\csc x = h/o = 1/\sin x$$

$$\sec x = h/a = 1/\cos x$$

$$\cot x = a/o = 1/\tan x$$

For example, in the figure above, the cosine of x is the side adjacent to x (labeled a), over the hypotenuse (labeled h):

$$\cos x = a/h$$

If a=12cm, and h=24cm, then $\cos x = 0.5$ (12 over 24).

Using A Calculator: Most calculators have buttons to find the sin, cos and tan of an angle. Be sure to set the calculator to degrees or radians mode depending on what units you are using