

SOME TRIG IDENTITIES

Derivatives

$$\begin{aligned}(\sin \theta)' &= \cos \theta \\(\cos \theta)' &= -\sin \theta \\(\tan \theta)' &= \sec^2 \theta \\(\sec \theta)' &= \sec \theta \tan \theta\end{aligned}$$

Identities

$$\begin{aligned}\sin^2 \theta + \cos^2 \theta &= 1 \\ \tan^2 \theta + 1 &= \sec^2 \theta\end{aligned}$$

Half Angle formula:

$$\begin{aligned}\sin \theta \cos \theta &= \frac{1}{2} \sin(2\theta) \\ \sin^2 \theta &= \frac{1}{2}(1 - \cos 2\theta) \\ \cos^2 \theta &= \frac{1}{2}(1 + \cos 2\theta)\end{aligned}$$

Product to Sum formula:

$$\begin{aligned}\sin a \sin b &= \frac{1}{2}[\cos(a - b) - \cos(a + b)], \\ \cos a \cos b &= \frac{1}{2}[\cos(a - b) + \cos(a + b)], \\ \sin a \cos b &= \frac{1}{2}[\sin(a + b) + \sin(a - b)], \\ \cos a \sin b &= \frac{1}{2}[\sin(a + b) - \sin(a - b)].\end{aligned}$$

Sum to Difference formula:

$$\begin{aligned}\sin(a \pm b) &= \sin a \cos b \pm \cos a \sin b, \\ \cos(a \pm b) &= \cos a \cos b \mp \sin a \sin b.\end{aligned}$$