

TRIG IDENTITIES

Reciprocal Identities:

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

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

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

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

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

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

Quotient Identities:

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

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

Pythagorean Identities:

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

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

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

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

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

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

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

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

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

Negative Angle Identities:

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

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

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

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

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

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

Cofunction Identities:

$$\sin\left(\frac{\pi}{2} - \theta\right) = \cos \theta$$

$$\cot\left(\frac{\pi}{2} - \theta\right) = \tan \theta$$

$$\cos\left(\frac{\pi}{2} - \theta\right) = \sin \theta$$

$$\sec\left(\frac{\pi}{2} - \theta\right) = \csc \theta$$

$$\tan\left(\frac{\pi}{2} - \theta\right) = \cot \theta$$

$$\csc\left(\frac{\pi}{2} - \theta\right) = \sec \theta$$

Sum or Difference Identities:

$$\cos(x - y) = \cos x \cos y + \sin x \sin y$$

$$\cos(x + y) = \cos x \cos y - \sin x \sin y$$

$$\tan(x - y) = \frac{\tan x - \tan y}{1 + \tan x \tan y}$$

$$\sin(x - y) = \sin x \cos y - \cos x \sin y$$

$$\sin(x + y) = \sin x \cos y + \cos x \sin y$$

$$\tan(x + y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$$

Double Angle Identities

$$\cos 2\theta = \cos^2 \theta - \sin^2 \theta$$

$$\cos 2\theta = 2\cos^2 \theta - 1$$

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

$$\sin 2\theta = 2\sin \theta \cos \theta$$

$$\tan 2\theta = \frac{2\tan \theta}{1 - \tan^2 \theta}$$