

TRIGONOMETRY IDENTITIES

MathMaster - Complete Trig Reference

PYTHAGOREAN IDENTITIES

$$\sin^2(x) + \cos^2(x) = 1$$

$$1 + \tan^2(x) = \sec^2(x)$$

$$1 + \cot^2(x) = \csc^2(x)$$

RECIPROCAL IDENTITIES

$$\csc(x) = 1/\sin(x)$$

$$\sec(x) = 1/\cos(x)$$

$$\cot(x) = 1/\tan(x) = \cos(x)/\sin(x)$$

QUOTIENT IDENTITIES

$$\tan(x) = \sin(x)/\cos(x)$$

$$\cot(x) = \cos(x)/\sin(x)$$

SUM AND DIFFERENCE FORMULAS

$$\sin(A \pm B) = \sin(A)\cos(B) \pm \cos(A)\sin(B)$$

$$\cos(A \pm B) = \cos(A)\cos(B) \mp \sin(A)\sin(B)$$

$$\tan(A \pm B) = (\tan(A) \pm \tan(B))/(1 \mp \tan(A)\tan(B))$$

DOUBLE ANGLE FORMULAS

$$\sin(2x) = 2\sin(x)\cos(x)$$

$$\cos(2x) = \cos^2(x) - \sin^2(x) = 2\cos^2(x) - 1 = 1 - 2\sin^2(x)$$

$$\tan(2x) = 2\tan(x)/(1 - \tan^2(x))$$

HALF ANGLE FORMULAS

$$\sin(x/2) = \pm \sqrt{(1 - \cos(x))/2}$$

$$\cos(x/2) = \pm \sqrt{(1 + \cos(x))/2}$$

$$\tan(x/2) = (1 - \cos(x))/\sin(x) = \sin(x)/(1 + \cos(x))$$

UNIT CIRCLE VALUES

$$0^\circ: \sin=0, \cos=1 | 30^\circ: \sin=1/2, \cos=\sqrt{3}/2$$

$$45^\circ: \sin=\sqrt{2}/2, \cos=\sqrt{2}/2 | 60^\circ: \sin=\sqrt{3}/2, \cos=1/2$$

$$90^\circ: \sin=1, \cos=0 | 180^\circ: \sin=0, \cos=-1$$