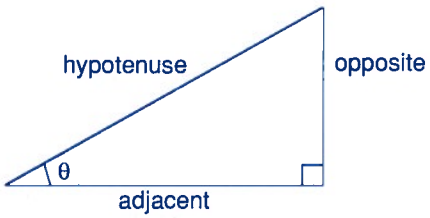
TRIGONOMETRIC IDENTITIES



$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{1}{\csc\theta}$$

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{1}{\sec\theta}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{\sin\theta}{\cos\theta}$$

$$\cot\theta = \frac{\text{adjacent}}{\text{opposite}} = \frac{\cos\theta}{\sin\theta}$$

$$\sec\theta = \frac{\text{hypotenuse}}{\text{adjacent}} = \frac{1}{\cos\theta}$$

$$\csc\theta = \frac{\text{hypotenuse}}{\text{opposite}} = \frac{1}{\sin\theta}$$

PYTHAGOREAN IDENTITIES:

$$\sin^2\theta + \cos^2\theta = 1$$
$$\tan^2\theta + 1 = \sec^2\theta$$
$$\cot^2\theta + 1 = \csc^2\theta$$

SUM OR DIFFERENCE OF TWO ANGLES:

$$\sin(\theta+\phi) = \sin\theta\cos\phi + \cos\theta\sin\phi$$
$$\sin(\theta-\phi) = \sin\theta\cos\phi - \cos\theta\sin\phi$$
$$\cos(\theta+\phi) = \cos\theta\cos\phi - \sin\upsilon\sin\phi$$
$$\cos(\theta-\phi) = \cos\theta\cos\phi + \sin\upsilon\sin\phi$$

$$\tan(\theta+\phi) = \frac{\tan\theta + \tan\phi}{1 - \tan\theta\tan\phi}$$

$$\tan(\theta-\phi) = \frac{\tan\theta - \tan\phi}{1 + \tan\theta\tan\phi}$$

DOUBLE ANGLE:

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

HALF ANGLE:

$$\sin^2\theta = \tfrac{1}{2}(1 - \cos 2\theta)$$
$$\cos^2\theta = \tfrac{1}{2}(1 + \cos 2\theta)$$
$$\tan\frac{\theta}{2} = \frac{1-\cos\theta}{\sin\theta} = \frac{\sin\theta}{1+\cos\theta}$$

REDUCTION FORMULA:

$$\sin(-\theta) = -\sin\theta$$
$$\cos(-\theta) = \cos\theta$$
$$\tan(-\theta) = -\tan\theta$$
$$\cot(-\theta) = -\cot\theta$$
$$\sec(-\theta) = \sec\theta$$
$$\csc(-\theta) = -\csc\theta$$

PRODUCT:

$$\sin\theta\sin\phi = \tfrac{1}{2}[\cos(\theta-\phi) - \cos(\theta+\phi)]$$
$$\cos\theta\cos\phi = \tfrac{1}{2}[\cos(\theta-\phi) + \cos(\theta+\phi)]$$
$$\sin\theta\cos\phi = \tfrac{1}{2}[\sin(\theta+\phi) + \sin(\theta-\phi)]$$
$$\cos\theta\sin\phi = \tfrac{1}{2}[\sin(\theta+\phi) - \sin(\theta-\phi)]$$

INVERSE TRIGONOMETRIC IDENTITIES:

$$\arcsin x = \frac{\pi}{2} - \arccos x = \arctan\frac{x}{\sqrt{1-x^2}}$$

$$\arccos x = \frac{\pi}{2} - \arcsin x = \operatorname{arccot}\frac{x}{\sqrt{1-x^2}}$$

$$\arctan x = \frac{\pi}{2} - \operatorname{arccot} x = \arcsin\frac{x}{\sqrt{1+x^2}}$$

$$\operatorname{arccot} x = \arctan\frac{1}{x}$$

$$\operatorname{arcsec} x = \arccos\frac{1}{x}$$

$$\operatorname{arccsc} x = \arcsin\frac{1}{x}$$

GREEK ALPHABET

Letter		*Name*
A	α	alpha
B	β	beta
Γ	γ	gamma
Δ	δ	delta
E	ε	epsilon
Z	ζ	zeta
H	η	eta
Θ	θ	theta
I	ι	iota
K	κ	kappa
Λ	λ	lambda
M	μ	mu
N	ν	nu
Ξ	ξ	xi
O	ο	omicron
Π	π	pi
P	ρ	rho
Σ	σ	sigma
T	τ	tau
Y	υ	upsilon
Φ	φ	phi
X	χ	chi
Ψ	ψ	psi
Ω	ω	omega