

TRIGONOMETRIC IDENTITIES

$$\sin(\theta + \varphi) = \sin\theta \cos\varphi + \sin\varphi \cos\theta$$

$$\cos(\theta + \varphi) = \cos\theta \cos\varphi - \sin\theta \sin\varphi$$

$$\sin\theta \cos\varphi = \frac{\sin(\theta + \varphi) + \sin(\theta - \varphi)}{2}$$

$$\cos\theta \cos\varphi = \frac{\cos(\theta + \varphi) + \cos(\theta - \varphi)}{2}$$

$$\sin\theta \sin\varphi = \frac{\cos(\theta - \varphi) - \cos(\theta + \varphi)}{2}$$

$$\cos^2\theta = \frac{1 + \cos 2\theta}{2}$$

$$\sin^2\theta = \frac{1 - \cos 2\theta}{2}$$

$$\cos\theta + \cos\varphi = 2 \cos\left(\frac{\theta + \varphi}{2}\right) \cos\left(\frac{\theta - \varphi}{2}\right)$$

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

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

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

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