Trig Tables

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Even/Odd Relations

$$\cos(-\theta) = \cos(\theta) \tag{1}$$
$$\sin(-\theta) = -\sin(\theta) \tag{2}$$
$$-\cos(-\theta) = -\cos(\theta) \tag{3}$$
$$-\sin(-\theta) = \sin(\theta) \tag{4}$$

Complementary and supplementary relations

$$\cos(\frac{\pi}{2} - \theta) = \sin(\theta) \tag{5}$$
$$\sin(\frac{\pi}{2} - \theta) = \cos(\theta) \tag{6}$$
$$\cos(\pi - \theta) = -\cos(\theta) \tag{7}$$
$$\sin(\pi - \theta) = \sin(\theta) \tag{8}$$

Lead/Lag relations

$$\cos(\theta + \frac{\pi}{2}) = -\sin\theta \tag{9}$$
$$\sin(\theta + \frac{\pi}{2}) = \cos\theta \tag{10}$$
$$\cos(\theta - \frac{\pi}{2}) = \sin\theta \tag{11}$$
$$\sin(\theta - \frac{\pi}{2}) = -\cos\theta \tag{12}$$

Sum and Difference Formulae

$$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta \tag{13}$$
$$\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta \tag{14}$$

Product Identities

$$\cos\alpha\cos\beta = \frac{1}{2}[\cos(\alpha+\beta) + \cos(\alpha-\beta)] \tag{15}$$
$$\sin\alpha\sin\beta = \frac{1}{2}[\cos(\alpha+\beta) - \cos(\alpha-\beta)] \tag{16}$$
$$\sin\alpha\cos\beta = \frac{1}{2}[\sin(\alpha+\beta) + \sin(\alpha-\beta)] \tag{17}$$

Power Reduction Formulae

$$\cos^2\theta = \frac{1}{2}(1+\cos 2\theta) \tag{18}$$

$$\sin^2\theta = \frac{1}{2}(1-\cos 2\theta) \tag{19}$$

$$\cos^3\theta = \frac{3}{4}\cos\theta + \frac{1}{4}\cos 3\theta \tag{20}$$

$$\sin^3\theta = \frac{3}{4}\sin\theta - \frac{1}{4}\sin 3\theta \tag{21}$$

Double and Triple Angle Identities

$$\cos 2\theta = \cos^2\theta - \sin^2\theta \tag{22}$$

$$= 2\cos^2\theta - 1 \tag{23}$$

$$= 1 - 2\sin^\theta \tag{24}$$

$$\sin 2\theta = 2\sin\theta\cos\theta \tag{25}$$

$$\cos 3\theta = -3\cos\theta + 4\cos^3\theta \tag{26}$$

$$\sin 3\theta = 3\sin\theta - 4\sin^3\theta \tag{27}$$

Complex and Hyperbolic Identities

Euler's Formula

$$e^{i\theta} = \cos\theta + i\sin\theta \tag{28}$$

$$\cos\theta = \frac{e^{i\theta}+e^{-i\theta}}{2} \tag{29}$$

$$\sin\theta = \frac{e^{i\theta}-e^{-i\theta}}{2i} \tag{30}$$

$$\cosh\theta = \frac{e^{\theta}+e^{-\theta}}{2} \tag{31}$$

$$= \cos(i\theta) \tag{32}$$

$$\sinh\theta = \frac{e^{\theta}-e^{-\theta}}{2} \tag{33}$$

$$= -i\sin(i\theta) \tag{34}$$

$$\cos\theta = \cosh(i\theta) \tag{35}$$

$$\sin\theta = -i\sinh(i\theta) \tag{36}$$

$$\cosh\theta + \sinh\theta = e^{\theta} \tag{37}$$

$$\cosh\theta - \sinh\theta = e^{-\theta} \tag{38}$$

$$\cosh^2\theta - \sinh^2\theta = 1 \tag{39}$$

$$\tag{40}$$

Inverse Hyperbolic Trig Functions

$$\text{arcosh}\theta = \ln(\theta + \sqrt{\theta^2 - 1}) \qquad \theta \geq 1 \qquad (41)$$

$$\text{arsinh}\theta = \ln(\theta + \sqrt{\theta^2 + 1}) \qquad (42)$$

$$\text{artanh}\theta = \frac{1}{2}\ln\left(\frac{1+\theta}{1-\theta}\right) \qquad |\theta| < 1 \qquad (43)$$

$$\text{arcoth}\theta = \frac{1}{2}\ln\left(\frac{\theta+1}{\theta-1}\right) \qquad |\theta| > 1 \qquad (44)$$

$$\text{arsech}\theta = \ln\left(\frac{1}{\theta} + \sqrt{\frac{1}{\theta^2} - 1}\right) = \ln\left(\frac{1+\sqrt{1-\theta^2}}{\theta}\right) \qquad 0 < \theta \leq 1 \qquad (45)$$

$$\text{arcsch}\theta = \ln\left(\frac{1}{\theta} + \sqrt{\frac{1}{x^2} + 1}\right) \qquad \theta \neq 0 \qquad (46)$$