

$$\cos(x) = \sin\left(x + \frac{\pi}{2}\right)$$

$$\tan(x) = \frac{\sin(x)}{\cos(x)}$$

$$\sec(x) = \frac{1}{\cos(x)}$$

$$\cot(x) = \frac{\cos(x)}{\sin(x)} = \frac{1}{\tan(x)}$$

$$\csc(x) = \frac{1}{\sin(x)}$$

$$\sin(x) = \sin(x + 2k\pi)$$

$$\cos(x) = \cos(x + 2k\pi)$$

$$\sec(x) = \sec(x + 2k\pi)$$

$$\csc(x) = \csc(x + 2k\pi)$$

$$\sin(-x) = -\sin(x) \quad \sin\left(\frac{\pi}{2} - x\right) = \cos(x) \quad \sin(\pi - x) = +\sin(x)$$

$$\cos(-x) = +\cos(x) \quad \cos\left(\frac{\pi}{2} - x\right) = \sin(x) \quad \cos(\pi - x) = -\cos(x)$$

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

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

$$\sec(-x) = +\sec(x) \quad \sec\left(\frac{\pi}{2} - x\right) = \csc(x) \quad \sec(\pi - x) = -\sec(x)$$

$$\csc(-x) = -\csc(x) \quad \csc\left(\frac{\pi}{2} - x\right) = \sec(x) \quad \csc(\pi - x) = +\csc(x)$$

$$\sin\left(x + \frac{\pi}{2}\right) = +\cos(x) \quad \sin(x + \pi) = -\sin(x)$$

$$\cos\left(x + \frac{\pi}{2}\right) = -\sin(x) \quad \cos(x + \pi) = -\cos(x)$$

$$\tan\left(x + \frac{\pi}{2}\right) = -\cot(x) \quad \tan(x + \pi) = +\tan(x)$$

$$\cot\left(x + \frac{\pi}{2}\right) = -\tan(x) \quad \cot(x + \pi) = +\cot(x)$$

$$\sec\left(x + \frac{\pi}{2}\right) = -\csc(x) \quad \sec(x + \pi) = -\sec(x)$$

$$\csc\left(x + \frac{\pi}{2}\right) = +\sec(x) \quad \csc(x + \pi) = -\csc(x)$$

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

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

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

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

$$\cos(x \pm y) = \cos(x)\cos(y) \mp \sin(x)\sin(y)$$

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

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

$$\cos^2(x) = \frac{1 + \cos(2x)}{2}$$

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

$$\cos\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 + \cos(x)}{2}}$$

$$\sin\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 - \cos(x)}{2}}$$

$$\cos(x) \cos(y) = \frac{\cos(x-y) + \cos(x+y)}{2}$$

$$\sin(x) \sin(y) = \frac{\cos(x-y) - \cos(x+y)}{2}$$

$$\sin(x) \cos(y) = \frac{\sin(x-y) + \sin(x+y)}{2}$$

$$\cos(x) + \cos(y) = 2 \cos\left(\frac{x+y}{2}\right) \cos\left(\frac{x-y}{2}\right)$$

$$\sin(x) + \sin(y) = 2 \sin\left(\frac{x+y}{2}\right) \cos\left(\frac{x-y}{2}\right)$$

$$\cos(x) - \cos(y) = -2 \sin\left(\frac{x+y}{2}\right) \sin\left(\frac{x-y}{2}\right)$$

$$\sin(x) - \sin(y) = 2 \cos\left(\frac{x+y}{2}\right) \sin\left(\frac{x-y}{2}\right)$$

$$e^{ix} = \cos(x) + i \sin(x) \quad e^{-ix} = \cos(x) - i \sin(x)$$

$$\cos(x) = \frac{e^{ix} + e^{-ix}}{2} \quad \sin(x) = \frac{e^{ix} - e^{-ix}}{2i}$$

$$\lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1, \quad \lim_{x \rightarrow 0} \frac{1 - \cos(x)}{x} = 0,$$

$$\frac{d}{dx} \sin(x) = \cos(x)$$

$$\frac{d}{dx} \sin x = \cos x, \quad \frac{d}{dx} \arcsin x = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \cos x = -\sin x, \quad \frac{d}{dx} \arccos x = \frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \tan x = \sec^2 x, \quad \frac{d}{dx} \arctan x = \frac{1}{1+x^2}$$

$$\frac{d}{dx} \cot x = -\csc^2 x, \quad \frac{d}{dx} \operatorname{arccot} x = \frac{-1}{1+x^2}$$

$$\frac{d}{dx} \sec x = \tan x \sec x, \quad \frac{d}{dx} \operatorname{arcsec} x = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx} \csc x = -\csc x \cot x, \quad \frac{d}{dx} \operatorname{arccsc} x = \frac{-1}{|x|\sqrt{x^2-1}}$$