Trigonometric Identities

$\sin\theta = \frac{opd}{hyp}$

$\cos\theta = \frac{adj}{hyp}$

$\tan\theta = \frac{opd}{adj}$

$\csc\theta = \frac{hyp}{opd}$

$\sec\theta = \frac{hyp}{adj}$

$\cot\theta = \frac{adj}{opd}$

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

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

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

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

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

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

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

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

$\cot^2 x = \csc^2 x - 1$

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

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

$\cot x = \frac{cosx}{\sin x}$

$\sin 2x = 2\sin x\cos x$

$\cos 2x = \cos^2 x - \sin^2 x$

$\tan 2x = \frac{2\tan x}{1-\tan^2 x}$

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

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

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

$\sin(-x) = -\sin x$

$\cos(-x) = \cos x$

$\tan(-x) = -\tan x$

$\sin^{-1}(\sin\theta) = \theta$

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

$\sin(\sin^{-1}\theta) = \theta$

$\sin(\cos^{-1}\theta) = \sqrt{1-\theta^2}$

$\cos^{-1}(\cos\theta) = \theta$

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

$\cos(\cos^{-1}\theta) = \theta$

$\cos(\sin^{-1}\theta) = \sqrt{1-\theta^2}$

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

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

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

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

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

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

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

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

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

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

$\cos(x+y) = \cos x\cos y - \sin x\sin y$

$\cos(x-y) = \cos x\cos y + \sin x\sin y$

$\sinh x = \frac{e^x - e^{-x}}{2}$

$\cosh x = \frac{e^x + e^{-x}}{2}$

$\tanh x = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

$\cosh x + \sinh x = e^x$

$\cosh x - \sinh x = e^{-x}$

$\sinh(-x) = -\sinh x$

$\sinh^{-1} x = \ln(x + \sqrt{1+x^2})$

$\sinh^2 x = \cosh^2 x - 1$

$\cosh^2 x = \sinh^2 x - 1$

$\tanh^2 x = 1 - \mathrm{sech}^2 x$

$\sinh^2 x = \frac{\cosh 2x - 1}{2}$

$\cosh^2 x = \frac{\cosh 2x + 1}{2}$

$\cosh(-x) = \cosh x$

$\cosh^{-1} = \ln(x + \sqrt{x^2-1})$

$\mathrm{csch}^2 x = \coth^2 x - 1$

$\mathrm{sech}^2 x = 1 - \tanh^2 x$

$\coth^2 x = 1 + \mathrm{csch}^2 x$

$\sinh 2x = 2\sinh x\cosh x$

$\cosh 2x = \cosh^2 x + \sinh^2 x$

$\tanh(-x) = -\tanh x$

$\tanh^{-1} x = \frac{1}{2}\ln(\frac{1+x}{1-x})$

$(\cosh x + \sinh x)^n = \cosh nx + \sinh nx$

$\sinh(x+y) = \sinh x\cosh y + \cosh x\sinh y$

$\sinh(x-y) = \sinh x\cosh y - \cosh x\sinh y$

$\sinh x\cosh y = \frac{1}{2}[\sinh(x+y) + \sinh(x-y)]$

$\cosh x\cosh y = \frac{1}{2}[\cosh(x+y) + \cosh(x-y)]$

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

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

$(\cosh x - \sinh x)^n = \cosh nx - \sinh nx$

$\cosh(x+y) = \cosh x\cosh y + \sinh x\sinh y$

$\cosh(x-y) = \cosh x\cosh y - \sinh x\sinh y$

$\cosh x\sinh y = \frac{1}{2}[\sinh(x+y) - \sinh(x-y)]$

$\sinh x\sinh y = \frac{1}{2}[\cosh(x+y) - \cosh(x-y)]$

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

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

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	∞