Cofunction Identities:

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

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

Addition Formulas:

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

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

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

Subtraction Formulas:

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

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

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

Sums of Sines and Cosines:

$A\sin x+B\cos x=k\sin(x+\phi)$ where $k=\sqrt{A^2+B^2}$ and ϕ satisfies

$\cos\phi=\frac{A}{\sqrt{A^2+B^2}}$ and $\sin\phi=\frac{B}{\sqrt{A^2+B^2}}$

Double-Angle Formulas:

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

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

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

Half-Angle Formulas:

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

$\cos\frac{x}{2}=\pm\sqrt{\frac{1+\cos x}{2}}$

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

Formulas for lowering powers:

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

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

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

Product-to-Sum Formulas:

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

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

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

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

Sum-to-Product Formulas:

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

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

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

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