DERIVATIVE RULES

Power: $\frac{d}{dx}\left(x^n\right) = nx^{n-1}$

Exponential: $\frac{d}{dx}\left(a^x\right) = \ln a \cdot a^x$

Product: $\frac{d}{dx}\left(f(x)\cdot g(x)\right) = f(x)\cdot g'(x) + g(x)\cdot f'(x)$

Quotient: $\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{g(x)\cdot f'(x) - f(x)\cdot g'(x)}{\left(g(x)\right)^2}$

Chain: $\frac{d}{dx}\left(f(g(x))\right) = f'(g(x))\cdot g'(x)$

Log: $\frac{d}{dx}\left(\ln x\right) = \frac{1}{x}$

Trig: $\frac{d}{dx}\left(\sin x\right) = \cos x$

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

$\frac{d}{dx}\left(\tan x\right) = \sec^2 x$

$\frac{d}{dx}\left(\cot x\right) = -\csc^2 x$

$\frac{d}{dx}\left(\sec x\right) = \sec x \tan x$

$\frac{d}{dx}\left(\csc x\right) = -\csc x \cot x$

Inverse Trig: $\frac{d}{dx}\left(\arcsin x\right) = \frac{1}{\sqrt{1-x^2}}$

$\frac{d}{dx}\left(\arctan x\right) = \frac{1}{1+x^2}$

$\frac{d}{dx}\left(\operatorname{arc}\sec x\right) = \frac{1}{x\sqrt{x^2-1}}$

Hyperbolic: $\frac{d}{dx}\left(\sinh x\right) = \cosh x$

$\frac{d}{dx}\left(\cosh x\right) = \sinh x$

INTEGRAL RULES

Power: $\int x^n dx = \frac{1}{n+1} x^{n+1} + c, \quad n \neq -1$

Exponential: $\int a^x dx = \frac{1}{\ln a} a^x + c$

Log: $\int \frac{1}{x} dx = \ln|x| + c$

Inverse Trig: $\int \frac{dx}{\sqrt{1-x^2}} = \arcsin x + c$

$\int \frac{dx}{1+x^2} = \arctan x + c$

$\int \frac{dx}{x\sqrt{x^2-1}} = \operatorname{arcsec} x + c$

Hyperbolic: $\int \sinh x dx = \cosh x + c$

$\int \cosh x dx = \sinh x + c$

Trig: $\int \sin x dx = -\cos x + c$

$\int \cos x dx = \sin x + c$

$\int \sec^2 x dx = \tan x + c$

$\int \csc^2 x dx = -\cot x + c$

$\int \sec x \tan x dx = \sec x + c$

$\int \csc x \cot x dx = -\csc x + c$