Derivates

Basic Identities

Power Rule	$\frac{d}{dx}[x^n] = nx^{n-1}$
Constant Rule	$\frac{d}{dx}[c] = 0$
Sum Rule	$\frac{d}{dx}\Big[f(x) + g(x)\Big] = f'(x) + g'(x)$
Difference Rule	$\frac{d}{dx}\Big[f(x) - g(x)\Big] = f'(x) - g'(x)$
Constant Multiple Rule	$\frac{d}{dx}[cf(x)] = cf'(x)$
Product Rule	$\frac{d}{dx}\Big[f(x)g(x)\Big] = f(x)g'(x) + g(x)f'(x)$
Quotient Rule	$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)f'(x) - f(x)g'(x)}{[g(x)]^2}$
Chain Rule	$\frac{d}{dx}\Big[f\big(g(x)\big)\Big] = f'\big(g(x)\big)g'(x)$

Common Derivatives

$\frac{d}{dx}\Big[\ln(x)\Big] = \frac{1}{x}, \quad x > 0$

$\frac{d}{dx}\Big[\ln(|x|)\Big] = \frac{1}{x}$

$\frac{d}{dx}[e^x] = e^x$

$\frac{d}{dx}\Big[\log(x)\Big] = \frac{1}{x\,\ln(10)}$

$\frac{d}{dx}\Big[\log_a(x)\Big] = \frac{1}{x\,\ln(a)}$

Trigonometric Derivatives

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

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

$\frac{d}{dx}[\tan(x)] = \sec^2(x)$

$\frac{d}{dx}[\sec] = \sec(x)\tan(x)$

$\frac{d}{dx}[\csc(x)] = -\csc(x)\cot(x)$

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

Arc Trigonometric Derivatives

$\frac{d}{dx}[\arcsin(x)] = \frac{1}{\sqrt{1-x^2}}$

$\frac{d}{dx}[\arccos(x)] = -\frac{1}{\sqrt{1-x^2}}$

$\frac{d}{dx}[\arctan(x)] = \frac{1}{x+1}$

$\frac{d}{dx}[\arcsec] = \frac{1}{\sqrt{x^2(x^2-1)}}$

$\frac{d}{dx}[\operatorname{arccsc}(x)] = \frac{1}{|x|\sqrt{x^2-1}}$

$\frac{d}{dx}[\operatorname{arccot}(x)] = -\frac{1}{\sqrt{x^2+1}}$