GENERAL DERIVATIVE RULES

Constant Rule	$\frac{d}{dx}[c] = 0$
Constant Multiple Rule	$\frac{d}{dx}[cf(x)] = cf'(x)$
Sum Rule	$\frac{d}{dx}[f(x) + g(x)] = f'(x) + g'(x)$
Difference Rule	$\frac{d}{dx}[f(x) - g(x)] = f'(x) - g'(x)$
Product Rule	$\frac{d}{dx}[f(x) \cdot g(x)] = f'(x)g(x) + f(x)g'(x)$
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	$\frac{d}{dx}[f(g(x))] = f'(g(x))g'(x)$

DERIVATIVE RULES FOR PARTICULAR FUNCTIONS

FUNCTION	BASIC RULE	CHAIN RULE
Power	$\frac{d}{dx}[x^n] = nx^{n-1}$	$\frac{d}{dx}[u^n] = nu^{n-1} \cdot u'$
TRIGONOMETRIC FUNCTIONS		
Sine	$\frac{d}{dx}[\sin(x)] = \cos(x)$	$\frac{d}{dx}[\sin u] = \cos(u) \cdot u'$
Cosine	$\frac{d}{dx}[\cos(x)] = -\sin(x)$	$\frac{d}{dx}[\cos u] = -\sin(u) \cdot u'$
Tangent	$\frac{d}{dx}[\tan(x)] = \sec^2(x)$	$\frac{d}{dx}[\tan(u)] = \sec^2(u) \cdot u'$
Cosecant	$\frac{d}{dx}[\csc(x)] = -\csc(x)\cot(x)$	$\frac{d}{dx}[\csc(u)] = -\csc(u)\cot(u) \cdot u'$
Secant	$\frac{d}{dx}[\sec(x)] = \sec(x)\tan(x)$	$\frac{d}{dx}[\sec(u)] = \sec(u)\tan(u) \cdot u'$
Cotangent	$\frac{d}{dx}[\cot(x)] = -\csc^2(x)$	$\frac{d}{dx}[\cot(u)] = -\csc^2(u) \cdot u'$
INVERSE TRIGONOMETRIC FUNCTIONS		
Arcsine	$\frac{d}{dx}\sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}}$	$\frac{d}{dx}\sin^{-1}(u) = \frac{1}{\sqrt{1-u^2}} \cdot u'$
Arccosine	$\frac{d}{dx}\cos^{-1}(x) = \frac{-1}{\sqrt{1-x^2}}$	$\frac{d}{dx}\cos^{-1}(u) = \frac{-1}{\sqrt{1-u^2}} \cdot u'$
Arctangent	$\frac{d}{dx}\tan^{-1}(x) = \frac{1}{1+x^2}$	$\frac{d}{dx}\tan^{-1}(u) = \frac{1}{1+u^2} \cdot u'$
Arccosecant	$\frac{d}{dx}\csc^{-1}(x) = \frac{-1}{\lvert x\rvert\sqrt{x^2-1}}$	$\frac{d}{dx}\csc^{-1}(u) = \frac{-1}{\lvert u\rvert\sqrt{u^2-1}} \cdot u'$
Arcsecant	$\frac{d}{dx}\sec^{-1}(x) = \frac{1}{\lvert x\rvert\sqrt{x^2-1}}$	$\frac{d}{dx}\sec^{-1}(u) = \frac{1}{\lvert u\rvert\sqrt{u^2-1}} \cdot u'$
Arccotangent	$\frac{d}{dx}\cot^{-1}(x) = \frac{-1}{1+x^2}$	$\frac{d}{dx}\cot^{-1}(u) = \frac{-1}{1+u^2} \cdot u'$
EXPONENTIAL FUNCTIONS		
Exponential (base e)	$\frac{d}{dx}[e^x] = e^x$	$\frac{d}{dx}[e^u] = e^u \cdot u'$
Exponential (base a)	$\frac{d}{dx}[a^x] = a^x\ln(a)$	$\frac{d}{dx}[a^u] = a^u\ln(a) \cdot u'$
LOGARITHMIC FUNCTIONS		
Natural Logarithm	$\frac{d}{dx}[\ln(x)] = \frac{1}{x}$	$\frac{d}{dx}[\ln(u)] = \frac{1}{u} \cdot u' \text{ or } \frac{u'}{u}$
Logarithm (base a)	$\frac{d}{dx}[\log_a(x)] = \frac{1}{x \cdot \ln(a)}$	$\frac{d}{dx}[\log_a(u)] = \frac{1}{u \cdot \ln(a)} \cdot u'$