Basic Differentiation Formulas

http://www.math.wustl.edu/~freiwald/Math131/derivativetable.pdf

In the table below, $u = f(x)$ and $v = g(x)$ represent differentiable functions of x

Derivative of a constant $\frac{dc}{dx} = 0$

Derivative of constant multiple $\frac{d}{dx}(cu) = c\frac{du}{dx}$ (We could also write $(cf)' = cf'$, and could use the "prime notion" in the other formulas as well)

Derivative of sum or difference $\frac{d}{dx}(u \pm v) = \frac{du}{dx} \pm \frac{dv}{dx}$

Product Rule $\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$

Quotient Rule $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$

Chain Rule $\frac{dy}{dx} = \frac{dy}{du}\frac{du}{dx}$

	$\frac{d}{dx}x^n = nx^{n-1}$	$\frac{d}{dx}u^n = nu^{n-1}\frac{du}{dx}$
	$\frac{d}{dx}a^x = (\ln a)\,a^x$	$\frac{d}{dx}a^u = (\ln a)\,a^u\frac{du}{dx}$
(If $a = e$)	$\frac{d}{dx}e^x = e^x$	$\frac{d}{dx}e^u = e^u\frac{du}{dx}$
	$\frac{d}{dx}\log_a x = \frac{1}{(\ln a)\,x}$	$\frac{d}{dx}\log_a u = \frac{1}{(\ln a)\,u}\frac{du}{dx}$
(If $a = e$)	$\frac{d}{dx}\ln x = \frac{1}{x}$	$\frac{d}{dx}\ln u = \frac{1}{u}\frac{du}{dx}$
	$\frac{d}{dx}\sin x = \cos x$	$\frac{d}{dx}\sin u = \cos u\frac{du}{dx}$
	$\frac{d}{dx}\cos x = -\sin x$	$\frac{d}{dx}\cos u = -\sin u\frac{du}{dx}$
	$\frac{d}{dx}\tan x = \sec^2 x$	$\frac{d}{dx}\tan u = \sec^2 u\frac{du}{dx}$
	$\frac{d}{dx}\cot x = -\csc^2 x$	$\frac{d}{dx}\cot u = -\csc^2 u\frac{du}{dx}$
	$\frac{d}{dx}\sec x = \sec x\tan x$	$\frac{d}{dx}\sec u = \sec u\tan u\frac{du}{dx}$
	$\frac{d}{dx}\csc x = -\csc x\cot x$	$\frac{d}{dx}\csc u = -\csc u\cot u\frac{du}{dx}$
	$\frac{d}{dx}\sin^{-1} x = \frac{d}{dx}\arcsin x = \frac{1}{\sqrt{1-x^2}}$	$\frac{d}{dx}\sin^{-1} u = \frac{d}{dx}\arcsin u = \frac{1}{\sqrt{1-u^2}}\frac{du}{dx}$
	$\frac{d}{dx}\tan^{-1} x = \frac{d}{dx}\arctan x = \frac{1}{1+x^2}$	$\frac{d}{dx}\tan^{-1} u = \frac{d}{dx}\arctan u = \frac{1}{1+u^2}\frac{du}{dx}$