Derivatives Cheat sheet

Common Functions

Equation	Derivative
c	0
$c * x$	$c * \frac{d}{dx}(x)$
e^x	e^x
$e^{f(x)}$	$f'(x) * e^{f(x)}$
$ln(x)$	$\frac{1}{x}$
$ln(f(x))$	$\frac{1}{f(x)} * f'(x)$
$a^{f(x)}$	$a^{f(x)} * \ln(a) * f'(x)$

Trigonometric Derivatives

$$\frac{d}{dx}sin = cos \qquad \frac{d}{dx}cos = -sin$$
$$\frac{d}{dx}tan = sec^2 \qquad \frac{d}{dx}cot = -csc^2$$
$$\frac{d}{dx}sec = sec * tan \qquad \frac{d}{dx}csc = -csc * cot$$

Derivative Rules

Power Rule

$$\frac{d}{dx}(x^n) = n * x^{n-1}$$

Product Rule

$$\frac{d}{dx}(f(x) * g(x)) = f'(x)g(x) + g'(x)f(x)$$

Quotient Rule

$$\frac{d}{dx}(\frac{f(x)}{g(x)}) = \frac{f'(x)g(x) - g'(x)f(x)}{(g(x))^2}$$

Chain Rule

$$\frac{d}{dx}f(g(x)) = f'(g(x)) * g'(x)$$

Nested Chain Rule

$$\frac{d}{dx}f(g(h(x))) = f'(g(h(x))) * g'(h(x)) * h'(x)$$

Other things to note

$$ln(\frac{x}{y}) = ln(x) - ln(y) \qquad ln(xy) = ln(x) + ln(y) \qquad ln(x^y) = y * ln(x)$$