Table of derivatives

Function y	Derivative $\frac{dy}{dx}$	Examples
kx^n	nkx^{n-1}	Multiply by the power n, then reduce the power by 1. $y = 3x^2 \Rightarrow \frac{dy}{dx} = 2 \times 3x^1 = 6x$ $y = -4x = -4x^1 \Rightarrow \frac{dy}{dx} = 1 \times (-4x^0) = -4$ $y = 3 = 3x^0 \Rightarrow \frac{dy}{dx} = 0 \times 3x^{-1} = 0$
$\sin(kx)$	$k\cos(kx)$	Multiply by k, then swap sin to cos. $y = \sin(2x) \Rightarrow \frac{dy}{dx} = 2\cos(2x)$
$\cos(kx)$	$-k\sin(kx)$	Multiply by $-k$, then swap cos to sin. $y = -\cos(\frac{x}{2}) \Rightarrow \frac{dy}{dx} = \frac{x}{2}\sin(\frac{x}{2})$
e^{kx}	ke^{kx})	Multiply by k. $y = e^{2x} \Rightarrow \frac{dy}{dx} = 2e^{2x}$
$\ln(x)$	$\frac{1}{x}$	Make sure you only have $\ln(x)$ which has derivative $\frac{1}{x}$. (Remember the derivative of a constant is 0.) $y = -\ln(3x) = -\ln(3) - \ln(x) \Rightarrow \frac{dy}{dx} = 0 - \frac{1}{x} = -\frac{1}{x}$

An example

A function can be expressed as the sum of smaller expressions called terms. So

$$f(x) = \text{ Term 1 } + \text{ Term 2 } + \ldots + \text{ Term k } .$$

For example, the function $f(x) = 3x^2 - 4x + 3 + \sin(2x) - cos(\frac{x}{2}) + e^{2x} - \ln(3x)$ has terms: $3x^2$, $-4x$, 3, $\sin(2x)$, $-cos(\frac{x}{2})$, e^{2x} and $-\ln(3x)$.
To find the derivative of a function, you can find the derivative of each term.
The examples in the table above give the derivatives of each of the terms in

$$f(x) = 3x^2 - 4x + 3 + \sin(2x) - cos(\frac{x}{2}) + e^{2x} - \ln(3x)$$

so the derivative of $f(x)$ is

$$f'(x) = 6x - 4 + 0 + 2\cos(2x) - \frac{1}{2}\sin(2x) + 2e^{2x} - \frac{1}{x} = 6x - 4 + 2\cos(2x) - \frac{1}{2}\sin(2x) + 2e^{2x} - \frac{1}{x}.$$