Derivative Helper

Note on Notation

There are a few ways that you are likely to see derivatives notated in NSW HSC maths textbooks and exam papers. Just remember that these are not hard rules and you should use the notation that fits with a question or feels most comfortable to you.

When a situation involves functions you are likely to see derivatives as $f'(x)$, $g'(x)$ and $f''(x)$, where the derivative is with respect to the input variable—usually x. This apostrophe mark may also be used with variables such as $y = 3x^2$ becomes $y' = 6x$. This mark may be pronounced "prime", so you might say "y prime" to mean the first derivative of y.

The other main form of notation is $\frac{dy}{dx}$, which represents the derivative of y with respect to x. Usually this is seen when equations use y or some other variable such as $u = 3x$ gives $\frac{du}{dx} = 3$. Multiple derivatives are represented with index notation as $\frac{d^2u}{dx^2}$ would be the second derivative of u with respect to x. A rarer use of this notation is $\frac{d}{dx}$ which is an operator that roughly means "take the derivative of [expression] with respect to x". For example, if we wanted the derivative of $2x^4$ we might write $\frac{d}{dx}(2x^4) = 8x$.