## DIFFERENTIATION FROM FIRST PRINCIPLES:

The derivative function, f'(x), allows you to find the gradient of the function f(x) for any value of x, so long as it exists on the graph.

$$f(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

As we noticed previously, by reducing "h" in the difference quotient, we could produce a secant line that was closer and closer to being the tangent at x. By setting a limit of  $h \rightarrow 0$ , we can set the two points closer and closer until the distance between the two is infinitesimally small. This is **deriving from first principles**.

