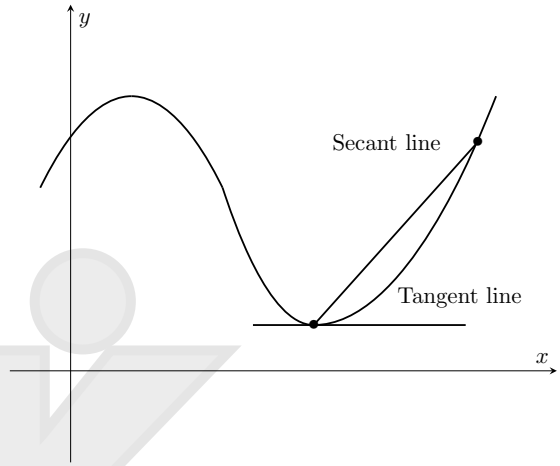
BEHAVIOUR OF THE DIFFERENCE QUOTIENT AS $H \to 0$:

This is the difference quotient:

$$\frac{f(x+h)-f(x)}{h}$$

As discussed previously, the difference quotient represents the slope of a secant between two points "h" units apart.

As "h" approaches 0, the two points become closer and closer. As such, the difference quotient begins to approach the gradient of the function at x.



8.1 WORKED EXAMPLE

Draw the graph of $y = x^2$. Draw secants from the origin $f(1)$ and $f(2)$. Compare their gradients.

8.2 WORKED EXAMPLE

Draw the secants from the origin to $f(0.25)$ and $f(0.5)$ for $y = x^2$ on another set of axes. Compare each of the 4 secants.