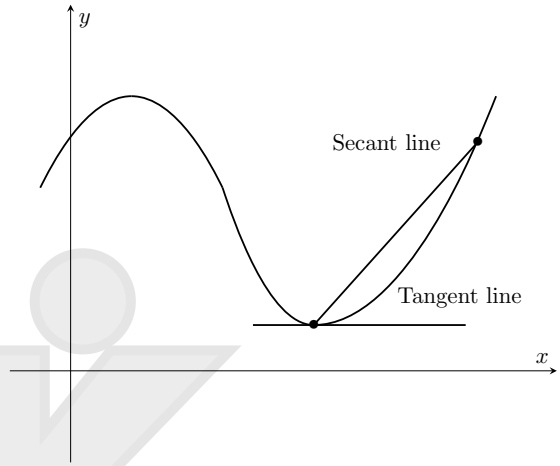
BEHAVIOUR OF THE DIFFERENCE QUOTIENT AS $H \to 0$:

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.



8.3 WORKED EXAMPLE

Draw the tangent to $y = x^2$ at $x = 0$. Which of the 4 secants had the closest slope?

8.4 WORKED EXAMPLE

Previously, we found that the difference quotient of $y = x^2$ was $2x + h$. Verify that as h approaches 0, the difference quotient also approaches 0.