

EJERCICIO MIBE2198:

$$f(x) = x^2 + 5x - 3 \Rightarrow f'(x) = ? \text{ ¡ CON LA DEFINICIÓN!}$$

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

DEFINICIÓN
DE
DERIVADA

$$f(x) = x^2 + 5x - 3$$

$$\begin{aligned} f(x+h) &= (x+h)^2 + 5(x+h) - 3 = \\ &= x^2 + 2xh + h^2 + 5x + 5h - 3 \end{aligned}$$

$$\begin{aligned} f'(x) &= \lim_{h \rightarrow 0} \frac{\cancel{x^2} + 2xh + h^2 + \cancel{5x} + 5h - 3 - (\cancel{x^2} + \cancel{5x} - 3)}{h} = \\ &= \lim_{h \rightarrow 0} \frac{2xh + h^2 + 5h}{h} = \left(\frac{0}{0}\right) = \text{¡ INDETERMINACIÓN!} \\ &= \lim_{h \rightarrow 0} \frac{\cancel{h}(2x + h + 5)}{\cancel{h}} = 2x + 0 + 5 \end{aligned}$$

$$f'(x) = 2x + 5 \quad \ddot{\smile}$$