

# DERIVADAS

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

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

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

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

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

$$f(x+h) = 2x^2 + 4xh + 2h^2 - 3x - 3h + 5$$

$$\lim_{h \rightarrow 0} \frac{2x^2 + 4xh + 2h^2 - 3x - 3h + 5 - 2x^2 + 3x - 5}{h}$$

$$\lim_{h \rightarrow 0} \frac{4xh + 2h^2 - 3h}{h} \quad \lim_{h \rightarrow 0} \frac{h(4x + 2h - 3)}{h}$$

$$\lim_{h \rightarrow 0} 4x + 2h - 3 = 4x + 2(0) - 3 = \underline{4x - 3} //$$

$$f(x) = 4x^2 + 3x + 3$$

$$f(x+h) = 4(x+h)^2 + (x+h) + 3$$

$$4(x^2 + 2xh + h^2) + (x+h) + 3$$

$$f(x+h) = 4x^2 + 8xh + 4h^2 + x + h + 3$$

$$\lim_{h \rightarrow 0} \frac{4x^2 + 8xh + 4h^2 + x + h + 3 - 4x^2 - x - 3}{h}$$

$$8xh + 4h^2 + h = \frac{h(8x + 4h + 1)}{h}$$

$$\lim_{h \rightarrow 0} 8x + 4h + 1 = \underline{8x + 1} //$$

$$f(x) = 3x + 5$$

$$f(x) = 3x + 5$$

$$f(x+h) = 3(x+h) + 5$$

$$f(x) = 2x - 4$$

$$f(x) = 2x - 4$$

$$f(x+h) = 2(x+h) - 4$$

$$\frac{3(x+h) + 5 - 3x - 5}{h}$$

$$\frac{3x + 3h + 5 - 3x - 5}{h}$$

$$\frac{3h}{3h} = \underline{3}$$

$$f(x) = 2x - 4$$

$$f(x) = 2x - 4$$

$$f(x+h) = 2(x+h) - 4$$

$$2(x+h) - 4 - 2x - 4$$

$h$

$$\frac{2x + 2h - 4 - 2x - 4}{h}$$

$$h - \frac{2h}{2h} = \underline{2}$$

$$F(x) = 5x^2 + 3x + 5$$

$$F(x+h) = 5(x+h)^2 + 3(x+h) + 5$$

$$5(x^2 + 2xh + h^2) + 3x + 3h + 5$$

$$5x^2 + 10xh + 5h^2 + 3x + 3h + 5$$

$$5x^2 + 10xh + 5h^2 + 3x + 3h + 5 - 5x^2 - 3x - 5$$

$$\frac{10xh + 5h^2 + 3h}{h} = \frac{h(10x + 5h + 3)}{h}$$

$$10x + 5h + 3 = 10x + 5(0) + 3 = 10x + 3$$

$$F(x) = 2x^2 + 5x + 70$$

$$F(x+h) = 2(x+h)^2 + 5(x+h) + 70$$

$$2(x^2 + 2xh + h^2) + 5x + 5h + 70$$

$$2x^2 + 4xh + 2h^2 + 5x + 5h + 70$$

$$2x^2 + 4xh + 2h^2 + 5x + 5h + 70 - 2x^2 - 5x - 70$$

$$\frac{4xh + 2h^2 + 5h}{h} = \frac{h(4x + 2h + 5)}{h} = \boxed{4x + 5}$$

$$F(x) = 2x^3 + 2x^2 + 3x + 2$$

$$F(x+h) = 2(x+h)^3 + 2(x+h)^2 + 3(x+h) + 2$$

$$F(x+h) = 2(x^3 + 3x^2h + 3xh^2 + h^3) + 2(x^2 + 2xh + h^2) + 3x + 3h + 2$$

$$F(x+h) = 2x^3 + 6x^2h + 6xh^2 + 2h^3 + 2x^2 + 4xh + 2h^2 + 3x + 3h + 2$$

$$\cancel{2x^3} + 6x^2h + 6xh^2 + 2h^3 + \cancel{2x^2} + 4xh + 2h^2 + 3x + 3h + \cancel{2} - \cancel{2x^3} - \cancel{2x^2} - \cancel{3x} - \cancel{2}$$

$h$

$$\frac{6x^2h + 6xh^2 + 2h^3 + 4xh + 2h^2 + 3h}{h}$$

$h$

$$h \frac{(6x^2 + 6xh + 2h^2 + 4x + 2h + 3)}{h} = \frac{6x^2 + 6xh + 2h^2 + 4x + 2h + 3}{1}$$

$$= 6x^2 - 6x(0) + 2(0) + 4x + 2(0) + 3$$

$$\frac{6x^2 + 4x + 3}{1}$$