

BIOMATHS.

DERIVATIVES:

$$1 \quad f(x) = 3x + 5$$

$$0f(x) = 3x + 5$$

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

$$2^{\circ} \quad f(x) = 2x - 4$$

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

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

$$3^{\circ} \quad f(x) = 2x - 4$$

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

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

$$\frac{2(x+h) - 4 - (2x - 4)}{h} = \frac{2x + 2h - 4 - 2x + 4}{h} = \frac{2h}{h} = 2$$

$$4^{\circ} \quad f(x) = 5x^2 + 3x + 5$$

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

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

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

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

$$5 \quad f(x) = 2x^2 + 5x + 10$$

$$f(x+h) = 2(x+h)^2 + 5(x+h) + 10$$

$$2(x^2 + 2xh + h^2) + 5x + 5h + 10$$

$$2x^2 + 4xh + 2h^2 + 5x + 5h + 10$$

$$\frac{2x^2 + 4xh + 2h^2 + 5x + 5h + 10 - (2x^2 + 5x + 10)}{h} = \frac{4xh + 2h^2 + 5h}{h} = 4x + 2h + 5$$

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

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

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

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

$$\begin{array}{r} 2x^3 + 6x^2h + 2h^3 + 2x^2 + 4xh + 2h^2 + 3x + 3 + 2 \\ \underline{2x^3 + 6x^2h + 2h^3 + 2x^2 + 4xh + 2h^2 + 3x + 3} \\ 2h^3 + 2h^2 + 2h \end{array}$$

$$\frac{2h^3 + 2h^2 + 2h}{h} = 2h^2 + 2h + 2$$

$$\begin{aligned} &= 2h^2 + 2h + 2 \\ &= 2h^2 + 4h + 3 \end{aligned}$$