18 Nov 20

Resuelve de forma clara y correcta las siguientes derivadas, aplicando el metodo general (metodo de los 4 pasos).

$\Delta x = h$ $\boxed{Y' = 6x^3 + 12x^3 + 3}$

1- $Y = 2x^3 - 3x + 9$

$Y + \Delta y = (2x + \Delta x)^3 - (3x + \Delta x) + 9$

$Y + \Delta y = 8x^3 + 12hx^2 + 6h^2x + h^3 - 3(x + \Delta x) + 9$

$Y + \Delta y = 8x^3 + 12hx^2 + 6h^2x + h^3 - 3x + 3h + 9$

$(8x^3 + 12hx^2 + 6h^2x + h^3 - 3x + 3h + 9) - (2x^3 - 3x + 9)$

$Y + \Delta y = 6x^3 + 12hx^2 + 6h^2x + h^3 + 3h$

$\dfrac{6x^3 + 12hx^2 + 6h^2x + h^3 + 3h}{h} = 6x^3 + 12x^2 + 6hx + h^2 + 3$

$\dfrac{\Delta y}{\Delta x} = 6x^3 + 12x^2 + 6hx + h^2 + 3$

$\lim_{\Delta x \to 0} (6x^3 + 12x^2 + 6hx + h^2 + 3)$

$= 6x^3 + 12x^3 + 6(0)x + (0)^2 + 3$

$= 6x^3 + 12x^3 + 3$

2.- $Y = 4/x^2$

$Y + \Delta y = 4/(x^2 + \Delta x)$

$Y + \Delta y = 4/x^2 + \Delta x$

$Y + \Delta y = (4/x^2 + \Delta x) - (4/x^2)$

$Y + \Delta y = 4/x^4 + \Delta x^2$

$Y + \Delta y = \dfrac{4/x^4 + \Delta x^2}{\Delta x} = 4/x^4 + x^2$

$\lim_{\Delta x \to 0} \left(\dfrac{4}{x^4 + x^2}\right) = \dfrac{4}{x^4 + x^2}$

$\boxed{Y' = \dfrac{4}{x^4 + x^2}}$

3- $Y = 5/4+x^2$

$Y + \Delta y = 5/4+x^2+\Delta x$

$Y + \Delta y = 5/4+x^2+\Delta x - 5/4+x^2$

$$Y + \Delta y = \frac{5\Delta x}{16+8x^2+x^2+4h+hx^2}$$

$$\frac{5\Delta x / 16+8x^2+x^2+4h+hx^2}{h} = 5 \quad / 16+8x^2+x^2+4+x^2$$

$$\lim_{\Delta x \to 0} = \left(\frac{5}{16+8x^2+x^2+4+x^2} \right)$$

$$Y' = \frac{5}{16+8x^2+x^2+4+x^2}$$

4- $Y = x + 2/x$

$$Y + \Delta y = (x+\Delta x) + \left(\frac{2}{x+\Delta x} \right)$$

$Y + \Delta y = (x + \Delta x + 2/x+\Delta x) - (x + 2/x)$

$$Y + \Delta y = \frac{hx^2 + h^2 x - 2h}{x^2 + hx} \Big/ h$$

$$Y + \Delta y = \frac{hx + hx - 2}{x^2 + x}$$

$$Y + \Delta y = \frac{2hx - 2}{x^2 - x}$$

$$\lim_{\Delta x \to 0} \left(\frac{2hx-2}{x^2-x} \right) = \left(\frac{2(0)-2}{x^2-x} \right)$$

$$Y' = -\frac{2}{x^2-x}$$

5- $Y = (a - bx)^2$

$Y + \Delta y = (a - bx + \Delta x)^2$

$Y + \Delta y = a^2 + b^2x^2 + \Delta x^2 + 2abx + 2a\Delta x + 2b\Delta x$

$Y + \Delta y = \frac{(a^2 + b^2x^2 + \Delta x^2 + 2abx + 2a\Delta x + 2b\Delta x) + (a^2 - 2abx + b^2x^2)}{}$ [illegible]

$Y + \Delta y = \frac{b^2x^2 + x^2 + 4abx + xh + 2bx - b^2 - x^2}{h}$

$Y + \Delta y = b^2x^2 + h + 4abx + 2 + 2bx - b^2 - x^2$

$\lim\limits_{\Delta x \to 0} = b^2x^2 + (0) + 4abx + 2 + 2bx - b^2 - x^2$

$\underline{Y' = b^2x^2 + 4abx + 2 + 2bx - b^2 - x^2}$

6- $Y = 2/x^2 + 4$

$Y + \Delta Y = \frac{2}{x^2 + \Delta x + 4}$

$Y + \Delta y \left(\frac{2}{x^2 + \Delta y + 4}\right) - \left(\frac{2}{x^2 + 4}\right)$

$Y + \Delta y = \frac{2h}{x^4 + 8x^2 + x^2 + 4h + 16}$

$Y + \Delta Y = \frac{2h}{x^4 + 8x^2 + x^2 + 4h + 16} / h$

$Y + \Delta y = \frac{2}{x^4 + 8x^2 + x^2 + 4 + 16}$

$\lim\limits_{\Delta x \to 0} \frac{2}{x^4 + 8x^2 + x^2 + 4 + 16}$ $\quad Y' = \frac{2}{x^4 + 8x^2 + x^2 + 20}$

$7.-\ Y = (1+2x)^2$

$Y+\Delta y = (1+2x+\Delta x)^2$

$Y+\Delta y = 1+4x^2+h^2+4x+2h+4hx$

$(1+4x^2+h^2+4x+2h+4hx) - (4x^2+4x+1)$

$Y+\Delta y = \dfrac{h^2+2h+4hx}{h}$

$Y+\Delta y = h+2+4x$

$\lim\limits_{\Delta x = 0} = 0+2+4x$

$= 2+4x$

$Y' = 2x4x$

$8.-\ Y = \dfrac{2-x}{x-2}$

$Y+\Delta y = \dfrac{2-x-\Delta x}{x+\Delta x-2} - \dfrac{2-x}{x-2}$

$Y+\Delta y = \dfrac{\Delta x}{\Delta x}$

$Y+\Delta y = \dfrac{\Delta x / \Delta x}{\Delta x}$

$\lim\limits_{\Delta x \to 0} = \dfrac{0/0}{0} = \emptyset$