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**Nombre Del Trabajo: Problemario**

PASIÓN POR EDUCAR

**Materia: Calculo**

**Grado: 4 Semestre**

**Grupo: A**

## PROBLEMARIO

1.  $Y = 2x^3 - 3x + 9$   $y + dy = 2(x+dx)^3 - 3(x+dx) + 9$

$$y + dy = x^3 + 3x^2 dx + 3x dx^2 + dx^3$$

$$-y + dy = 2x^3 + 6x^2 dx + 6x dx^2 + 2dx^3 - 3x - 3dx + 9$$

$$\frac{dy}{dx} = \frac{6x^2 dx + 6x dx^2 + 2dx^3 - 3dx}{dx}$$

$$\frac{dy}{dx} = 6x^2 + 6x dx + 2dx^2 - 3$$

$$\lim_{dx \rightarrow 0} \frac{dy}{dx} = 6x^2 + 6x dx + 2dx^2 - 3$$

$$\frac{dy}{dx} = 6x^2 - 3$$

2.  $Y = \frac{4}{x^2}$

$$y + dy = \frac{4}{(x+dx)^2}$$

$$y + dy = \frac{4}{x^2 + 2x dx + dx^2}$$

$$y + dy - y = \frac{4}{x^2 + 2x dx + dx^2} - \frac{4}{x^2}$$

$$dy = \frac{4x^2 - (4x^2 + 8x dx + 4dx^2)}{x^4 + 2x^3 dx + x^2 dx^2}$$

$$dy = \frac{-8x dx - 4dx^2}{x^4 + 2x^3 dx + x^2 dx^2}$$

$$\frac{dy}{dx} = \frac{-8x dx - 4dx^2}{(x^4 + 2x^3 dx + x^2 dx^2)} \cdot \frac{dx}{dx}$$

$$\frac{dy}{dx} = \frac{-8x - 4dx}{x^4 + 2x^3 dx + x^2 dx^2}$$

$$\lim_{dx \rightarrow 0} \frac{dy}{dx} = \frac{-8x}{x^4}$$

$$\frac{dy}{dx} = \frac{-8}{x^3}$$

$$3 = y = \frac{5}{4+x^2}$$

$$-4 + 4 + D_4 = \frac{5}{4(x+Dx)^2} - \frac{5}{4+x^2}$$

$$D_4 = \frac{20+5x^2 - 20+5(x+Dx)^2}{16+4(x+Dx)^2+4x^2+x^2(x+Dx)^2}$$

$$D_4 = \frac{5x^2 - (5x^2 + 10xDx + 5Dx^2)}{16+4(x+Dx)^2+4x^2+x^2(x+Dx)^2}$$

$$\frac{D_4}{Dx} = \frac{10xDx + 5Dx^2}{16+4(x+Dx)^2+4x^2+x^2(x+Dx)^2} \cdot Dx$$

$$\frac{D_4}{Dx} = \frac{10x}{16+4x^2+8xDx+4Dx^2+4x^2+8xDx+4Dx^2+4x^2+4x^2+x^4+2x^3Dx+10x^2}$$

$$\frac{D_4}{Dx} = \frac{10x}{16+8x^2+8xDx+4Dx^2+x^4+2x^3Dx+Dx^2}$$

$$\lim_{Dx \rightarrow 0} \frac{D_4}{Dx} = \frac{10x}{16+8x^2+x^4}$$

$$4 = y = \frac{x+2}{x} = \frac{x}{x} + \frac{2}{x} = 1 + \frac{2}{x}$$

$$-4 + 4 + D_4 = 1 + \left(\frac{2}{x+Dx}\right) - 1 + \left(\frac{2}{x}\right)$$

$$= 1 \cdot \frac{2}{x+Dx} - \frac{2}{x} = \frac{2x - 2x + 2Dx}{x^2 + xDx}$$

$$\frac{D_4}{Dx} = \frac{-2Dx}{x^2 + xDx} \cdot Dx$$

$$\frac{D_4}{Dx} = \frac{-2}{x^2 + xDx} \dots$$

$$\frac{D_4}{Dx} = \frac{-2}{x^2}$$

$$\lim_{Dx \rightarrow 0}$$

$$5 = Y = \frac{(a-bx)^2}{(a-bx)(a-bx)}$$

$$= \frac{a^2 - abx}{a^2 - 2abx + b^2x^2}$$

$$y + dy = a^2 - 2ab(x+dx) + b^2(x+dx)^2$$

$$y + dy = a^2 - 2abx + 2abdx + b^2x^2 + 2b^2x dx + b^2dx^2$$

$$-y \quad -a^2 + 2abx \quad -b^2x^2$$

$$\frac{dy}{dx} = \frac{2abdx}{dx} + \frac{2b^2x dx}{dx} + \frac{b^2dx^2}{dx}$$

$$\frac{dy}{dx} = 2ab + 2b^2x + b^2dx$$

$$\lim_{dx \rightarrow 0}$$

$$\frac{dy}{dx} = 2ab + 2b^2x$$

$$6 = Y = \frac{2}{x^2 + 4} \quad y + dy = \frac{2}{(x+dx)^2 + 4}$$

$$-y + y + dy = \frac{2}{x^2 + 2x dx + dx^2 + 4} - \frac{2}{x^2 + 4}$$

$$= \frac{2x^2 + 8 - 2x^2 - 4x dx - 2x^2 - 8}{x^4 + 2x^3 dx + x^2 dx^2 + 4x^2 + 4x^2 + 8x dx + 4 dx^2 + 16}$$

$$dy = \frac{-4x dx - 2 dx^2}{(x^4 + 2x^3 dx + x^2 dx^2 + 4x^2 + 4x^2 + 8x dx + 4 dx^2 + 16) dx}$$

$$\frac{dy}{dx} = \frac{-4x - 2 dx}{x^4 + 2x^3 dx + x^2 dx^2 + 8x^2 + 8x dx + 4 dx^2 + 16}$$

$$\lim_{dx \rightarrow 0}$$

$$\frac{dy}{dx} = \frac{-4x}{x^4 + 8x^2 + 16}$$

$$7 = 4(1+2x)^2$$

$$y = (1+2x)^2$$

$$\begin{array}{r} (1+2x)(1+2x) \\ 1+2x \\ + 2x+4x^2 \\ \hline 1+4x+4x^2 \end{array}$$

$$y = (1+4x+4x^2)$$

$$y + dy = 1 + 4(x+dx) + 9(x+dx)^2$$

$$1 = 1 + 4x + 4dx + 4(x^2 + 2xdx + dx^2)$$

$$y + dy = 1 + 4x + 4dx + 4x^2 + 8xdx + 4dx^2$$

$$-y = -1 - 4x - 4x^2$$

$$dy = \frac{x \cdot 4dx + 8xdx + 4dx^2}{dx}$$

$$\frac{dy}{dx} = 4 + 8x + 4dx$$

$$\frac{dy}{dx} = 4 + 8x$$

$$8 = y = 2$$

$$\lim_{dx \rightarrow 0}$$

$$8 = 4 \frac{2-x}{x-2}$$

$$y + dy = \frac{2-x+dx}{x+dx-2} - \left( \frac{2-x}{x-2} \right)$$

$$dy = \frac{-2x - 4 + x^2 + 2x \cdot dx - 2dx - (2x - x^2 + 2dx)}{-x \cdot dx - 4 - 2x}$$

$$x^2 - 2x + xdx - 2dx - 2x + 4$$

$$dy = \frac{(-4) - xdx - 2dx - dx \cdot dx - 4}{x^2 - 2x + xdx - 2dx - 2x + 4}$$

$$\frac{dy}{dx} = \frac{-8 - 2dx}{x^2 - 4x + xdx - 2dx}$$

$$\frac{dy}{dx} = \frac{-10}{x^2 + dx + 4dx - 2dx}$$

$$\frac{dy}{dx} = \frac{-10}{x^2}$$