



**Nombre del alumno: Cynthia  
Mariana Jimenez Ramirez.**

**Nombre del profesor: Juan José  
Ojeda Trujillo.**

**Nombre del trabajo: Problemario.**

**Materia: Calculo.**

**Grado: Cuarto Semestre.**

**Grupo: A.**

**PASIÓN POR EDUCAR**

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1

$$y = 2x^3 - 3x + 9$$

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

$$y + \Delta y = x^3 + 3x^2 \Delta x + 3x \Delta x^2 + \Delta x^3$$

$$\cancel{y} + \Delta y = \cancel{2x^3} + 6x^2 \Delta x + 6x \Delta x^2 + 2\Delta x^3 - \cancel{3x} + 3\Delta x + \cancel{9}$$

$$\Delta y = 6x^2 \Delta x + 6x \Delta x^2 + 2\Delta x^3 - 3$$

$\Delta x$

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

$\Delta x = \Delta x \rightarrow 0$

$$\frac{\Delta y}{\Delta x} = 6x^2 - 3$$

$$y = \frac{4}{x^2}$$

17

05

23

Scribe

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

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

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

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

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

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

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

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

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

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

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

17

OS

23

$$-y + y + dy = \frac{5}{4+(x+dx)^2} - \frac{5}{4+x^2}$$

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

$$dy = \frac{5x^2 - (5x^2 + 10x dx + 5dx^2)}{16 + 4(x+dx)^2 + 4x^2 + x^2(x+dx)^2}$$

$$\frac{dy}{dx} = \frac{10x dx + 5dx^2}{16 + 4(x+dx)^2 + 4x^2 + x^2(x+dx)^2} dx$$

$$\frac{dy}{dx} = \frac{10x}{16 + 4x^2 + 8x dx + 4dx^2 + 4x^2 + x^4 + 2x^3 dx + dx^2}$$

$$\frac{dy}{dx} = \frac{10x}{16 + 8x^2 + 8x dx + 4dx^2 + x^4 + 2x^3 dx + dx^2}$$

Lim

 $dx \rightarrow 0$ 

$$\frac{dy}{dx} = \frac{10x}{16 + 8x^2 + x^4}$$

$$\frac{dy}{dx} = \frac{10x}{16 + 8x^2 + x^4}$$

~~y = 0 / 0~~  $y = 5/4 + x^2$

4

$$y = x + 2 / x$$

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

$$-y + y + dy = 1 + \left(\frac{2}{x+dx}\right) - 1 + \left(\frac{2}{x}\right)$$

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

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

$$\frac{dy}{dx} = \frac{2}{x^2 + dx} \quad \therefore \quad \frac{dy}{dx} = \frac{-2}{x^2}$$

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

$$y = (a - bx)^2$$

$$(a - bx)(a - bx)$$

$$a^2 - abx$$

$$-abx + b^2x^2$$

$$a^2 - 2abx + b^2x^2$$

$$y + dy = a^2 - 2abx + 2abDx + b^2x^2 + 2b^2xDx + b^2Dx^2$$

$$-y = -a^2 + 2abx$$

$$\frac{dy}{dx} = \frac{2abDx}{Dx} + \frac{2b^2xDx}{Dx} + \frac{b^2Dx^2}{Dx}$$

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

$$\lim_{Dx \rightarrow 0} \frac{dy}{dx} = 2ab + 2b^2x$$

$$y = 2 / x^2 + 4$$

$$y + dy = \frac{2}{x + Dx}$$

$$-y + y + dy = \frac{2}{x + Dx} - \frac{2}{x}$$

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

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

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

$$\frac{dy}{dx} = -4x - 2Dx$$

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

$$\frac{dy}{dx} = -4x$$

$$\frac{dy}{dx} = -4x$$

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

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

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

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

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

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

$$\begin{array}{r} -y \\ -1 - 4x \\ \hline dy = \frac{4dx}{dx} + \frac{8x dx}{dx} + \frac{4dx^2}{dx} \end{array}$$

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

L.P.M

dx →

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

$$y = 2 - \frac{x}{x-2}$$

8

$$y = \frac{2-x}{x-2}$$

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

$$-y \quad \frac{2-x+dx}{x-2} - \frac{2-x}{x-2} - (2x - x^2 + 2x)$$

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

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

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

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

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

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