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Nombre del tema: Tarea Calculo

Parcial: III

Nombre de la Materia: Calculo

1.- $y = 2x^3 - 6x^2 - 7x + 11$

$2(x+\Delta x)^3 - 6(x+\Delta x)^2 - 7(x+\Delta x) + 11$

$2(x^3 + 3x^2\Delta x + 3x\Delta x^2 + \Delta x^3) - 6(x^2 + 2x\Delta x + \Delta x^2) - 7(x+\Delta x) + 11$

$2x^3 + 6x^2\Delta x + 6x\Delta x^2 + 2\Delta x^3 - 6x^2 + 12x\Delta x + 6\Delta x^2 - 7x - 7\Delta x + 11$

$\Delta y = \dfrac{6x^2\Delta x}{\Delta x} + \dfrac{6x\Delta x^2}{\Delta x} + \dfrac{2\Delta x^3}{\Delta x} + \dfrac{12x\Delta x}{\Delta x} + \dfrac{6\Delta x^2}{\Delta x} + \dfrac{7\Delta x}{\Delta x}$

$\dfrac{\Delta y}{\Delta x} = 6x^2 + 6\Delta x + 2\Delta x^2 + 12x + 6\Delta x + 7$

$\dfrac{\Delta y}{\Delta x} = 6x^2 + 6\Delta x + 2\Delta x^2 + 12x + 6\Delta x + 7$

$\underset{\Delta x \to 0}{\text{Lim}} \quad \dfrac{\Delta y}{\Delta x} = 6x^2 - 12x - 7$

$\underline{\text{Resultado}}$

2.- $y = \dfrac{11}{4x^3} + \dfrac{7}{3x^2}$

$y + \Delta y = \dfrac{11}{4(x+\Delta x)^3}$

$y + \Delta y = \dfrac{11}{4(x^3 + 3x^2\Delta x + 3x\Delta x^2 + \Delta x^3)}$

$-y + y + \Delta y = \dfrac{11}{4x^3 + 12x^2\Delta x + 12x\Delta x^2 + 4\Delta x^3} - \dfrac{11}{4x^3}$

$\Delta y = \dfrac{44x^3 - 44x^3 - 132x^2\Delta x - 132x\Delta x^2 - 44\Delta x^3}{(4x^3 + 12x^2\Delta x + 12x\Delta x^2 + 4\Delta x^3)(4x^3)}$

$\Delta y = \dfrac{-132x^2\Delta x - 132x\Delta x^2 - 44\Delta x^3}{(4x^3 + 12x^2\Delta x + 12x\Delta x^2 + 4\Delta x^3)(4x^3)} \; [\Delta x]$

$\dfrac{\Delta y}{\Delta x} = \dfrac{-132x^2 - 132x\Delta x - 44\Delta x^2}{(4x^3 + 12x^2\Delta x + 12x\Delta x^2 + 4\Delta x^3)(4x^3)}$

$\text{Lim} \to 0$

$\dfrac{\Delta y}{\Delta x} = \dfrac{132x^2}{(4x^3)^2}$

$\dfrac{7}{3x^2} \qquad y = \dfrac{7}{3(x+\Delta x)^2}$

$y + \Delta y = \dfrac{7}{3(x+\Delta x)^2}$

$y + \Delta y = \dfrac{7}{3(x^2 + 2x\Delta x + \Delta x^2)}$

$-y + y + \Delta y = \dfrac{7}{3x^2 + 6x\Delta x + 3\Delta x^2}$

$\Delta y = \dfrac{21x^2 - 21x^2 - 42x\Delta x - 21\Delta x^2}{(3x^2 + 6x\Delta x + 3\Delta x^2)(3x^2)}$

$\Delta y = \dfrac{-42x\Delta x - 21\Delta x^2}{(3x^2 + 6x\Delta x + 3\Delta x^2)(3x^2)} \; [\Delta x]$

$\dfrac{\Delta y}{\Delta x} = \dfrac{-42x - 21\Delta x^2}{(3x^2 + 6x\Delta x + 3\Delta x^2)(3x^2)}$

$\underset{\to 0}{\text{Lim}}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{-42x}{(3x^2)^2}$

3. $y = 11 - 2x^2 - 6x^3$

$11 - 2(x+\Delta x)^2 - 6(x+\Delta x)^3$

$11 - 2(x^2 + 2x\Delta x + \Delta x^2) - 6(x^3 + 3x^2\Delta x + 3\Delta x^2 + \Delta x^3)$

$11 - 2x^2 + 4x\Delta x + 2\Delta x^2 - 6x^3 + 18x^2\Delta x + 18x\Delta x^2 + 6\Delta x^3$

$11 \quad 2x^2 \qquad\qquad 6x^3$

$$\frac{-4x\Delta x}{\Delta x} + \frac{2\Delta x^2}{\Delta x} + \frac{18x^2\Delta x}{\Delta x} + \frac{18x\Delta x^2}{\Delta x} + \frac{6\Delta x^3}{\Delta x}$$

$$\frac{\Delta y}{\Delta x} = -4x + 2\Delta x + 18x^2 + 18x\Delta x + 6\Delta x^2$$

$\lim \to 0$

$$\frac{\Delta y}{\Delta x} = -4x + 18x^2 \; / \text{Resultado}$$

4. $\dfrac{x}{(x^2 - 8x)} = \dfrac{x}{x(x-8x)}$

$y = \dfrac{1}{(x+\Delta x)+8}$

$y = \dfrac{1}{x+\Delta x + 8} - \dfrac{1}{x+8}$

$= \dfrac{x+8-x-\Delta x - 8}{(x+\Delta x+8)(x+8)}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{-\Delta x}{(x+\Delta x+8)(x+8)[\Delta x]}$

$\dfrac{1}{(x+\Delta x+8)(x+8)} = \dfrac{-1}{(x+8)^2} \; / \text{Resultado}$

$\lim \to 0$

0

5. $y = \dfrac{5}{3x-4}$

$y \quad \dfrac{5}{3(x+\Delta x)-4}$

$\dfrac{5}{3x+3\Delta x - 4} - \dfrac{5}{3x-4}$

$y+y+\Delta y = \dfrac{15x - 20 + 15x + 15\Delta x - 20}{(3x+3\Delta x -4)(3x-4)}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{15\Delta x}{(3x+3\Delta x -4)(3x-4)[\Delta x]}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{15}{(3x+3\Delta x -4)(3x-4)}$

$\lim \to 0$

$\dfrac{15}{(3x-4)^2} \; / \text{Resultado}$

0

6. $y = \dfrac{3x^2 + 1}{2x - 1}$

7. $y = \dfrac{(3x^2 + 1)}{(2x)}$

$y + \Delta y = \dfrac{3(x + \Delta x)^2 + 2}{2(x + \Delta x)} = \dfrac{3(x^2 + 2x\Delta x + \Delta x^2) + 2}{2x + 2\Delta x}$

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

$\Delta y = \dfrac{6x^3 + 12x^2\Delta x + 6x\Delta x^3 + 4x - 6x^2 - 6x^2\Delta x - 4x - 4\Delta x}{(2x + 2\Delta x) 2}$

$\Delta y = \dfrac{12x^2\Delta x + 6x\Delta x^2 - 6x^2\Delta x - 4\Delta x}{(2x + 2\Delta x) 2 \quad [\Delta x]}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{12x^2 + 6x\Delta x - 6x^2 - 4}{(2x + 2\Delta x)(2x)}$

$\underset{\Delta x \to 0}{\text{Lim}}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{12x^2 - 6x^2 - 4}{(2x)^2} = y$

8. $\dfrac{5}{4 + x^2}$

$y + \Delta y = \dfrac{5}{4 + (x + \Delta x)^2}$

$y + \Delta y = \dfrac{5}{4 + x^2 + 2x\Delta x + \Delta x^2} - \dfrac{5}{4 + x^2}$

$\dfrac{20 + 5x^2 + 20 + 5x^2 + 10x\Delta x + 5\Delta x}{(4 + x^2 + 2x\Delta x + \Delta x^2)(4 + x^2) \quad [\Delta x]}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{10x\Delta x + 5\Delta x}{(4 + x^2 + 2x\Delta x + \Delta x^2)(4 + x^2)\Delta x}$

$\underset{\Delta x \to 0}{\text{Lim}}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{10x + 5}{(4 + x^2)^2}$

$9_o- \quad y = (1+2x)^2 = \dfrac{(1+2x)(1+2x)}{\begin{array}{l}1+2+\\2++4x^2\\\hline 1+4x+4x^2\end{array}}$

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

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

$4(x^2+2x\Delta x+\Delta x^2)+4(x+\Delta x)+1$

$\Delta y = 4x^2 + 8x\Delta x+4\Delta x^2+4x+4\Delta x+1$
$\quad\quad 4x^2 \quad\quad\quad\quad\quad\quad\quad 4x \quad\quad\quad 1$

$\dfrac{8x\Delta x}{\Delta x} - \dfrac{4\Delta x^2}{\Delta x} + \dfrac{4\Delta x}{\Delta x} = \dfrac{\Delta y}{\Delta x} = 8x-4\Delta x-4$

$\underset{\lim \to 0}{}$

$\dfrac{+8x+4}{\text{Resultado}}$

$10_o- \quad y = \dfrac{3}{5x^2} - \dfrac{3}{4x} + \dfrac{1}{8}$

$y = \dfrac{3}{5x^2}$

$y+\Delta v = \dfrac{3}{5(x^2+2x\Delta x+\Delta x^2)}$

$-y+y+\Delta y \quad \dfrac{3}{5x^2+10x\Delta x+5\Delta x^2} - \dfrac{3}{5x^2}$

$\Delta y = \dfrac{15x^2 - 15x^2 - 30x\Delta x - 15\Delta x^2}{(5x^2+10x\Delta x+5\Delta x^2)(5x^2)}$

$\dfrac{\Delta y}{\Delta x} = \dfrac{-30x\Delta x - 15\Delta x^2}{[5x^2+10x\Delta x+5\Delta x^2](5x^2)[\Delta x]}$

$\Delta y = \dfrac{-30x - 15\Delta x}{(5x^2+10x\Delta x+5\Delta x^2)(5x^2)}$

$\underset{\lim \to 0}{}$

$\Delta y = \dfrac{-30x}{(5x^2)^2}$

$y = \dfrac{-3}{4x}$

$y+\Delta y = \dfrac{-3}{4(x+\Delta x)}$

$y+\Delta y = \dfrac{3}{4x+4\Delta x}$

$-y+y+\Delta y \quad \dfrac{12x-12x-12\Delta x}{(4x+4\Delta x)(4x)}$

$\dfrac{\Delta y}{\Delta x} = -\dfrac{12\Delta x}{(4x+4\Delta x)(4x)[\Delta x]}$

$\Delta y = \dfrac{12}{(4x+4\Delta x)(4x)}$

$\underset{\lim \to 0}{} = -\dfrac{12}{(4x)^2}$

$\dfrac{-30x}{(5x^2)^2} - \dfrac{12}{(4x)^2}$