2020

# EXAMEN CALCULO


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INSTRUCCIONES: Resuelve de forma clara y correcta las siguientes derivadas, aplicando el método general (método de los cuatro pasos)

NOTA: LOS NUMEROS DESPUES DE LAS VARIABLES Y LOS PARENTESIS SON EXPONENTES

1.- Y = 2X3 – 3X + 9

2.- Y = 4 / X2

3.- Y = 5 / 4 + X2

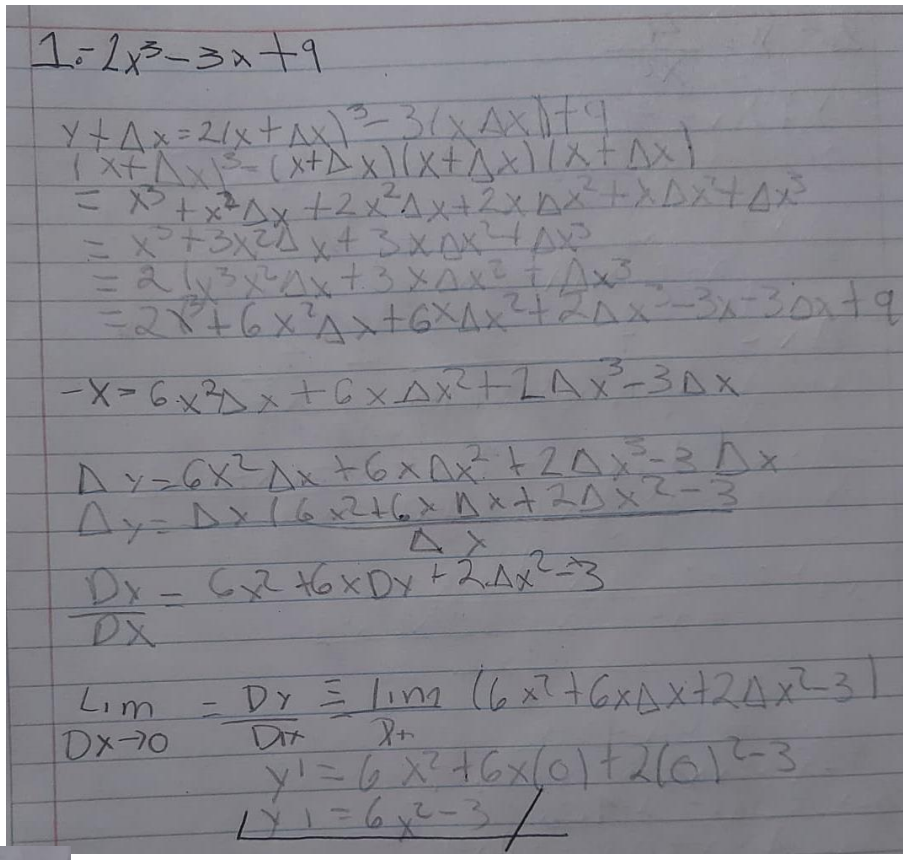
4.- Y = X + 2 / X

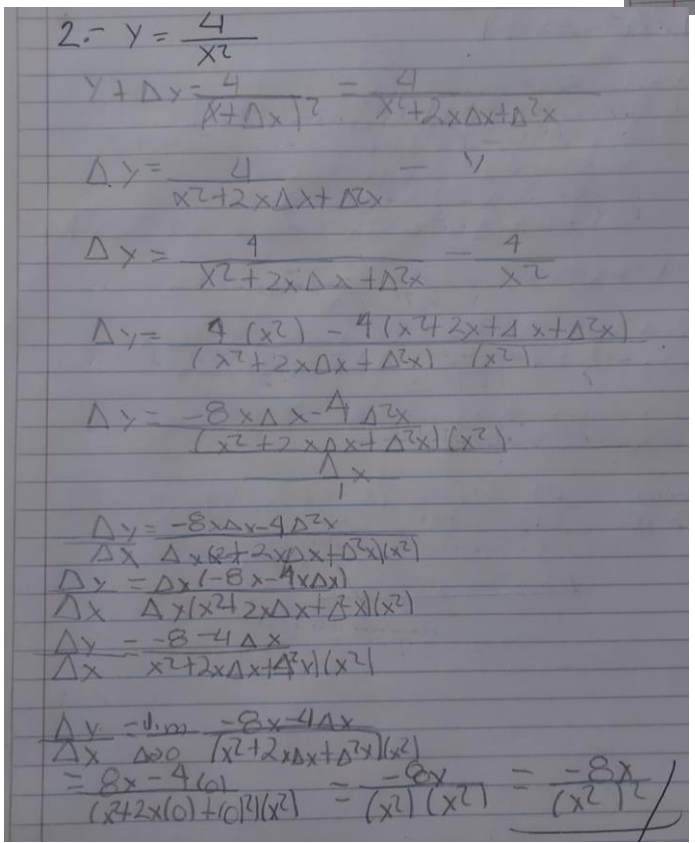
5.- Y = ( a – bx )2

6.- Y = 2 / X2 + 4

7.- Y = ( 1 + 2X ) 2

8.- Y = 2 – X / X – 2



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

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

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

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

$\Delta y = \frac{20+5x^2-20-5x^2-10x\Delta x-5\Delta^2 x}{(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$

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

$\frac{\Delta x}{1}$

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

$\frac{Dy}{Dx} = \frac{\Delta y(-10x-5\Delta x)}{Dx(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$

$\lim_{\Delta x \to 0} \frac{Dy}{Dx} = \frac{-10x-5(0)}{(4+2x(0)+(0)^2)(4+x^2)} = \frac{-10x}{(4+x^2)(4+x^2)}$

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

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

$y + \Delta y = \frac{x+2}{x} = y' = \frac{d}{dx}\left(\frac{x+2}{x}\right)$

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

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

$y' = 0 - 2 \times \frac{1}{x^2}$

$\boxed{y' = \frac{-2}{x^2}}$

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

$x = (a - bx)(a - bx)$

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

$y = a^2 - 2ab(x + \Delta x) + b^2(x + \Delta x)^2$

$= (x + \Delta x)(x + \Delta x) = x^2 + x\Delta x + x\Delta x + \Delta x^2$

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

$= a^2 - 2ab(x + \Delta x) + b^2(x + \Delta x)^2$

$= a^2 - 2ab(x^2 - 2x\Delta x + \Delta x^2) + bx^2 - b\Delta x$

$= a^2 - 2abx^2 + 4abx + \Delta x + 2ab\Delta x^2 - b^2 - b\Delta x$

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

$= a^2 - 2abx^2 + 4abx\Delta x + 2ab\Delta x^2 - b^2 - b^2x^2 - a^2 - 2abx + b^2x^2$

$= \frac{4abx\Delta x - b\Delta x^2 - 2a}{\Delta x} = 4abx + b(0)x - 2ab$

$\Delta x \to 0 = 6a(0) - 2ab$

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

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

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

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

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

$\Delta y \quad \frac{-2x^2+8-2x^2-4x\Delta x-2\Delta^2 x-8}{(x^2+2x\Delta x+\Delta^2 x+4)(x^2+4)}$

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

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

$\lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \frac{-4x-2(0)x}{(x^2+2x(0)+(0)^2+4)(x^2+4)}$

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