Prueba Matemáticas

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Curso: 2°Eco

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1.- $y = sen(\ln(x)) + \cos(\ln(x)) \quad / \frac{d}{dx}$

$y' = \cos(\ln(x)) \cdot \frac{1}{x} + -sen(\ln(x)) \cdot \frac{1}{x}$

$y' = \frac{\cos(\ln(x))}{x} - \frac{sen(\ln(x))}{x}$

$y'' = \frac{-sen(\ln(x)) \cdot \frac{1}{\cancel{x}} \cdot \cancel{x} - \cos(\ln(x)) \cdot 1}{x^2} - \frac{\left(\cos(\ln(x)) \cdot \frac{1}{\cancel{x}} \cdot \cancel{x} - sen(\ln(x)) \cdot \frac{1}{\cancel{x}} \cdot 1\right)}{x^2}$

$y'' = \left[\frac{-sen(\ln(x)) - \cos(\ln(x))}{x^2}\right] - \left[\frac{\cos(\ln(x)) + sen(\ln(x))}{x^2}\right]$

$y'' = \frac{-2\cos(\ln(x))}{x^2}$

$\frac{-2\cos(\ln(x))}{\cancel{x^2}} \cdot \cancel{x^2} + \left(\frac{\cos(\ln(x)) - sen(\ln(x))}{\cancel{x}} \cdot \cancel{x} + (sen(\ln(x)) + \cos(\ln(x))\right) = 0$

$-2\cos(\ln(x)) + 2\cos(\ln(x)) = 0$

$0 = 0$

La función $y = sen(\ln(x)) + \cos(\ln(x))$ sí satisface la ecuación diferencial $\frac{d^2y}{dx^2} \cdot x^2 + \frac{dy}{dx} \cdot x + y = 0$

2) D. Log. dy/dx

a) $y = 3^{tg(x^3+x)}$ $/ \ln(\ )$

$\ln(y) = \ln(3^{tg(x^3+x)})$

$\ln(y) = tg(x^3+x) \cdot \ln(3)$ $/ \frac{d}{dx}$

$\frac{1}{y} \cdot y' = \ln(3) [\sec^2(x^3+x)(3x^2+1)]$

$y' = 3^{tg(x^3+x)} \cdot [\ln(3) \cdot \sec^2(x^3+x)(3x^2+1)]$

Escaneado con CamScanner

b) $$y = \frac{(e^x - x)^{10} \cdot (8+x^3)^2}{\sqrt{6+\sqrt{x}}} \quad / \ln$$

$$\ln(y) = \frac{10\ln(e^x - x) \cdot 2\ln(8+x^3)}{\frac{1}{2}\ln(6+\sqrt{x})}$$

$$\ln(y) = 10\ln(e^x - x) + 2\ln(8+x^3) - \left(\frac{1}{2}\ln(6+\sqrt{x})\right) \quad / \frac{d}{dx}$$

$$\frac{1}{y}\, y' = 10 \cdot \frac{1}{e^x - x} \cdot (e^x - 1) + 2 \cdot \frac{1}{8+x^3} \cdot (3x^2) - \frac{1}{2} \cdot \frac{1}{6+\sqrt{x}} \cdot \left(\frac{1}{2\sqrt{x}}\right)$$

$$y' = \left[\frac{10(e^x - 1)}{e^x - x} + \frac{6x^2}{8+x^3} - \frac{1}{2(6+\sqrt{x})(2\sqrt{x})}\right] \cdot \left[\frac{(e^x - x)^{10} \cdot (8+x^3)^2}{\sqrt{6+\sqrt{x}}}\right]$$

c) $y = \dfrac{\text{sen}(x) \cdot (x^2+x)^{3x}}{110}$ / ln

$\ln(y) = \dfrac{\ln(\text{sen}(x)) \cdot 3x \cdot \ln(x^2+x)}{\ln(110)}$

$\ln(y) = [\ln(\text{sen}(x)) + 3x \cdot \ln(x^2+x)] - \ln(110)$ / $\frac{d}{dx}$

$\frac{1}{y} \cdot y' = \frac{1}{\text{sen}(x)} \cdot \cos(x) + 3\ln(x^2+x) + 3x \cdot \frac{1}{x^2+x} (2x+1) - 0$

$y' = \left[\frac{\cos(x)}{\text{sen}(x)} + 3\ln(x^2+x) + \frac{3x(2x+1)}{x^2+x}\right] \cdot \left[\frac{\text{sen}(x) \cdot (x^2+x)^{3x}}{110}\right]$

3]

a) $y^2 = x^3 + sen(x \cdot y) - x \cdot ln(y) \; / \frac{d}{dx}$ Def: $[dy/dx]$

$2y \cdot y' = 3x^2 + \cos(x \cdot y)(y + xy') - \left(ln(y) + x \cdot \frac{1}{y} \cdot y' \right)$

$2y \cdot y' = 3x^2 + y\cos(xy) + x\cos(xy) \cdot y' - ln(y) - \frac{x}{y} \cdot y'$

$2y \cdot y' + \frac{x}{y} \cdot y' - x\cos(xy) \cdot y' = 3x^2 + y\cos(xy) - ln(y)$

$y'\left(2y + \frac{x}{y} - x\cos(xy)\right) = 3x^2 + y \cdot \cos(xy) - ln(y)$

$$y' = \frac{(3x^2 + y\cos(xy) - ln(y))}{\left(2y + \frac{x}{y} - x\cos(xy)\right)}$$

b) Si $y + x\sqrt{1+2y} = x^2 \; / \frac{d}{dx}$ $\quad y'(\overset{x}{1}, \overset{y}{0})$

$y' + 1 \cdot \sqrt{1+2y} + x \cdot \frac{1}{2\sqrt{1+2y}} \cdot 2y' = 2x$

$y' + 1 \cdot \sqrt{1+0} + 1 \cdot \frac{1}{2\sqrt{1+0}} \cdot 2y' = 2$

$y' + 1 + \frac{1}{\cancel{2}} \cdot \cancel{2}y' = 2$

$y' + y' = 1$

$2y' = 1$

$y'\big|_{(1,0)} = \frac{1}{2}$

4)

a) L_T curva: $3x^2y + y^2 - 3x = 1$ $P(1,-4)$

$$3x^2 \cdot y + y^2 - 3x = 1 \quad / \frac{d}{dx}$$

$$6xy + 3x^2 \cdot y' + 2y \cdot y' - 3 = 0$$

$$6 \cdot 1 \cdot -4 + 3 \cdot (1)^2 \cdot y' + 2 \cdot -4 \cdot y' - 3 = 0$$

$$-24 + 3y' - 8y' = 3$$

$$-27 = 5y'$$

$$-\frac{27}{5} = y'$$

$$m_T = -\frac{27}{5}$$

$$L_T = y + 4 = -\frac{27}{5}(x - 1)$$

$$y = -\frac{27}{5}x + \frac{27}{5} - 4$$

$$L_T = y = -\frac{27}{5}x + \frac{7}{5}$$

b) L_N $f(x) = x^3 - 8x + 2$

$m_T = 4$

$m_N = -\frac{1}{4}$

$4 \cdot m_N = -1$

$$y = x^3 - 8x + 2 \quad / \frac{d}{dx}$$

$$y' = 3x^2 - 8 + 0$$

$$y' = 3x^2 - 8$$

$$3x^2 - 8 = 4$$

$$3x^2 = 12$$

$$x^2 = 4 \quad / \sqrt{\ }$$

$$x = 2 \quad y \quad x = -2$$

$y = 8 - 16 + 2$

$y = -6$

$P_1(2, -6)$

$$L_{N_1} = y + 6 = -\frac{1}{4}(x - 2)$$

$$y = -\frac{1}{4}x + \frac{1}{2} - 6$$

$$L_{N_1} = y = -\frac{1}{4}x - \frac{11}{2}$$

$y = -8 + 16 + 2 = 10$

$P_2 = (-2, +10)$

$$L_N = y - 10 = -\frac{1}{4}(x + 2)$$

$$y = -\frac{1}{4}x - \frac{1}{2} + 10$$

$$L_{N_2} = y = -\frac{1}{4}x + \frac{19}{2}$$