

Prueba Matemáticas

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Curso: 2º Eco

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1: $y = \sin(\ln(x)) + \cos(\ln(x)) \quad / \frac{d}{dx}$

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

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

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

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

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

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

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

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

2) D. Log. dy/dx

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

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

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

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

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

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

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

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

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

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

$$c) \quad y = \frac{\operatorname{sen}(x) \cdot (x^2 + x)^{3x}}{110} \quad / \ln$$

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

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

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

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

3]

$$a) \quad y^2 = x^3 + \sin(xy) - x \cdot \ln(y) \quad \left| \frac{d}{dx} \right. \quad \text{Der:} \quad \left[\frac{dy}{dx} \right]$$

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

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

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

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

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

$$b) \quad \text{Si:} \quad y + x \sqrt{1+2y} = x^2 \quad \left| \frac{d}{dx} \right. \quad y'(1,0)$$

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

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

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

$$y' + y' = 1$$

$$2y' = 1$$

$$y' = \frac{1}{2}$$

(1,0)

4)

a) L_T

curva:

$$3x^2y + y^2 - 3x = 1$$

$P(1, -4)$

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

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

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

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

$$-27 = 5y'$$

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

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

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

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

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

b) L_N

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

$$m_T = 4$$

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

$$4 \cdot m_N = -1$$

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

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

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

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

$$3x^2 = 12$$

$$x^2 = 4 \quad \bigg| \sqrt{}$$

$$x = 2$$

$$y \quad x = -2$$

$$y = 8 - 16 + 2$$

$$y = -6$$

$$P_1(2, -6)$$

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

$$P_2(-2, 10)$$

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

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

$$L_{N2}: y = -\frac{1}{4}x + \frac{19}{2}$$

$$L_{N1}: y + 6 = -\frac{1}{4}(x - 2)$$

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

$$L_{N1}: y = -\frac{1}{4}x - \frac{11}{2}$$