

Prueba Matemáticas

CURSO: 2º ECO

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$$y = \operatorname{sen}(\ln x) + \cos(\ln x)$$

$$y'' \cdot x^2 + y' \cdot x + y = 0$$

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

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

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

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

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

$$\therefore \frac{-2\cos(\ln(x))}{x^2} + \frac{(\cos(\ln(x)) - \operatorname{sen}(\ln(x)))}{x} + y = 0$$

$$\begin{aligned} & -2\cos(\ln(x)) + \cos(\ln(x)) - \operatorname{sen}(\ln(x)) + y = 0 \\ & -\cos(\ln(x)) - \operatorname{sen}(\ln(x)) + \operatorname{sen}(\ln(x)) + \cos(\ln(x)) = 0 \end{aligned}$$

$$0 = 0$$

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

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

$\frac{1}{y} \cdot y' = \left[(\sec^2(x^3+x) \cdot (3x^2+1)) \cdot \ln(3) \right] + \left[\tan(x^3+x) \cdot \frac{1}{3} \cdot 0 \right]$

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

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

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

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

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

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

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

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

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

2.C

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

$$\ln(y) = \ln(\sec(x)) + 3x \ln(x^2 + x) - \ln(110) \quad / \frac{d}{dx}$$

$$\frac{1}{y} \cdot y' = \left(\frac{1}{\sec(x)} \cdot \sec(x) \right) + \left(3x \ln(x) + 6x \ln(x) \right) - \left(\frac{1}{110} \cdot 0 \right)$$

$$\frac{1}{y} \cdot y' = \cot(x) + 3 \cdot \frac{1}{x} + 6 \cdot \frac{1}{x}$$

$$y' = y \left(\cot(x) + 9 \right)$$

$$y' = \left(\frac{\sec(x) \cdot (x^2 + x)^{3x}}{110} \right) \left(\cot(x) + 9 \right)$$

③ a) $y^2 = x^3 + \sin(xy) - x \ln(y)$

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

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

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

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

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

b) $y + x \cdot \sqrt{1+2y'} = x^2$ Determine $y'(1,0)$

$$y' + \left(1 - \sqrt{1+2y'} \right) + x \cdot \frac{1}{2\sqrt{1+2y'}} \cdot 2y' = 2x$$

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

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

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

$$\begin{aligned}
 \hookrightarrow y' \sqrt{1+2y} + 1+2y + y'x &= 2x \sqrt{1+2y} \\
 y' \sqrt{1+2y} + y'x &= 2x \sqrt{1+2y} - 2y - 1 \\
 y' (\sqrt{1+2y} + x) &= 2x \sqrt{1+2y} - 2y - 1 \\
 y' &= \frac{2x \sqrt{1+2y} - 2y - 1}{\sqrt{1+2y} + x}
 \end{aligned}$$

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

$$\text{R: } y' = \frac{1}{2} \text{ en el punto } (1,0)$$

Problema 4
a) $3x^2y + y^2 - 3x - 1$

$P(1, -4)$

$$(6x \cdot y) + (5x^2 \cdot y') + 2y \cdot y' - 3 = 1$$

$$6xy + 3x^2y' + 2y \cdot y' - 3 = 1$$

$$y'(3x^2 + 2y) = 3 - 6xy$$

$$y' = \frac{3 - 6xy}{3x^2 + 2y}$$

$/P(1, -4)$

$$y' = \frac{3 - 6 \cdot 1 \cdot -4}{3 \cdot 1^2 + 2 \cdot -4} \quad y' = \frac{3 + 24}{3 - 8} = \frac{-27}{5}$$

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

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

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

$$\textcircled{5} y = x^3 - 8x + 2 \quad / \cdot \frac{dy}{dx} \quad m_x = 4$$

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

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

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

$$12 = 3x^2$$

$$\sqrt{4} = x \quad \left. \vphantom{\sqrt{4} = x} \right\} x = 2 //$$

$$\circ \circ y = 8 - 16 + 2$$

$$y = -6 //$$

$$m_x = 4 \Rightarrow m_r = -\frac{1}{4}$$

$$P(2, -6)$$

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

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

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

$$\boxed{y = \frac{-x}{4} - \frac{11}{2}}$$