Resolución Prueba 5 matemáticas

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2°ECO

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Pregunta 1

$$y = \sin(\ln x) + \cos(\ln x)$$

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

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

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

calculo de ecuación diferencial

$$\frac{d^2y}{dx^2} \cdot x^2 + \frac{dy}{dx} \cdot x + y = 0$$

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

$$0 = 0$$

R// la función $y = \sin(\ln(x)) + \cos(\ln(x))$ SI satisface la ecuación diferencial de $y'' \cdot x^2 + y' \cdot x + y = 0$.

Pregunta 2

Pregunta $\frac{dy}{dx}$ usando derivacion logaritmica

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

$\ln(y) = \tan(x^3+x) \cdot \ln(3)$

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

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

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

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

$\frac{y'}{y} = 10 \cdot \frac{1}{e^x - x} \cdot (e^x - 1) + 2 \cdot \frac{1}{8+x^3} \cdot (0+3x^2) - \frac{1}{2} \cdot \frac{1}{(6+\sqrt{x})} \cdot \left(0 + \frac{1}{2\sqrt{x}}\right)$

$\frac{y'}{y} = \frac{10e^x - 10}{e^x - x} + \frac{6x^2}{8+x^3} - \frac{1}{(12+2\sqrt{x})} \cdot \frac{1}{(2\sqrt{x})}$

$y' = \left[\frac{10e^x - 10}{e^x - x} + \frac{6x^2}{8+x^3} - \frac{1}{24\sqrt{x}+4x}\right] \cdot \left[\frac{(e^x - x)^{10} \cdot (8+x^3)^2}{\sqrt{6+\sqrt{x}}}\right]$

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c) $Y = \dfrac{\sin(x) \cdot (x^2+x)^{3x}}{110}$ / Ln

p constante

$$\ln(y) = \ln(\sin(x)) + 3x \cdot \ln(x^2+x) - \ln(110)$$

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

$$y' = Y \cdot \left[\cot(x) + 3\ln(x^2+x) + \frac{6x^2+3x}{x^2+x} \right]$$

$$y' = \cancel{y} \left[\cot(x) + 3\ln(x^2+x) + \frac{6x^2+3x}{x^2+x} \right] \cdot \left[\frac{\sin(x) \cdot (x^2+x)^{3x}}{110} \right]$$

Pregunta 3)+2

a) Sea $y^2 = x^3 + (\sin(x\cdot y) - x\cdot \ln(y)$. Determine $\frac{dy}{dx}$ ·2

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

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

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

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

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

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

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

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

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

$$y' = \frac{2(1) - \sqrt{1}}{1 + \frac{1}{\sqrt{1}}}$$

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

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Pregunta 4

$(-2)+2$

$; +2$

P1) ✓ $P(1,-4)$

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

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

$$3x^2 \cdot y' + 2y \cdot y' = 4 - 6x \cdot y$$

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

$$y' = \frac{3 - 6(1)(-4)}{3(1)^2 + 2(-4)}$$

$$y' = \frac{3 + 24}{3 - 8} \qquad m_T = \frac{27}{-5}$$

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

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

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

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

b) $m_T = 4$

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

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

$4 = 3x^2 - 8$

$4 + 8 = 3x^2$

$\frac{12}{3} = x^2$

$4 = x^2$

$\boxed{2 \pm = x}$

$y = x^3 - 8x + 2 \quad \vee \quad y = (-2)^3 - 8(-2) + 2$

$y = (2)^3 - 8(2) + 2 \quad \vee \quad y = -8 + 16 + 2$

$y = -6 \quad \vee \quad y = 10$

1) $P(2, -6)$

2) $P(-2, 10)$

$Ln_1 = y - (-6) = \frac{-1}{4}(x - 2)$

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

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

$Ln_2 = y - 10 = \frac{-1}{4}(x + 2)$

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

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