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

1.- $y = \text{sen}(\ln(x)) + \cos(\ln(x))$

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

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

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

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

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

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

$$-2\cos(\ln(x)) + \cos(\ln(x)) - \cancel{\text{sen}(\ln(x))} + \cancel{\text{sen}(\ln(x))} + \cos(\ln(x)) = 0$$

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

$$0 = 0$$

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

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

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

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

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

$\ln(y) = \frac{10\ln(e^x-x) \cdot 2\ln(8+x^3)}{\frac{1}{2}\ln(6+\sqrt{x})}$ $\nearrow$ $\frac{1}{2}\ln(6) + \frac{1}{2}\ln(x^{\frac{1}{4}}$

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

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

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

c): $\frac{\text{sen}(x) \cdot (x^2+x)^{3x}}{110}$ / ln $\Rightarrow$ $\frac{\ln(y) = \ln(\text{sen}(x)) \cdot 3x \cdot \ln(x^2+x)}{\ln(1100}$

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

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

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

Pregunta 3B

b) $y + x \cdot \sqrt{1+2y} = x^2$

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

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

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

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

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

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

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

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

3.- Sea $y^2 = x^3 + \text{sen}(xy) - x\ln(y)$ 3a

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

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

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

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

4.. LT   CURVA: $3x^2y + y^2 - 3x = 0$ $p(1,-4)$

$\frac{dy}{dx} / = 3x^2 \cdot y + y + y^2 = 0$

$\frac{dy}{dx} = 6xy + 3x^2 \cdot y' + 2y \cdot y' - 3 = 0$ $(x=1)$ $(x=-4)$

$-24 + 3 \cdot y' + -8y' - 3 = 0$

$-27 = 5y$

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

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

$(y - y_1) = m(x - x_1)$

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

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

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

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

$y' = 3x^2 - 8$

$3x^2 - 8 = 4$

$3x^2 = 12$

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

$x = 2$

$m = 4$

$y = 8 - 16 + 2$

$y = -6$

$P = (2,-6)$

$l_N = (y - y_1) = m(x - x_1)$

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

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

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