data

d- $f(x) = \dfrac{x}{\sqrt{1-3x}}$ = Pela derivada do quocien- te

$$h'(x) = \frac{f'(x)\cdot g(x) - f(x)\, g'(x)}{(g(x))^2}$$

$$h'(x) = 1\sqrt{1-3x} - x\left(\frac{1}{2\sqrt{1-3x}} \times (-3)\right)$$

$$* \frac{d}{dx}[g(x)]^n = n[g(x)]^{n-1}\cdot g'(x)$$

$$(1-3x)^{\frac{1}{2}} \to \frac{1}{2}\cdot(1-3x)^{-\frac{1}{2}}\cdot(0-3) = \frac{(1-3x)^{-\frac{1}{2}}}{2}\cdot(-3)$$

$$* \frac{1}{2\sqrt{1-3x}}\cdot(-3)$$

$$h'(x) = \sqrt{1-3x} - x\left(\frac{1}{2\sqrt{1-3x}} \times (-3)\right)$$

$$h'(x) = \frac{\sqrt{1-3x} - \left(\frac{-3x}{2\sqrt{1-3x}}\right)}{(\sqrt{1-3x})^2} = \frac{\frac{2(\sqrt{1-3x})^2 + 3x}{2\sqrt{1-3x}}}{1-3x}$$

$$h'(x) = \frac{\frac{2-6x+3x}{2\sqrt{1-3x}}}{1-3x} = \frac{2-3x}{2\sqrt{1-3x}}\cdot\frac{1}{(1-3x)}$$

$$h'(x) = \frac{2-3x}{2(\sqrt{1-3x})\cdot(1-3x)}$$

data 31/05/25 D

2. $g(t) = \dfrac{f(t^4)}{2[f(t^4)]^2+1}$ / $f(1) = f'(1) = 1$ / $t = 1$

$u = t^4 \Rightarrow u' = 4t^3 \Rightarrow h(t) = 2[f(u)]^2 + 1$

$\dfrac{d}{dx}: 2[f(u)]^2 + \dfrac{d}{dx} 1 \Rightarrow 2((f(u))^2 + 0$

usando $\dfrac{df}{dx} = \dfrac{df}{du} \cdot \dfrac{du}{dx} \Rightarrow$

$4f(u) \cdot f'(u) \cdot 4t^3 = 4f(t^4) \cdot f'(t^4) \cdot 4t^3$

$2(f(u))^2 = 4(f(u)) \cdot f'(u)$

(quociente)

$g'(t) = \dfrac{f'(t^4) \cdot 4t^3 \cdot (2(f(t^4))^2+1) - (f(t^4) \cdot 4f(t^4) \cdot f'(t^4) \cdot 4t^3)}{(2(f(t^4))^2+1)^2}$

$g'(t) = \dfrac{4(2+1) - (16)}{9} = \dfrac{12-16}{9} = \dfrac{-4}{9}$

3. $f(x) = x^3 + ax^2 + bx + c$ / $g(x) = 5 - 3\,sen(x)$

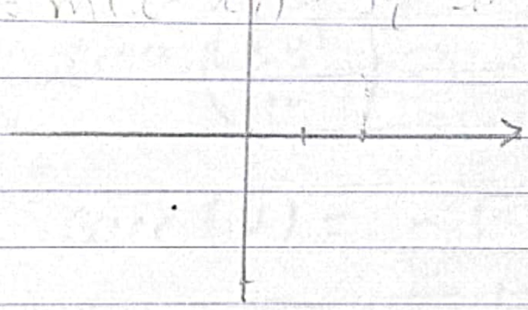
$g(x) = 5 - 3\,sen(x) \quad = \quad g(0) = 5 - 3 \cdot sen(0) = 5$

$g(0 + \Delta x) = 5 - 3 \cdot sen(\Delta x)$

$$m(1) = \lim_{\Delta x \to 0} \frac{5 - 3 \cdot sen(\Delta x) - 5}{\Delta x} = \frac{-3\,sen(\Delta x)}{\Delta x}$$

$$m(1) = -3 \lim_{\Delta x \to 0} \frac{sen(\Delta x)}{\Delta x} = \frac{0}{[illegible]}$$

$y = m(x - x_1) + y_1 = \ldots (x - 0) + y$



data

4a. $y \operatorname{sen}(x^2) = x \operatorname{sen}(y^2) - \operatorname{cosec}\left(\frac{8y^4}{\pi}\right) + 1$

$$\frac{d}{dx} y \cdot \operatorname{sen}(x^2) = \frac{d}{dx} x \operatorname{sen}(y^2) - \operatorname{cosec}\left(\frac{8y^4}{\pi}\right)$$

$$* \frac{d}{dx} y \operatorname{sen}(x^2) = \frac{dy}{dx} \cdot \operatorname{sen}(x^2) + y \cdot \left(2x \cos(x^2)\right)$$

$$* \frac{d}{dx} x \operatorname{sen}(y^2) = 1 \cdot \operatorname{sen}(y^2) + x \cdot \left(\cos(y^2) \cdot 2y \frac{dy}{dx}\right)$$

$$\frac{d}{dx} \operatorname{sen}(y^2) = \cos(y^2) \cdot 2y \frac{dy}{dx}$$

$$* \frac{d}{dx} \operatorname{cosec}\left(\frac{8y^4}{\pi}\right) \Rightarrow \frac{8y^4}{\pi} = U$$

$$\operatorname{cosec}(U) = -\operatorname{cosec}(U) \cdot \operatorname{Cotg}(U)$$

$$U' = \frac{8 \cdot y^4 \cdot \pi^{-1}}{\pi}$$

$$\frac{d}{dx} y^4 = \frac{d}{dx} ((f(x))^4) = 4(f(x)^3) \cdot (f(x))' = 4 \cdot y^3 \frac{dy}{dx}$$

$$U' = \cancel{0 \cdot y^4} \cdot \pi^{-1} - 8 \cdot 4y^3 \frac{dy}{dx} \cdot \pi^{-1} - (8 \cdot y^4 \cdot (\pi)^{-2})$$

$$U' = -8 \cdot 4y^3 \frac{dy}{dx} \cdot \pi^{-1} + 8 \cdot y^4 \cdot \pi^{-2}$$

data

$$\frac{dy}{dx}\operatorname{sen}(x^2)+y\left(2x\cos(x^2)\right)=\operatorname{sen}(y^2)+x(\cos(y^2).$$

$$2y\frac{dy}{dx}-\left(-\operatorname{cosec}\left(\frac{8y^4}{\pi}\right)\operatorname{cotg}\left(\frac{8y^4}{\pi}\right)\cdot -8\,4y^3\frac{dy}{dx}\pi^{-1}+8y^4\cdot\pi^{-2}\right.$$

$$\frac{dy}{dx}\operatorname{sen}(x^2)=\operatorname{sen}(y^2)+x(\cos(y^2))\cdot 2y\frac{dy}{dx}+\operatorname{cosec}\left(\frac{8y^4}{\pi}\right)\operatorname{cotg}\left(\frac{8y^4}{\pi}\right)$$

$$+64y^3\frac{dy}{dx}\cdot\pi^{-1}+8y^4\cdot\pi^{-2}$$

5 $f(x) = \ln\left(\operatorname{arctg}\left(\sqrt{\frac{1-x}{x+1}}\right)\right)$

$\operatorname{arctg}\left(\sqrt{\frac{1-x}{x+1}}\right) = g \Rightarrow \frac{d}{dg}\left(\ln(g)\right) \cdot \frac{d}{dx}\left(\operatorname{arctg}\left(\sqrt{\frac{1-x}{x+1}}\right)\right)$

$\frac{1}{g} \cdot \frac{d}{dx}\left(\operatorname{arctg}\left(\sqrt{\frac{1-x}{x+1}}\right)\right) \Rightarrow h = \sqrt{\frac{1-x}{x+1}} \Rightarrow$

* $\frac{d}{dh}\left(\operatorname{arctg}(h)\right) \cdot \frac{d}{dx}\left(\sqrt{\frac{1-x}{x+1}}\right) \Rightarrow$

$\frac{1}{1+h^2} \cdot \frac{1}{2\sqrt{\frac{1-x}{x+1}}} \cdot \frac{-1(x+1)-(1-x)}{(x+1)^2}$

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

$\frac{1}{\operatorname{arctg}\left(\sqrt{\frac{1-x}{x+1}}\right)} \cdot \frac{1}{1+\left(\sqrt{\frac{1-x}{x+2}}\right)^2} \cdot \frac{1}{\cancel{2}\sqrt{\frac{1-x}{x+1}}} \cdot \frac{\overset{-2}{\cancel{-x-1+1+x}}}{(x+1)^2}$

$\frac{1}{\operatorname{arctg}\left(\sqrt{\frac{1-x}{x+1}}\right)} \cdot \frac{1}{1+\frac{1-x}{x+1}} \cdot \frac{1}{\frac{\sqrt{1-x}}{\sqrt{x+1}}} \cdot \frac{1}{(x+1)^2}$

* $\frac{x+1+1-x}{x+1} = \frac{2}{x+1}$

5 $-\dfrac{1}{\operatorname{arctg}\left(\sqrt{\dfrac{1-x}{x+1}}\right)}\cdot\dfrac{x+1}{2}\cdot\dfrac{\sqrt{x+1}}{\sqrt{1-x}}\cdot\dfrac{1}{(x+1)^2}$

$-\dfrac{\sqrt{x+1}}{2\operatorname{arctg}\left(\sqrt{\dfrac{1-x}{x+1}}\right)\cdot\sqrt{1-x}\cdot(x+1)}$

data

6. $f(x) = |x^3| \Rightarrow \frac{d}{dx}\sqrt{(x^3)^2} = \sqrt{x^6} \left(x^{6/2 = 3} \right)$

$f'(x) = \frac{1}{\cancel{2}\sqrt{x^6}} \cdot \cancel{6}x^5 = \frac{1}{|x^3|} \times 3x^5 = \frac{3x^5}{|x^3|}$

$f''(x) = \left(\frac{3x^5}{\sqrt{(x^3)^2}} \right) = \frac{3x^5}{\sqrt{x^6}} \Rightarrow$ Quociente

$$f''(x) = \frac{3 \cdot 5x^4 \cdot \sqrt{x^6} - 3x^5 \cdot \frac{1}{2\sqrt{x^6}} \cdot 6x^5}{(\sqrt{x^6})^2}$$

$$f''(x) = \frac{15x^4 \cdot |x^3| - 3x^5 \cdot \frac{3x^5}{|x^3|}}{x^6} \Rightarrow$$

$$f''(x) = \frac{15x^4 \cdot |x^3| - \frac{9x^{10}}{|x^3|}}{x^6} \Rightarrow$$ $|a|^2 = a^2$

$$f''(x) = \frac{\frac{15x^4 \cdot (x^3)^2 - 9x^{10}}{|x^3|}}{x^6} = \frac{\frac{15x^4 \cdot x^6 - 9x^{10}}{|x^3|}}{x^6}$$

$$f''(x) = \frac{\frac{15x^{10} - 9x^{10}}{|x^3|}}{x^6} = \frac{6x^{10}}{|x^3|} \cdot \frac{1}{x^6} =$$

$$f''(x) = \frac{6x^4}{|x^3|}$$