$$\frac{d}{dx} f(x)$$

$$f'(x)$$

$$\boxed{(\cos(7x))^{x}}$$

$$\cos((7x)^{x})$$

miro

$$\boxed{e^{\ln(\cos(7x))}}$$

$$\left(e^{\ln(\cos(7x))}\right)^{x}$$

$$\|$$

$$\to e^{x\ln(\cos(7x))}$$

$$\downarrow$$

$$\frac{d}{}\, e^{h(x)} \rightarrow e^{h(x)}\,'$$

$$e^{h(x)} \cdot h'(x)$$

$$\vdots$$

Calcule $\left[(\cos(7x))^x\right]'$

- $(\cos(7x))^x =$

$$= \left(e^{\ln(\cos(7x))}\right)^x$$

$$= e^{x\ln(\cos(7x))}$$

- $\left[e^{x\ln(\cos(7x))}\right]' = ?$

Regra da Cadeia

$f: \mathbb{R} \longrightarrow \mathbb{R}$

$g: \mathbb{R} \longrightarrow \mathbb{R}$

$f \circ g$

$f \circ g\,(x) = f(g(x))$

$f \circ g'(x) = f'(g(x)) \cdot g'(x)$

miro

$$f(z) = e^{z}$$

$$g(x) = x \cdot \ln(\cos(7x))$$

$$f(g(x)) = *$$

$$f'(g(x)) = e^{g(x)}$$

$$g'(x) = \left(\overline{x} \cdot \overline{\ln(\cos(7x))}\right)'$$

$$p$$

$$= 1 \cdot \ln(\cos(7x))$$

$$+ x \cdot \left(\ln(\cos(7x)) \right)'$$

- $\left(\ln(\cos(7x)) \right)' = \, ?$ $\boxed{\ln}$

Regra da Cadeia

$h = \ln$

$t(x) = \cos(7x)$

$$\cdot\ h'(t(x)) = \frac{1}{t(x)}$$

$$\cdot\ t'(x) = 7 \cdot (-\operatorname{sen}(7x))$$

$$= \frac{-7 \cdot \operatorname{sen}(7x)}{\cos(7x)}$$

$$= -7\,\operatorname{tg}(7x)$$

$$g'(x) =$$

$$\ln(\cos(7x)) +$$

$$+ x \cdot (-7 \operatorname{tg}(7x))$$

$$f \circ g'(x) =$$

$$= e^{\ln|\cos(7x))} \cdot (g'(x))$$

$\vdots$

$* \rightarrow f(x)^3 + 2x\, f(x)^2$

$+ x = 4$

$f(1)^3 + 2 \cdot 1 \cdot f(1)^2$

$+ 1 = 4$

$f(1)^3 + 2f(1)^2 - 3 = 0$

$y = f(x)$

é dado implicitamente

por

$$y^3 + 2xy^2 + x = 4 \qquad \ast$$

$$\boxed{f'(1) = \,?}$$

$3z^{-3}$

$(z-1)\cdot\left(\overline{z^2+3z+3}\right)$

$\sqrt{\underline{1}}$

$\underbrace{\text{o único valor}}$ p/ f(1)

é $\underline{1}$

$f(\underline{1}) = \underline{1} \quad \underline{o}$

r a iz do polin.

$$z^3 + 2z^2 - 3 \quad \Big| \; (z - \underline{1})$$

$$-z^3 + z^2 \qquad\qquad z^2 + 3z$$

$$\overline{}$$

$$\cancel{3z^2} - 3$$

$$\cancel{-3z^2} + 3z$$

$$\overline{}$$

miro

b) $f'(1) = ?$

$$\frac{d}{dx} f(x)^3 + 2x f(x)^2 + x = \frac{d}{dx} 4$$

$$(f(x)^3)' + (2x f(x)^2)' + (x)'$$

$$= (4)' = 0$$

$$\vdots$$