

DICAS - L4 - 1º Bim

PROF. PAULO ALEX.
ENG. DE AVM.
UFT / PALMAS / TO

1a) $f(x) = (2x^2 + 3) \cdot \ln(x+1)$

(*) $f(x) = a(x) \cdot b(x) \Rightarrow f'(x) = a'(x) \cdot b(x) + a(x) \cdot b'(x)$

ONDE: i) $a(x) = 2x^2 + 3 \Rightarrow a'(x) = 4x + 0$ $\rightarrow$ R. DA CÁLCULA

ii) $b(x) = \ln(x+1) \Rightarrow b'(x) = \frac{1}{x+1} \cdot (1)$

SUBST. i) e ii) EM (*):

$$f'(x) = (4x) \cdot (\ln(x+1)) + (2x^2 + 3) \cdot \left(\frac{1}{x+1}\right)$$

$$f'(x) = 4x \ln(x+1) + \frac{2x^2 + 3}{x+1}$$

1.d) $f(x) = e^{(x+1) \cdot \cos(2x)}$

$f(x) = e^{a(x) \cdot b(x)} \Rightarrow f'(x) = e^{a(x) \cdot b(x)} \cdot [a'(x) \cdot b(x) + a(x) \cdot b'(x)]$

(*) $f'(x) = e^{a(x) \cdot b(x)} \cdot [a'(x) \cdot b(x) + a(x) \cdot b'(x)]$

ONDE: i) $a(x) = x+1 \Rightarrow a'(x) = 1$ $\rightarrow$ R. DA CÁLC.

ii) $b(x) = \cos(2x) \Rightarrow b'(x) = -\sin(2x) \cdot 2$

SUBST. i) e ii) EM (*): $b'(x) = -2\sin(2x)$

$$f'(x) = e^{(x+1) \cdot \cos(2x)} \cdot [1 \cdot \cos(2x) + (x+1) \cdot (-2\sin(2x))]$$

$$f'(x) = e^{(x+1) \cdot \cos(2x)} \cdot (\cos(2x) - (2x+2)\sin(2x))$$

1.j) $f(x) = \frac{(x^2 + 1) \cdot \sin(x+2)}{e^{x-1}}$

(*) $f(x) = a(x) / b(x) \Rightarrow f'(x) = \frac{a'(x) \cdot b(x) - a(x) \cdot b'(x)}{[b(x)]^2}$

(***) $a(x) = c(x) \cdot d(x) \Rightarrow a'(x) = c'(x) \cdot d(x) + c(x) \cdot d'(x)$

ONDE i) $c(x) = x^2 + 1 \Rightarrow c'(x) = 2x$ $\rightarrow$ R. DA CÁLC.

ii) $d(x) = \sin(x+2) \Rightarrow d'(x) = \cos(x+2) \cdot (1)$

iii) $b(x) = e^{x-1} \Rightarrow b'(x) = e^{x-1} \cdot (1)$

SUBST. i) e ii) $E_M (**)$:

(***) $a'(x) = 2x \cdot \text{SEN}(x+2) + (x^2+1) \cdot \cos(x+2)$

SUBST. iii) $\in (***) E_M (*)$:

$$f'(x) = \frac{[2x \cdot \text{SEN}(x+2) + (x^2+1) \cdot \cos(x+2)] \cdot e^{x-1} - [(x^2+1) \cdot \text{SEN}(x+2)] \cdot e^{x-1}}{(e^{x-1})^2}$$

$$f'(x) = \frac{e^{x-1} [2x \text{SEN}(x+2) + (x^2+1) \cdot (\cos(x+2) - \text{SEN}(x+2))]}{e^{2x-2}}$$

2c) $x^3 + 2xy^2 = 3xy^3$

$y(x)$

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

$$4xy \cdot y' - 9xy^2 y' = 3y^3 - 3x^2 - 2y^2$$

$$y' \cdot (4xy - 9xy^2) = 3(y^3 - x^2) - 2y^2$$

$$y' = \frac{3(y^3 - x^2) - 2y^2}{4xy - 9xy^2}$$

3.d) $\sqrt{y} + 2x - y^2 = \sqrt[3]{y} + 3x^3$ $x(y)$

$$\frac{1}{2\sqrt{y}} + 2x' - 2y = \frac{1}{3\sqrt[3]{y^2}} + 9x^2 x'$$

$$2x' - 9x^2 x' = \frac{1}{3\sqrt[3]{y^2}} - \frac{1}{2\sqrt{y}} + 2y$$

$$x'(2 - 9x^2) = \frac{1}{3\sqrt[3]{y^2}} - \frac{1}{2\sqrt{y}} + 2y$$

$$x' = \frac{\frac{1}{3\sqrt[3]{y^2}} - \frac{1}{2\sqrt{y}} + 2y}{2 - 9x^2}$$

RASCUNHO:

$$(\sqrt[3]{y})' = (y^{\frac{1}{3}})' = \frac{1}{3} y^{\frac{1}{3}-1}$$

$$= \frac{1}{3} y^{-\frac{2}{3}} = \frac{1}{3} \cdot \frac{1}{\sqrt[3]{y^2}}$$

$$= \frac{1}{3\sqrt[3]{y^2}}$$