

EXERCÍCIOS

1) Encontrar a derivada das funções dadas.

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

b) $f(x) = x^2 + \sqrt{x}$

c) $f(x) = x^3(2x^2 - 3x)$

d) $f(x) = x^3 \cdot \cos(x)$

e) $f(x) = \frac{2x+5}{4x}$

f) $f(x) = \left(\frac{2}{5}\right)^x$

g) $f(x) = \frac{6x^5}{x^6 - 1}$

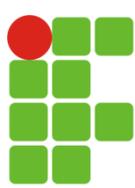
h) $f(x) = 7(x^2 + 5x - 3)^6 \cdot (5x + 2)$

i) $f(x) = \frac{1}{3}(2x^5 + 6x^{-3})^5$

j) $f(s) = \frac{1}{\sqrt[5]{x^3 - 1}}$

k) $f(x) = \left(\frac{3x+2}{2x+1}\right)^5$

l) $f(x) = \cos\left(\frac{1}{x}\right)$



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2) Dadas as funções $f(x) = x^2 + Ax$ e $g(x) = Bx$, determinar A e B de tal forma

que
$$\begin{cases} f'(x) + g'(x) = 1 + 2x \\ f(x) - g(x) = x^2 \end{cases}$$

3) Dada a função $f(t) = 3t^3 - 4t + 1$, encontrar $f(0) - t.f'(0)$.

4) Encontrar a equação da reta tangente à curva $y = 2^{3x-1}$, no ponto $x = -2$.

5) Seja $y = ax^2 + bx$. Encontrar os valores de a e b, sabendo que a tangente à curva no ponto (1,5) tem inclinação $m = 8$.

6) Determinar a equação da reta tangente às curvas, nos pontos indicados. Esboçar o gráfico em cada caso.

a) $f(x) = \sqrt{3x+4}$; $x = \frac{1}{3}$; $x = 3$

b) $f(x) = \frac{\sec(x)}{3x+2}$; $x = 0$; $x = 2$

7) Calcular as seguintes derivadas:

a) $f(s) = \frac{1}{2}(a+bs)^{\ln(a+bs)}$

h) $f(\theta) = -\operatorname{cosec}^2\theta^3$

b) $f(u) = \cos(\pi/2 - u)$

i) $f(x) = a\sqrt{\cos bx}$

c) $f(\theta) = 2\cos\theta^2 \cdot \operatorname{sen}2\theta$

j) $f(u) = (u \cdot \operatorname{tgu})^2$

d) $f(x) = \operatorname{sen}^3(3x^2 + 6x)$

k) $f(x) = (\operatorname{arc} \operatorname{sen} x)^2$

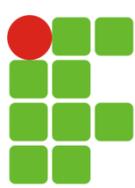
e) $f(x) = 3\operatorname{tg}(2x+1) + \sqrt{x}$

l) $f(t) = \operatorname{arc} \cos 3t$

f) $f(x) = \frac{3\sec^2 x}{x}$

m) $f(x) = \frac{1}{2}[\operatorname{arg} \operatorname{cot} \operatorname{gh} x^2]^2$

g) $f(x) = e^{2x} \cos 3x$



Gabarito

1)

a) $f'(x) = -2x^3 + 2x^2 - x$

b) $f'(x) = 2x + \frac{\sqrt{x}}{2x}$

c) $f'(x) = 10x^4 - 12x^3$

d) $f'(x) = x^2(3\cos(x) - x\sin(x))$

e) $f'(x) = -\frac{5}{4x^2}$

f) $f'(x) = \ln\left(\frac{2}{5}\right) \cdot \left(\frac{2}{5}\right)^x$

g) $f'(x) = \frac{-6x^{10} - 30x^4}{(x^6 - 1)^2}$

h) $f'(x) = 7(x^2 + 5x - 3)^5(65x^2 + 199x + 45)$

i) $f'(x) = \frac{5}{3} \left(2x^5 + \frac{6}{x^3}\right)^4 \cdot \left(10x^4 - \frac{18}{x^4}\right)$

j) $f'(x) = -\frac{3x^2}{5(x^3 - 1)\sqrt[5]{x^3 - 1}}$

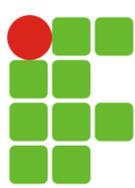
k) $f'(x) = 5 \left(\frac{3x+2}{2x+1}\right)^4 \cdot \left(-\frac{1}{(2x+1)^2}\right)$

l) $f'(x) = \frac{1}{x^2} \cdot \text{sen}\left(\frac{1}{x}\right)$

2) $A = \frac{1}{2}$ e $B = \frac{1}{2}$

3) $1 + 4t$

4) $y = \frac{3x\ln(2) + 6\ln(2) - 63}{128}$



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5) $a = 3$ e $b = 2$

6)

a) $p/x = \frac{1}{3} \rightarrow y = \frac{3\sqrt{5}x - 31\sqrt{5}}{30}$ $p/x = 3 \rightarrow y = \frac{\sqrt{13}x + 10\sqrt{13}}{13}$

b) $p/x = 0 \rightarrow y = -\frac{3x}{4}$

$$p/x = 2 \rightarrow y = \left(\frac{8\sec(2) \cdot \operatorname{tg}(2) - 3\sec(2)}{64} \right) (x - 2) + \frac{\sec(2)}{8}$$

7) Na lista anterior