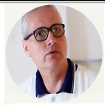


1.Calcule a derivada de cada uma das funções abaixo:

$a)\ f_1(x) = \left(x^3 + 2x\right)^2$ Resp: f ’(x) = $6x^5 + 16x^3 + 8x$

$b)\ f_2(x) = e^{2x-3}$ Resp: f ’(x) = $2e^{2x-3}$

$c)\ f_3(x) = \dfrac{2}{(2 + \ln x)^2}$ Resp: f ’(x) = $-\dfrac{4}{x(2 + \ln x)^3}$

$d)\ f_4(x) = e^{senx} + sen\left(e^x\right)$ Resp: f ’(x) = $e^{senx}.\cos x + e^x.cos\left(e^x\right)$

$e)\ f_5(x) = sen^2 x + sen\, 2x$ Resp: f ’(x) = 2 sen x cos x + 2 cos (2x)

$f)\ f_6(x) = 3x + 1 \cdot \dfrac{1}{5x - 1}$ Resp: f ’(x) = $-\dfrac{8}{(5x-1)^2}$

g) f(x) = ln (x^2+1) R: f ’(x) = $\dfrac{2^x}{x^2 + 1}$

h) f(x) = sen(3x+1) R: f ’(x) = 3cos(3x+1)

i) f(x) = (x^2 + 2x + 10)^2 R: f ’(x) = $4x^3 + 12x^2 + 48x + 40$

j) f(x) = sen 2x R: f ’(x) = 2.cos2x

k) f(x) = cos 3x R: f ’(x) = -3.sen3x

l) f(x) = sen^2 x R: f ’(x) = 2.senx.cosx

m) f(x) = sen x^2 R: f ’(x) = 2x.cos x^2

2. Calcule as derivadas $f'(x)$ das funções:

a) $f(x) = 3x + 1$ b) $f(x) = 2x^3$ c) $f(x) = x^2 - x + 3$ d) $f(x) = -5x^2 + \pi$	e) $f(x) = \sqrt{x} + 2$ f) $f(x) = \sqrt[3]{x} + \ln 3$ g) $f(x) = \sqrt[3]{2x^2}$ h) $f(x) = \frac{1}{x^2}$	i) $f(x) = \frac{1}{x^5} - 4x^3$ j) $f(x) = \frac{1}{\sqrt{x}}$ k) $f(x) = \frac{5}{\sqrt[4]{x^3}}$

Respostas :

a) $f'(x) = 3$	g) $f'(x) = \frac{2.\sqrt[3]{2x^2}}{3x}$
b) $f'(x) = 6x^2$	h) $f'(x) = -\frac{2}{x^3}$
c) $f'(x) = 2x - 1$	i) $f'(x) = -\frac{5}{x^6} - 12x^2$
d) $f'(x) = -10x$	j) $f'(x) = -\frac{\sqrt{x}}{2x^2}$
e) $f'(x) = \frac{\sqrt{x}}{2x}$	k) $f'(x) = -\frac{15\sqrt[4]{x}}{4x^2}$
f) $f'(x) = \frac{\sqrt[3]{x}}{3x}$	

3. Conhecendo f(x), determine a derivada $f'(x)$, nos seguintes casos:

a) $f(x) = \frac{2x-1}{x}$ — *R.:* $f'(x) = \frac{1}{x^2}$

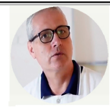
b) $f(x) = \frac{x^2+1}{x-1}$ — *R.:* $f'(x) = \frac{x^2-2x-1}{x^2-2x+1}$

c) $f(x) = \frac{x+1}{x^2}$ — *R.:* $f'(x) = \frac{-x^2-2x}{x^4}$

d) $f(x) = \frac{5x^3}{x^2+3}$ — *R.:* $f'(x) = \frac{5x^4+45x^2}{x^4+6x^2+9}$

e) $f(x) = \frac{\cos x}{x^2}$ — *R.:* $f'(x) = \frac{-x^2.\text{sen}\, x - 2x.\cos x}{x^4}$

f) $f(x) = \frac{1+\cos x}{\text{sen}\, x}$ — *R.:* $f'(x) = \frac{-1-\cos x}{\text{sen}^2\, x}$



4. Determinar a derivada das seguintes funções compostas:

a) $f(x) = \ln(x^2+1)$ R: $f'(x) = 2x/x^2 + 1$

b) $f(x) = \text{sen}(3x+1)$ R: $f'(x) = 3\cos(3x+1)$

c) $f(x) = (x^2 + 2x + 10)^2$ R: $f'(x) = 4x^3 + 12x^2 + 48x + 40$

d) $f(x) = \text{sen}\ 2x$ R: $f'(x) = 2.\cos 2x$

e) $f(x) = \cos 3x$ R: $f'(x) = -3.\text{sen}3x$

f) $f(x) = \text{sen}^2\ x$ R: $f'(x) = 2.\text{sen}x.\cos x$

g) $f(x) = \text{sen}\ x^2$ R: $f'(x) = 2x.\cos x^2$

h) $f(x) = \cos^2 x$ R: $f'(x) = -\ 2\cos x.\text{sen}x$

i) $f(x) = \cos x^3$ R: $f'(x) = -3x^2.\text{sen}\ x^3$

j) $f(x) = \text{tg}(x^2+1)$ R: $f'(x) = 2x.\sec^2(x^2+1)$

k) $f(x) = (x^2-1)^4$ R: $f'(x) = 8x(x^2-1)^3$

l) $f(x) = \ln(\text{sen}\ x)$ R: $f'(x) = \text{cotg}\ x$

---

5. Considerando $f(x) = \text{sen}(\cos x)$, obtenha $f'\left(\frac{\pi}{2}\right)$. R: $f'\left(\frac{\pi}{2}\right) = -1$