1ª AULA_revisão de derivadas_Calculo II

Determine a derivada das funções abaixo

1)

a) $f(x)=2x+1$ b) $f(x)=x^2-2$ c) $f(x)=x^3+1$

d) $f(x)=\sqrt{x-3}$ e) $f(x)=\dfrac{2+x}{3-x}$ f) $f(x)=3x^2-2x+1$

g) $f(x)=8-x^3$ h) $f(x)=\sqrt{3x+5}$ i) $f(x)=\dfrac{2x+3}{3x-2}$

j) $f(x)=4x^7-3x^4+x^3+2$ l) $f(x)=\dfrac{1}{2}(x^4+3x^2+5)$

m) $f(x)=\dfrac{x^2+x-4}{5}$ n) $f(x)=-3x^{-8}+2\sqrt{x}$

o) $f(x)=\sqrt{x}+2\sqrt[3]{x}-3x^{-2}$ p) $f(x)=x^{-3}+\dfrac{1}{x^7}$

q) $f(x)=8-3x^2+2x^4$ r) $f(x)=\pi^3$

2)

a) $f(x)=(2x^3-4x^2).(3x^5+x^2)$ b) $f(x)=(2x^4-1).(5x^3+6x)$

c) $f(x)=(x^3-x^2+3x+5).(2x^2+3x)$ d) $f(x)=(-2x^4+3x^2-1).(3x^2-5)$

d) $f(x)=\dfrac{2x^3+4}{x^2-4x+1}$ e) $f(x)=\dfrac{x^3-8}{x^3+8}$

f) $f(x)=\dfrac{x}{x^2-3x+2}$ g) $f(x)=\dfrac{4-3x-x^2}{x^4}$

h) $f(x)=\dfrac{x^3}{3}+\dfrac{3}{x^3}$ i) $f(x)=\dfrac{x^4-2x^3+5x-2}{x^3-2x}$

j) $f(x)=\left(\dfrac{2x+1}{x+5}\right)$ l) $f(x)=\left(\dfrac{x^3+1}{x^2+3}\right)$

3)

a) $f(x)=(3x^2+2x+1)^4$ b) $f(x)=\left(-x^3+2x^2-x+6\right)^2$

c) $f(x)=\left(\dfrac{2x+1}{3x-2}\right)^4$ d) $f(x)=\left(\dfrac{2x-1}{3x^2+x-2}\right)^3$

e) $f(x)=\sqrt{3x^2+2x}$ f) $f(x)=\sqrt{x^3+4x^2+x-3}$

g) $f(x)=\sqrt{\dfrac{x+7}{x+3}}$ h) $f(x)=\sqrt{\dfrac{2x^3+5x}{x^2-2x}}$

i) $f(x)=\dfrac{(x^2+2)^2}{3x^2+5}$ j) $f(x)=\dfrac{(x^2+2)^4}{(3x^2+5x)^2}$

l) $f(x)=\sqrt{(3x^2-2x).(4x-1)}$ m) $f(x)=\sqrt[3]{2x^4+3x}$

n) $f(x)=3\sqrt{(x^4-1).(3x+2)}$ 0) $f(x)=\dfrac{x^3}{\sqrt{3x^2-1}}$

p) $f(x)=\sqrt{x^2-5}.\sqrt[3]{x^3+4}$ q) $f(x)=\dfrac{\sqrt{x-1}}{\sqrt[3]{x+1}}$

r) $f(x)=\sqrt{(3x^2+2x-5)^3}$ s) $f(x)=\left(5-x^2\right)^{\frac{1}{2}}.\left(x^3+1\right)^{\frac{1}{4}}$

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a) $y' = 2$ b) $y' = 2x$ c) $y' = 3x^2$ d) $y' = \frac{1}{2} \cdot (x-3)^{-\frac{1}{2}} \cdot 1$ ou

$y' = \frac{1}{2\sqrt{x-3}}$ e) $y' = \frac{(3-x) - (2+x)(-1)}{(3-x)^2} = \frac{5}{(3-x)^2}$ //

f) $y' = 6x - 2$ g) $y' = -3x^2$ h) $y' = \frac{3}{2\sqrt{3x+5}}$

i) $y' = \frac{2(3x-2) - (2x+3).3}{(3x-2)^2} = \frac{6x-4-6x-9}{(3x-2)^2} = \frac{-13}{(3x-2)^2}$

j) $y' = 28x^6 - 12x^3 + 3x^2$ l) $y' = 2x^3 + 3x$

m) $y' = \frac{(2x+1).5 - (x^2+x-4).0}{25} = \frac{10x+5}{25} = \frac{x}{5} + \frac{1}{5} = \frac{x+1}{5}$

n) $y' = 24x^{-9} + \frac{2}{2\sqrt{x}} = 24x^{-9} + \frac{1}{\sqrt{x}}$ o) $y' = \frac{1}{2\sqrt{x}} + \frac{2}{3\sqrt[3]{x^2}} + 6x^{-3}$

p) $y' = -3x^{-4} + (-7x^{-8})$ q) $y' = -6x + 8x^3$ r) $y' = 0$.

Fonte: Prof. Carlos Bifi

(2) a) $y' = (6x^2 - 8x)\cdot(3x^5 + x^2) + (2x^3 - 4x^2)\cdot(15x^4 + 2x) =$

$= 18x^7 + 6x^4 - 24x^6 - 8x^3 + 30x^7 - 60x^6 + 4x^4 - 8x^3 =$

$= 48x^7 - 84x^6 + 10x^4 - 16x^3$

b) $y = (8x^3)(5x^3 + 6x) + (2x^4 - 1)\cdot(15x^2 + 6) =$

$= 40x^6 + 48x^4 + 30x^6 + 12x^4 - 15x^2 - 6 =$

$= 70x^6 + 60x^4 - 15x^2 - 6$

c) $y' = (3x^2 - 2x + 3)(2x^2 + 3x) + (x^3 - x^2 + 3x + 5)\cdot(4x + 3) =$

$= 6x^4 - 4x^3 + 6x^2 + 9x^3 - 6x^2 + 9x + 4x^4 - 4x^3 + 12x^2 + 20x + 3x^3 - 6x^2 + 9x + 15$

$= 10x^4 + 4x^3 + 6x^2 + 38x + 15$

d) $y' = \dfrac{6x\cdot(x^2 - 4x + 1) - (2x^3 + 4)(2x - 4)}{(x^2 - 4x + 1)^2} = \dfrac{6x^4 - 24x^3 + 6x^2 - 4x^4 + 8x^3 + 8x - 16}{(x^2 - 4x + 1)^2}$

$= \dfrac{2x^4 - 16x^3 + 6x^2 + 8x - 16}{(x^2 - 4x + 1)^2}$

e) $y' = \dfrac{3x^2(x^3 + 8) - (x^3 - 8)\cdot(3x^2)}{(x^3 + 8)^2} = \dfrac{3x^5 + 24x^2 - 3x^5 + 24x^2}{(x^3 + 8)^2} = \dfrac{48x^2}{(x^3 + 8)^2}$

f) $y' = \dfrac{x^2 - 3x + 2 - (x)(2x - 3)}{(x^2 - 3x + 2)^2} = \dfrac{x^2 - 3x + 2 - 2x^2 + 3x}{(x^2 - 3x + 2)^2} = \dfrac{-x^2 + 2}{(x^2 - 3x + 2)^2}$

g) $y' = \dfrac{(-3 - 2x)(x^4) - (4 - 3x - x^2)\cdot(4x^3)}{x^8} = \dfrac{-3x^4 - 2x^5 - 16x^3 + 12x^4 + 4x^5}{x^8} =$

$= \dfrac{9x^4 + 2x^5 - 16x^3}{x^8} = \dfrac{9}{x^4} + \dfrac{2}{x^3} - \dfrac{16}{x^5}$

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

i) $y' = \frac{(4x^3 - 6x^2 + 5)\cdot(x^3 - 2x) - (x^4 - 2x^3 + 5x - 2)\cdot(3x^2 - 2)}{(x^3 - 2x)^2} =$

$= \frac{4x^6 - 8x^4 - 6x^5 + 12x^3 + 5x^3 - 10x - 3x^6 + 6x^5 - 15x^3 + 6x^2 + 2x^4 - 4x^3 + 10x - 4}{(x^3 - 2x)^2}$

$= \frac{x^6 - 6x^4 - 2x^3 + 6x^2 + 10x - 4}{(x^3 - 2x)^2}$

j) $y' = \frac{2(x+5) - (2x+1)\cdot 1}{(x+5)^2} = \frac{2x + 10 - 2x - 1}{(x+5)^2} = \frac{9}{(x+5)^2}$

l) $y' = \frac{3x^2\cdot(x^2+3) - (x^3+1)\cdot 2x}{(x^2+3)^2} = \frac{3x^4 + 9x^2 - 2x^3 - 2x}{(x^2+3)^2} =$

(3) a) $y' = 4(3x^2 + 2x + 1)^3 \cdot (6x + 2)$ b) $y' = 2(-x^3 + 2x^2 - x + 6)\cdot(-3x^2 + 4x - 1)$

c) $y' = 4\cdot\left(\frac{2x+1}{3x-2}\right)^3 \cdot \left(\frac{2(3x-2) - (2x+1)\cdot 3}{(3x-2)^2}\right) = 4\left(\frac{2x+1}{3x-2}\right)^3 \cdot \left(\frac{-7}{(3x-2)^2}\right)$ //

d) $y' = 3\cdot\left(\frac{2x-1}{3x^2+x-2}\right)^2 \cdot \left(\frac{2(3x^2+x-2) - (2x-1)\cdot(6x+1)}{(3x^2+x-2)^2}\right) =$

$= 3\cdot\left(\frac{2x-1}{3x^2+x-2}\right)^2 \cdot \left(\frac{6x^2 + 2x - 4 - 12x^2 - 2x + 6x + 1}{(3x^2+x-2)^2}\right) =$

$= 3\left(\frac{2x-1}{3x^2+x-2}\right)^2 \cdot \left(\frac{-6x^2 + 6x - 3}{(3x^2+x-2)^2}\right)$ //

e) $y' = \frac{6x+2}{2\sqrt{3x^2+2x}}$ f) $y' = \frac{3x^2+8x+1}{2\sqrt{x^3+4x^2+x-3}}$

g) $y' = \frac{1}{2\sqrt{\frac{x+7}{x+3}}} \cdot \left(\frac{x+3-x-7}{(x+3)^2}\right) = \frac{1}{2\sqrt{\frac{x+7}{x+3}}} \cdot \left(\frac{-4}{(x+3)^2}\right)$

h) $y' = \frac{1}{2\sqrt{\frac{2x^3+5x}{x^2-2x}}} \cdot \left(\frac{(6x^2+5)(x^2-2x)-(2x^3+5x)\cdot(2x-2)}{(x^2-2x)^2}\right)$

i) $= \frac{1}{2\sqrt{\frac{2x^3+5x}{x^2-2x}}} \cdot \left(\frac{6x^4-12x^3+5x^2-10x-4x^4+4x^3-10x^2+10x}{(x^2-2x)^2}\right) =$

$= \frac{1}{2\sqrt{\frac{2x^3+5x}{x^2-2x}}} \cdot \left(\frac{2x^4-8x^3-5x^2}{(x^2-2x)^2}\right)$

i) $y = \frac{x^4+4x^2+4}{3x^2+5} \Rightarrow y' = \frac{(4x^3+8x)\cdot(3x^2+5)-(x^4+4x^2+4)\cdot(6x)}{(3x^2+5)^2} =$

$= \frac{12x^5+20x^3+24x^3+40x-6x^4-24x^2-24x}{(3x^2+5)^2} = \frac{12x^5-6x^4+44x^3+16x-24x^2}{(3x^2+5)^2}$

l) $y = \sqrt{12x^3-3x^2-8x^2+2x} = y' = \frac{1}{2\sqrt{12x^3-11x^2+2x}} \cdot 36x^2-22x+2$ //

m) $y' = \frac{1}{3\sqrt{(2x^4+3x)^2}} \cdot 8x^3+3$ //