



estudar.com.br

Cálculo I

Lista de Regra da Cadeia





1. Cadeia da Exponencial

Elaboração própria

Calcule as derivadas das seguintes funções

a. $a(x) = e^{2x+3}$

b. $b(x) = e^{x^2+x+2}$

c. $c(x) = e^{\sqrt{x}}$

d. $d(x) = -e^{\frac{1}{x}}$

e. $f(x) = e^{2\sqrt{x}+3\sqrt[3]{x^2}+5\sqrt[5]{x^4}}$

f. $g(x) = e^{\frac{1+\sqrt{x}}{x}}$

g. $h(x) = 2^{5x}$

h. $i(x) = 7^{\frac{\sqrt[7]{x^6}+1}{x}}$

2. Cadeia da Polinomial

Elaboração própria

Derive as funções a seguir:

a. $a(x) = (x^2 + 2x + 2)^5$

b. $b(x) = (x + x^3 + x^5)^{99}$



c. $c(x) = \left(\frac{1}{x} - \frac{2}{x^2}\right)^6$

d. $d(x) = (e^x + x^2 + \sqrt{x})^{11}$

e. $f(x) = \left(3e^{\sqrt[3]{x}} + \ln x + 5\sqrt[5]{x}\right)^{50}$

3. Cadeia do LN

Elaboração própria

Derive as funções a seguir:

a. $a(x) = \ln 5x$

b. $b(x) = \ln(x^2 + x + 1)$

c. $c(x) = \ln(1 + x + x^2 + x^3)^5$

d. $d(x) = \ln(e^{x^2} + 1)$

e. $f(x) = \ln(e^x + x^2)$

f. $g(x) = \ln[2e^{\sqrt{x}} + (2^{3x} + 1)^5]$



Gabarito

1.

a. $a'(x) = 2e^{2x+3}$

b. $b'(x) = (2x + 1)e^{x^2+x+2}$

c. $c'(x) = \frac{1}{2\sqrt{x}} \cdot e^{\sqrt{x}}$

d. $d'(x) = \frac{e^{\frac{1}{x}}}{x^2}$

e. $f'(x) = e^{2\sqrt{x}+3\sqrt[3]{x^2}+5\sqrt[5]{x^4}} \left(\frac{1}{\sqrt{x}} + \frac{2}{\sqrt[3]{x}} + \frac{4}{\sqrt[5]{x}} \right)$

f. $g'(x) = e^{\frac{1+\sqrt{x}}{x}} \left(-\frac{1}{x^2} - \frac{1}{2x\sqrt{x}} \right)$

g. $h'(x) = 2^{5x}(\ln 2)5$

h. $i'(x) = 7^{\frac{7\sqrt{x^6+1}}{x}}(\ln 7) \left(-\frac{1}{7x\sqrt[7]{x}} - \frac{1}{x^2} \right)$

2.

a. $a'(x) = 10(x + 1)(x^2 + 2x + 2)^4$

b. $b'(x) = 99(x + x^3 + x^5)^{98}(1 + 3x^2 + 5x^4)$

c. $c'(x) = 6 \left(\frac{1}{x} - \frac{2}{x^2} \right)^5 \left(-\frac{1}{x^2} + \frac{4}{x^3} \right)$

d. $d'(x) = 11(e^x + x^2 + \sqrt{x})^{10} \left(e^x + 2x + \frac{1}{2\sqrt{x}} \right)$



$$\mathbf{e.} \quad f'(x) = 50 \left(3e^{\sqrt[3]{x}} + \ln x + 5\sqrt[5]{x} \right)^{49} \left(\frac{e^{\sqrt[3]{x}}}{\sqrt[3]{x^2}} + \frac{1}{x} + \frac{1}{\sqrt[5]{x^4}} \right)$$

3.

$$\mathbf{a.} \quad a'(x) = \frac{1}{x}$$

$$\mathbf{b.} \quad b'(x) = \frac{2x+1}{x^2+x+1}$$

$$\mathbf{c.} \quad c'(x) = \frac{5(3x^2+2x+1)}{1+x+x^2+x^3}$$

$$\mathbf{d.} \quad d'(x) = \frac{2x e^{x^2}}{e^{x^2}+1}$$

$$\mathbf{e.} \quad f'(x) = \frac{e^x+2x}{e^x+x^2}$$

$$\mathbf{f.} \quad g'(x) = \frac{\frac{e^{\sqrt{x}}}{\sqrt{x}} + 15(2^{3x}+1)^4 \cdot 2^{3x} \cdot (\ln 2)}{2e^{\sqrt{x}} + (2^{3x}+1)^5}$$