LISTA 0 DE CÁLCULO I - Prof. Edézio

1. Diferencie cada função aplicando as regras básicas para diferenciação:

   (a) $f(x) = \dfrac{x^{10}}{2} + \dfrac{x^5}{5} + 6$;

   (b) $f(x) = \dfrac{3}{x^2} + \dfrac{4}{x}$;

   (c) $h(y) = \dfrac{5}{y^5} - \dfrac{25}{y}$;

   (d) $g(x) = 3x^{-2} - 7x^{-1} + 6$;

   (e) $f(x) = \dfrac{2}{5x} + \dfrac{\sqrt{2}}{3x^2}$;

   (f) $f(x) = (x^3 - 8)(\dfrac{2}{x} - 1)$;

   (g) $f(x) = (x^2 + 3x)(x^3 - 9x)$.

2. Calcule a derivada de cada função:

   (a) $f(x) = (5 - 2x)^{10}$:

   (b) $f(x) = \dfrac{1}{(4x+1)^5}$;

   (c) $f(x) = (x^3 + 2)^{15}$;

   (d) $f(x) = (x^5 - 2x^2 + x + 1)^{-7}$;

   (e) $h(x) = \sqrt{x^2 + 2x - 1}$;

   (f) $g(x) = \sqrt[3]{\sqrt{x^2 + 2x + 1}}$;

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

3. Calcule a derivada de cada função:

   (a) $f(x) = 5sen\,7x$;

   (b) $f(x) = 4sen\,6x^2$;

   (c) $h(x) = sen\,\sqrt{x}$;

   (d) $h(x) = \cos(sen\,x)$;

   (e) $f(x) = \sqrt{\cos 5x}$;

   (f) $h(x) = \dfrac{sen\,x}{1 + \cos 5x}$;

(g) $f(x) = \dfrac{sen\, 8x}{\cos x}$;

(h) $f(x) = x^3\, tg\, 2x$.

4. Calcule a derivada de cada função:

(a) $f(x) = e^{7x}$;

(b) $g(x) = e^{\ln x^3}$;

(c) $f(x) = \cos e^x$;

(d) $f(x) = (1 - e^{3x})^2$;

(e) $f(x) = e^{-2x}\, sen\, x$;

(f) $f(x) = e^{x \ln x}$.

Respostas

1. (a) $f'(x) = 5x^9 - x^4$;

(b) $g'(x) = \dfrac{-6}{x^3} - \dfrac{4}{x^2}$;

(c) $h'(y) = \dfrac{-25}{y^6} - \dfrac{25}{y^2}$;

(d) $g'(x) = \dfrac{-6}{x^3} + \dfrac{7}{x^2}$;

(e) $f'(x) = -\dfrac{2}{5x^2} + \dfrac{2\sqrt{2}}{3x^3}$;

(f) $f'(x) = \dfrac{16}{x^2} - 3x^2 + 4x$;

(g) $f'(x) = 5x^4 + 12x^3 - 27x^2 - 54x$.

2. (a) $f'(x) = -20(5 - 2x)^9$;

(b) $f'(x) = \dfrac{-20}{(4x+1)^6}$;

(c) $f'(x) = 45x^2(x^3 + 2)^{14}$;

(d) $f'(x) = \dfrac{-35x^4 + 28x - 7}{(x^5 - 2x^2 + x + 1)^8}$;

(e) $h'(x) = \dfrac{x+1}{\sqrt{x^2 + 2x - 1}}$;

(f) $g'(x) = \dfrac{x+1}{3\sqrt[6]{(x^2 + 2x + 1)^5}}$;

(g) $f'(x) = \dfrac{-3x-2}{x^3}$;

3. (a) $f'(x) = 35\cos 7x$;

(b) $f'(x) = 48x\cos(6x^2)$;

(c) $h'(x) = \dfrac{\cos\sqrt{x}}{2\sqrt{x}}$;

(d) $h'(x) = -\cos x\, sen(sen\, x)$;

(e) $f'(x) = \dfrac{-5sen\, 5x}{2\sqrt{\cos 5x}}$;

(f) $h'(x) = \dfrac{\cos x + \cos x\cos 5x + 5sen\, x\, sen\, 5x}{(1+\cos 5x)^2}$;

(g) $f'(x) = \dfrac{8\cos x\ \cos 8x + sen\, x\, sen\, 8x}{\cos^2 x}$;

(h) $f'(x) = 3x^2 tg\, 2x + 2x^3 sec^2 2x$.

4. (a) $f'(x) = 7e^{7x}$;

(b) $g'(x) = 3x^2$;

(c) $f'(x) = -e^x sen\, e^x$;

(d) $f'(x) = -6(1-e^{3x})e^{3x}$

(e) $f'(x) = -2e^{-2x} sen\, x + e^{-2x}\cos x$;

(f) $f'(x) = x^x(\ln x + 1)$.