1a LISTA DE EXERCÍCIOS DERIVADA
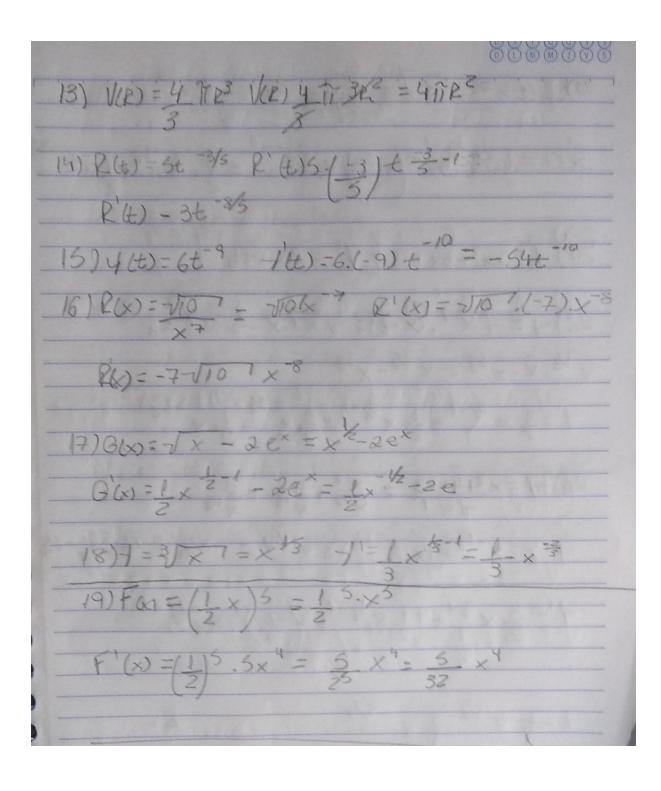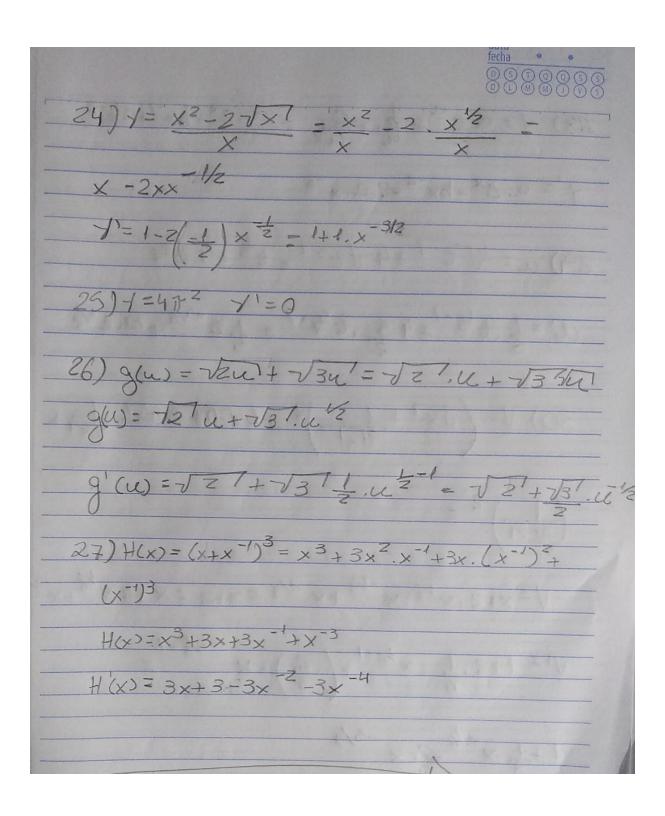
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3) $f(x) = 186,5$ $f'(x) = 0$

4) $f(x) = \sqrt{30}$ $f'(x) = 0$

5) $f(x) = 5x - 1$ $f'(x) = 5 \cdot 1 - 0 = 5$

6) $f(x) = -4x^{10}$ $f'(x) = -4 \cdot 10^{10-1} = 40x^9$

7) $f(x)\, x^3 - 4x + 6 = f'(x) = 3x^2 - 4$

8) $f(t) = \frac{1}{6} t^4 - 3t^? + t^? =$

$f'(x) = \frac{1}{2} 6 \cdot t^5 - 54t^3 + 1 =$

$f'(x) = 3t^5 - 12t^3 + 1$

9) $f(x) = \frac{1}{4}(t^4+8) = \frac{1}{4} \cdot t^4 + \frac{1}{4} \cdot 8 = \frac{1}{4} \cdot t^4 + 2$

$f'(x) = \frac{1}{4} \cdot 4t^3 + 0 = t^3$

10) $h(x) = (x-2) \cdot (2x+3) = 2x^2 + 3x - 4x - 6$

$h(x) = x^2 - x - 6 \qquad h'(x) = 2x - 1$

11) $f = x^{-2/5} \qquad y' = -\frac{2}{5} x^{-\frac{2}{5}-1} = -\frac{2}{5} x^{-7/5}$

12) $y = 5e^x + 3 \qquad y' = 5 \cdot e^x$

13) $V(R) = \dfrac{4}{3} \pi R^3$ $V(R) \dfrac{4}{8} \pi \cdot 3R^2 = 4\pi R^2$

14) $R(t) = 5t^{-3/5}$ $R'(t) 5 \cdot \left(\dfrac{-3}{5}\right) t^{\frac{-3}{5}-1}$

$R'(t) - 3t^{-8/5}$

15) $y(t) = 6t^{-9}$ $y'(t) = 6 \cdot (-9) t^{-10} = -54t^{-10}$

16) $R(x) = \dfrac{\sqrt{10}}{x^7} = \sqrt{10} x^{-7}$ $R'(x) = \sqrt{10} \cdot (-7) \cdot x^{-8}$

$R(x) = -7\sqrt{10} \, x^{-8}$

17) $G(x) = \sqrt{x} - 2e^x = x^{1/2} - 2e^x$

$G'(x) = \dfrac{1}{2} x^{\frac{1}{2}-1} - 2e^x = \dfrac{1}{2} x^{-1/2} - 2e^x$

18) $y = \sqrt[3]{x} = x^{1/3}$ $y' = \dfrac{1}{3} x^{\frac{1}{3}-1} = \dfrac{1}{3} x^{\frac{-2}{3}}$

19) $F(x) = \left(\dfrac{1}{2} x\right)^5 = \dfrac{1}{2}^5 \cdot x^5$

$F'(x) = \left(\dfrac{1}{2}\right)^5 \cdot 5x^4 = \dfrac{5}{2^5} x^4 = \dfrac{5}{32} x^4$

20) $f(t) = \sqrt{t} - \dfrac{1}{\sqrt{t}} = t^{1/2} - t^{-1/2}$

$f'(x) = \dfrac{1}{2} t^{1/2-1} - \left(-\dfrac{1}{2}\right) t^{-\frac{1}{2}-1} = \dfrac{1}{2} t^{-1/2} + \dfrac{1}{2} \cdot t^{-3/2}$

21) $y = ax^2 + bx + c \Rightarrow \boxed{y' = 2 \cdot ax + b}$

22) $y = \sqrt{x} \cdot (x-1) = \sqrt{x} \cdot x - \sqrt{x} =$

$x^{1/2} \cdot x - x^{1/2} = x^{3/2} - x^{1/2}$

$y' = \dfrac{3}{2} x^{\frac{3}{2}-1} - \dfrac{1}{2} x^{\frac{1}{2}-1} = \dfrac{3}{2} x^{1/2} - \dfrac{1}{2} x^{-1/2}$

23) $y = \dfrac{x^2 + 4x + 3}{\sqrt{x}} = \dfrac{x^2}{x^{1/2}} + \dfrac{4x}{x^{1/2}} + \dfrac{3}{x^{1/2}}$

$y = x^2 \cdot x^{-1/2} + 4x \cdot x^{-1/2} + 3 \cdot x^{-1/2} = x^{3/2} + 4x^{1/2} + 3x^{-1/2}$

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

24) $y = \dfrac{x^2 - 2\sqrt{x}}{x} = \dfrac{x^2}{x} - 2 \cdot \dfrac{x^{1/2}}{x} =$

$x - 2x x^{-1/2}$

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

25) $y = 4\pi^2 \qquad y' = 0$

26) $g(u) = \sqrt{2u} + \sqrt{3u} = \sqrt{2} \cdot u + \sqrt{3} \sqrt{u}$

$g(u) = \sqrt{2} \, u + \sqrt{3} \cdot u^{1/2}$

$g'(u) = \sqrt{2} + \sqrt{3} \, \dfrac{1}{2} \cdot u^{\frac{1}{2} - 1} = \sqrt{2} + \dfrac{\sqrt{3}}{2} \cdot u^{-1/2}$

27) $H(x) = (x + x^{-1})^3 = x^3 + 3x^2 \cdot x^{-1} + 3x \cdot (x^{-1})^2 + (x^{-1})^3$

$H(x) = x^3 + 3x + 3x^{-1} + x^{-3}$

$H'(x) = 3x + 3 - 3x^{-2} - 3x^{-4}$

28) $y = ae^u + \dfrac{b}{u} + \dfrac{c}{u^2} = a \cdot e^x + bx^{-1} + cx^{-2}$

$y' = a \cdot e^x - bx^{-2} - 2 \cdot c \cdot x^{-3}$

29) $u = \sqrt[5]{t} + 4\sqrt{t^5} = t^{\frac{1}{5}} + 4 \cdot t^{\frac{3}{2}}$

$u' = \dfrac{1}{5} \cdot t^{\frac{1}{5}-1} + 4 \dfrac{5}{2} \cdot t^{\frac{5}{2}-1} = \dfrac{1}{5} t^{-4/5} + 10 \cdot t^{3/2}$

30) $V = \left(\sqrt{x} + \dfrac{1}{\sqrt[3]{x}}\right)^2 = (\sqrt{x}) + 2\sqrt{x} \cdot \dfrac{1}{\sqrt[3]{x}} +$

$\left(\dfrac{1}{\sqrt[3]{x}}\right)^2$

$V = x + 2 \cdot x^{\frac{1}{2}} \cdot x^{-\frac{1}{3}} + x^{-2/3} = x + 2 \div x + 2x^{\frac{1}{6}} + x^{-3/3}$

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

$1 + \dfrac{1}{3} \cdot x^{-5/6} - \dfrac{2}{3} x^{-5/3}$