

## Exercícios sobre derivadas

I) Utilizando as regras de derivação, calcule as derivadas abaixo:

7.  $f(x) = (3x^5 - 1)(2 - x^4)$

8.  $f(x) = \frac{2}{3} (5x - 3)^{-1}(5x + 3)$

9.  $f(x) = (x - 1)(x + 1)$

10.  $f(s) = (s^2 - 1)(3s - 1)(5s^3 + 2s)$

11.  $f(x) = 7(ax^2 + bx + c)$

12.  $f(u) = (4u^2 - a)(a - 2u)$

13.  $f(x) = \frac{2x + 4}{3x - 1}$

14.  $f(t) = \frac{t - 1}{t + 1}$

15.  $f(t) = \frac{3t^2 + 5t - 1}{t - 1}$

16.  $f(t) = \frac{2 - t^2}{t - 2}$

17.  $f(x) = \frac{4 - x}{5 - x^2}$

18.  $f(x) = \frac{5x + 7}{2x - 2}$

19.  $f(x) = \frac{x + 1}{x + 2} (3x^2 + 6x)$

20.  $f(t) = \frac{(t - a)^2}{t - b}$

II) Calcule a derivadas das funções compostas abaixo:

1.  $f(x) = 10 (3x^2 + 7x - 3)^{10}$

2.  $f(x) = \frac{1}{3} (2x^5 + 6x^{-3})^5$

3.  $f(x) = \frac{1}{a} (bx^2 + ax)^3$

4.  $f(x) = (3x^2 + 6x)^{10} - \frac{1}{x^2}$

5.  $f(t) = (7t^2 + 6t)^7 (3t - 1)^4$

6.  $f(x) = (5x - 2)^6 (3x - 1)^3$

7.  $f(t) = \left( \frac{7t + 1}{2t^2 + 3} \right)^3$

8.  $f(x) = (2x - 5)^4 + \frac{1}{x + 1} - \sqrt{x}$

9.  $f(x) = \sqrt[3]{(3x^2 + 6x - 2)^2}$

10.  $f(t) = (4t^2 - 5t + 2)^{-1/3}$

$$11. f(x) = \frac{2x}{\sqrt{3x-1}}$$

$$13. f(t) = \sqrt{\frac{2t+1}{t-1}}$$

$$21. f(t) = e^{t^2} (t^2 + 5t)$$

$$23. f(x) = \log_2 (2x+4)$$

$$25. f(s) = \log_3 \sqrt{s+1}$$

$$27. f(x) = \ln \left( \frac{1}{x} + \frac{1}{x^2} \right)$$

$$35. f(u) = \cos (\pi/2 - u)$$

$$37. f(\theta) = 2 \cos \theta^2 \cdot \text{sen } 2 \theta$$

$$39. f(x) = \text{sen}^3 (3x^2 + 6x)$$

$$12. f(x) = \frac{7x^2}{2 \sqrt[5]{3x+1}} + \sqrt{3x+1}$$

$$14. f(x) = 2 e^{3x^2 + 6x + 7}$$

$$22. f(t) = \frac{\sqrt{e^t - 1}}{\sqrt{e^t + 1}}$$

$$24. f(x) = \frac{1}{a} (bx^2 + c) - \ln x$$

$$26. f(x) = \frac{1}{2} \ln (7x^2 - 4)$$

$$28. f(x) = \ln \left( \frac{1+x}{1-x} \right)$$

$$36. f(\theta) = 2 \cos (2 \theta^2 - 3 \theta + 1)$$

$$38. f(\alpha) = \frac{1 + \cos 2 \alpha}{2}$$

$$40. f(\theta) = \text{sen}^2 \theta + \cos^2 \theta$$

## RESPOSTAS

i)

7.  $-27x^8 + 30x^4 + 4x^3$

8.  $\frac{-20}{(5x - 3)^2}$

9.  $2x$

10.  $(s^2 - 1)(3s - 1)(15s^2 + 2) + 3(s^2 - 1)(5s^3 + 2s) + 2s(3s - 1)(5s^3 + 2s)$

11.  $7(2ax + b)$

12.  $-24u^2 + 8au + 2a$

13.  $\frac{-14}{(3x - 1)^2}$

14.  $\frac{2}{(t + 1)^2}$

15.  $\frac{3t^2 - 6t - 4}{(t - 1)^2}$

16.  $\frac{-t^2 + 4t - 2}{t^2 - 4t + 4}$

17.  $\frac{-x^2 + 8x - 5}{(5 - x^2)^2}$

18.  $\frac{-24}{(2x - 2)^2}$

19.  $\frac{6x^3 + 27x^2 + 36x + 12}{(x + 2)^2}$

20.  $\frac{t^2 - 2bt - a^2 + 2ab}{(t - b)^2}$

ii)

1.  $100(3x^2 + 7x - 3)^9(6x + 7)$

2.  $\frac{10}{3}(2x^5 + 6x^{-3})^4(5x^4 - 9x^{-4})$

3.  $\frac{3}{a}(bx^2 + ax)^2(2bx + a)$

4.  $60(3x^2 + 6x)^9(x + 1) + \frac{2}{x^3}$

5.  $(7t^2 + 6t)^6(3t - 1)^3[12(7t^2 + 6t) + 7(3t - 1)(14t + 6)]$

6.  $(5x - 2)^5(3x - 1)^2(135x - 48)$

7.  $\frac{3(7t + 1)^2(-14t^2 - 4t + 21)}{(2t^2 + 3)^4}$

8.  $8(2x - 5)^3 - \frac{1}{(x + 1)^2} - \frac{1}{2\sqrt{x}}$

9.  $\frac{4(x + 1)}{\sqrt[3]{3x^2 + 6x - 2}}$

10.  $-\frac{1}{3}(4t^2 - 5t + 2)^{-4/3}(8t - 5)$

11.  $\frac{3x - 2}{(3x - 1)\sqrt{3x - 1}}$

$$12. -\frac{21}{10} x^2 (3x + 1)^{-6/5} + 7x (3x + 1)^{-1/5} + \frac{3}{2} (3x + 1)^{-1/2}$$

$$13. \frac{-3}{2(t-1)^{3/2} (2t+1)^{1/2}}$$

$$14. 12e^{3x^2+6x+7} (x+1)$$

$$15. -\frac{1}{3} e^{3-x}$$

$$16. \frac{e^{\sqrt{x}}}{2\sqrt{x}}$$

$$17. 2^{3x^2+6x} 6(x+1) \ln 2$$

$$18. \frac{2^{\ln 2x} \ln 2}{x}$$

$$19. 6[(7s^2+6s-1)^2(7s+3) - e^{-3s}]$$

$$20. \frac{-2t^2 e^{-t^2} - e^{-t^2} - 1}{t^2}$$

$$21. e^{t/2} (1/2t^2 + 9/2t + 5)$$

$$22. \sqrt{\frac{e^t+1}{e^t-1}} \cdot \frac{e^t}{(e^t+1)^2}$$

$$23. \frac{2}{2x+4} \log_2 e$$

$$24. \frac{2bx^2 - a}{ax}$$

$$25. \frac{\log_3 e}{2(s+1)}$$

$$26. \frac{7x}{7x^2 - 4}$$

$$27. \frac{-x-2}{x(x+1)}$$

$$28. \frac{2}{1-x^2}$$

$$35. \operatorname{sen} \left( \frac{\pi}{2} - u \right)$$

$$36. -2 \operatorname{sen} (2\theta^2 - 3\theta + 1) (4\theta - 3)$$

$$37. 4 \cos \theta^2 \cos 2\theta - 4\theta \operatorname{sen} 2\theta \operatorname{sen} \theta^2$$

$$38. -\operatorname{sen} 2\alpha$$

$$39. 3 \operatorname{sen}^2 (3x^2 + 6x) \cos (3x^2 + 6x) (6x + 6)$$

$$40. 0$$