

1-11 Derive a função.

1. $f(x) = x^2 - 10x + 100$

2. $g(x) = x^{100} + 50x + 1$

3. $s(t) = t^3 - 3t^2 + 12t$

4. $F(x) = (16x)^3$

5. $H(s) = (s/2)^5$

6. $y = \sqrt{5x}$

7. $y = x^{4/3} - x^{2/3}$

8. $y = 3x + 2e^x$

9. $y = A + \frac{B}{x} + \frac{C}{x^2}$

10. $y = x + \sqrt[5]{x^2}$

11. $v = x\sqrt{x} + \frac{1}{x^2\sqrt{x}}$

17-20 Encontre uma equação da reta tangente à curva no ponto dado. Ilustre com o gráfico da curva e da reta tangente na mesma tela.

17. $y = x + \frac{4}{x}, \quad (2, 4)$

18. $y = x^{5/2}, \quad (4, 32)$

19. $y = x + \sqrt{x}, \quad (1, 2)$

20. $y = x^2 + 2e^x, \quad (0, 2)$

1-14 Derive

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

2. $f(u) = \frac{1-u^2}{1+u^2}$

3. $G(s) = (s^2 + s + 1)(s^2 + 2)$

4. $g(x) = (1 + \sqrt{x})(x - x^3)$

5. $H(x) = (x^3 - x + 1)(x^{-2} + 2x^{-3})$

6. $H(t) = e^t(1 + 3t^2 + 5t^4)$

7. $y = \frac{3t-7}{t^2+5t-4}$

8. $y = \frac{4t+5}{2-3t}$

9. $y = \frac{x^2+4x+3}{\sqrt{x}}$

10. $y = \frac{u^2-u-2}{u+1}$

11. $y = \frac{e^x}{x+e^x}$

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

13. $s = \sqrt{t}(t^3 - \sqrt{t} + 1)$

14. Encontre a primeira e a segunda derivadas de $y = \frac{x^2}{x+1}$.

17-21 Encontre uma equação da reta tangente à curva no ponto dado.

17. $y = x\sqrt{x}$, (1, 1)

18. $y = \frac{x}{x-3}$, (6, 2)

19. $y = x + \frac{4}{x}$, (2, 4)

20. $y = x^{5/2}$, (4, 32)

21. $y = x + \sqrt{x}$, (1, 2)

3.3 DERIVADAS DE FUNÇÕES TRIGONOMÉTRICAS

1-8 Derive.

1. $y = \operatorname{sen} x + \cos x$

2. $y = \cos x - 2 \operatorname{tg} x$

3. $y = e^x \operatorname{sen} x$

4. $y = \frac{\operatorname{tg} x}{x}$

5. $y = \frac{\operatorname{sen} x}{1 + \cos x}$

6. $y = \frac{x}{\operatorname{sen} x + \cos x}$

7. $y = \operatorname{tg} \theta (\operatorname{sen} \theta + \cos \theta)$

8. $y = \operatorname{cosec} x \operatorname{cotg} x$

9-10 Encontre uma equação da reta tangente à curva no ponto especificado.

9. $y = 2 \operatorname{sen} x$, $(\pi/6, 1)$

10. $y = \sec x - 2 \cos x$, $(\pi/3, 1)$

3.4 REGRA DA CADEIA

1-4 Escreva a função composta na forma $f(g(x))$.

Identifique a função de dentro $u = g(x)$ e a de fora $y = f(u)$.] Então, encontre a derivada dy/dx .

1. $y = (x^2 + 4x + 6)^5$

2. $y = \operatorname{tg} 3x$

3. $y = \cos(\operatorname{tg} x)$

4. $y = \sqrt[3]{1 + x^3}$

5-30 Encontre a derivada da função.

5. $F(x) = (x^3 - 5x)^4$

6. $f(t) = (2t^2 + 6t + 1)^{-8}$

7. $g(x) = \sqrt{x^2 - 7x}$

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

9. $h(t) = \left(t - \frac{1}{t}\right)^{3/2}$

10. $y = \operatorname{sen} \frac{1}{x}$

11. $G(x) = (3x - 2)^{10} (5x^2 - x + 1)^{12}$

12. $g(t) = (6t^2 + 5)^3 (t^3 - 7)^4$

13. $F(y) = \left(\frac{y - 6}{y + 7}\right)^3$

14. $s(t) = \sqrt[4]{\frac{t^3 + 1}{t^3 - 1}}$

15. $f(z) = \frac{1}{\sqrt[5]{2z - 1}}$

16. $f(x) = \frac{x}{\sqrt{7 - 3x}}$

17. $y = 5^{-1/x}$

18. $y = \sqrt{1 + 2 \operatorname{tg} x}$

19. $y = \operatorname{sen}^3 x + \cos^3 x$

20. $y = \operatorname{sen}^2(\cos kx)$

21. $y = \frac{e^{3x}}{1 + e^x}$

22. $y = e^{5 \operatorname{sen} \theta}$

23. $y = \left(\operatorname{sen} \sqrt{x^2 + 1}\right)^{\sqrt{2}}$

GABARITOS

3.1 RESPOSTAS

1. $f'(x) = 2x - 10$

2. $g'(x) = 100x^{99} + 50$

3. $s'(t) = 3t^2 - 6t + 12$

4. $F'(x) = 12\,288x^2$

5. $H'(s) = \frac{5}{32}s^4$

6. $y' = \frac{\sqrt{5}}{2\sqrt{x}}$

7. $y' = \frac{4}{3}x^{1/3} - \frac{2}{3}x^{-1/3}$

8. $y' = 3 + 2e^x$

9. $y' = -\frac{B}{x^2} - 2\frac{C}{x^3}$

10. $y' = 1 + \frac{2}{5\sqrt[3]{x^3}}$

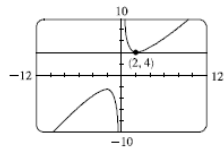
11. $v' = \frac{3}{2}\sqrt{x} - \frac{5}{2x^3\sqrt{x}}$

12. $4x - 4x^3$

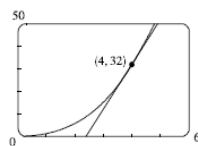
13. $1 - x^{-2/3}$

14. $2x + 2e^x$

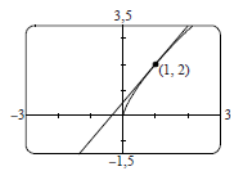
17. $y = 4$



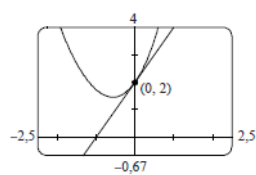
18. $y = 20x - 48$



19. $y = \frac{3}{2}x + \frac{1}{2}$



20. $y = 2x + 2$



21. $(1, 0), \left(-\frac{1}{2}, \frac{32}{27}\right)$

3.2 RESPOSTAS

1. $h'(x) = -\frac{3}{(x-1)^2}$
2. $f'(u) = -\frac{4u}{(1+u^2)^2}$
3. $G'(s) = (2s+1)(s^2+2) + (s^2+s+1)(2s)$
 $[= 4s^3 + 3s^2 + 6s + 2]$
4. $g'(x) = 1 - 3x^2 + \frac{3}{2}x^{1/2} - \frac{7}{2}x^{5/2}$
5. $H'(x) = 1 + x^{-2} + 2x^{-3} - 6x^{-4}$
6. $H'(t) = e^t(5t^4 + 20t^3 + 3t^2 + 6t + 1)$
7. $y' = \frac{-3t^2 + 14t + 23}{(t^2 + 5t - 4)^2}$
8. $y' = \frac{23}{(2-3t)^2}$
9. $y' = \frac{3}{2}\sqrt{x} + \frac{2}{\sqrt{x}} - \frac{3}{2x\sqrt{x}}$
10. $y' = 1$
11. $y' = \frac{e^x(x-1)}{(x+e^x)^2}$
12. $f'(x) = \frac{2x^4(x^3-5)}{(x^3-2)^2}$
13. $s' = \frac{7}{2}t^{5/2} - 1 + \frac{1}{2\sqrt{t}}$
14. $y' = \frac{x^2+2x}{(x+1)^2}, y'' = \frac{2}{(x+1)^3}$
15. $24x(1-x^2)(1+x^2)^{-4}$
16. $-12(1+x)^{-4}$
17. $y = \frac{3}{2}x - \frac{1}{2}$
18. $x + 3y = 12$
19. $y = 4$
20. $y = 20x - 48$
21. $y = \frac{3}{2}x + \frac{1}{2}$

3.3 RESPOSTAS

1. $dy/dx = \cos x - \sin x$
2. $dy/dx = -\sin x - 2 \sec^2 x$
3. $dy/dx = e^x(\cos x + \sin x)$
4. $\frac{dy}{dx} = \frac{x \sec^2 x - \tan x}{x^2}$
5. $\frac{dy}{dx} = \frac{1}{1 + \cos x}$
6. $\frac{dy}{dx} = \frac{(1+x) \sin x + (1-x) \cos x}{1 + \sin 2x}$
7. $y' = \sin \theta - \sin \theta \tan \theta + \sin \theta \sec^2 \theta + \sec \theta$
8. $dy/dx = -\operatorname{cosec} x (\cot^2 x + \operatorname{cosec}^2 x)$
9. $y = \sqrt{3}x + 1 - \frac{1}{6}\sqrt{3}\pi$
10. $y = 3\sqrt{3}x + 1 - \pi\sqrt{3}$
11. 5
12. $\frac{8}{9}$
13. 0
14. $\frac{1}{4}$
15. $\frac{5}{3}$
16. $\frac{1}{2}$
17. $\frac{1}{4}$
18. $\frac{1}{2}$
19. -1
20. -1
21. 1
22. 1

3.4 RESPOSTAS

1. $10(x^2 + 4x + 6)^4(x + 2)$
2. $3 \sec^2 3x$
3. $-\operatorname{sen}(\operatorname{tg} x) \sec^2 x$
4. $\frac{x^2}{(1 + x^3)^{2/3}}$
5. $F'(x) = 4(x^3 - 5x)^3(3x^2 - 5)$
6. $f'(t) = -16(2t^2 - 6t + 1)^{-9}(2t - 3)$
7. $g'(x) = \frac{2x - 7}{2\sqrt{x^2 - 7x}}$
8. $f'(t) = \frac{8(1 - t)}{(t^2 - 2t - 5)^5}$
9. $h'(t) = \frac{3}{2}(t - 1/t)^{1/2}(1 + 1/t^2)$
10. $y' = -\frac{1}{x^2} \cos \frac{1}{x}$
11. $G'(x) = 6(3x - 2)^9(5x^2 - x + 1)^{11}(85x^2 - 51x + 9)$
12. $g'(t) = 12t(6t^2 + 5)^2(t^3 - 7)^3(9t^3 + 5t - 21)$
13. $F'(y) = \frac{39(y - 6)^2}{(y + 7)^4}$
14. $s'(t) = \frac{1}{2} \left(\frac{t^3 + 1}{t^3 - 1} \right)^{-3/4} \frac{-3t^2}{(t^3 - 1)^2}$
15. $f'(z) = -\frac{2}{5}(2z - 1)^{-6/5}$
16. $f'(x) = \frac{14 - 3x}{2(7 - 3x)^{3/2}}$
17. $y' = 5^{-1/x} (\ln 5)/x^2$
18. $y' = \frac{\sec^2 x}{\sqrt{1 + 2 \operatorname{tg} x}}$
19. $y' = 3 \operatorname{sen} x \cos x (\operatorname{sen} x - \cos x)$
20. $y' = -k \operatorname{sen} kx \operatorname{sen} (2 \cos kx)$
21. $y' = \frac{3e^{3x} + 2e^{4x}}{(1 + e^x)^2}$
22. $y' = 5 \cos(5\theta) e^{\operatorname{sen} 5\theta}$
23. $y' = \sqrt{2}x \left(\operatorname{sen} \sqrt{x^2 + 1} \right)^{\sqrt{2}-1} \frac{\cos \sqrt{x^2 + 1}}{\sqrt{x^2 + 1}}$
24. $y' = 0$