

(3) Derive e simplifique.

- (1) $y = x^5$ (2) $y = x$ (3) $y = x^{10}$ (4) $g(x) = 8x^2$
 (5) $g(z) = -2z^7$ (6) $f(x) = 3x^4 + 8x + 5$ (7) $g(y) = 9y^5 - 4y^2 + 2y + 7$ (8) $y = (2x^3 - 1)(x^4 + x^2)$
 (9) $F(t) = \frac{1}{2}(t^2 + 5)(t^6 + 4t)$ (10) $y = \frac{2x^4 - 3}{x^2 - 5x + 3}$ (11) $y = 1/x$ (12) $y = x^{-n}, n \in \mathbb{Z}_+$
 (13) $\frac{t-1}{t+1}$ (14) $s(t) = s_0 + vt$ (15) $\theta(t) = \theta_0 + \omega t$ (16) $A(\ell) = \frac{\ell^2 \sqrt{3}}{2}$
 (17) $A_o(r) = \pi r^2$ (18) $y = y(x) > 0$ e $x^2 + y^2 = 1$ (19) $y(x) = (x+a)^2$ (20) $y = -1$
 (21) $y(x) = (x^2 + a)^2$ (22) $(x^2 + 5x + 2)^7$ (23) $y = \left(\frac{3x+2}{2x+1}\right)^5$ (24) $(3x^2 + 1)^3(x - x^2)^2$
 (25) $y = 5\sqrt{x^2 + 3}$ (26) $g(t) = \frac{t^2}{\sqrt[3]{t^3 + 1}}$ (27) $y = x^8 + (2x+4)^3 + \sqrt{x}$ (28) $z(\xi) = \frac{\xi + 1}{\sqrt{\xi^2 - 3}}$
 (29) $y = 3x(8x^3 - 2)$ (30) $y = \sqrt[3]{6x^2 + 7x + 2}$ (31) $y = e^x$ (32) $y = a^x$
 (33) $y = \sinh(x)$ (34) $y = \cosh(x)$ (35) $y = \sin(x)$ (36) $y = \cos(x)$
 (37) $y = \operatorname{tg}(x)$ (38) $y = \sec(x)$ (39) $y = \operatorname{cosec}(x)$ (40) $y = \operatorname{cotg}(x)$
 (41) $y = \arcsen(x)$ (42) $y = \arccos(x)$ (43) $y = \operatorname{arctg}(x)$ (44) $y = \ln(x)$
 (45) $y = \operatorname{argsenh}(x)$ (46) $f(x) = 3x^2 + 8x + 1, f''(x) = ?$ (47) $y = \operatorname{tg}(x), \dot{y} = ?$ (48) $y = \sin(x), y^{viii}(x) = ?$
 (49) $Y(s) = e^{\frac{s}{2}}, Y^{(n)}(s) = ?$ (50) $y = 3x^5 + 8x^2, f^{(n)}(x); n \in \mathbb{N}$

Respostas. 1.5 3.10x 5. -14x⁶ 7.45y⁴ - 8y² + 2 9.t²(t⁵ + 4) + t(3t⁴ + 2)(t² + 5) 11. -1/x² 13.2/(t+1)² 15.ω. 17.A'_o(r) = 2πr 19.2(x+a) 21.4x(x² + a)
 23. -5(3x+2)⁴/(2x-1)⁶ 25.5x/√x² + 3 27.8x⁷ + 6(2x+4)² + √x/(2x) 29.96x³ - 6 41.1/√1-x² 43.1/(1+x²) 45.1/√1+x² 47.2 sec²(x)tg(x) 49.e^{s/2}/2ⁿ

(4) Derive e simplifique.

- (1) $y = (x^4 - 3x^2 + 5)^3$ (2) $y = \cos(\operatorname{tg}(x))$ (3) $y = \sqrt{x} + \frac{1}{\sqrt[3]{x^4}}$ (4) $y = \frac{3x - 2}{\sqrt{2x + 1}}$
- (5) $y = 2x\sqrt{x^2 + 1}$ (6) $y = \frac{e^x}{1 + x^2}$ (7) $y = e^{\operatorname{sen}(2\theta)}$ (8) $y = e^{-t}(t^2 - 2t + 2)$
- (9) $y = \frac{t}{1 - t^2}$ (10) $y(x) = e^{mx} \cos(nx)$ (11) $y = \sqrt{x \cos \sqrt{x}}$ (12) $y = (\operatorname{arcsen} 2x)^2$
- (13) $y = \frac{e^{1/x}}{x^2}$ (14) $y = \frac{1}{\operatorname{sen}(x - \operatorname{sen} x)}$ (15) $y = x \ln x - x.$ (16) $y = \ln(\operatorname{cosec} 5x)$
- (17) $y = \frac{\sec 2\theta}{1 + \operatorname{tg} 2\theta}$ (18) $y = 2^x.$ (19) $y = e^{cx}(\operatorname{c} \operatorname{sen} x - \cos x)$ (20) $y = \ln(x^2 e^x)$
- (21) $y = 3^{x \ln x}$ (22) $y = \sec(1 + x^2)$ (23) $y = (1 - x^{-1})^{-1}$ (24) $y = 1/\sqrt[3]{x + \sqrt{x}}$
- (25) $y = 3^x.$ (26) $y = \sqrt{\operatorname{sen} \sqrt{x}}$ (27) $y = \log_5(1 + 2x)$ (28) $y = (\cos x)^x$
- (29) $y = \ln \operatorname{sen} x - \frac{1}{2} \operatorname{sen}^2 x$ (30) $y = \frac{(x^2 + 1)^4}{(2x + 1)^3(3x - 1)^5}$ (31) $y = x \operatorname{arctg}(4x)$ (32) $y = e^{\cos x} + \cos(e^x)$
- (33) $y = \ln |\sec 5x + \operatorname{tg} 5x|$ (34) $y = 10^{\operatorname{tg} \pi \theta}$ (35) $y = \operatorname{cotg}(3x^2 + 5)$ (36) $y = \sqrt{t \ln(t^4)}$
- (37) $y = \operatorname{sen}(\operatorname{tg} \sqrt{1 + x^3})$ (38) $y = \operatorname{arctg}(\operatorname{arcsen} \sqrt{x})$ (39) $y = \operatorname{tg}^2(\operatorname{sen}(\theta))$ (40) $y = x e^x.$
- (41) $y = \frac{\sqrt{x+1}(2-x)^5}{(x+3)^7}$ (42) $y = \frac{(x+\lambda)^4}{x^4 + \lambda^4}$ (43) $y = x \operatorname{senh}(x^2)$ (44) $y = \frac{\operatorname{sen} mx}{x}$
- (45) $y = \ln(\operatorname{cosh} 3x)$ (46) $y = \ln \left| \frac{x^2 + 4}{2x + 5} \right|$ (47) $y = \operatorname{argcosh}(\operatorname{senh} x)$ (48) $y = x \operatorname{arctg} \sqrt{x}$
- (49) $y = \cos(e^{\sqrt{\operatorname{tg}(3x)}})$ (50) $y = \operatorname{sen}^2(\cos \sqrt{\operatorname{sen} \pi x})$

Respostas. 1. $6x(x^4 - 3x^2 + 5)^2(2x^2 - 3)$ 3. $1/(2\sqrt{x}) - 4/(3\sqrt[3]{x^7})$ 5. $2(2x^2 + 1)/\sqrt{x^2 + 1}$ 7. $2 \cos 2\theta e^{\operatorname{sen} 2\theta}$ 9. $(t^2 + 1)/(1 - t^2)^2$ 11. $(\cos \sqrt{x} - \sqrt{x} \operatorname{sen} \sqrt{x})/2\sqrt{x}$
 13. $[e^{1/x}(1+2x)]/x^4$ 15. $\ln x.$ 17. $2 \sec 2\theta(\operatorname{tg} 2\theta - 1)/(1 + \operatorname{tg} 2\theta)^2$ 19. $(1 + e^2)e^{cx} \operatorname{sen} x$ 21. $3^{x \ln x} (\ln 3)(1 + \ln x)$ 23. $-(x-1)^{-2}$ 25. $3^x \ln 3.$ 27. $2/(1+2x) \ln 5$ 29. $\operatorname{cotg} x - \operatorname{sen} x \cos x$ 31. $4x/(1 + 16x^2) + \operatorname{arctg}(4x)$ 33. $5 \sec 5x$ 35. $-6x \operatorname{cosec}^2(3x^2 + 5)$ 37. $3x^2 \cos(\operatorname{tg} \sqrt{1 + x^3})(\sec^2 \sqrt{1 + x^3})/2\sqrt{1 + x^3}$ 39. $2 \cos \theta \operatorname{tg}(\operatorname{sen} \theta) \sec^2(\operatorname{sen} \theta)$
 41. $(x-2)^4(3x^2 - 55x - 52)/2\sqrt{x+1}(x+3)^8$ 43. $2x^2 \operatorname{cosh}(x^2) + \operatorname{senh}(x^2)$ 45. $3 \operatorname{tgh} 3x$ 47. $\operatorname{cosh} x/\sqrt{\operatorname{senh}^2 x - 1}$
 49. $(-3 \operatorname{sen}(e^{\sqrt{\operatorname{tg} 3x}}) e^{\sqrt{\operatorname{tg} 3x}} \sec^2(3x))/2\sqrt{\operatorname{tg} 3x}$

(5) Derive e simplifique.

(1) $y = (\cosh^2 x - \sinh^2 x)^{100}$

(2) $f(x) = \arcsen(2\sen(x) \cos(x))$

(3) $f(x) = 2x^3 - 7x + 2$

(4) $k(x) = 1/(x^4 - x^2 + 1)$

(5) $g(t) = \sqrt{6t + 5}$

(6) $h(t) = 1/\sqrt{6t + 5}$

(7) $F(z) = \sqrt[3]{7z^2 - 4z + 3}$

(8) $f(\omega) = \sqrt[5]{3\omega^2}$

(9) $G(x) = 6/(3x^2 - 1)^4$

(10) $H(x) = (3x^2 - 1)^4/6$

(11) $F(y) = (y^2 - y^{-2})^{-2}$

(12) $h(z) = [(z^2 - 1)^5 - 1]^5$

(13) $g(x) = \sqrt[5]{(3x + 2)^4}$

(14) $P(x) = (x + x^{-1})^2$

(15) $r(s) = \left(\frac{8s^2 - 4}{1 - 9s^3}\right)$

(16) $g(w) = \frac{(w-1)(w-3)}{(w+1)(w+3)}$

(17) $F(x) = (x^6 + 1)^5(3x + 2)^3$

(18) $k(z) = (z^2 + (z^2 + 9)^{1/2})^{1/2}$

(19) $g(y) = \sqrt{1 + \cos 2y}$

(20) $p(x) = (2x^4 + 3x^2 - 1)/x^2$

(21) $f(x) = \sen^2(4x^3)$

(22) $H(t) = (1 + \sen 3t)^3$

(23) $h(x) = \sqrt{x + \sqrt{x + \sqrt{x}}}$

(24) $K(r) = \sqrt{r}\sqrt{r+1}\sqrt{r+2}$

(25) $f(x) = \sqrt[3]{2x + 3}/\sqrt{3x + 2}$

(26) $f(x) = 6x^2 - (5/x) + (2/\sqrt[3]{x^2})$

(27) $g(z) = (9z^{5/3} - 5z^{3/5})^3$

(28) $F(t) = (5t^2 - 7)/(t^2 + 2)$

(29) $k(s) = (2s^2 - 3s + 1)(9s - 1)^4$

(30) $H(x) = |\cos x|$

(31) $f(w) = \sqrt{(2w+5)/(7w-9)}$

(32) $S(t) = \sqrt{t^2 + t + 1} \sqrt[3]{4t - 9}$

(33) $P(\theta) = \theta^2 \cos^2 \theta^2$

(34) $g(v) = 1/(1 + \cos^2 2v)$

(35) $g(x) = (\cos \sqrt[3]{x} - \sen \sqrt[3]{x})^3$

(36) $f(x) = \sen(\cos 5x)$

(37) $y = 5x^3 + 4\sqrt{x}$

(38) $y = 2x^2 - 3x - \cos 5x$

(39) $y = x^3 - x^2 - 5x + 2$

(40) $y = 3x^2 - 2x - 5$

(41) $f(x) = \arctg(\theta x) - k$

(42) $G(x) = 3x^{-2} - 2x - \sec \theta$

Respostas. 1.0. $2.2. 3.6x^2 - 7.5.3/\sqrt{6t+5} 7.(1/3)(7z^2 - 4z + 3)^{-2/3}(14z - 4) 9. -144x/(3x^2 - 1)^5 11. -2(y^2 - y^{-2})^{-3}(2y - 2y^{-3}) 13.(12/5)(3x+2)^{-1/5}$
 15. $4(8s^2 - 4)^3(72s^4 - 108s^2 + 16s)/(1 - 9s^3)^5 17.(x^6 + 1)^4(3x + 2)^2(99x^6 + 60x^5 + 9) 19. -\sen 2y/\sqrt{1 + \cos 2y} 21.24x^2 \sen(4x^3) \cos(4x^3) = 12x^2 \sen 8x^3$
 23. $(1/2\sqrt{x + \sqrt{x + \sqrt{x}}})(1 + (2\sqrt{x} + 1)/(4\sqrt{x}\sqrt{x + \sqrt{x}})) 25.[(2/3)(3x+2)^{1/2}(2x+3)^{-2/3} - (3/2)(2x+3)^{1/3}(3x+2)^{-1/2}]/[3x+2] 27.3(9z^{5/3} - 5z^{3/5})^2(15z^{2/3} - 3z^{-2/5})$
 29. $(9s - 1)^3(108s^2 - 139s + 39) 31. -53/2\sqrt{(2w+5)(7w-9)^3} 33.2\theta \cos \theta^2 [\cos \theta^2 - 2\theta^2 \sen \theta^2] 35. -x^{-2/3}(\cos \sqrt[3]{x} + \sen[3]x)(\cos[3]x - \sen[3]x)^2$
 37. $15x^2 + 2/\sqrt{x} 39.3x^2 - 2x - 5 41.\theta/(1 + \theta^2 x^2)$

Bom Estudo!