CAPÍTULO 3

EXERCÍCIOS 3.1

1. (a) Veja a Definição do Número e

(b) 0,99, 1,03; $2{,}7 < e < 2{,}8$

3. $f'(x) = 0$ **5.** $f'(x) = 5$ **7.** $f'(x) = 3x^2 - 4$

9. $g'(x) = 2x - 6x^2$ **11.** $y' = -\frac{2}{5}x^{-7/5}$ **13.** $A'(s) = 60/s^6$

15. $R'(a) = 18a + 6$ **17.** $S'(p) = \frac{1}{2}p^{-1/2} - 1$

19. $y' = 3e^x - \frac{4}{3}x^{-4/3}$ **21.** $h'(u) = 3Au^2 + 2Bu + C$

23. $y' = \frac{3}{2}\sqrt{x} + \dfrac{2}{\sqrt{x}} - \dfrac{3}{2x\sqrt{x}}$ **25.** $j'(x) = 2{,}4x^{1,4}$

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

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

31. $z' = -10A/y^{11} + Be^y$ **33.** $y = \frac{1}{4}x + \frac{3}{4}$

35. Tangente: $y = 2x + 2$; normal: $y = -\frac{1}{2}x + 2$

37. $y = 3x - 1$ **39.** $f'(x) = 4x^3 - 6x^2 + 2x$

41. (a) (c) $4x^3 - 9x^2 - 12x + 7$

EXERCÍCIOS 3.2

1. $1 - 2x + 6x^2 - 8x^3$ **3.** $f'(x) = e^x(x^3 + 3x^2 + 2x + 2)$

5. $y' = (x - 2)e^x/x^3$ **7.** $g'(x) = 5/(2x + 1)^2$

9. $H'(u) = 2u - 1$ **11.** $F'(y) = 5 + \dfrac{14}{y^2} + \dfrac{9}{y^4}$

13. $y' = \dfrac{x^2(3 - x^2)}{(1 - x^2)^2}$ **15.** $y' = \dfrac{2t(-t^4 - 4t^2 + 7)}{(t^4 - 3t^2 + 1)^2}$

17. $y' = e^p(1 + \frac{3}{2}\sqrt{p} - p + p\sqrt{p})$ **19.** $y' = 2v - 1/\sqrt{v}$

21. $f'(t) = \dfrac{4 + t^{1/2}}{(2 + \sqrt{t})^2}$ **23.** $f'(x) = \dfrac{-ACe^x}{(B + Ce^x)^2}$

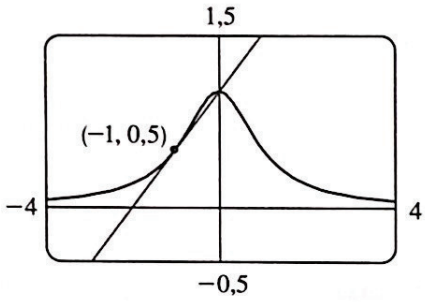
25. $f'(x) = \dfrac{2cx}{(x^2 + c)^2}$

27. $(x^4 + 4x^3)e^x$; $(x^4 + 8x^3 + 12x^2)e^x$

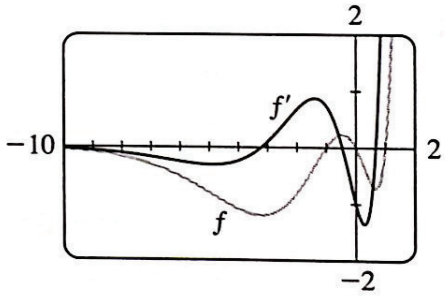
29. $\dfrac{2x^2 + 2x}{(1 + 2x)^2}$; $\dfrac{2}{(1 + 2x)^3}$ **31.** $y = \frac{2}{3}x - \frac{2}{3}$

33. $y = 2x$; $y = -\frac{1}{2}x$

35. (a) $y = \frac{1}{2}x + 1$ (b)

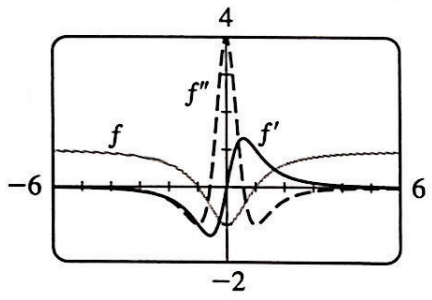


37. (a) $e^x(x^3 + 3x^2 - x - 1)$ (b)



39. $f'(x) = \dfrac{4x}{(x^2 + 1)^2}$; $f''(x) = \dfrac{4(1 - 3x^2)}{(x^2 + 1)^2}$

(b)



41. $\frac{1}{4}$ **43.** (a) -16 (b) $-\frac{20}{9}$ (c) 20 **45.** 7

EXERCÍCIOS 3.4

1. $4\cos 4x$ **3.** $-20x(1-x^2)^9$ **5.** $e^{\sqrt{x}}/(2\sqrt{x})$

47. $y' = -2x\,\text{sen}(x^2)$; $y'' = -4x^2\cos(x^2) - 2\,\text{sen}(x^2)$

51. $y = 20x + 1$

EXERCÍCIOS 4.1

Abreviações: abs, absoluto; loc, local; max., máximo; min., mínimo

47. $f(0) = 5, f(2) = -7$

49. $f(-1) = 8, f(2) = -19$

73. (a) $r = \frac{2}{3}r_0$ (b) $v = \frac{4}{27}kr_0^3$

EXERCÍCIOS 4.3

Abreviações: cres., crescente; decres., decrescente

9. (a) Cres. em $(-\infty, -3), (2, \infty)$; decres. em $(-3, 2)$

(b) Max. loc $f(-3) = 81$; Min. loc $f(2) = -44$

(c) CC em $(-\frac{1}{2}, \infty)$; CB em $\left(-\infty, -\frac{1}{2}\right)$; PI $(-\frac{1}{2}, \frac{37}{2})$

11. (a) Cres. em $(-1, 0), (1, \infty)$; decres. em $(-\infty, -1), (0, 1)$

(b) Max. loc $f(0) = 3$; Min. loc $f(\pm 1) = 2$

(c) CC em $\left(-\infty, -\sqrt{3}/3\right), \left(\sqrt{3}/3, \infty\right)$;