# R E S P O S T A S

**2. a)** $-1$ **b)** $f'_-(0) = -1$ e $f'_+(0)$ *não existe* **c)** não

**3. a)** não **b)** sim **c)** $f'(x) = \begin{cases} 2, x > 0 \\ 0, x < 0 \end{cases}$

**4. a)** $f$ não é derivável em $x = 0$ **b)** $f$ não é derivável em $x = 1$

**c)** $f$ é derivável em $x = 1$ e $f'(1) = 1/2$

**5.** 0 e 4 **6.** $f(1) = 0$ e $f'(1) = 5$ **7.** $f(0) = 0$ e $f'(x) = 5x + 3$ **8.** $a = 6$ e $b = -3$

**9. a)** $\begin{cases} y = \frac{1}{3}x + \frac{4}{3} \\ y = -3x + 28 \end{cases}$ **b)** $\begin{cases} y - \frac{1}{8} = -\frac{3}{2^9}(x - 16) \\ y - \frac{1}{8} = \frac{2^9}{3}(x - 16) \end{cases}$ **c)** $\begin{cases} y - \sqrt{3} = \frac{1}{2\sqrt{3}}(x - 3) \\ y - \sqrt{3} = -2\sqrt{3}(x - 3) \end{cases}$

**10.** $y - 16 = -8(x + 4)$ **11.** $y \pm \frac{9}{16} = \frac{8}{9}(x \mp \frac{3}{2})$ **12.** $x = 2;\ y = 0$ **13.** $y = 4x - 4$

**15.** $y = -\frac{13}{6}$ e $y = \frac{7}{3}$ **16. b)** não **c)** não **17. a)** sim **b)** não

**18. a)** $f'(0) = 0$ **b)** $f'(x) = \begin{cases} -2x, \text{ para } x < 0 \\ 2x, \text{ para } x > 0 \end{cases}$ **19.** $\frac{dy}{dx} = 2x + \frac{2u}{(x-1)^2\sqrt{1+u^2}}$

**23.** $2x + y + 5 = 0;\ x - 2y - 5 = 0$ **24.** $h'(2) = -15$

**26.**

**a)** $-\frac{\pi}{x^2}$ **b)** $-\frac{1}{3} + 2x - 2x^3$ **c)** $\frac{4}{3x^2\sqrt[3]{x}} - \frac{2}{3x\sqrt[3]{x^2}}$

**d)** $\frac{1}{\sqrt{x}\,(1-\sqrt{x})^2}$ **e)** $arcsen\,x + \frac{x}{\sqrt{1-x^2}}$ **f)** $x\,arctgx$

**g)** $e^x(\cos x - senx)$ **h)** $\frac{2}{x} + \frac{\ln x}{x^2} - \frac{2}{x^2}$ **i)** $-10(3 - 2sen\,x)^4 \cos x$

**j)** $2 - 15\cos^2 x\, senx$ **k)** $\frac{3\cos x + 2senx}{2\sqrt{15senx - 10\cos x}}$ **l)** $\frac{e^x(x+1)+1}{2\sqrt{x(e^x+1)}}$

**m)** $\frac{e^{-x}}{\sqrt{1-e^{2x}}}$ **n)** $3\cos 3x - \frac{1}{5}sen\left(\frac{x}{5}\right) + \frac{1}{2\sqrt{x}\cos^2\left(\sqrt{x}\right)}$

**o)** $-2\,cotgx\cos sec^2 x$ **p)** $-\frac{1}{1+x^2}$ **q)** $cotgx$ **r)** $\frac{2\ln x}{x} - \frac{1}{x\ln x}$

**30.** $n!a^n$

**31.**

**a)** $y' = \frac{1}{3y^2 - 1}$ **b)** $y' = \frac{\sqrt{y}}{\sqrt{x+y} - \sqrt{y}}$ **c)** $y' = \frac{\frac{y^2(x-y)^2}{2\sqrt{x}} + y^3 - y(x-y)^2}{y^2(x-y) + y^3 - x(x-y)^2}$

**d)** $y' = tgx.tgy$ **e)** $y' = -\frac{y}{x}$ **f)** $y' = \frac{4xy\sqrt{xy} - y}{x - 2x^2\sqrt{xy}}$

**32.** $\begin{cases} 3x + 4y = 25 \\ 4x - 3y = 0 \end{cases}$

**33.** $\begin{cases} y = -\frac{5}{4}x - 4 \\ y = \frac{4}{5}x + \frac{25}{4} \end{cases}$

**35.** *De cima para baixo, a correspondência segue a seqüência* **2**, **4**, **1** *e* **3**.

**36.**

**a)** $x = g(y) = \sqrt{\frac{y}{1-y}}, 0 \le y < 1$

**b)** $x = g(y) = -\sqrt{\frac{y}{1-y}}, 0 \le y < 1$

**c)** $x = g(y) = -\sqrt{y+4}, y \ge -4$

**d)** $x = g(y) = \sqrt{y+4}, y \ge -4$

**e)** $x = g(y) = 1 - y^2, y \le 0$

**f)** $x = g(y) = -\frac{y}{y-1}, y < 1$

**37.**

**a)** $y = x^2 - 2x - 3, x \le 1$ $\quad$ $y = x^2 - 2x - 3, x \ge 1$

$x = 1 - \sqrt{y+4}, y \ge -4$ $\quad$ $x = 1 + \sqrt{y+4}, y \ge -4$

**b)** $y = -x^2 + x + 2, x \le 1/2$ $\quad$ $y = -x^2 + x + 2, x \ge 1/2$

$x = \frac{1}{2} - \sqrt{\frac{9}{4} - y}, y \le \frac{9}{4}$ $\quad$ $x = \frac{1}{2} + \sqrt{\frac{9}{4} - y}, y \le \frac{9}{4}$

**c)** $y = \sqrt{1-x^2}, -1 \le x \le 0$ $\quad$ $y = \sqrt{1-x^2}, 0 \le x \le 1$

$x = -\sqrt{1-y^2}, 0 \le y \le 1$ $\quad$ $x = \sqrt{1-y^2}, 0 \le y \le 1$

**d)** $y = \sqrt{4-x^2}, -2 \le x \le 0$ $\quad$ $y = -\sqrt{4-x^2}, 0 \le x \le 2$

$x = -\sqrt{4-y^2}, -2 \le y \le 0$ $\quad$ $x = \sqrt{4-y^2}, -2 \le y \le 0$

**39. a)** $x = \frac{1}{y}, y \ne 0$ $\quad$ **b)** $x = -\frac{y}{y-1}, y \ne 1$

**40. a)** $D(g) = [-9/4, +\infty)$ *e* $Im(g) = [1/2 + \infty)$ $\quad$ **b)** $g'(-2) = 1$

**42.** $y - \frac{\pi}{4} = \frac{1}{4}(x - 2)$ $\quad$ **43.** $g'(0) = 2$

**44.**

**a)** $D(f) = \{x \in \mathbb{R} \ / -\sqrt{5} < x < \sqrt{5}\}$ $\quad$ $f'(x) = -\frac{x}{5 - x^2}$

**b)** $D(f) = \{x \in \mathbb{R} / 2k\pi < x < \pi + 2k\pi\}$ $\quad$ $f'(x) = cotgx$

**c)** $D(f) = (0, +\infty)$; $\quad f'(x) = lnx$

**d)** $D(f) = \mathbb{R} - \{0\}$; $\quad f'(x) = \frac{1}{x}$

**e)** $D(f) = \mathbb{R} - \{1\}$; $\quad f'(x) = -\frac{1}{x(lnx)^2}$

**f)** $D(f) = (1, +\infty)$; $\quad f'(x) = -\frac{1}{xlnx}$

**g)** $D(f) = \{x \in \mathbb{R} \ / \ x < 2 \ ou \ x > 3\}$; $\quad f'(x) = -\frac{1}{2(2-x)(3-x)}$

**h)** $D(f) = \{x \in \mathbb{R} / \frac{1}{3}[(-\frac{\pi}{2} - 5) + 2k\pi] < x < \frac{1}{3}[(\frac{\pi}{2} - 5) + 2k\pi]\}$; $\quad f'(x) = -3tg(3x + 5)$

**i)** $D(f) = (-\frac{3}{2}, +\infty)$; $f'(x) = \frac{2}{2x+3}\cos\left(\ln\left(2x+3\right)\right)$

**46. a)** $\mathbb{R}$ **b)** $y + 1 = -x + \ln 2$; $y = 0$.

**47. a)** *Basta notar que* $N = b^a \Rightarrow \ln N = a \ln b$. *Assim,* $\log_b N = a = \frac{\ln N}{\ln b}$.

**48.**

**a)** $\cos x e^{\operatorname{sen} x}$ **b)** $2xe^{x^2}$ **c)** $2e^{2x}$ **d)** $-3^x \ln 3$ **e)** $x^x\left(\ln x + 1\right)$

**f)** $x^{\left(x^x\right)}\left[x^x \ln x\left(\ln x + 1\right) + x^{x-1}\right]$ **g)** $\left(x^x\right)^x\left(2x\ln x + x\right)$

**h)** $3^{x \operatorname{sen} x}\left[2x + x^2 \ln 3\left(\operatorname{sen} x + x\cos x\right)\right]$ **i)** $2^{x^x}\left[x^x\left(\ln x + 1\right)\right]\ln 2$

**50.**

**a)** 2 **b)** $\frac{1}{3}$ **c)** 1 **d)** 1 **e)** 0 **f)** 0 **g) 1** **h)** $\frac{1}{2}$ **i)** $\frac{2}{3}$

**51. a)** $v(t) = t^2 - 2t - 3$; $a(t) = 2t - 2$ **b)** $t = 3$ **c)** $t = 1$

**52.** $p = (\frac{1}{2}, \frac{1}{4})$ **53.** $-\frac{12}{25}\,cm/s$ **54.** *No ponto de abscissa* $x = \frac{5}{6}$. **55.** $3.750\,cm^3/s$

**56.** $562{,}5\,\pi\,cm^3/s$ **57.** $-\frac{8}{5}$ *unidades* $/s$ **58.** $-\frac{6}{\sqrt{55}}\,m/s$ **59.** $-\frac{1}{48}\,rad/s$

**60.** $-1.200\,N/m^2$.

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