Lista 2 de Cálculo I

Data da entrega: 05/09/19

Exercício 1: Ache o limite:

13. $\lim\limits_{t \to 2^+} \dfrac{t+2}{t^2-4}$

15. $\lim\limits_{t \to 2^-} \dfrac{t+2}{t^2-4}$

17. $\lim\limits_{x \to 0^-} \dfrac{\sqrt{3+x^2}}{x}$

19. $\lim\limits_{x \to 3^+} \dfrac{\sqrt{x^2-9}}{x-3}$

21. $\lim\limits_{x \to 0^+} \left(\dfrac{1}{x} - \dfrac{1}{x^2} \right)$

23. $\lim\limits_{x \to 0^-} \dfrac{2-4x^3}{5x^2+3x^3}$

Resposta:

13. $+\infty$ **15.** $-\infty$ **17.** $-\infty$

19. $+\infty$ **21.** $-\infty$ **23.** $+\infty$

Exercício 2: Ache a(s) assíntota(s) vertical(is) do gráfico da função e faça um esboço dele.

35. $f(x) = \dfrac{2}{x-4}$

37. $f(x) = \dfrac{-2}{x+3}$

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

41. $f(x) = \dfrac{5}{x^2+8x+15}$

Respostas

35. $x = 4$ **37.** $x = -3$ **39.** $x = -3$ **41.** $x = -5, x = -3$
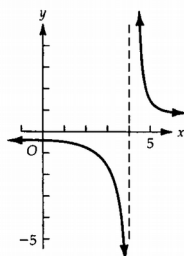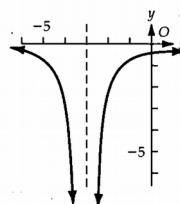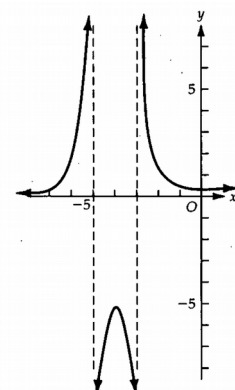

FIGURA 2.4-35
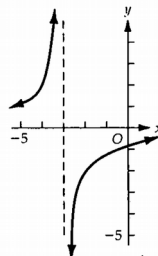
FIGURA 2.4-37

FIGURA 2.4-39

FIGURA 2.4-41

Exercício 3: Ache o limite.

11. $\displaystyle\lim_{t \to +\infty} \frac{2t + 1}{5t - 2}$

13. $\displaystyle\lim_{x \to -\infty} \frac{2x + 7}{4 - 5x}$

15. $\displaystyle\lim_{x \to +\infty} \frac{7x^2 - 2x + 1}{3x^2 + 8x + 5}$

17. $\displaystyle\lim_{x \to +\infty} \frac{x + 4}{3x^2 - 5}$

19. $\displaystyle\lim_{y \to +\infty} \frac{2y^2 - 3y}{y + 1}$

21. $\displaystyle\lim_{x \to -\infty} \frac{4x^3 + 2x^2 - 5}{8x^3 + x + 2}$

23. $\displaystyle\lim_{y \to +\infty} \frac{2y^3 - 4}{5y + 3}$

25. $\displaystyle\lim_{x \to -\infty} \left(3x + \frac{1}{x^2}\right)$

27. $\displaystyle\lim_{x \to +\infty} \frac{\sqrt{x^2 + 4}}{x + 4}$

29. $\displaystyle\lim_{w \to -\infty} \frac{\sqrt{w^2 - 2w + 3}}{w + 5}$

Resposta:

11. $\frac{2}{5}$ 13. $-\frac{2}{5}$ 15. $\frac{7}{3}$ 17. 0   19. $+\infty$ 21. $\frac{1}{2}$ 23. $+\infty$ 25. $-\infty$ 27. 1   29. -1

Exercício 4: Encontre as assíntotas horizontal e vertical e trace um esboço do gráfico da função.

37. $f(x) = \dfrac{2x + 1}{x - 3}$

39. $g(x) = 1 - \dfrac{1}{x}$

41. $f(x) = \dfrac{2}{\sqrt{x^2 - 4}}$

43. $G(x) = \dfrac{4x^2}{x^2 - 9}$

45. $h(x) = \dfrac{2x}{6x^2 + 11x - 10}$

47. $f(x) = \dfrac{4x^2}{\sqrt{x^2 - 2}}$

Resposta:

37. $y = 2, x = 3$ 39. $y = 1, x = 0$ 41. $y = 0, x = -2, x = 2$ 43. $y = 4, x = -3, x = 3$ 45. $y = 0, x = \frac{2}{3}, x = -\frac{5}{2}$
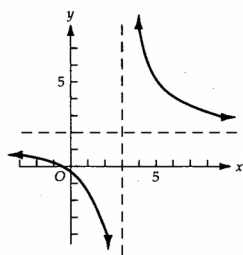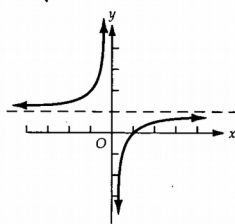
47. $x = -\sqrt{2}, x = \sqrt{2}$
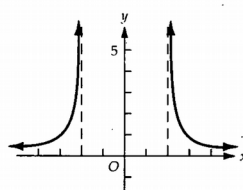
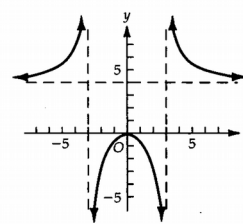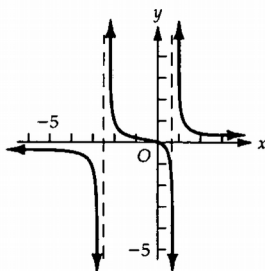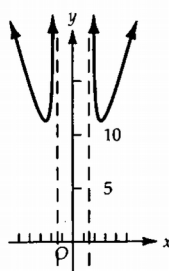FIGURA 2.5-37

FIGURA 2.5-39

FIGURA 2.5-41

FIGURA 2.5-43

FIGURA 2.5-45

FIGURA 2.5-47

Exercício 5: Calcule o limite, quando ele existir.

1. $\lim\limits_{x \to 0} \dfrac{\operatorname{sen} 4x}{x}$

3. $\lim\limits_{x \to 0} \dfrac{\operatorname{sen} 9x}{\operatorname{sen} 7x}$

5. $\lim\limits_{y \to 0} \dfrac{3y}{\operatorname{sen} 5y}$

7. $\lim\limits_{x \to 0} \dfrac{x^2}{\operatorname{sen}^2 3x}$

11. $\lim\limits_{x \to 0} \dfrac{1 - \cos 4x}{x}$

13. $\lim\limits_{x \to 0} \dfrac{3x^2}{1 - \cos^2 \frac{1}{2}x}$

15. $\lim\limits_{x \to 0} \dfrac{\operatorname{tg} x}{2x}$

17. $\lim\limits_{t \to 0^+} \dfrac{\operatorname{sen} t}{t^2}$

19. $\lim\limits_{x \to 0} \dfrac{1 - \cos 2x}{\operatorname{sen} 3x}$

Resposta:

1. 4   **3.** $\frac{9}{7}$ **5.** $\frac{3}{5}$ **7.** $\frac{1}{9}$ **9.** 0   **11.** 0   **13.** 12   **15.** $\frac{1}{2}$ **17.** $+\infty$ **19.** 0

Exercício 6: Calcule.

a) $\lim\limits_{x \to +\infty} \left(1 + \dfrac{2}{x}\right)^x$

b) $\lim\limits_{x \to +\infty} \left(1 + \dfrac{1}{x}\right)^{x+2}$

c) $\lim\limits_{x \to +\infty} \left(1 + \dfrac{1}{2x}\right)^x$

d) $\lim\limits_{x \to +\infty} \left(1 + \dfrac{2}{x}\right)^{x+1}$

e) $\lim\limits_{x \to +\infty} \left(\dfrac{x+2}{x+1}\right)^x$

f) $\lim\limits_{x \to 0} (1 + 2x)^x$

g) $\lim\limits_{x \to 0} (1 + 2x)^{\frac{1}{x}}$

h) $\lim\limits_{x \to +\infty} \left(1 + \dfrac{1}{x}\right)^{2x}$

Resposta:

a) e^2 b) e c) $e^{\frac{1}{2}}$ d) e^2 e) e f) 1 g) e^2 h) e^2