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1. Encontre, quando existe, os seguintes limites.

(a) $\lim_{x\to 3^+} \frac{5}{3-x}$

(b) $\lim_{x\to 4^-} \frac{4}{x-4}$

(c) $\lim_{x\to \frac{1}{2}^+} \frac{-2}{2x-1}$

(d) $\lim_{x\to 0^+} \frac{2x+1}{x}$

(e) $\lim_{x\to 0^+} \frac{3}{x^2-x}$

(f) $\lim_{x\to 0^-} \frac{3}{x^2-x}$

(g) $\lim_{x\to 1^-} \frac{2x+3}{x^2-1}$

(h) $\lim_{x\to 3^+} \frac{x^2-3x}{x^2-6x+9}$

(i) $\lim_{x\to -1^+} \frac{2x+1}{x^2+x}$

(j) $\lim_{x\to 0^+} \frac{2x+1}{x^2+x}$

(k) $\lim_{x\to -1^+} \frac{3x^2-4}{1-x^2}$

(l) $\lim_{x\to 0^+} \frac{\operatorname{sen} x}{x^3-x^2}$

2. Calcule os limites no infinito.

(a) $\lim_{x\to +\infty} \frac{1}{x^2}$

(b) $\lim_{x\to -\infty} \frac{2}{x^3}$

(c) $\lim_{x\to -\infty} \left(5+\frac{1}{x}+\frac{2}{x^2}\right)$

(d) $\lim_{x\to +\infty} \left(2-\frac{1}{x}\right)$

(e) $\lim_{x\to +\infty} \frac{2x+1}{x+3}$

(f) $\lim_{x\to -\infty} \frac{2x+1}{x+3}$

(g) $\lim_{x\to -\infty} \frac{x^2-2x+3}{3x^2+x+1}$

(h) $\lim_{x\to +\infty} \frac{5x^4-2x+1}{4x^4+3x+2}$

(i) $\lim_{x\to +\infty} \frac{x}{x^2+3x+1}$

(j) $\lim_{x\to -\infty} \sqrt[3]{\frac{x}{x^2+3}}$

(k) $\lim_{x\to +\infty} \frac{\sqrt{x^2+1}}{3x+2}$

(l) $\lim_{x\to +\infty} \frac{\sqrt[3]{x^3+2x-1}}{\sqrt{x^2+x+1}}$

(m) $\lim_{x\to +\infty} \frac{\sqrt{x}+\sqrt[3]{x}}{x^2+3}$

(n) $\lim_{x\to +\infty} \frac{3}{\sqrt{x}}$

(o) $\lim_{x\to +\infty} \left(x-\sqrt{x^2+1}\right)$

(p) $\lim_{x\to -\infty} \left(\sqrt{2-x}-\sqrt{1-x}\right)$

3. Calcule, quando existir, os limites abaixo.
   (a) $\lim_{x\to 0} \frac{\operatorname{tg} x}{x}$
   (b) $\lim_{x\to 0} \frac{x}{\operatorname{sen} x}$
   (c) $\lim_{x\to 0} \frac{\operatorname{sen} 6x}{x}$
   (d) $\lim_{x\to \pi} \frac{\operatorname{sen} x}{x-\pi}$
   (e) $\lim_{x\to 0} \frac{x^2}{\operatorname{sen} x}$
   (f) $\lim_{x\to 0} \frac{3x^2}{\operatorname{tg} x \cdot \operatorname{sen} x}$
   (g) $\lim_{x\to 0} \frac{1-\cos x}{x}$
   (h) $\lim_{x\to \pi/2} \frac{1-\operatorname{sen} x}{2x-\pi}$
   (i) $\lim_{x\to 0} \frac{\operatorname{tg} 3x}{\operatorname{sen} 4x}$
   (j) $\lim_{x\to a} \frac{\operatorname{tg}(x-a)}{x^2-a^2}$, com $a \neq 0$
   (k) $\lim_{x\to a} \frac{\operatorname{sen}(x^2-a^2)}{x-a}$, com $a \neq 0$
   (l) $\lim_{x\to 0} \frac{x+\operatorname{sen} x}{x^2-\operatorname{sen} x}$
   (m) $\lim_{x\to 1} \frac{\operatorname{sen} \pi x}{x-1}$
   (n) $\lim_{x\to 0} \frac{x-\operatorname{sen} x}{x^2}$
   (o) $\lim_{x\to 0} \frac{x-\operatorname{tg} x}{x+\operatorname{tg} x}$
   (p) $\lim_{x\to a} \frac{\operatorname{sen} x-\operatorname{sen} a}{x-a}$

4. Calcule:
   (a) $\lim_{x\to +\infty} (x^4-4x+1)$
   (b) $\lim_{x\to +\infty} (5-4x+x^2-x^5)$
   (c) $\lim_{x\to -\infty} (3x^3+2x+1)$
   (d) $\lim_{x\to +\infty} \frac{5x^3-6x+1}{6x^3+2}$
   (e) $\lim_{x\to +\infty} \frac{5x^3+7x-3}{x^4-2x+3}$
   (f) $\lim_{x\to -\infty} \frac{2x+3}{x+1}$
   (g) $\lim_{x\to -\infty} \frac{5-x}{3+2x}$

5. Faça o gráfico de $y=\sqrt{x}$ para concluir que $\lim_{x\to +\infty} \sqrt{x} = +\infty$.

6. Calcule:
   (a) $\lim_{x\to +\infty} \frac{\sqrt{x}+1}{x+3}$
   (b) $\lim_{x\to +\infty} \frac{x+\sqrt{x+3}}{2x-1}$
   (c) $\lim_{x\to +\infty} \left(2x-\sqrt{x^2+3}\right)$
   (d) $\lim_{x\to +\infty} \left(x-\sqrt{x+3}\right)$

7. Dê exemplo de funções f e g tais que $\lim_{x\to +\infty} f(x) = +\infty$, $\lim_{x\to +\infty} g(x) = +\infty$ e $\lim_{x\to +\infty} [f(x)-g(x)] \neq 0$. [Indeterminação $\infty - \infty$]