

DICAS LISTA 5 - 1º Bim

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CÁLCULO I

ENG. DE ALIM.
UFT - PALMAS/TO

$$2.f) \lim_{x \rightarrow 0^+} \frac{\sqrt{3+x^2}}{x} = L_f \quad \text{TESTE: } \frac{3}{0} \text{ (T.L.10)}$$

$$L_f = \lim_{x \rightarrow 0^+} \frac{\sqrt{3}}{x} = +\infty$$

$$2.b) \lim_{t \rightarrow 2^-} \frac{-t+2}{(t-2)^2} = L_b \quad \text{TESTE: } \frac{0}{0} \text{ (T.L.9)}$$

OBS.: $f(t) = \frac{-t+2}{(t-2)^2} = \frac{-1(t-2)}{(t-2) \cdot (t-2)} = \frac{-1}{t-2}$ TESTE: $\frac{-1}{0}$ (T.L.10)

$$f(t) = \frac{-1}{t-2} = g(t)$$

$$L_b = \lim_{t \rightarrow 2^-} \frac{-1}{t-2} \quad \text{M.V.: Se } a = t-2 \text{ e } t \rightarrow 2^- \Rightarrow a \rightarrow 0^-$$

$$L_b = \lim_{a \rightarrow 0^-} \frac{-1}{a} = +\infty \quad \therefore \lim_{t \rightarrow 2^-} \frac{-t+2}{(t-2)^2} = +\infty$$

$$2.g) \lim_{x \rightarrow 3^+} \frac{\sqrt{x^2-9}}{x-3} = L_g \quad \text{TESTE: } \frac{0}{0} \text{ (T.L.9)}$$

OBS.: $f(x) = \frac{\sqrt{x^2-9}}{x-3} \stackrel{(*)}{=} \sqrt{\frac{x^2-9}{(x-3)^2}} = \sqrt{\frac{(x+3) \cdot \cancel{(x-3)}}{(x-3) \cdot \cancel{(x-3)}}}$

$$f(x) = \sqrt{\frac{x+3}{x-3}} = g(x)$$

(*)
 $(x-3) > 0$
 $\sqrt{(x-3)^2} = (x-3)$

$$L_g = \lim_{x \rightarrow 3^+} \sqrt{\frac{x+3}{x-3}} = \sqrt{\lim_{x \rightarrow 3^+} \frac{x+3}{x-3}} \quad \text{TESTE: } \frac{6}{0} \text{ (T.L.10)}$$

M.V.: Se $b = x-3$ e $x \rightarrow 3^+ \Rightarrow b \rightarrow 0^+$ e $x+3=6$

$$L_g = \sqrt{\lim_{b \rightarrow 0^+} \frac{6}{b}} = \sqrt{+\infty} = +\infty \quad \therefore \lim_{x \rightarrow 3^+} \frac{\sqrt{x^2-9}}{x-3} = +\infty$$

$$2, j) \lim_{\Delta \rightarrow 2^-} \left(\frac{1}{\Delta-2} - \frac{3}{\Delta^2-4} \right) = \lim_{\Delta \rightarrow 2^-} \frac{1}{\Delta-2} - \lim_{\Delta \rightarrow 2^-} \frac{3}{\Delta^2-4} = L_j$$

$$L_1 = \lim_{\Delta \rightarrow 2^-} \frac{1}{\Delta-2} \quad \text{TESTE: } \frac{1}{0} \text{ (T.L.10)}$$

$$\text{M.V.: SE } a = \Delta-2 \text{ E } \Delta \rightarrow 2^- \Rightarrow a \rightarrow 0^-$$

$$L_1 = \lim_{a \rightarrow 0^-} \frac{1}{a} = -\infty$$

$$L_2 = \frac{3}{\Delta^2-4} \quad \text{TESTE: } \frac{3}{0} \text{ (T.L.10)}$$

$$\text{M.V.: SE } b = \Delta^2-4 \text{ E } \Delta \rightarrow 2^- \Rightarrow b \rightarrow 0^-$$

$$L_2 = \lim_{b \rightarrow 0^-} \frac{3}{b} = -\infty$$

SUBSTITUINDO L_1 E L_2 EM L_j :

$$L_j = -\infty - (-\infty) = -\infty + \infty = ? \text{ (INDEFINIÇÃO)}$$

DEVEMOS RESOLVER DE OUTRO JEITO: (PODE COMEÇAR DAQUI):

$$\text{OBS.: } f(\Delta) = \frac{1}{\Delta-2} - \frac{3}{\Delta^2-4} = \frac{\Delta+2-3}{\Delta^2-4} = \frac{\Delta-1}{\Delta^2-4} = g(\Delta)$$

$$L_j = \lim_{\Delta \rightarrow 2} \frac{\Delta-1}{\Delta^2-4} \quad \text{TESTE: } \frac{1}{0} \text{ T.L.10}$$

$$\text{M.V. SE } \gamma = \Delta^2-4 \text{ E } \Delta \rightarrow 2^- \Rightarrow \gamma \rightarrow 0^- \text{ E } \Delta-1=1$$

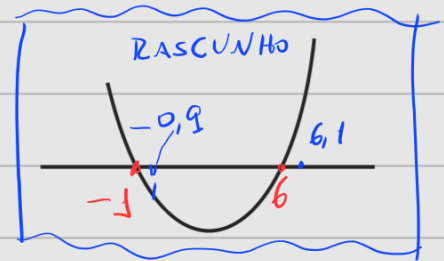
$$L_j = \lim_{\gamma \rightarrow 0^-} \frac{1}{\gamma} = -\infty.$$

$$\therefore \lim_{\Delta \rightarrow 2^-} \left(\frac{1}{\Delta-2} - \frac{3}{\Delta^2-4} \right) = -\infty$$

$$3.c) f(x) = \frac{1}{x^2 + 5x - 6} \quad (\text{Assint. Vert.})$$

DEVEMOS ENCONTRAR "a" TAL QUE: $\lim_{x \rightarrow a^+} f(x) = \pm \infty$

$$\lim_{x \rightarrow a^-} f(x) = \pm \infty \quad \text{ou} \quad \lim_{x \rightarrow a^+} f(x) = \pm \infty$$



$$i) f(x) = 0 \Rightarrow x^2 + 5x - 6 = 0$$

$$\begin{cases} x' + x'' = b/a = 5/1 = 5 & x' = -1 \text{ e } x'' = 6 \\ x' \cdot x'' = c/a = -6/1 = -6 \end{cases}$$

$$a = -1 \quad \text{ou} \quad a = 6$$

$$ii) \lim_{x \rightarrow -1^+} \frac{1}{x^2 + 5x - 6} = L_{ii} \quad \text{TESTE: } \frac{1}{0} \quad (\text{T.L.10})$$

$$\text{subs. } x = -0,9$$

$$\text{M.V.: Se } y = x^2 + 5x - 6 \text{ e } x \rightarrow -1^+ \Rightarrow y \rightarrow 0^-$$

$$L_{ii} = \lim_{y \rightarrow 0^-} \frac{1}{y} = -\infty, \text{ Logo } x = -1 \text{ é uma A.V.}$$

$$iii) \lim_{x \rightarrow 6^+} \frac{1}{x^2 + 5x - 6} = L_{iii} \quad \text{TESTE: } \frac{1}{0} \quad (\text{T.L.10})$$

$$\text{subs. } x = 6,1$$

$$\text{M.V.: Se } k = x^2 + 5x - 6 \text{ e } x \rightarrow 6^+ \Rightarrow k \rightarrow 0^+$$

$$L_{iii} = \lim_{k \rightarrow 0^+} \frac{1}{k} = +\infty \Rightarrow x = 6 \text{ é uma A.V.}$$

∴ Para $f(x)$ DADA TEMOS DUAS A.V.: $x = -1$ e $x = 6$.