

DÍCAS LISTA 4 - 5ª BIM

CÁLCULO I
ENG. DE ALIM.
PROF. PAULO ALGX.
UFT / PALMAS

$$3.b) \lim_{x \rightarrow \frac{1}{3}} \frac{3x-1}{9x-1} = L_b$$

$$\text{TESTE: } L_b = \frac{0}{0} \text{ (T.L.9)}$$

$$\text{OBS.: } f(x) = \frac{3x-1}{9x^2-1} = \frac{3x-1}{(3x)^2-1^2} = \frac{\cancel{1}(3\cancel{x}-1)}{(\cancel{3}x-1)(\cancel{3}x+1)}$$

$$f(x) = \frac{1}{3x+1} = g(x)$$

$$L_b = \lim_{x \rightarrow \frac{1}{3}} \frac{1}{3x+1} = \frac{1}{3(\frac{1}{3})+1} = \frac{1}{2}$$

$$\therefore \lim_{x \rightarrow \frac{1}{3}} \frac{3x-1}{9x-1} = \frac{1}{2}$$

$$3.e) \lim_{t \rightarrow \frac{3}{2}} \sqrt{\frac{8t^3-27}{4t^2-9}} = L_e \quad \text{TESTE: } L_e = \frac{\sqrt{0}}{0} \text{ (T.L.9)}$$

$$\text{OBS.: } f(t) = \frac{8t^3-27}{4t^2-9} = \frac{(2t)^3-3^3}{(2t)^2-3^2} = \frac{\cancel{(2t-3)} \cdot [(2t)^2+2t \cdot 3+3^2]}{(\cancel{2t-3}) \cdot (2t+3)}$$

$$f(t) = \frac{4t^2+6t+9}{2t+3} = g(t)$$

$$L_e = \sqrt{\lim_{t \rightarrow \frac{3}{2}} \frac{8t^3-27}{4t^2-9}} = \sqrt{\lim_{t \rightarrow \frac{3}{2}} \frac{4t^2+6t+9}{2t+3}}$$

$$\text{TESTE: } L_e = \sqrt{\frac{27}{6}}$$

$$L_e = \sqrt{\frac{4 \cdot (\frac{3}{2})^2 + 6(\frac{3}{2}) + 9}{2 \cdot (\frac{3}{2}) + 3}} = \sqrt{\frac{27}{6}} = \sqrt{\frac{9}{2}} = 3\sqrt{\frac{1}{2}}$$

$$\therefore \lim_{t \rightarrow \frac{3}{2}} \sqrt{\frac{8t^3-27}{4t^2-9}} = 3\sqrt{\frac{1}{2}}$$

$$3.f) \lim_{x \rightarrow -2} \frac{x^3-x^2-x+10}{x^2+3x+2} = L_i$$

$$\text{TESTE: } L_i = \frac{0}{0} \text{ (T.L.9)}$$

$$\text{OBS.: } \frac{x^3-x^2-x+10}{x^2+3x+2} = \frac{\cancel{(x+2)} \cdot (x^2-3x+5)}{(\cancel{x+2}) \cdot (x+1)} = \frac{x^2-3x+5}{x+1} = g(x)$$

$$\begin{array}{r}
 x^3 - x^2 - x + 10 \quad | \quad x+2 \\
 (-) \quad x^3 + 2x^2 \\
 \hline
 0 - 3x^2 - x + 10 \\
 (-) \quad -3x^2 - 6x \\
 \hline
 0 + 5x + 10 \\
 (-) \quad 5x + 10 \\
 \hline
 0
 \end{array}$$

$$\begin{array}{r}
 x^2 + 3x + 2 \quad | \quad x+2 \\
 (-) \quad x^2 + 2x \\
 \hline
 0 \quad x + 2 \\
 \quad x + 2 \\
 \hline
 0
 \end{array}$$

$$L_i = \lim_{x \rightarrow -2} \frac{x^2 - 3x + 5}{x + 1} = \frac{(-2)^2 - 3(-2) + 5}{(-2) + 1} = \frac{15}{-1} = -15$$

$$\therefore \lim_{x \rightarrow -2} \frac{x^3 - x^2 - x + 10}{x^2 + 3x + 2} = -15$$

$$3.f) \lim_{h \rightarrow -1} \frac{\sqrt{h+5} - 2}{h+1} = L_f$$

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$$\text{TESTE: } L_f = \frac{0}{0} \quad (\text{T.L.G})$$

$$\text{OBS.: } f(h) = \frac{\sqrt{h+5} - 2}{h+1} \cdot \frac{(\sqrt{h+5} + 2)}{(\sqrt{h+5} + 2)} = \frac{(h+5) - 2^2}{(h+1) \cdot (\sqrt{h+5} + 2)}$$

$$f(h) = \frac{(h+1)}{(h+1) \cdot (\sqrt{h+5} + 2)} = \frac{1}{\sqrt{h+5} + 2} = g(h)$$

$$L_f = \lim_{h \rightarrow -1} \frac{1}{\sqrt{h+5} + 2} = \frac{1}{\sqrt{-1+5} + 2} = \frac{1}{4}$$

$$\therefore \lim_{h \rightarrow -1} \frac{\sqrt{h+5} - 2}{h+1} = \frac{1}{4}$$