12.5)

$$\lim_{x \to 4} \frac{\sqrt{x}-2}{\sqrt{3x-8}-2} = \lim_{x\to 4} \frac{(x-4)}{(3x-12)} \cdot \lim_{x \to 4} \frac{(\sqrt{3x-8}+2)}{(\sqrt{x}+2)} = \frac{1}{3} \cdot \frac{4}{4} = \frac{1}{3}$$

$$\parallel$$

$$\frac{\sqrt{x}-2}{\sqrt{3x-8}-2} \cdot \frac{(\sqrt{x}+2)}{(\sqrt{x}+2)} \cdot \frac{(\sqrt{3x-8}+2)}{(\sqrt{3x-8}+2)}$$

$$\parallel$$

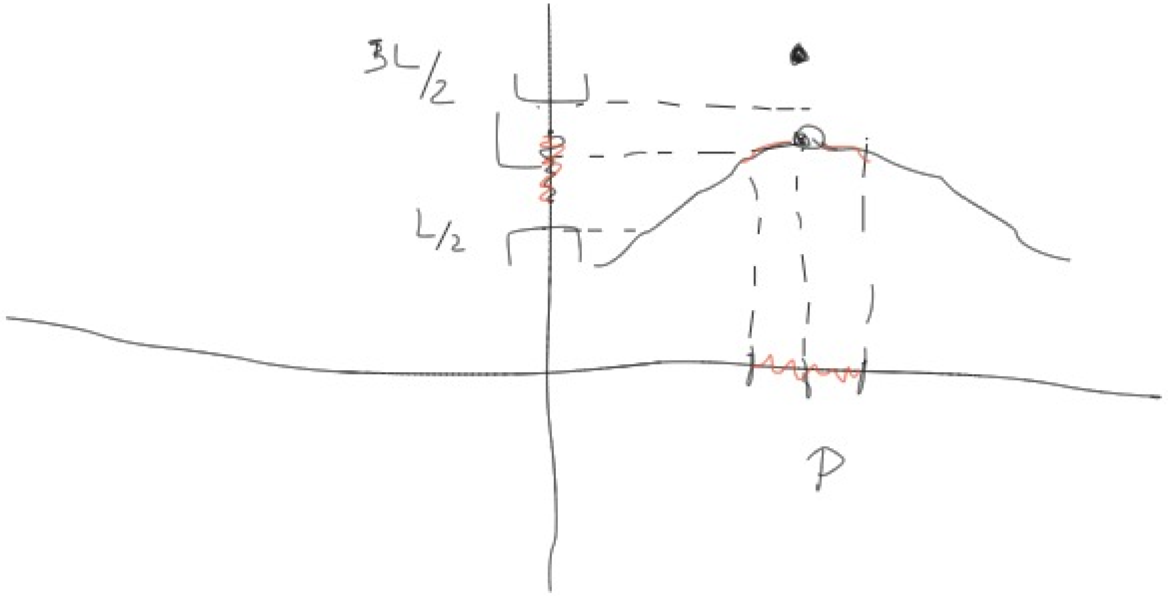
o lim existe e é 1/3

$$\frac{(x-4) \cdot (\sqrt{3x-8}+2)}{(3x-8-4) \cdot (\sqrt{x}+2)}$$

o lim ñ é ind ✓

miro

/4



$L>0$ $\quad \frac{L}{2}>0$

$\lim_{x\to p} f(x) = L > 0$

tomando $\varepsilon = L/2$

$\exists\, \delta>0$ tq se $|x-p|<\delta$

então $|f(x) - L| < \varepsilon = L/2$

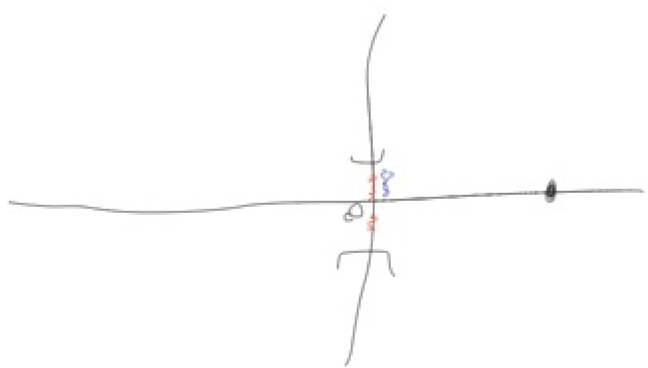
portanto $f(x) \in \,]L/2, 3L/2[$

e $f(x) > 0$

16 $f: D \longrightarrow \mathbb{R}$

$$\boxed{\lim_{x\to p} f(x) = 0} \iff \lim_{x\to p} |f(x)| = 0$$

δ



$(\Leftarrow)$

$(\Rightarrow)$: para todo $\varepsilon > 0$ $\exists$ $\delta > 0$ tq se $|x-p| < \delta$ então $\big|\,|f(x)| - 0\,\big| < \varepsilon$ $*$

$$\big|\,|f(x)| - 0\,\big| = \big|\,|f(x)|\,\big| = |f(x)| = \boxed{|f(x) - 0|}$$

fixe $\varepsilon > 0$ quero achar $\boxed{\delta > 0}$ satisf $*$

$$\big|\,|f(x)| - 0\,\big| = \overbrace{|f(x) - 0| < \varepsilon}^{\to \text{ def } \lim_{x\to p} f(x) = 0}$$

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$$\boxed{\lim_{x \to 0} \frac{3x^2}{x + tg\,x\,sen\,x}} \rightsquigarrow \frac{3x^2 \cos x}{x \cos x - sen^2 x} \rightsquigarrow \frac{3x^2 \cos x}{x \cos x - 1 + \cos^2 x}$$

$$\rightsquigarrow$$

$$\lim_{x \to 0} \frac{3x^2}{x \cdot \left(1 + \frac{tg x\, sen x}{x}\right)} = \lim_{x \to 0} \frac{3x}{1 + \underset{tg(0)}{tg\,x} \underset{\to 1}{\frac{sen\,x}{x}}} = 0$$

12 z) $\lim_{x \to \pi/2} \dfrac{\cos(x)}{x - \pi/2}$

$u = x - \pi/2$

$x = u + \pi/2$

$$\lim_{u \to 0} \frac{\cos(u + \pi/2)}{u} = \lim_{u \to 0} \frac{\cos(u)\,\overbrace{\cos(\pi/2)}^{0} - \operatorname{sen}(u)\,\overbrace{\operatorname{sen}(\pi/2)}^{1}}{u}$$

$$= \lim_{u \to 0} - \frac{\operatorname{sen}(u)}{u} = -1$$

miro