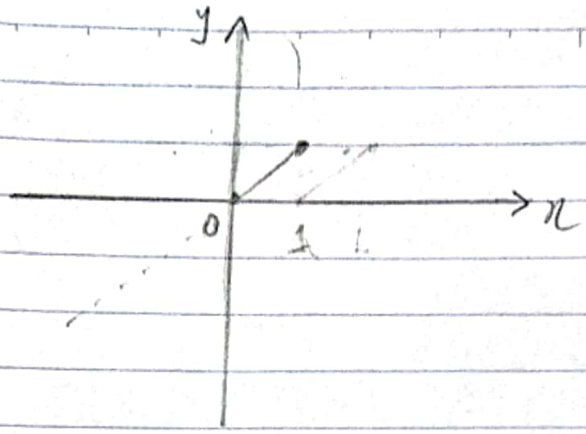
data

1.a)

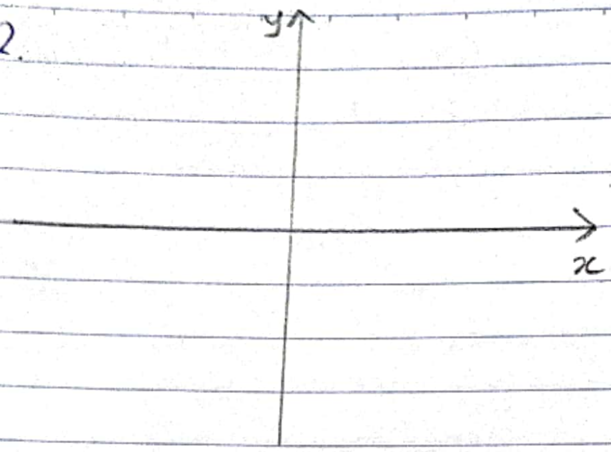


Falsa, caso $g(x) = 0$ teremos uma indeterminação

b) Verdadeiro pois $\frac{5}{8}x - 1 = -\frac{3}{8}$

$x - 1$, se $x \geq \frac{5}{8}$

2.



$$\begin{cases} \dfrac{sen(3x)}{x}, & se\ x<0 \\ \dfrac{x+6}{x+2}, & se\ x>0 \end{cases}$$

$$\lim_{x\to 0^-} \frac{sen\, 3x}{x} = \lim_{x\to 0^-} \frac{3\cdot sen\, 3x}{3x} = 3 \lim_{x\to 0^-} \frac{sen\, 3x}{3x}$$

$$3\cdot 1 = 3$$

$$\lim_{x\to 0^+} \frac{x+6}{x+2} = \frac{6}{2} = 3$$

$$f(x) = \begin{cases} \dfrac{sen(3x)}{x}, & se\ x<0 \\ 3, & se\ x=0 \\ \dfrac{x+6}{x+2}, & se\ x>0 \end{cases}$$

data . .
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3- a) $f(x) = \dfrac{x^3 \operatorname{sen}(x)}{3x^4 + 2x^2 - 10}$ $-1 \leq \operatorname{sen}(x) \leq 1$

$$\lim_{x \to +\infty} \frac{\dfrac{x^3 \cdot \operatorname{sen}(x)}{x^4}}{\dfrac{3x^4 + 2x^2 - 10}{x^4}} \Rightarrow \frac{\dfrac{\operatorname{sen}(x)}{x}}{3 + \dfrac{2}{x^2} - \dfrac{10}{x^4}} = \frac{0}{3} = 0$$

$* \; \dfrac{-1}{x} \leq \dfrac{\operatorname{sen}(x)}{x} \leq \dfrac{1}{x} = \lim_{x \to +\infty} \dfrac{-1}{x} = 0 \;\Big|\; \lim_{x \to +\infty} \dfrac{1}{x} = 0$

$* \; 0 \leq \lim_{x \to +\infty} \dfrac{\operatorname{sen}(x)}{x} \leq 0$

$$\lim_{x \to -\infty} \frac{\dfrac{x^3 \cdot \operatorname{sen}(x)}{x^4}}{\dfrac{3x^4 + 2x^2 - 10}{x^4}} \Rightarrow \frac{\dfrac{\operatorname{sen}(x)}{x}}{3 + \dfrac{2}{x^2} - \dfrac{10}{x^4}} = \frac{0}{3} = 0$$

as assintotas horizontais da função é $y = 0$

data

3b. $6x-3x^2=3 \Rightarrow -3x^2+6x-3=0$

$\Delta = 36-36$ $\qquad \frac{-6}{-6} = 1$

$\Delta = 0$

$$\lim_{x\to 1^+} \frac{1-x}{\sqrt{3}-\sqrt{6x-3x^2}} \cdot \frac{(\sqrt{3}+\sqrt{6x-3x^2})}{(\sqrt{3}+\sqrt{6x-3x^2})} \Rightarrow$$

$$\lim_{x\to 1^+} \frac{(1-x)(\sqrt{3}+\sqrt{6x-3x^2})}{(\sqrt{3})^2-(\sqrt{6x-3x^2})^2} \Rightarrow$$

$$\lim_{x\to 1^+} \frac{(1-x)(\sqrt{3}+\sqrt{6x-3x^2})}{3-6x+3x^2}$$

$$\lim_{x\to 1^+} \frac{(1-x)(\sqrt{3}+\sqrt{6x-3x^2})}{3(1-2x+x^2)} \Rightarrow \frac{(1-x)\cdot(\sqrt{3}+\sqrt{6x-3x^2})}{3\cdot(1-x)^2}$$

$$\lim_{x\to 1^+} \frac{\sqrt{3}+\sqrt{6x-3x^2}}{3\cdot(1-x)} \Rightarrow \frac{\sqrt{3}+\sqrt{3}}{0^-} = \frac{2\sqrt{3}}{0^-} = -\infty$$

4.a)

data . .

S T Q Q S S D

4_b) $\lim_{x\to+\infty} \ln\left(\left(\frac{2x-1}{2x+1}\right)^{x}\right) \Rightarrow 2x = t$

$* \left(\frac{\frac{t-1}{t}}{\frac{t+1}{t}}\right)^{\frac{t}{2}} \Rightarrow \left(\frac{1-\frac{1}{t}}{1+\frac{1}{t}}\right)^{\frac{t}{2}} = \left(\left(\frac{1-\frac{1}{t}}{1+\frac{1}{t}}\right)^{t}\right)^{\frac{1}{2}} \Rightarrow$

$\left(\frac{\left(1-\frac{1}{t}\right)^{t}}{\left(1+\frac{1}{t}\right)^{t}}\right)^{\frac{1}{2}} \Rightarrow \quad * \; \frac{-1}{t} = \frac{1}{m} \Rightarrow$

$\ln \lim_{t\to+\infty} \left(\frac{\left(1-\frac{1}{t}\right)^{t}}{\left(1+\frac{1}{t}\right)^{t}}\right)^{\frac{1}{2}} = \ln\left(\frac{\lim_{t\to+\infty}\left(1-\frac{1}{t}\right)^{t}}{\lim_{t\to+\infty}\left(1+\frac{1}{t}\right)^{t}}\right)$

$* \left(1-\frac{1}{t}\right)^{t} \Rightarrow \left(1+\frac{1}{m}\right)^{-m} = \left(\left(1+\frac{1}{m}\right)^{m}\right)^{-1}$

$\ln\left(\frac{\lim_{m\to-\infty}\left(\left(1+\frac{1}{m}\right)^{m}\right)^{-1}}{\lim_{t\to+\infty}\left(1+\frac{1}{t}\right)^{t}}\right)^{\frac{1}{2}} \Rightarrow \ln\left(\frac{(e)^{-1}}{e}\right)^{\frac{1}{2}} =$

$\ln\left(e^{-2}\right)^{\frac{1}{2}} = \ln e^{-1}$

data

4-B) $\lim\limits_{x \to +\infty} \left[\frac{3x^3}{x^4 \text{sen} \frac{1}{x}} + \frac{x \cos(\sqrt{x})}{x^4 \text{sen}(1/x)} \right]$

* $\frac{1}{x} = a \quad x = \frac{1}{a} \quad \begin{matrix} x \to +\infty \\ a \to 0 \end{matrix}$

$$\frac{3x^3}{x^4 \text{sen} \frac{1}{x}} = \frac{3}{x \text{sen} \frac{1}{x}} = \frac{3}{\frac{1}{a} \text{sen}(a)} \Rightarrow \lim_{a \to 0} \frac{3}{\frac{\text{sen}\, a}{a}} = 3$$

** $$\frac{x \cos\sqrt{x}}{x^4 \text{sen}\left(\frac{1}{x}\right)} = \frac{\cos\sqrt{1/a}}{\frac{1}{a^3} \text{sen}(a)} = \frac{\cos\sqrt{1/a}}{\frac{1}{a^2} \cdot \frac{\text{sen}\, a}{a}} = \frac{a^2 \cdot \cos\sqrt{1/a}}{\left(\frac{\text{sen}\, a}{a}\right)}$$

$$\lim_{a \to 0} \frac{a^2 \cdot \cos\sqrt{1/a}}{\frac{\text{sen}(a)}{a}} = 0$$

R- $3 + 0 = 3$