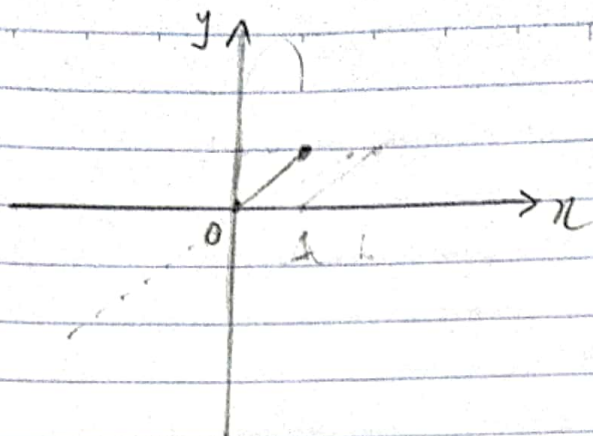


1.a)



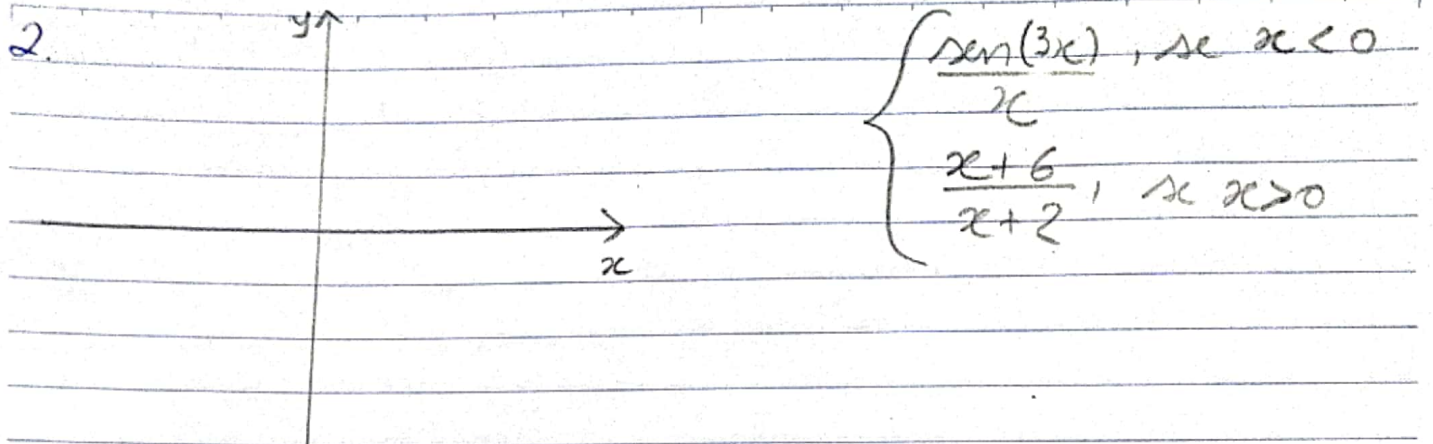
Falsa, caso $g(x) = 0$ temos uma indeterminação

$$b) \lim_{x \rightarrow 5/8} \frac{4x^2 + 5x - 1}{-x + (5/8)} = \frac{4x^2 + 5x - 1}{-x + \frac{5}{8}} = \frac{4x^2 + 5x - 1}{-x + \frac{5}{8}}$$

$$\Delta = 25 +$$

$$\frac{4x^2 + 5x - 1}{-x + \frac{5}{8}} = \frac{4x^2 + 5x - 1}{-x + \frac{5}{8}}$$

$$\frac{4x^2 + 5x - 1}{-x + \frac{5}{8}} = \frac{4x^2 + 5x - 1}{-x + \frac{5}{8}}$$



$$\lim_{x \rightarrow 0^-} \frac{\sin 3x}{x} = \lim_{x \rightarrow 0^-} \frac{3 \cdot \sin 3x}{3x} = 3 \lim_{x \rightarrow 0^-} \frac{\sin 3x}{3x}$$

$$3 \cdot 1 = 3$$

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

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

$$3. a) f(x) = \frac{x^3 \cdot \sin(x)}{3x^4 + 2x^2 - 10}$$

$$-1 \leq \sin(x) \leq 1$$

$$\lim_{x \rightarrow +\infty} \frac{x^3 \cdot \sin(x)}{3x^4 + 2x^2 - 10} \Rightarrow \frac{\sin(x)}{x} = \frac{0}{3} = 0$$

$$\frac{3 + \frac{2}{x^2} - \frac{10}{x^4}}{1}$$

$$* \frac{-1}{x} \leq \frac{\sin(x)}{x} \leq \frac{1}{x} = \lim_{x \rightarrow +\infty} \frac{-1}{x} = 0 \quad \bigg| \quad \lim_{x \rightarrow +\infty} \frac{1}{x} = 0$$

$$* 0 \leq \lim_{x \rightarrow +\infty} \frac{\sin(x)}{x} \leq 0$$

$$\lim_{x \rightarrow -\infty} \frac{x^3 \cdot \sin(x)}{3x^4 + 2x^2 - 10} \Rightarrow \frac{\sin(x)}{x} = \frac{0}{3} = 0$$

$$\frac{3 + \frac{2}{x^2} - \frac{10}{x^4}}{1}$$

as assíntotas horizontais da função é y=0

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

$$\Delta = 36 - 36$$

$$\Delta = 0$$

$$\frac{-6}{-6} = \underline{\underline{1}}$$

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

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

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

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

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

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

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

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

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

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

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

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

data

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4a)

$$c+b) \lim_{x \rightarrow +\infty} \left[\frac{3x^3}{x^4 \sin \frac{1}{x}} + \frac{x \cos(\sqrt{x})}{x^4 \sin(1/x)} \right]$$

$$* \frac{1}{x} = a \quad x = \frac{1}{a} \quad x \rightarrow +\infty \\ a \rightarrow 0$$

$$\frac{3x^3}{x^4 \sin \frac{1}{x}} = \frac{3}{x \sin \frac{1}{x}} = \frac{3}{\frac{1}{a} \sin(a)} \Rightarrow \lim_{a \rightarrow 0} \frac{3}{\frac{\sin a}{a}} = \underline{\underline{3}}$$

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

$$\lim_{a \rightarrow 0} \frac{a^2 \cdot \cos \sqrt{\frac{1}{a}}}{\frac{\sin(a)}{a}} = \underline{\underline{0}}$$

R.

$$3 + 0 = \underline{\underline{3}}$$