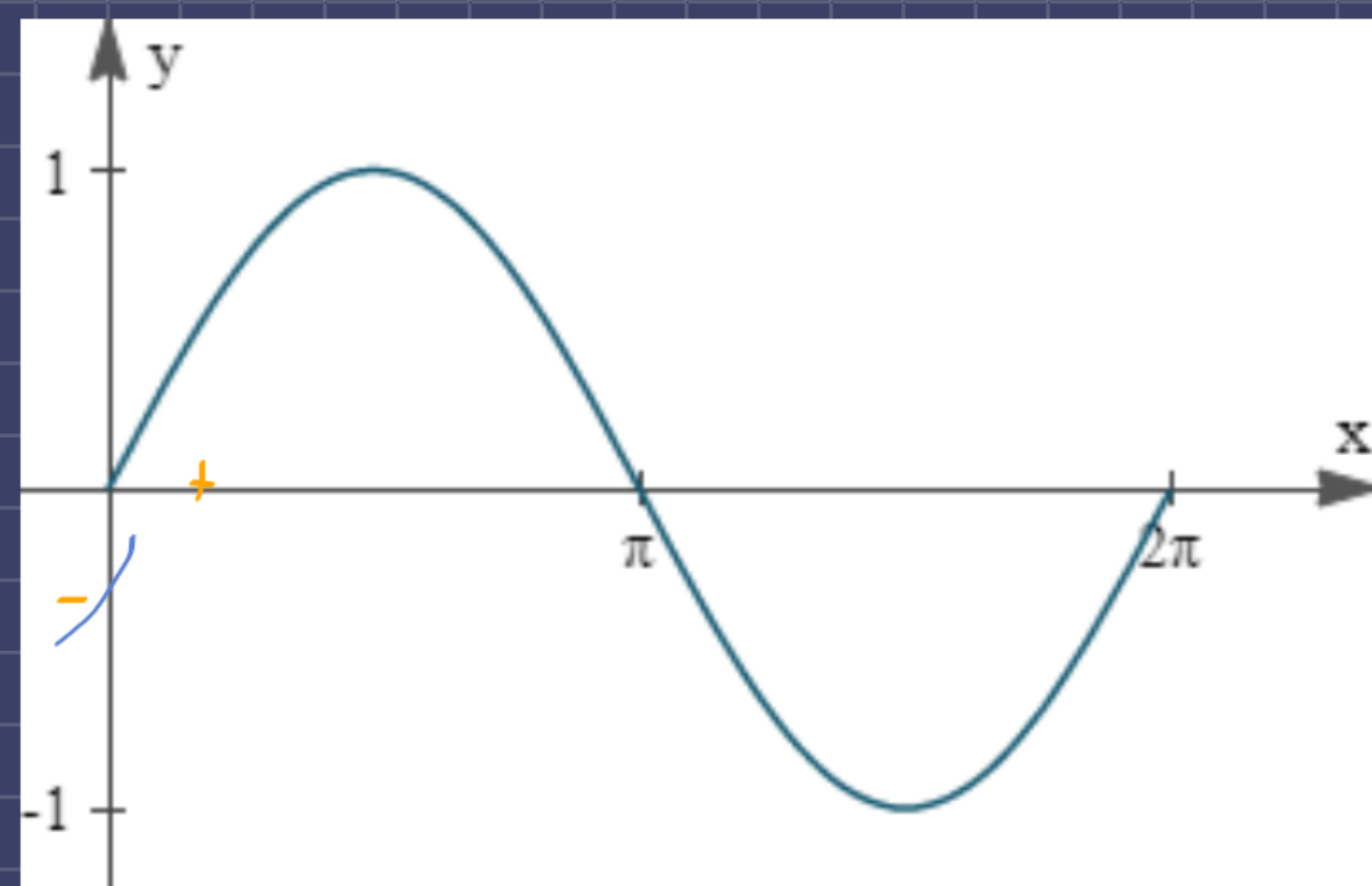


d) Determine $\lim_{x \rightarrow 0} \frac{e^{2x} - 3e^{-x} + x^2 + 2}{5 - 5\cos x}$

$$\stackrel{L.H}{=} \lim_{x \rightarrow 0} \frac{e^{2x} \cdot 2 + 3e^{-x} + 2x}{+5 \sin x} = \boxed{7}$$



$$\lim_{x \rightarrow 0^+} \frac{e^{2x} \cdot 2 + 3e^{-x} + 2x}{+5 \sin x} = +\infty$$

$$\lim_{x \rightarrow 0^-} \frac{e^{2x} \cdot 2 + 3e^{-x} + 2x}{+5 \sin x} = -\infty$$

Questão 01 (2,5 pontos): Faça um esboço completo do gráfico de $y = \frac{e^x}{x} + 1$.

$$D \{x \in \mathbb{R} : x \neq 0\}$$

$$\lim_{x \rightarrow \infty} \frac{e^x + x}{x} \stackrel{L.H}{=} \lim_{x \rightarrow \infty} \frac{e^x + 1}{1} = \infty$$

$$\lim_{x \rightarrow -\infty} \frac{e^x + x}{x} \stackrel{L.H}{=} \lim_{x \rightarrow -\infty} \frac{e^x + 1}{1} = 1$$

$$\lim_{x \rightarrow 0^+} \frac{e^x + x}{x} = +\infty \quad \lim_{x \rightarrow 0^-} \frac{e^x + x}{x} = -\infty$$

$$y' = e^x x^{-1} - e^x x^{-2} \rightarrow e^x \left[\frac{1}{x} - \frac{1}{x^2} \right]$$

$$0 = \frac{e^x}{x} - \frac{e^x}{x^2}$$

$$0 = e^x \left(\frac{1}{x} - \frac{1}{x^2} \right)$$

$$x^2 - x = 0$$

$$(x-1)x = 0$$

$$x = 1 \text{ ou } x = 0$$

$$y'' = e^x x^{-1} - 2e^x x^{-2} + 2e^x x^{-3}$$

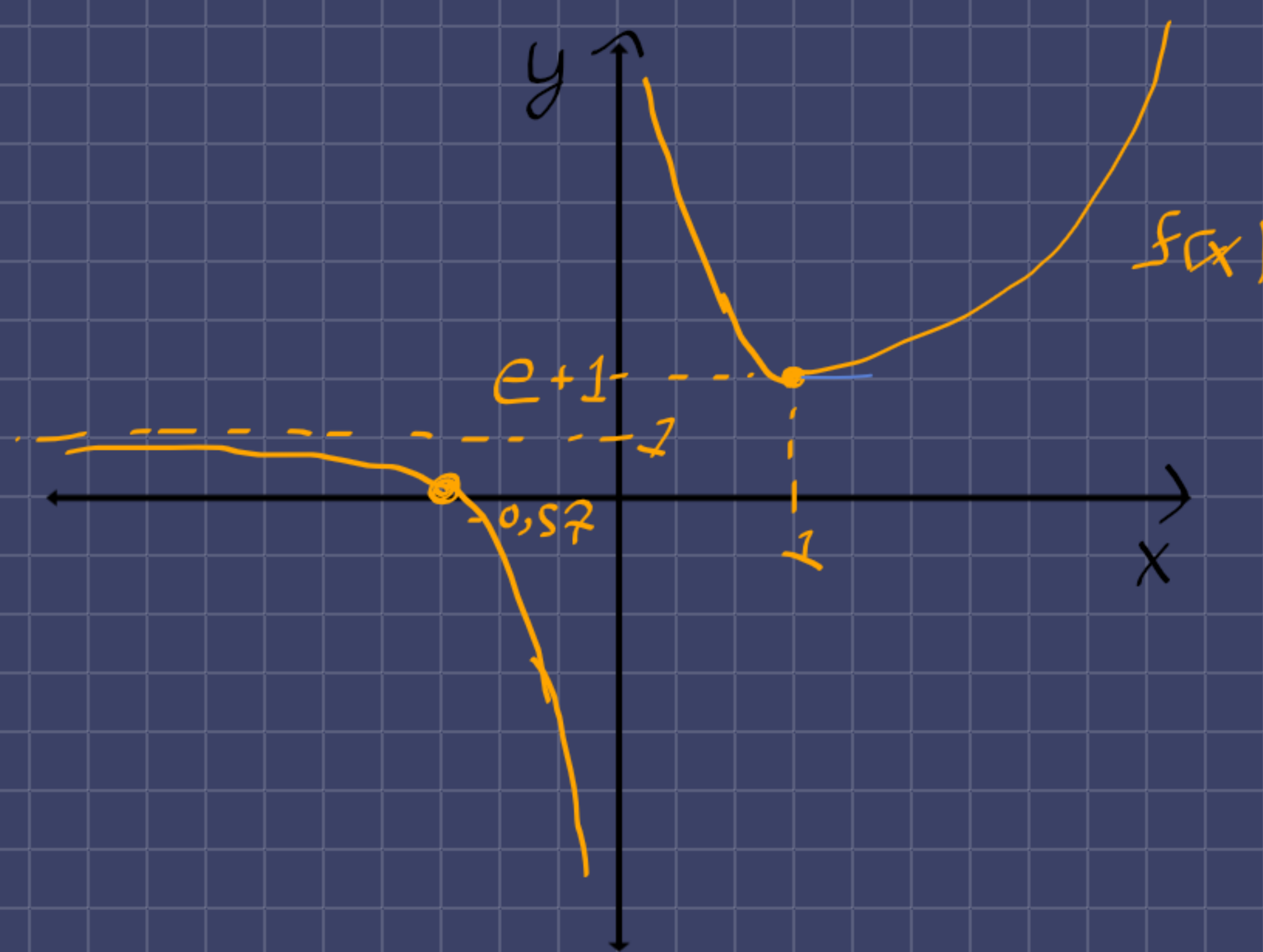
$$0 = \frac{e^x}{x} - \frac{2e^x}{x^2} + \frac{2e^x}{x^3}$$

$$0 = (x^2 - 2x + 2)x$$

$$\Delta = 4 - 4 \cdot 2 = \boxed{-4}$$

$$x = \mathbb{N} \cup \mathbb{R} \cup \mathbb{R}$$

$$D \{x \in \mathbb{R} : x \neq 0\}$$



y'	\searrow	\searrow	\searrow	\nearrow
y''	\cap	\cap	\cup	\cup

$$f(1) = e+1$$

$$\frac{e^x}{x} + 1 = 0$$

$$\frac{e^x}{x} = -1$$

$$x \approx -0.57$$

Boa sorte chutando valores ;-)

$$\rightarrow e^x \left[\frac{1}{x} - \frac{2}{x^2} + \frac{2}{x^3} \right]$$