INSTITUTO FEDERAL Santa Catarina Câmpus Tubarão	Curso: Licenciatura em Matemática Unidade curricular: Cálculo I Estudante: Francislaine Rosa Chagas Francisco Nerling Número de matrícula: 202110805848

a) $f(x) = \frac{x}{x-1}$

i) Domínio = $\mathbb{R} - \{1\} = \{x \in \mathbb{R} / x \neq 1\}$

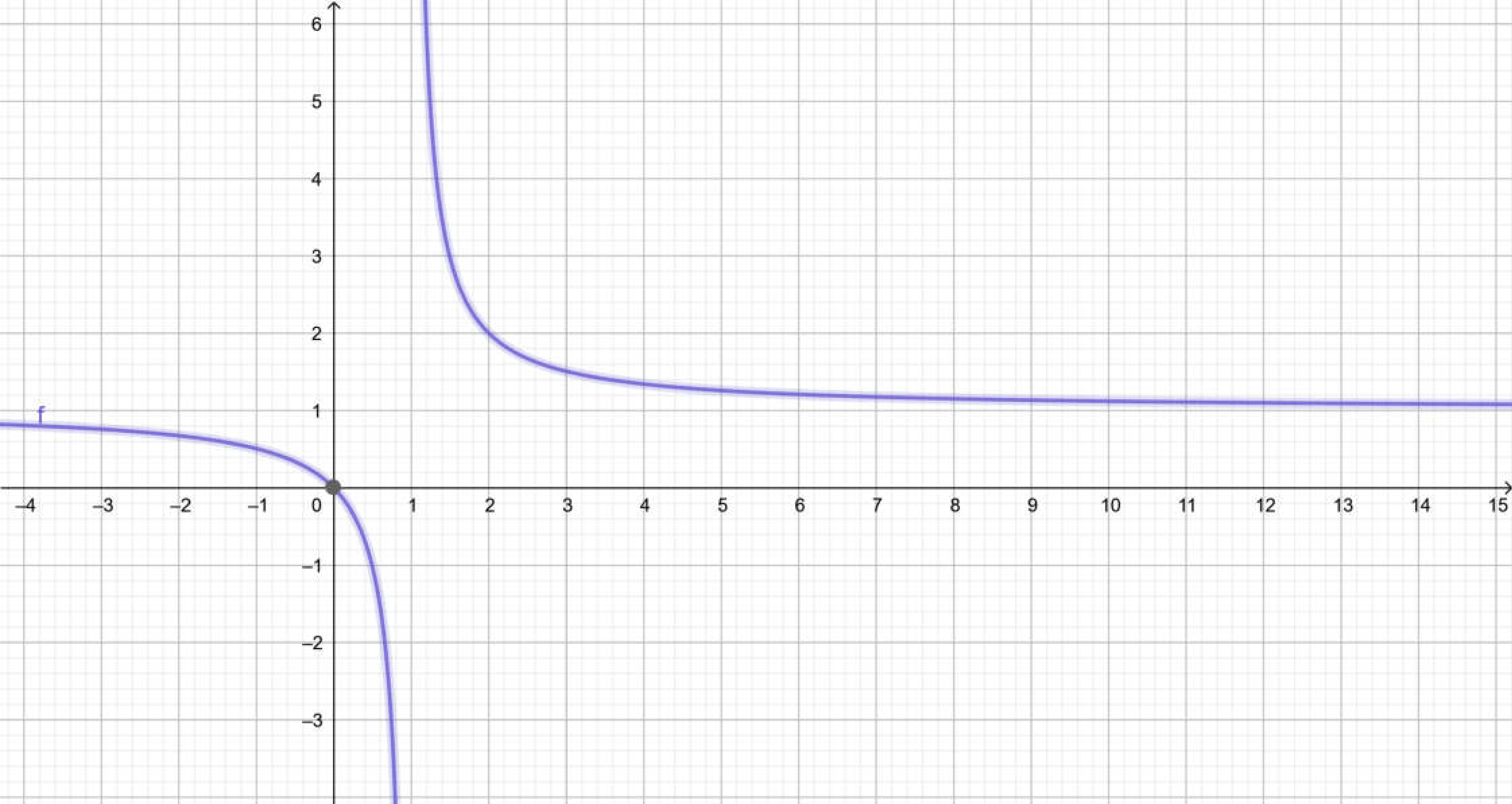
ii) $\lim_{x \to 1} \frac{x}{x-1} = \frac{1}{1-1} = \frac{1}{0} = \nexists$

$\lim_{x \to +\infty} \frac{x}{x-1} = \lim_{x \to +\infty} \frac{\frac{x}{x}}{\frac{x}{x} - \frac{1}{x}} = \frac{1}{1 - \frac{1}{x}} = 1 \quad \frac{1}{x} \to 0 = \frac{1}{1}$

$\lim_{x \to -\infty} \frac{x}{x-1} = 1$

iii) $y = 1$ → assíntota horizontal
$x = 1$ → assíntota vertical

iv) $f(x)$ é contínua $]-\infty, 1[\cup]1, +\infty[$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b) $f(x) = \dfrac{x+1}{x^2 - 1^2}$

I) Domínio = $\{x \in \mathbb{R} \mid x \neq 1\}$

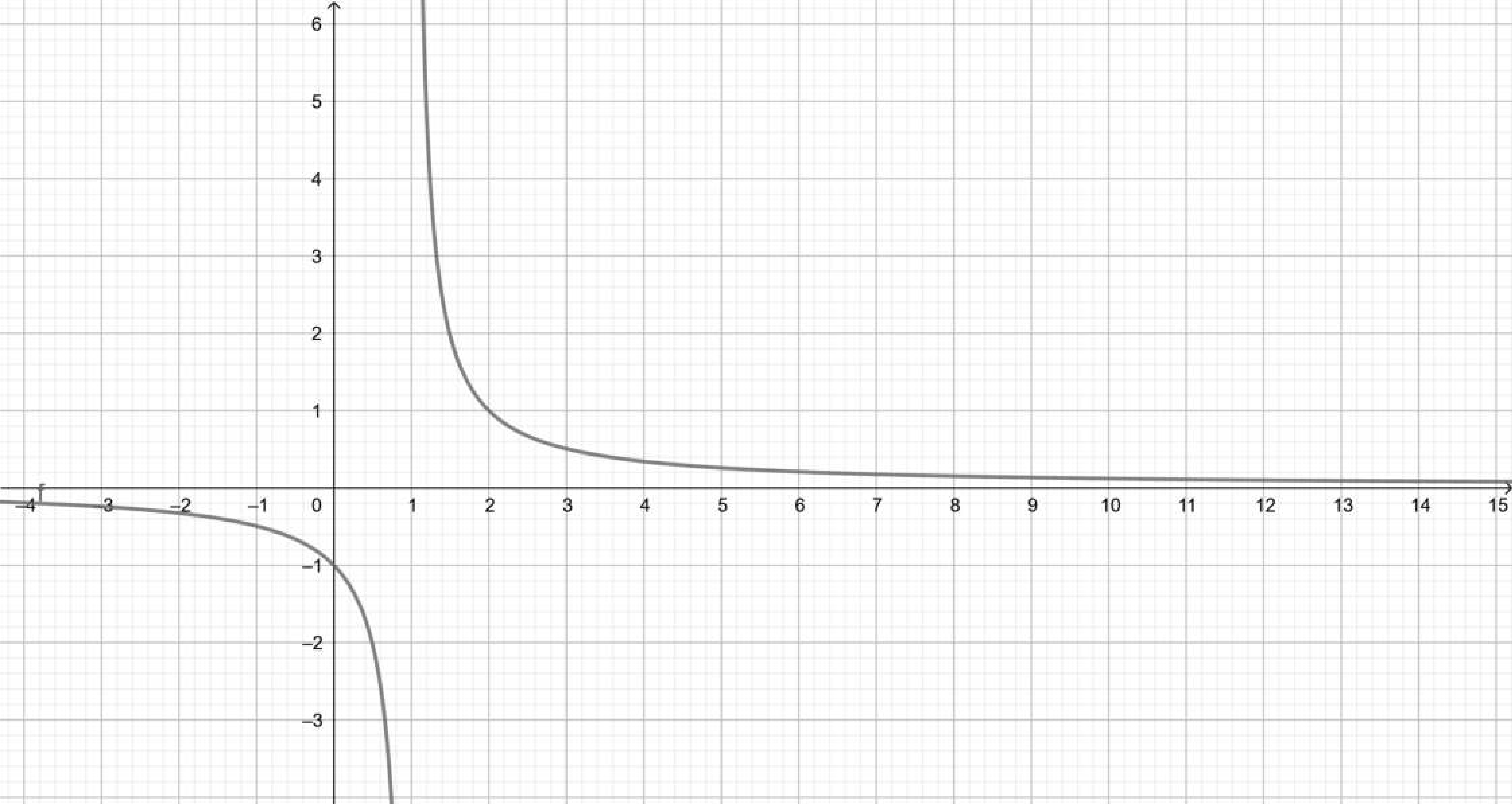
II) $\lim\limits_{x \to 1} \dfrac{x+1}{x^2-1} = \lim\limits_{x \to 1} \dfrac{\cancel{x+1}}{\cancel{(x+1)}(x-1)} \to \dfrac{1}{(x-1)} \to +\infty ; -\infty$

$\lim\limits_{x \to +\infty} \dfrac{x+1}{x^2-1^2} \to \dfrac{1}{(x-1)} \to \dfrac{1}{"0_+"-1} = 0$

$\lim\limits_{x \to -\infty} \dfrac{x+1}{x^2-1^2} \to \dfrac{1}{(x-1)} \to \dfrac{1}{"0_-"-1} = 0$

III) $y = 0$ assíntota horizontal
$x = 1$ assíntota vertical

IV) $f(x)$ é contínua $]+\infty, 1[$ e $]-\infty, 0[$



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c) $f(x) = \frac{x^2 - 2x + 1}{x - 1}$

i) Domínio $\{x \in \mathbb{R} / x \neq 1\}$

ii) $\lim_{x \to 1} = \frac{1^2 - (2 \cdot 1) + 1}{1 - 1} \to \frac{1 - 2 + 1}{0} \to \frac{2 - 2}{0} \to \frac{0}{0}$

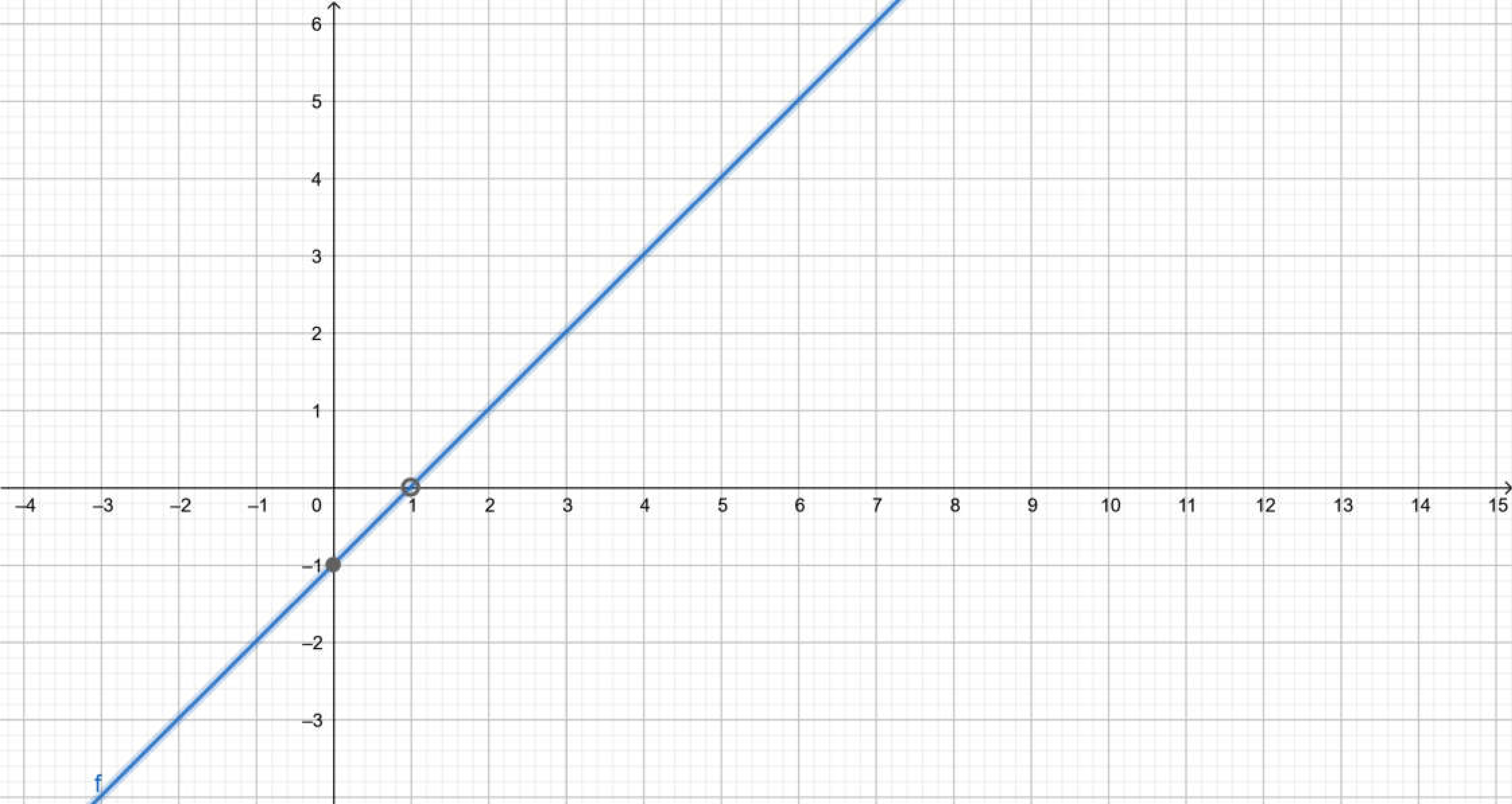
$\lim_{x \to +\infty} \to \frac{x^2 - 2x + 1}{x - 1} \to \frac{(x-1) \cdot (x-1)}{(x-1)} \to +\infty$

$\lim_{x \to -\infty} \to \frac{(x-1) \cdot (x-1)}{(x-1)} \to -\infty$

iii) não é assíntota.

iv) Descontínua $]1, 0[$

v) $f(x) = \{x \in \mathbb{R} / x \neq 1\} \to f(1) = 0$.



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d) $f(x) = tg\left(\frac{x}{1}\right) = \frac{sen\left(\frac{x}{1}\right)}{cos\left(\frac{x}{1}\right)}$

$\frac{x}{1} \neq \frac{\pi}{2} + k\pi \rightarrow \frac{2x}{2} \neq \frac{\pi}{2} + \frac{2k\pi}{2} \rightarrow \frac{2x}{2} \neq \frac{\pi + 2k\pi}{2}$

$2x \neq \pi + 2k\pi \rightarrow x \neq \frac{\pi}{2} + k\pi$

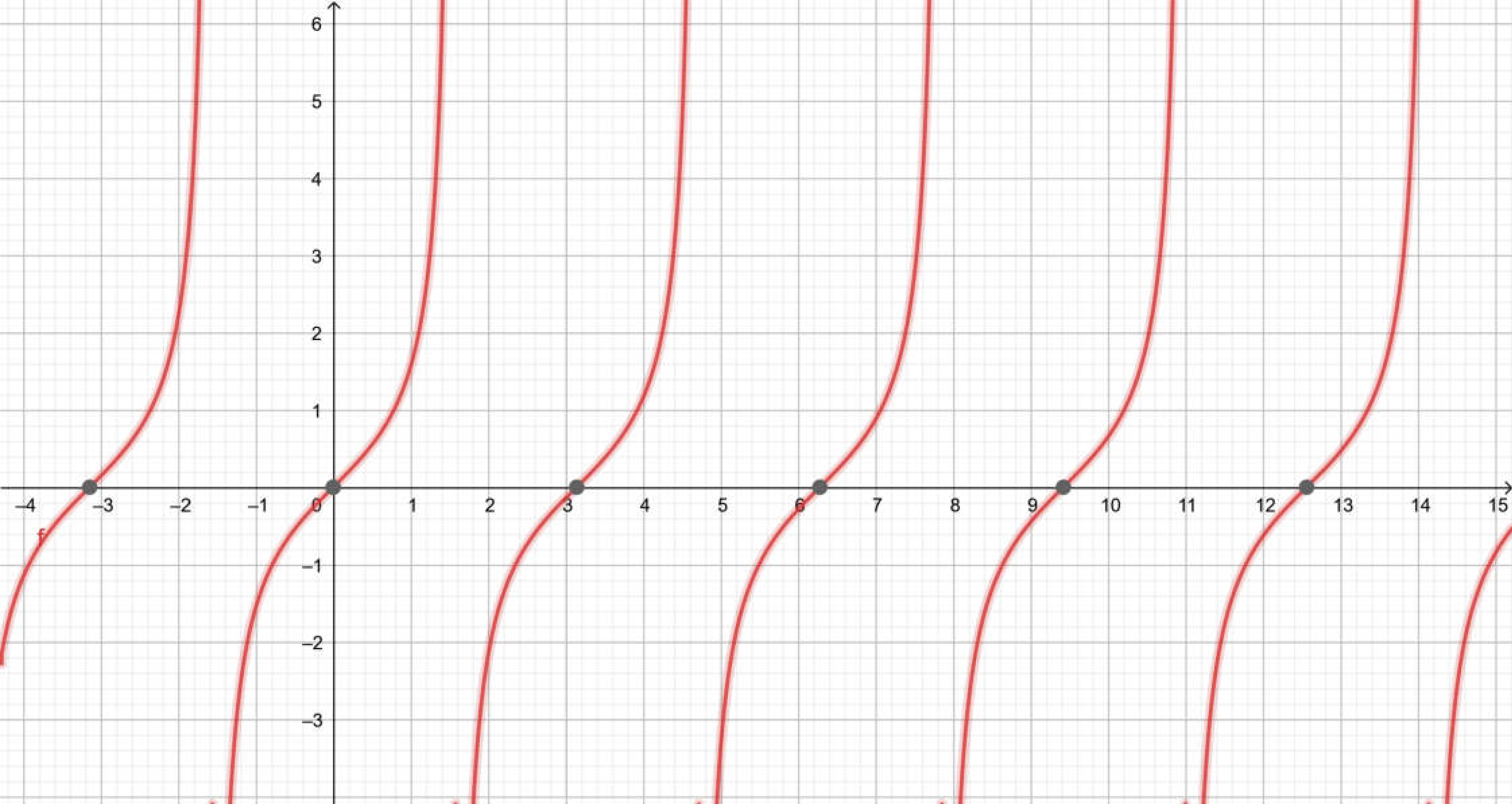
i) Domínio $\rightarrow \{x \in \mathbb{R} \,/\, x \neq \frac{\pi}{2} + k\pi\}$.

ii) $\lim_{x \to 1} tg\left(\frac{x}{1}\right) = tg\left(\frac{1}{1}\right) \cong 1,55740$

$\lim_{x \to -\infty} tg\left(\frac{x}{1}\right) = \nexists$; $\lim_{x \to +\infty} tg\left(\frac{x}{1}\right) = \nexists$

iii) assíntota vertical: $\{x \neq \frac{\pi}{2} + k\pi, N \in \mathbb{R}\}$.

iv) Descontínua. Contínua em $]\frac{\pi}{2} + k\pi[$ $k \in \mathbb{Z}$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e) $f(x) = e^{-x} + 1 \Rightarrow \frac{1}{e^x} + 1$

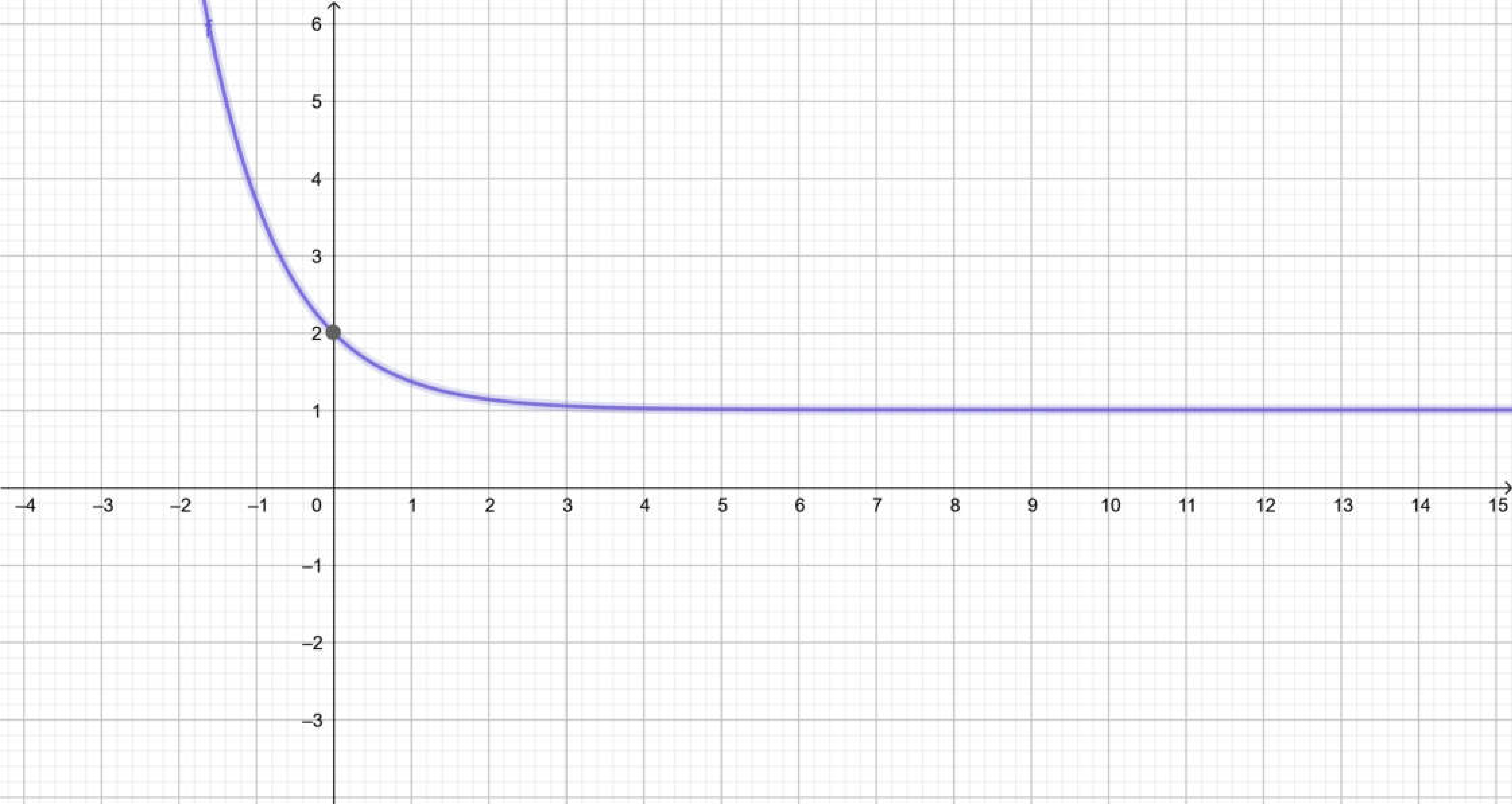
I) Domínio $\Rightarrow \{x \in \mathbb{R}\}$

II) $\lim_{x \to 1} \frac{1}{e^1} + 1 \cong 1,36787$

$\lim_{x \to -\infty} e^{-x} + 1 = +\infty$; $\lim_{x \to +\infty} e^{-x} + 1 = 1$

III) Assíntota horizontal em $y = 1$

IV) Contínua em $\mathbb{R}$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f) $f(x) = \ln(x-1)$

I) Domínio $\to \{x \in \mathbb{R} \mid x > 1\}$

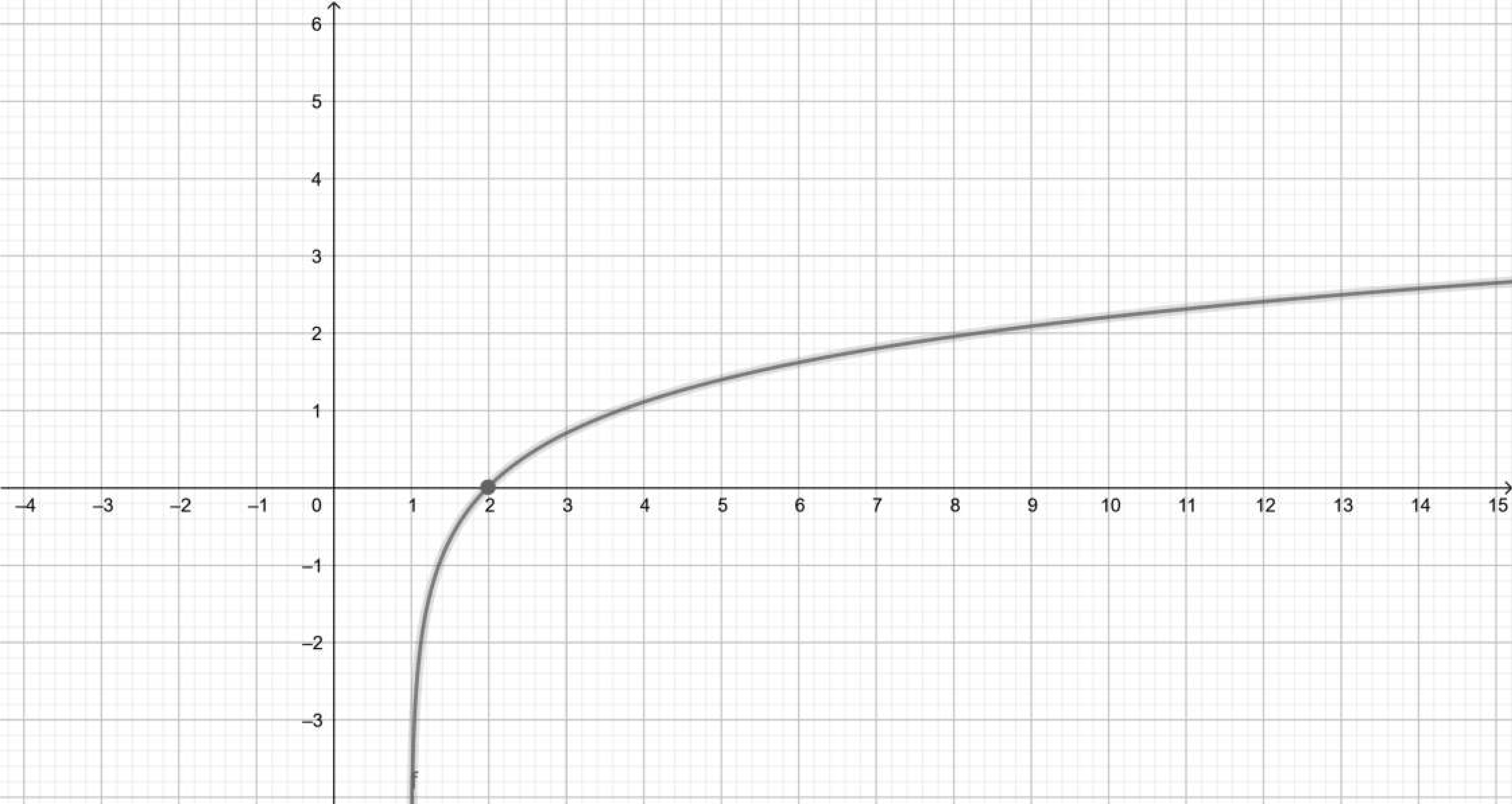
II) $\lim_{x \to 1} \ln(x-1) = \ln(1-1) = \ln 0 = -\infty$

$\lim_{x \to -\infty} \ln(x-1) \to \ln(1-1) \to \nexists$

$\lim_{x \to +\infty} \ln(x-1) = +\infty$

III) Assíntota vertical em $y = 1$

IV) Contínua para $x > 1$



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g) $f(x) = \sqrt{-x+1}$

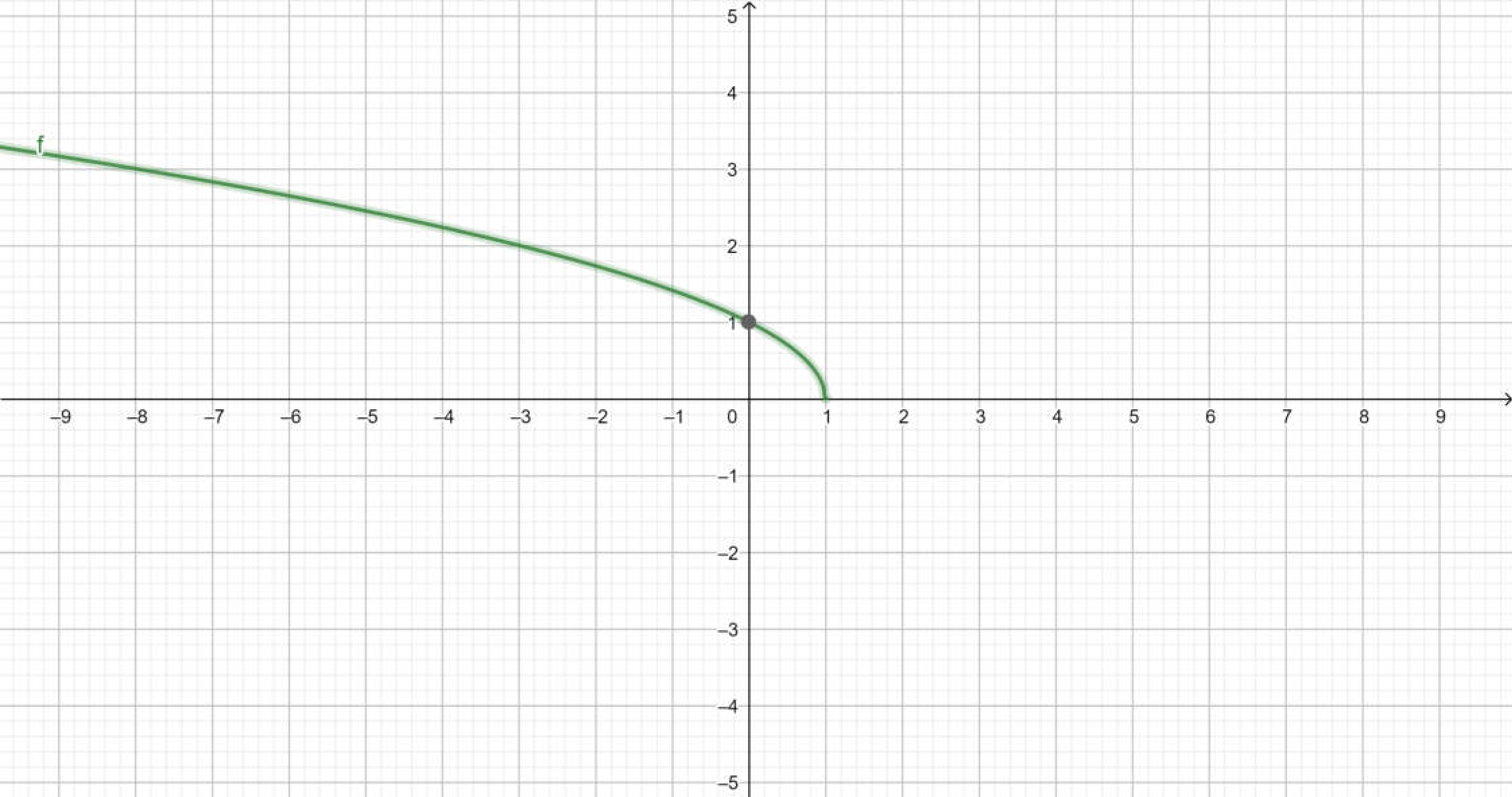
I) Domínio: $\{x \in \mathbb{R} / x \leq 1\}$

II) $\lim_{x \to 1} \sqrt{-x+1} \to \sqrt{-1+1} \to \sqrt{0} = 0$

$\lim_{x \to -\infty} \sqrt{-x+1} = +\infty$; $\lim_{x \to +\infty} \sqrt{-x+1} = \nexists$

III) não é assíntota.

IV) contínua em $]-\infty, 1]$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2) $f(x) = \frac{\text{sen}(1x)}{1}$

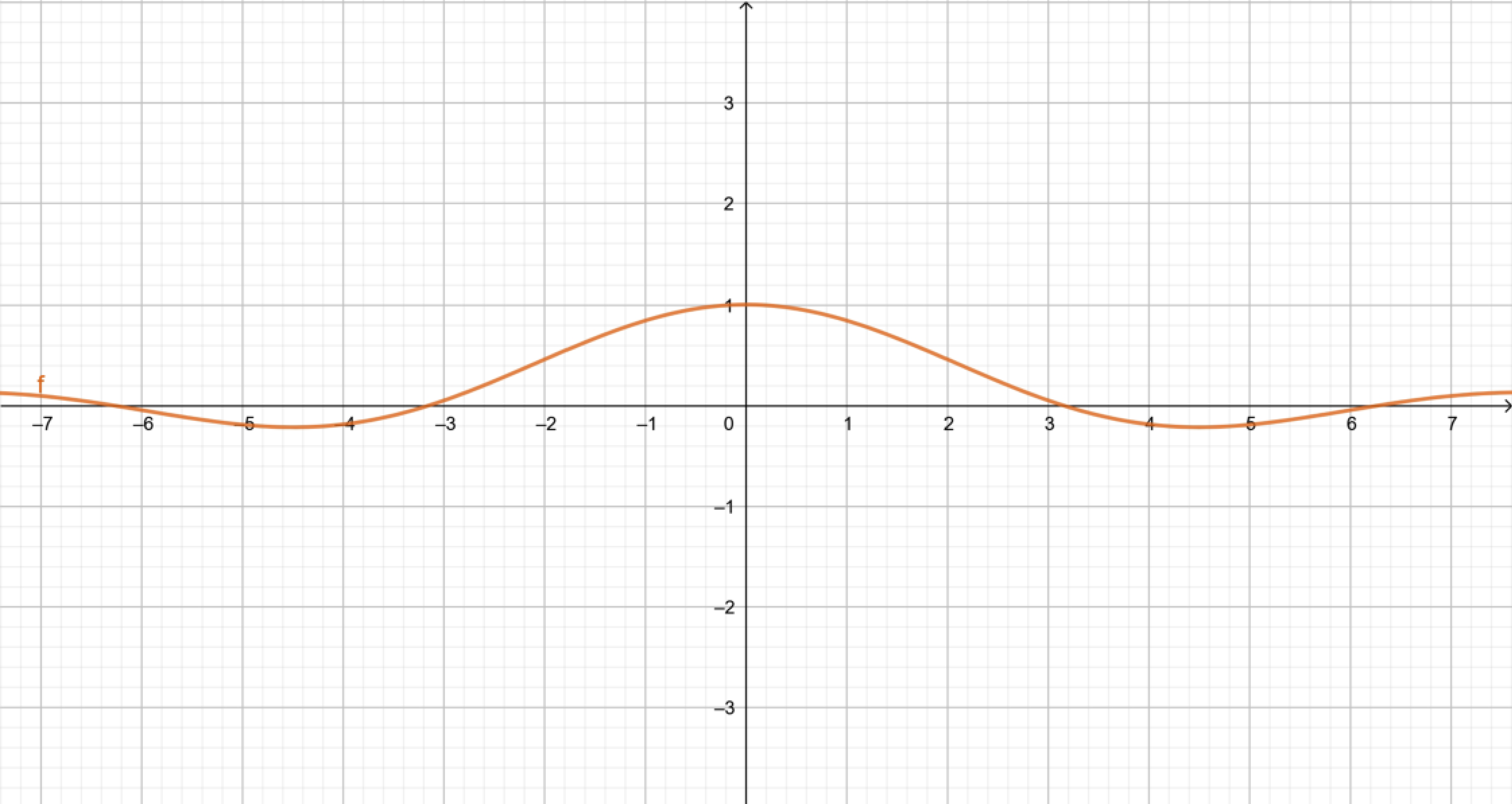
I) Domínio $\{x \in \mathbb{R} / x \neq 0\}$

II) $\lim_{x \to 1} \frac{\text{sen}\,1x}{1} = \frac{\text{sen}\,1.1}{1} = \text{sen}\,1 \cong -0,84147$

$\lim_{x \to +\infty} \frac{\text{sen}(1x)}{1} = 0$; $\lim_{x \to -\infty} \frac{\text{sen}(1x)}{1} = 0$.

III) não é assíntota.

Descontínua : $]-\infty, 1[$ e $]+\infty, 1[$



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