66

$$f(x) = \frac{2\log x - 1}{\log x - 1}$$

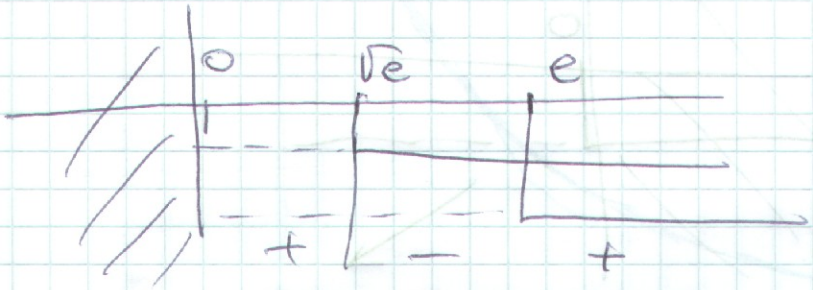
CAMPO DI ESISTENZA

$$\begin{cases} \log x - 1 \neq 0 \\ x > 0 \end{cases} \quad \begin{cases} x \neq e \\ x > 0 \end{cases}$$

CE: $]0, e[ \cup ]e, +\infty[$

POSITIVITÀ

$$f(x) > 0 \quad \begin{cases} 2\log x - 1 > 0 \\ \log x - 1 > 0 \end{cases} \quad \begin{cases} \log x > \frac{1}{2} \\ \log x > 1 \end{cases} \quad \begin{cases} x > \sqrt{e} \\ x > e \end{cases}$$




Intersezione con l'asse x per $x = \sqrt{e}$

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

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

$$\lim_{x \to e^-} f(x) = -\infty$$

$$\lim_{x \to e^+} f(x) = +\infty$$

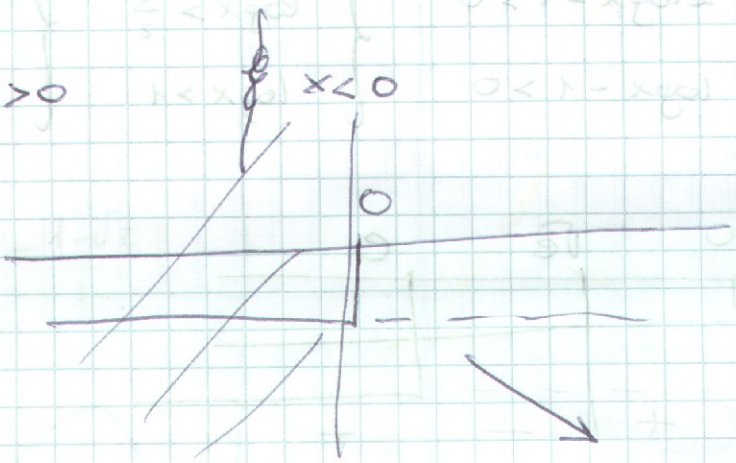
MAX E MIN

$$f'(x) = \frac{\frac{2}{x}(\log x - 1) - (2\log x - 1)\frac{1}{x}}{(\log x - 1)^2} =$$

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

$$= -\frac{1}{x(\log x - 1)^2}$$

$f'(x) > 0$ se $x < 0$




$$f''(x) = + \frac{(\log x - 1)^2 + 2x(\log x - 1)\cdot\frac{1}{x}}{x^2(\log x - 1)^2}$$

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

$$= \frac{\log^2 x - 1}{x^2(\log x - 1)^2} \longrightarrow \log^2 x = \pm 1$$

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

$f''(x) > 0$ $x < e^{-1}$ , $x > e$