

STUDIARE LA FUNZIONE $y = x \ln^2 x$

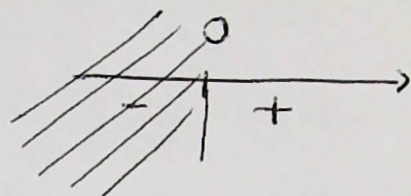
(4)

1) DOMINIO: fne logaritmica $x > 0$ $D: (0, +\infty)$

2) SIMMETRIE: $x > 0 \rightarrow$ la funzione non può essere né PARI né DISPARI

3) INTERSEZIONE ASSI $\begin{cases} x=0 \\ y=\cancel{x} \end{cases} \quad \begin{cases} x \ln^2 x = 0 \\ y=0 \end{cases} \quad \ln x = 0 \quad \begin{cases} x=1 \\ y=0 \end{cases} \quad A(1,0)$

4) SEGNO DI $f(x)$ $x \ln^2 x > 0 \quad x > 0$



5) LIMITI e ASINTOTI

$\lim_{x \rightarrow +\infty} x \ln^2 x = +\infty$ $\cancel{A. OBLIQ.}$ $\lim_{x \rightarrow 0^+} x \ln^2 x = 0$ $\cancel{A. VERT.}$

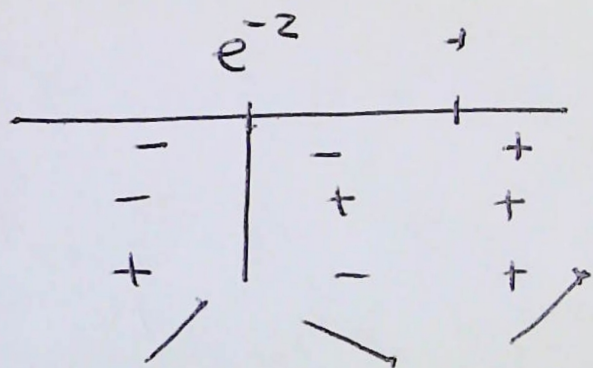
$y = mx + q \quad m = \lim_{x \rightarrow \infty} \frac{x \ln^2 x}{x} = \infty \Rightarrow \cancel{AS. OBLIQ.}$

6) STUDIO DELLA DERIVATA PRIMA y'

$$y' = \ln^2 x + \cancel{x} \cdot 2 \ln x \cdot \frac{1}{\cancel{x}} = \ln x (\ln x + 2)$$

$$y' > 0 \quad \ln x > 0 \quad x > 1$$

$$\ln x > -2 \quad x > e^{-2}$$



$$\text{MAX}(e^{-2}, 4e^{-2})$$

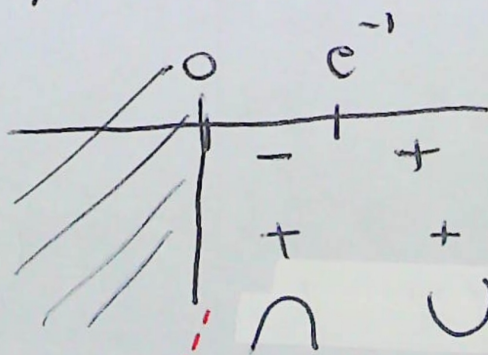
$$\text{MIN}(1,0)$$

7) STUDIO DELLA DERIVATA SECONDA y''

$$y'' = \frac{1}{x} (\ln x + 2) + \ln x \left(\frac{1}{x} \right) = \frac{1}{x} \ln x + \frac{2}{x} + \frac{1}{x} \ln x = \frac{2}{x} \ln x + \frac{2}{x} = \frac{2}{x} (1 + \ln x)$$

$$y'' > 0 \quad \ln x > -1 \quad x > e^{-1}$$

$$x > 0$$



$$F(e^{-1}, e^{-1})$$

