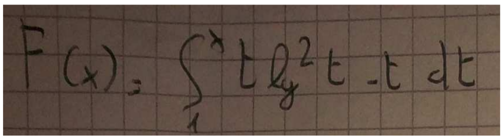
BY GIMUSI 23/11/17


$F(x) = \int_1^x t\lg^2 t - t \, dt$

$$F(x) = \int_1^x \delta \lg^2\delta - \delta \, d\delta$$

DOMINIO: $\delta > 0$ $\quad x \in (0, +\infty)$ $\quad F(1) = 0$

$$\lim_{x \to +\infty} F(x) = +\infty \qquad \lim_{x \to 0^+} F(x) = 1/4$$

$$\int_0^1 \delta \lg^2\delta - \delta \, d\delta = \Big[\overbrace{\tfrac{\delta^2}{2}\lg^2\delta}^{=0}\Big]_0^1 - \int_0^1 \delta \lg\delta \, d\delta - \int_0^1 \delta \, d\delta =$$

$$= -\Big[\overbrace{\tfrac{\delta^2}{2}\lg\delta}^{=0}\Big]_0^1 + \int_0^1 \tfrac{\delta}{2} \, d\delta - \big[\delta^2/2\big]_0^1 = \big[\delta^2/4\big]_0^1 - 1/2 = 1/4 - 1/2 = -1/4$$

$$F'(x) = x\lg^2 x - x = x(\lg^2 x - 1) =$$

$$= x(\lg x - 1)(\lg x + 1)$$

$0 \quad 1/e \quad e$

$0 + + + \bullet - - - - - \bullet + + + + + +$

$$F''(x) = \lg^2 x + 2\lg x - 1$$

$e^{\sqrt{2}-1}$

$\bullet - - \quad - - \circ + + + \quad + + + +$

$$a^2 + 2a - 1 = 0 \qquad a = \frac{-2 \pm \sqrt{4+4}}{2} \;\Big<\; \begin{matrix} -1-\sqrt{2} \\ -1+\sqrt{2} \end{matrix}$$

$$\leadsto \lg x = \sqrt{2} - 1 \qquad x = e^{\sqrt{2}-1}$$