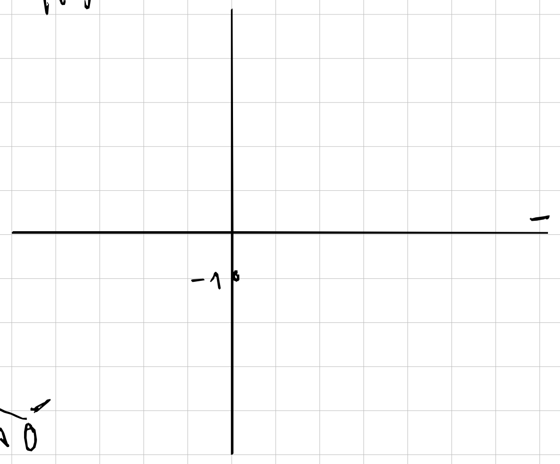
$f(x) = e^{-\lambda x}(\lambda x - 1) \qquad \lambda > 0$

DOMINIO: $\mathbb{R}$ INTERSEZIONE $f(0) = -1$



ASINTOTI:

CASO $\lambda > 0$:

$\lim_{x \to +\infty} e^{-\infty}(\infty) = \frac{1}{e^{\infty}} \cdot \infty$ F.I.

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

CASO $\lambda < 0$:

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

$\lim_{x \to -\infty} e^{-\infty} \cdot (+\infty) = \frac{\infty}{e^{\infty}} = 0$

MAX, MIN (DERIVATA PRIMA):

$f'(x) = \lambda e^{-\lambda x} \cdot (\lambda x - 1) + e^{-\lambda x}(\lambda)$

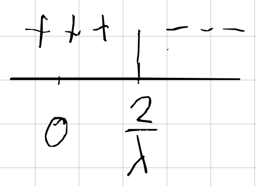
$= \lambda e^{-\lambda x}(-\lambda x + 1 + 1)$

$= \lambda e^{-\lambda x}(-\lambda x + 2) > 0$

CASO $\lambda > 0$:

$\lambda e^{-\lambda x} > 0 \rightarrow$ SEMPRE > 0

$-\lambda x + 2 > 0 \qquad +\frac{1}{\lambda} x < +\frac{2}{\lambda} \qquad \boxed{x < \frac{2}{\lambda}}$

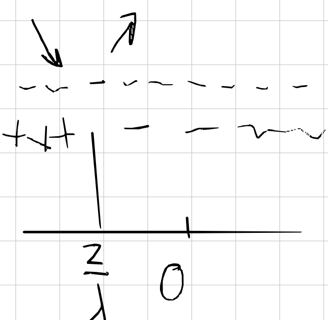


ABBIAMO UN MAX IN $\frac{2}{\lambda}$

CASO $\lambda < 0$

$\lambda e^{-\lambda x} > 0$ SEMPRE NEGATIVA

$x < \frac{2}{\lambda} \qquad \frac{2}{\lambda}$ È < 0



ABBIAMO UN MINIMO IN $\frac{2}{\lambda}$

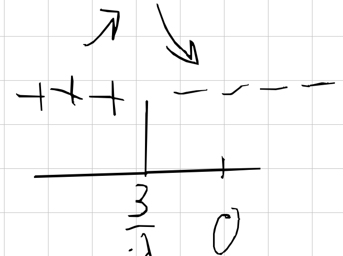
DERIVATA SECONDA:

$f''(x) = \lambda e^{-\lambda x}[-\lambda(2 - \lambda x) - \lambda] = \lambda e^{-\lambda x}[-2\lambda + \lambda^2 x - \lambda]$

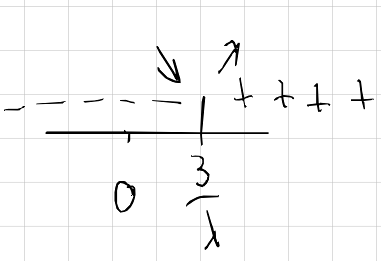
$f''(x) = \underbrace{\lambda^2 e^{-\lambda x}}_{\text{SEMPRE} > 0}(\lambda x - 3) > 0$

$\lambda x - 3 > 0 \qquad x > \frac{3}{\lambda}$

SE $\lambda < 0$



SE $\lambda > 0$



ABBIAMO UN FLESSO IN ENTRAMBI I CASI,
SE $\lambda < 0$ PASSA DA CONVESSA A CONCAVA,
SE $\lambda > 0$ PASSA DA CONCAVA A CONVESSA