$$f(x) = 2^x \cdot x^2$$

CE : $\mathbb{R}$

POSITIVITÀ $\quad f(x)>0 \quad \forall x \neq 0$

INTERSEZIONE - ~~asse~~ $y \quad x=0 \quad y=0$

asse $x \quad y=0 \quad x=0$

~~KA~~/

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

$$\lim_{x\to-\infty} \frac{x^2}{2^{-x}} = \lim_{x\to-\infty} \frac{2x}{-2^{-x}\log 2} =$$

$$= \lim_{x\to-\infty} \frac{2}{2^{-x}\log^2 2} = 0$$

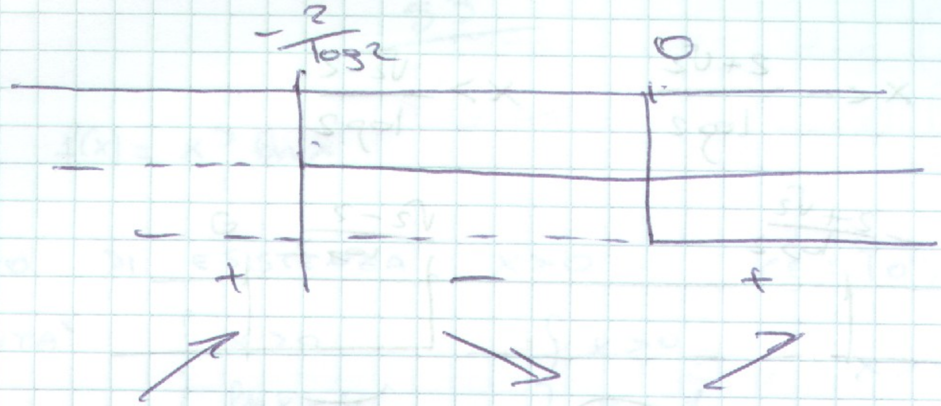
$$\lim_{x\to+\infty} 2^x \cdot x^2 = +\infty$$

$$m = \lim_{x\to+\infty} 2^x \cdot x = +\infty$$ non c'è asintoto obliquo

MAX E MIN

$$f'(x) = 2^x \log 2 \cdot x^2 + 2^x \cdot 2x = x\,2^x(x\log 2 + 2)$$

$$f'(x)=0 \quad \begin{cases} x=0 \\ x = -\frac{2}{\log 2} \end{cases} \qquad f'(x)>0 \quad \begin{cases} x>0 \\ x > -\frac{2}{\log 2} \end{cases}$$



$x = -\frac{2}{\log 2}$ punto di MAX

$$f\left(-\frac{2}{\log 2}\right) = 2^{-\frac{2}{\log 2}} \frac{4}{\log^2 2} =$$

$$= \cancel{\left(2^{-1}\right)^2}$$

$x = 0$ punto di min

$f(0) = 0$

CONCAVITÀ E CONVESSITÀ

$$f''(x) = 2^x \log 2 \left(x^2 \log 2 + 2x\right) + 2^x\left(2x \log 2 + 2\right) =$$

$$= 2^x\left(x^2 \log^2 2 + 2x \log 2 + 2x \log 2 + 2\right) =$$

$$= 2^x\left(x^2 \log^2 2 + 4x \log 2 + 2\right)$$

$$x = \frac{-2\log 2 \pm \sqrt{4\log^2 2 - 2\log^2 2}}{\log^2 2} = \frac{-2\log 2 \pm \sqrt{2\log^2 2}}{\log^2 2} =$$

$$= \frac{-2\log 2 \pm \log 2 \sqrt{2}}{\log^2 2} = \frac{-2 \pm \sqrt{2}}{\log 2}$$

$f''(x)>0 \qquad x<-\frac{2+\sqrt{2}}{\log 2} \qquad x>\frac{\sqrt{2}-2}{\log 2}$