Ripasso e limiti

23 set 2020

$$\boxed{y = \frac{x^2 - 2x}{x^2+1}}$$

trovare insieme delle immagini

$(x^2+1)y = x^2-2x; \quad x^2y + y = x^2 - 2x; \quad x^2\underbrace{(y-1)} + \underbrace{2}x + \underbrace{y} = 0$

$$x = \frac{-1 \pm \sqrt{1-y^2+y}}{y-1}$$ ⇝ ora basta fare il campo di esistenza

$$\begin{cases} y-1 \neq 0 \\ 1-y^2+y \geq 0 \end{cases} ; \quad \begin{cases} y \neq 1 \\ \frac{1-\sqrt{5}}{2} \leq y \leq \frac{1+\sqrt{5}}{2} \end{cases}$$

$$I: \left[\frac{1-\sqrt{5}}{2}; 1\right) \cup \left(1; \frac{1+\sqrt{5}}{2}\right]$$

FUNZIONI DA DISEGNARE

- $y = \frac{1}{\operatorname{sen} x + 1}$
- $y = \ln\left(\frac{1}{x-1}\right)$
- $y = e^{\cos x}$
- $y = e^{|x-2|} + 1$
- $y = -|\operatorname{sen} x| + 2$
- $y = 3 \cdot \operatorname{sen} 2x - 1$
- $y = \operatorname{sen} x \cdot \cos x$
- $y = -\operatorname{cotg}|x|$
- $y = -1 - \sqrt{5 - 4x - x^2}$
- $y = \sqrt{4 - 9x^2}$
- $y = \sqrt{9x^2 - 4}$
- $y = \sqrt{\frac{x+1}{x-2}}$
- $y = \ln^2 x$
- $y = -1 + \sqrt{3 - x}$ da fare in due modi

LIMITI

- $\lim_{n\to-\infty}\left(n+\frac{5}{n}\right) = -\infty + \underbrace{\frac{5}{-\infty}}_{0^-} = -\infty$

- $\lim_{n\to+\infty}\frac{e^{n}+e^{-n}}{e^{-n}} = \frac{e^{+\infty}+e^{-\infty}}{e^{-\infty}} = \frac{+\infty+0^+}{0^+} = +\infty\cdot\frac{1}{0^+} = +\infty\cdot+\infty = +\infty$

- $\lim_{n\to+\infty}\frac{e^{n}+e^{-n}}{e^{-n}} = \frac{e^{2n}+1}{e^{n}}\cdot\frac{e^{n}}{1} = e^{2n}+1 = e^{2\cdot+\infty}+1 = +\infty+1 = +\infty$

- $\lim_{n\to1}\frac{2n-1}{\ln n-3} = \frac{1}{-3} = -\frac{1}{3}$

- $\lim_{n\to2}\frac{\ln(n^2+n-5)}{2^{n}-1} = \frac{\ln(4+2-5)}{4-1} = \frac{\ln 1}{3} = 0$

- $\lim_{n\to0^+}\arctan(\ln n) = \arctan(-\infty) = -\frac{\pi}{2}^{+}$

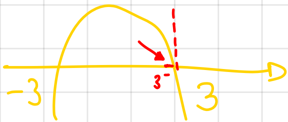
- $\lim_{n\to0^-}\arctan(\ln n)$ $\nexists$ CE $f(n)$ $n\in(0;+\infty)$

- $\lim_{n\to0^+} n^{1/n} = (0^+)^{1/0^+} = (0^+)^{+\infty} = 0^+$

- $\lim_{n\to-1^+}\frac{1}{\tan[\ln(n+2)]} = +\infty$

- $\lim_{n\to2^+}\left(\frac{n-2}{e^{n-2}}\right)^{\frac{1}{n-2}} = \left(\frac{0^+}{e^{0^+}}\right)^{\frac{1}{0^+}} = (0^+)^{+\infty} = 0^+$

- $\lim_{n\to3^-}\log_{\frac{1}{2}}(9-n^2) = -\log_2(9-n^2) = -\log_2 0^+ = -(-\infty) = +\infty$
  → calcolo il limite per 3^- basandomi sul grafico



- $\lim_{n\to0^+}\frac{\ln n}{\operatorname{sen} n-1} = \frac{\ln 0^+}{\operatorname{sen} 0^+-1} = \frac{-\infty}{0^+-1} = \frac{-\infty}{-1} = +\infty$

- $\lim_{n\to0^+}\frac{\ln n}{n} = \frac{\ln 0^+}{0^+} = -\infty(+\infty) = -\infty$

- $\lim_{n\to0^-}\frac{\ln n}{n}$ $\nexists$ → é un limite monco

- $\lim_{n\to4^+}\frac{\log_2 n}{2-\log_2 n} = \frac{2^+}{2-2^+} = \frac{2^+}{0^-} = -\infty$

- $\lim_{n\to+\infty}\frac{\arctan n-1}{\arctan n+1} = \frac{\frac{\pi}{2}^- -1}{\frac{\pi}{2}^- +1} = \frac{\pi-2}{\pi+2}$

esercizio

$$K \mid \lim_{n \to +\infty} K^{-n} = +\infty$$

$\lim_{n \to +\infty} \left(\frac{1}{K}\right)^n = +\infty \implies \frac{1}{K} > 1$; dato che $K \in (0; +\infty)$ posso dire $0 < K < 1$