Asintoti

28 ott 2020

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① $y = \dfrac{\sqrt{x^2+4}}{x}$ • CE D: $x \in (-\infty; 0) \cup (0; +\infty)$

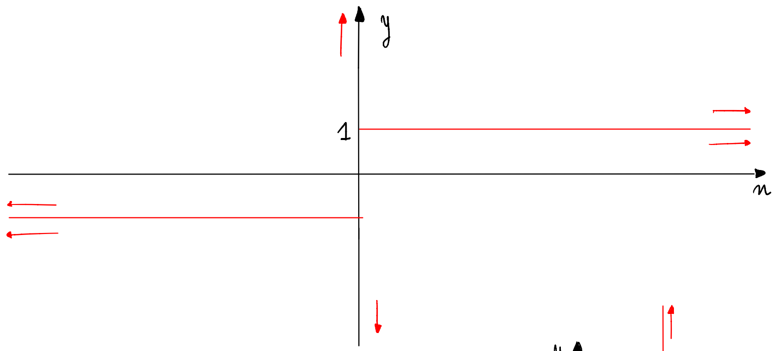
•• $\lim\limits_{x\to-\infty} \dfrac{\sqrt{x^2+4}}{x} = \left[\dfrac{\infty}{\infty}\right] = \lim\limits_{x\to-\infty} \dfrac{|x|\sqrt{1+\frac{4}{x^2}}}{x} = \lim\limits_{x\to-\infty} \dfrac{-\cancel{x}\sqrt{1+\frac{4}{x^2}}}{\cancel{x}} = -1 \Rightarrow y=-1$ A.O. sx

$\lim\limits_{x\to+\infty} \dfrac{\sqrt{x^2+4}}{x} = \left[\dfrac{\infty}{\infty}\right] = \lim\limits_{x\to+\infty} \dfrac{|x|\sqrt{1+\frac{4}{x^2}}}{x} = \lim\limits_{x\to+\infty} \dfrac{+\cancel{x}\sqrt{1+\frac{4}{x^2}}}{\cancel{x}} = +1 \Rightarrow y=+1$ A.O. dx

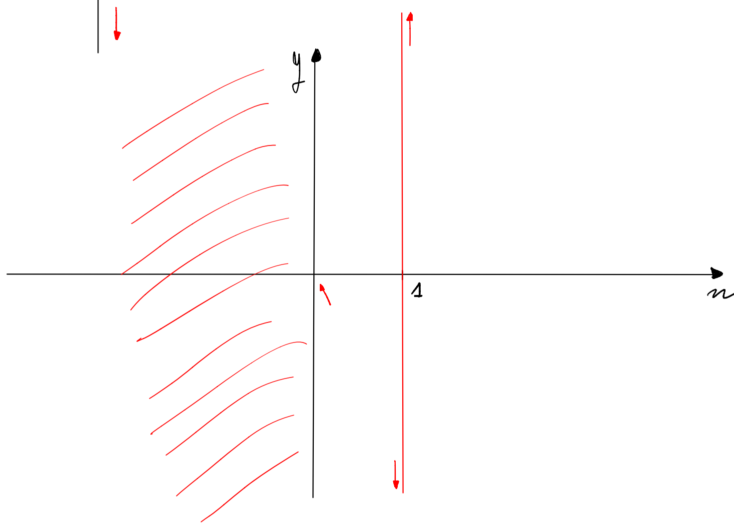
$\lim\limits_{x\to 0} \dfrac{\sqrt{x^2+4}}{x} = \dfrac{2}{0} = \infty$

- $x \to 0^- \Rightarrow 2/0^- = -\infty$
- $x \to 0^+ \Rightarrow 2/0^+ = +\infty$

$\Rightarrow x=0$ A.V.



② $y = \dfrac{x}{\ln x}$



• CE $\begin{cases} x>0 \\ \ln x \neq 0 \Rightarrow x \neq 1 \end{cases}$ D: $x \in (0;1) \cup (1;+\infty)$

•• $\lim\limits_{x\to 0^+} \dfrac{x}{\ln x} = \dfrac{0^+}{\ln 0^+} = \dfrac{0^+}{-\infty} = 0^-$

$\lim\limits_{x\to 1} \dfrac{x}{\ln x} = \dfrac{1}{0} = \infty \Rightarrow x=1$ A.V.

- $x\to 1^-$: $\dfrac{1}{0^-} = -\infty$
- $x\to 1^+$: $\dfrac{1}{0^+} = +\infty$

$\lim\limits_{x\to+\infty} \dfrac{x}{\ln x} = \left[\dfrac{\infty}{\infty}\right]$

- infinito / infinito ⤳ $x\to\infty$ più velocemente di $\ln x \Rightarrow \lim = \infty$ NO A.O.
- De l'Hôpital

∴ asintoti obliqui $m = \lim\limits_{x\to\infty} \dfrac{f(x)}{x} = \lim\limits_{x\to\infty} \dfrac{\cancel{x}}{\cancel{x}\ln x} = \lim\limits_{x\to\infty} \dfrac{1}{\ln x} = \dfrac{1}{+\infty} = 0^+$ IMPOSSIBILE

se $m=0$ la retta é orizzontale

③ $y = \frac{5x^2 - 3x + 2}{2x + 4}$

• CE $2x + 4 \neq 0 \Rightarrow D: x \in (-\infty; -2) \cup (-2; +\infty)$

•• $\lim\limits_{x \to -\infty} \frac{5x^2 - 3x + 2}{2x + 4} = \left[\frac{\infty}{\infty}\right] = -\infty$

$\lim\limits_{x \to -2} \frac{5x^2 - 3x + 2}{2x + 4} = \frac{20 + 6 + 2}{0} = \infty \Rightarrow x = -2 \quad A.O$

▸ $x \to -2^- \Rightarrow \frac{28}{0^-} = -\infty$

▸ $x \to -2^+ \Rightarrow \frac{28}{0^+} = +\infty$

$\lim\limits_{x \to +\infty} \frac{5x^2 - 3x + 2}{2x + 4} = \left[\frac{\infty}{\infty}\right] = +\infty$