12/10/2020

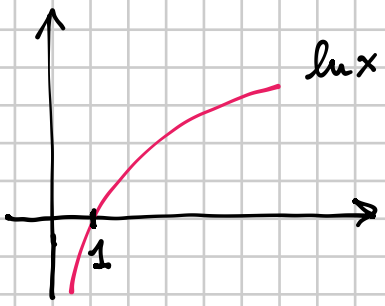
20. $(1-3\sqrt{n})\dfrac{n-1}{n+2}$

$$\lim_{n\to+\infty}\underbrace{(1-3\sqrt{n})}_{\downarrow -\infty}\underbrace{\frac{n-1}{n+2}}_{\downarrow 1} = -\infty \cdot 1 = -\infty$$

21. $\ln(n^2+n)$

$$\lim_{n\to+\infty}\ln\underbrace{(n^2+n)}_{\downarrow +\infty} = \ln(+\infty) = +\infty$$

↑ SIGNIFICA $\lim_{n\to+\infty}\ln(n)$



22. $\ln\left(1+\dfrac{2}{n+2}\right)$

$$\lim_{n\to+\infty}\ln\Big(1+\underbrace{\frac{2}{n+2}}_{\downarrow 0}\Big) = \ln(1) = 0$$

26. $\cos(n+1)$

27. $n + \sin(n)$

$\lim_{n \to +\infty} \cos(n+1)$ NON ESISTE

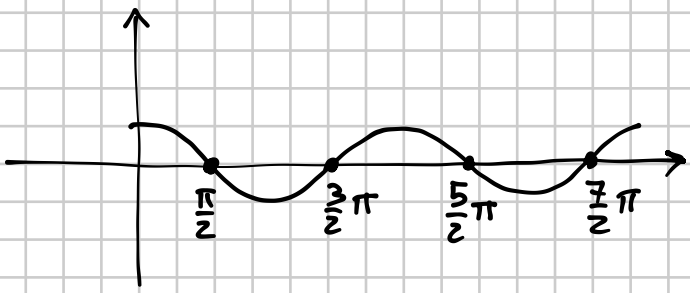
$\cos x$ continua a oscillare tra -1 e 1, dunque non ha un valore di tendenza per $x \to +\infty$, cioè non si avvicina sempre più a un numero ($\in$ o $\pm\infty$) quando x diventa "grande"

$\Downarrow$

$\lim_{x \to +\infty} \cos x$ NON ESISTE

ATTENZIONE

$$\lim_{n \to +\infty} \underbrace{\cos\left(\frac{\pi}{2} + n\pi\right)}_{= 0 \ \forall n} = 0$$



$$\lim_{n \to +\infty} (n + \sin n)$$

so che $\lim_{n \to +\infty} \sin n$ NON ESISTE

$$-1 \leq \sin n \leq 1$$

$$\Downarrow$$

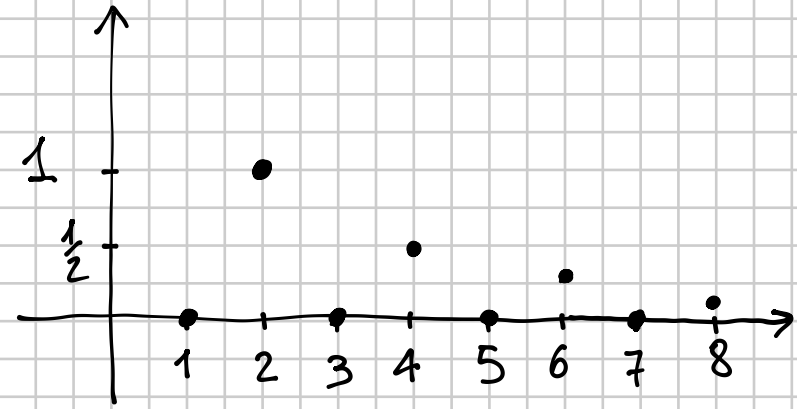
$$n - 1 \leq n + \sin n \leq n + 1$$

$n - 1 \to +\infty$; $n + \sin n \to +\infty$; $n + 1 \to +\infty$

$+\infty$ per il TH. DEI 2 CARABINIERI

$$\lim_{n \to +\infty} (n + \sin n) = +\infty$$

28. $a_n = \begin{cases} \dfrac{2}{n} & \text{se } n \text{ è pari} \\ 0 & \text{se } n \text{ è dispari} \end{cases}$

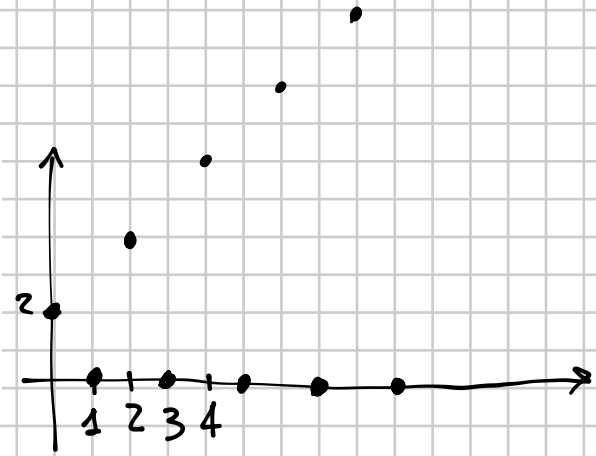


$\lim_{n \to +\infty} a_n = 0$

$b_n = \begin{cases} \dfrac{2}{n} & \text{se } n \text{ è pari} \\ 1 & \text{se } n \text{ è dispari} \end{cases}$

$\lim_{n \to +\infty} b_n$ NON ESISTE

$c_n = \begin{cases} n+2 & \text{se } n \text{ è pari} \\ 0 & \text{se } n \text{ è dispari} \end{cases}$



$\lim_{n \to +\infty} c_n$ NON ESISTE

32. $e^{\frac{n^2+1}{n^2-1}}$

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

36. $\log_{\frac{1}{3}} \dfrac{9n}{9+n}$

$$\lim_{n\to+\infty} \log_{\frac{1}{3}} \frac{9n}{9+n} = \log_{\frac{1}{3}} 9 = \log_{\frac{1}{3}} 3^2 =$$

$$= 2 \log_{\frac{1}{3}} 3 = 2 \cdot (-1) = -2$$

$\frac{9n}{9+n} \to 9$

$$\lim_{n\to+\infty} \frac{9n}{9+n} =$$

$$= \lim_{n\to+\infty} \frac{9n}{n\left(\frac{9}{n}+1\right)} = \frac{9}{0+1} = 9$$

($\frac{9}{n} \to 0$)

37. $\sin \dfrac{n+1}{n^2+1}$

$$\lim_{n\to+\infty} \sin \frac{n+1}{n^2+1} = \sin 0 = 0$$

($\frac{n+1}{n^2+1} \to 0$)

38. $\cos \dfrac{3}{3n^3+1}$

$$\lim_{n\to+\infty} \cos\left(\frac{3}{3n^3+1}\right) = \cos 0 = 1$$

($\frac{3}{3n^3+1} \to 0$)