

12/10/2020

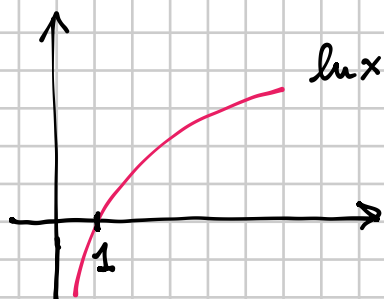
$$20. (1 - 3\sqrt{n}) \frac{n-1}{n+2}$$

$$\lim_{n \rightarrow +\infty} \underbrace{(1 - 3\sqrt{n})}_{-\infty} \cdot \underbrace{\frac{n-1}{n+2}}_1 = -\infty \cdot 1 = -\infty$$

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

$$\lim_{n \rightarrow +\infty} \ln(n^2 + n) = \ln(+\infty) = +\infty$$

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



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

$$\lim_{n \rightarrow +\infty} \ln\left(1 + \underbrace{\frac{2}{n+2}}_0\right) = \ln(1) = 0$$

$$26. \cos(n+1)$$

$$27. n + \sin(n)$$

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



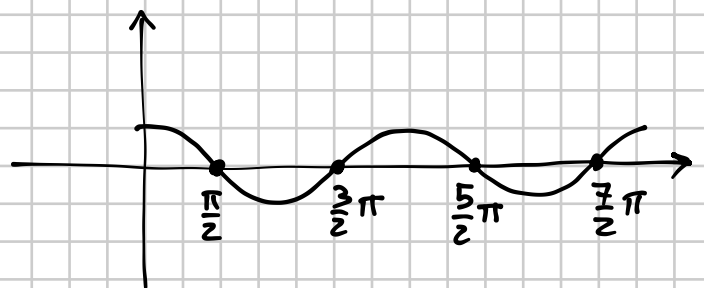
$\cos x$ continua a oscillare tra -1 e 1 , dunque non ha un valore di tendenza per $x \rightarrow +\infty$, cioè non si avvicina sempre più a un numero (o a $\pm\infty$) quando x diventa "grande"

$$\Downarrow$$
$$\lim_{x \rightarrow +\infty} \cos x \text{ NON ESISTE}$$

ATTENZIONE

$$\lim_{n \rightarrow +\infty} \cos\left(\frac{\pi}{2} + n\pi\right) = 0$$

$= 0 \quad \forall n$



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

↳ che $\lim_{n \rightarrow +\infty} \sin n$ NON ESISTE

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



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

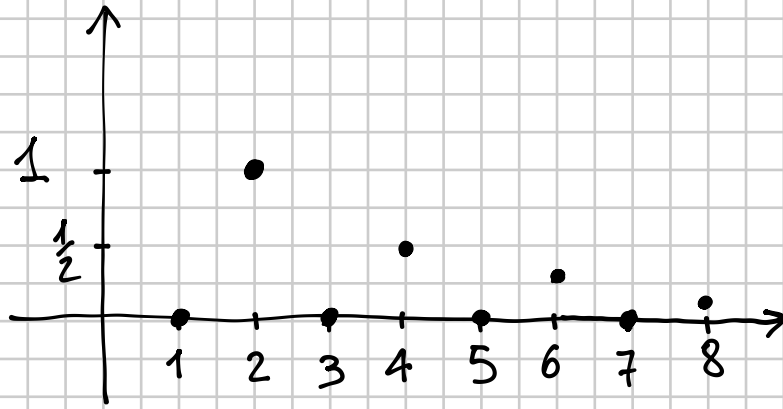
Diagram showing the inequality $n - 1 \leq n + \sin n \leq n + 1$. Brackets are drawn under $n - 1$ and $n + 1$, with arrows pointing down to $+\infty$. A larger bracket is drawn under the entire expression $n + \sin n$, with an arrow pointing down to the next line.

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

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

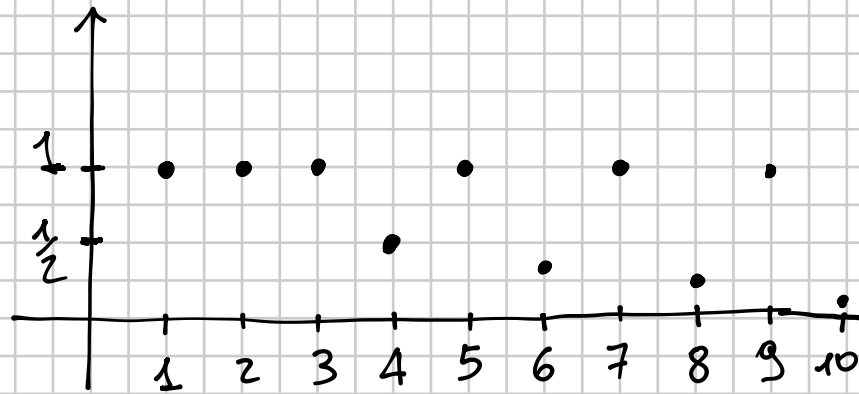
$$28. \quad a_n = \begin{cases} \frac{2}{n} & \text{se } n \text{ è pari} \\ 0 & \text{se } n \text{ è dispari} \end{cases}$$

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



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

$$\lim_{n \rightarrow +\infty} b_n \text{ NON ESISTE}$$



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

$$\lim_{n \rightarrow +\infty} c_n \text{ NON ESISTE}$$



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

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

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

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

↗ ↘
9

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

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

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

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

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

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

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