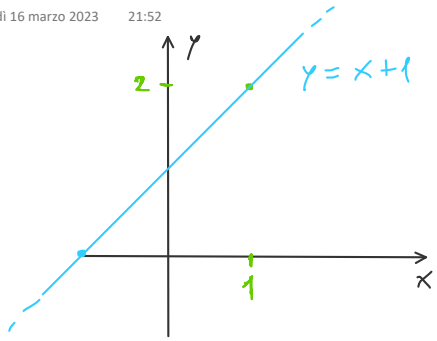
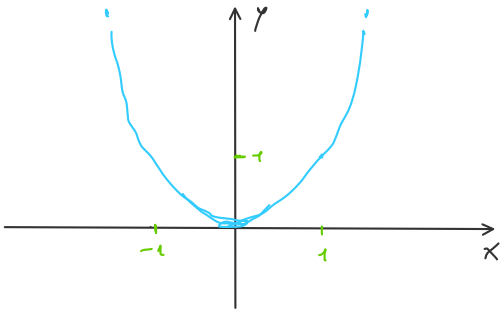
Limiti Teoria ed Esercizi

giovedì 16 marzo 2023 21:52



$\lim_{x \to 1} (x+1) =$ "Dimmi cosa fa la quantità $x+1$, ovvero la y, quando x si avvicina al $1^{\text{n}} = 2$



dimmi a cosa tende

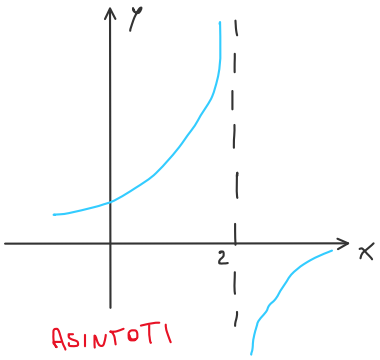
$\lim_{x \to -1} x^2 = 1$ → x^2, ovvero la y

Lo quando mi avvicino a $x = -1$

Perché usiamo i limiti?

→ li usiamo spesso per ricercare punti in cui la funzione non esiste:

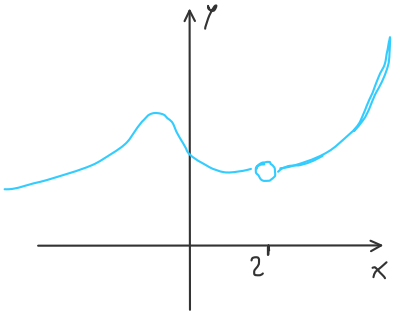
- ASINTOTI
- PUNTI ESCLUSI
- SALTI



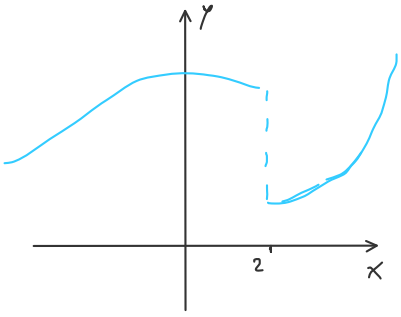
$y = \frac{-3x-2}{x-2}$

$\lim_{x \to 2} \frac{-3x-2}{x-2} = -\frac{8}{0}$

impossibile



PUNTI ESCLUSI



SALTI

LIMITI NOTEVOLI:

https://www.youmath.it/lezioni/analisi-matematica/limiti-continuita-e-asintoti/136-limiti-notevoli-quali-sono.html

FORME INDETERMINATE:

https://www.youmath.it/lezioni/analisi-matematica/limiti-continuita-e-asintoti/133-le-forme-di-indecisione-cosa-e-perche.html#:~:text=Le%20forme%20indeterminate%20sono%20operazioni,alla%20zero%2C%20infinito%20alla%20zero.

ESERCIZI

1. $\lim_{x \to 2} \left(\sqrt{8x} - 4\right) = \sqrt{8 \cdot 2} - 4 = 4 - 4 = 0$

2. $\lim_{x \to +\infty} \left(\ln(x)\right)^x = \left(\ln(+\infty)\right)^{+\infty} = +\infty$

3. $\lim_{x \to 0} \frac{\ln(x^2)}{x+3} = \frac{\ln(0^+)}{3} = \frac{-\infty}{3} = -\infty$

4. $\lim_{x \to +\infty} \frac{x^3 + 2x - 5}{x^4 - 1} = \frac{+\infty}{+\infty}$ forma indeterminata.

$$\lim_{x \to +\infty} \frac{x^3 + 2x - 5}{x^4 - 1} = \frac{x^3\left(1 + \frac{2}{x^2} - \frac{5}{x^3}\right)}{x^4\left(1 - \frac{1}{x^4}\right)} = \frac{1 + \boxed{\frac{2}{+\infty}} - \boxed{\frac{5}{+\infty}}}{x\left(1 - \boxed{\frac{1}{+\infty}}\right)} \to 0 \quad (\boxed{\frac{2}{+\infty}} \to 0,\ \boxed{\frac{5}{+\infty}} \to 0,\ \boxed{\frac{1}{+\infty}} \to 0)$$

$$= \frac{1 + 0 - 0}{x(1 - 0)} = \frac{1}{x} = \frac{1}{+\infty} = 0$$