I limiti

21 set 2020

$$y = \frac{3^{2x} + 3^{x} - 6}{(1/3)^{2x} - 3}$$

① dominio

$\left(\frac{1}{3}\right)^{2x} - 3 \neq 0 \rightsquigarrow (1/3)^{2x} \neq 3$

$3^{-2x} \neq 3$

$-2x \neq 1 \rightsquigarrow x \neq -\frac{1}{2}$

$x \in \left(-\infty; -\frac{1}{2}\right) \cup \left(-\frac{1}{2}; +\infty\right)$

② segno

$$\frac{3^{2x} + 3^{x} - 6}{(1/3)^{2x} - 3} \geq 0$$

N ≥ 0: $3^{2x} + 3^{x} - 6 \geq 0$; $t = 3^{x}$

$t^2 + t - 6 \geq 0$; $t \leq -3 \wedge t \geq 2$

$3^x \leq -3$ (NO) $\wedge$ $3^x \geq 2 \rightsquigarrow x \geq \log_3 2$

D > 0: $\left(\frac{1}{3}\right)^{2x} > 3$; $3^{-2x} > 3^1$; $-2x > 1$; $x < -\frac{1}{2}$

P.S.

		$-\frac{1}{2}$		$\log_2 3$	
N	−		−	0	+
D	+	∄	−		−
	−	∄	+	0	−

$f(x) \geq 0 \Leftrightarrow x \in \left(-\frac{1}{2}; \log_2 3\right]$

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

① dominio

$$\begin{cases} 2^{x+1} - 1 \neq 0 \rightsquigarrow x \neq -1 \\ -1 \leq \dfrac{2^x}{2^{x+1}-1} \leq 1 \end{cases} \quad \begin{cases} \dfrac{2^x}{2^{x+1}-1} \leq 1 \\ \dfrac{2^x}{2^{x+1}-1} \geq -1 \end{cases} \Rightarrow \begin{cases} \dfrac{2^x - 2^{x+1} + 1}{2^{x+1}-1} \leq 0 \\ \dfrac{2^x + 2^{x+1} - 1}{2^{x+1}-1} \geq 0 \end{cases} \Rightarrow \begin{cases} \dfrac{1 - 2^x}{2^{x+1}-1} \leq 0 \\ \dfrac{3 \cdot 2^x - 1}{2^{x+1}-1} \geq 0 \end{cases}$$

N: $1 - 2^x \geq 0 \rightsquigarrow x \leq 0$

D: $2^{x+1} - 1 > 0 \rightsquigarrow x > -1$

		-1		0	
N	+		+	•	−
D	−	∄	+		+
	−		+	•	−

$x < -1 \vee x \geq 0$

N: $3 \cdot 2^x - 1 \geq 0 \rightsquigarrow x \geq -\log_2 3$

D: $2^{x+1} - 1 > 0 \rightsquigarrow x > -1$

		$-\log_2 3$		-1	
N	−	•	+		+
D	−		−	∄	+
	+	•	−	∄	+

$x \leq -\log_2 3 \vee x > -1$

$$\begin{cases} x < -1 \vee x \geq 0 \\ x \leq -\log_2 3 \vee x > -1 \end{cases}$$

$x \in (-\infty; -\log_2 3] \cup [0; +\infty)$

LIMITI FONDAMENTALI

si tratta di tutti quei limiti calcolabili "semplicemente" sostituendo il valore

esempi

- $\lim_{x \to -\infty} e^{x} = e^{-\infty} = 0^{+}$ (basato sul grafico)
- $\lim_{x \to 5^{+}} \left(\frac{1}{2}\right)^{\frac{1}{x-5}} = \left(\frac{1}{2}\right)^{\frac{1}{5^{+}-5}} = \left(\frac{1}{2}\right)^{\frac{1}{0^{+}}} = \left(\frac{1}{2}\right)^{+\infty} = 0^{+}$

etc etc etc...