12/9/2019

Calcolare il dominio naturale

47 $y = \dfrac{x}{x^3 - 3x^2 + 2x - 6}$ $[x \neq 3]$

$x^3 - 3x^2 + 2x - 6 \neq 0$

$x^3 - 3x^2 + 2x - 6 = 0$

$x^2(x-3) + 2(x-3) = 0$

$(x-3)\underbrace{(x^2+2)}_{>0 \ \forall x} = 0$

$\downarrow$

$x - 3 = 0 \Rightarrow x = 3$

$\Downarrow$

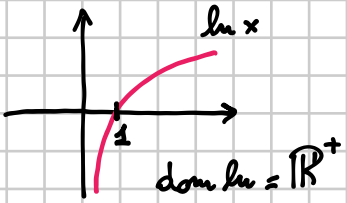
$x \neq 3$

$D = \mathbb{R} - \{3\}$

$= \{x \in \mathbb{R} \mid x \neq 3\}$

$= (-\infty, 3) \cup (3, +\infty)$

117 $y = \dfrac{\ln|3^x - 9|}{1 - e^{x^2-6x}}$ $[x \neq 0 \wedge x \neq 2 \wedge x \neq 6]$



$\begin{cases} |3^x - 9| > 0 & \boxed{1} \\ 1 - e^{x^2-6x} \neq 0 & \boxed{2} \end{cases}$

$\boxed{1}$ $|3^x - 9| > 0 \Rightarrow 3^x - 9 \neq 0 \Rightarrow 3^x \neq 3^2 \Rightarrow x \neq 2$

$\boxed{2}$ $1 - e^{x^2-6x} \neq 0 \Rightarrow e^{x^2-6x} \neq 1 \Rightarrow x^2 - 6x \neq 0$

$\Rightarrow x(x-6) \neq 0 \Rightarrow x \neq 0 \wedge x \neq 6$

$\boxed{1} \wedge \boxed{2} \Rightarrow \quad x \neq 2 \wedge x \neq 0 \wedge x \neq 6$

$D = (-\infty, 0) \cup (0, 2) \cup (2, 6) \cup (6, +\infty)$

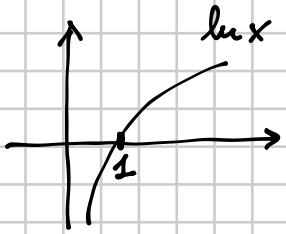
13/9/2019

Calcolare il dominio

213 $y = \dfrac{\sqrt{\ln(2x - \sqrt{1-x})}}{\ln(2x+1)}$ $\left[\frac{3}{4} \le x \le 1\right]$

NUMERATORE $\begin{cases} \ln(2x - \sqrt{1-x}) \ge 0 \\ 2x+1 > 0 \quad \text{esistenza del logaritmo} \\ 2x+1 \ne 1 \quad \text{logaritmo diverso da } 0 \end{cases}$

DENOMINATORE



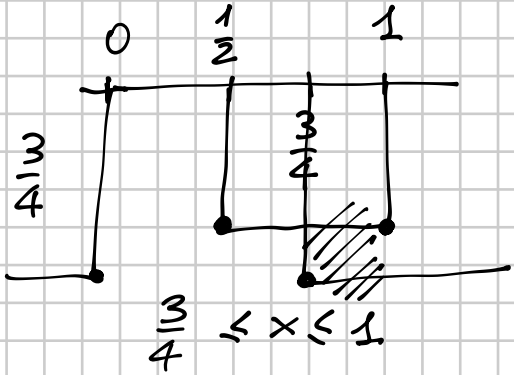
$\begin{cases} 2x - \sqrt{1-x} > 0 \quad \text{(esistenza del logaritmo)} \\ 2x - \sqrt{1-x} \ge 1 \quad (\log \ge 0) \\ x > -\frac{1}{2} \\ x \ne 0 \end{cases}$

$\begin{cases} 2x - \sqrt{1-x} \ge 1 \\ x > -\frac{1}{2} \\ x \ne 0 \end{cases} \longrightarrow -\sqrt{1-x} \ge 1 - 2x$

$\sqrt{1-x} \le 2x - 1$

$\begin{cases} 1-x \ge 0 \\ 2x-1 \ge 0 \\ 1-x \le (2x-1)^2 \end{cases}$ $\begin{cases} x \le 1 \\ x \ge \frac{1}{2} \\ 1-x \le 4x^2+1-4x \end{cases}$

$\begin{cases} \frac{1}{2} \le x \le 1 \\ 4x^2 - 3x \ge 0 \\ x(4x-3) \ge 0 \\ x \le 0 \ \vee \ x \ge \frac{3}{4} \end{cases} \Rightarrow \begin{cases} x \ne 0 \\ x > -\frac{1}{2} \\ \frac{1}{2} \le x \le 1 \\ x \le 0 \ \vee \ x \ge \frac{3}{4} \end{cases}$

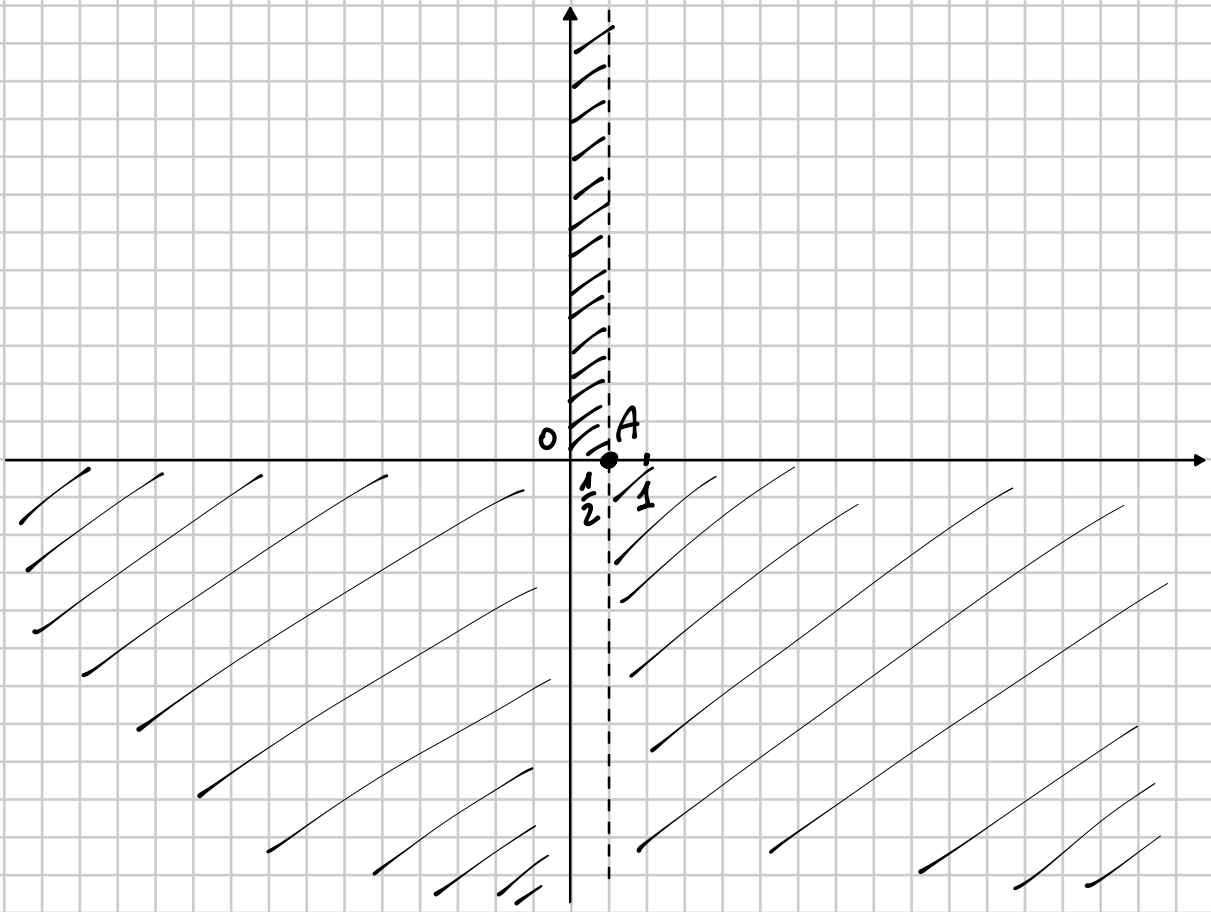


$\boxed{D = \left[\frac{3}{4}, 1\right]}$

STUDIO DI FUNZIONE

289 $y = \dfrac{e^{2x-1} - 1}{e^x - 1}$ $\left[x < 0 \vee x > \frac{1}{2}\right]$

1) DOMINIO $e^x - 1 \neq 0$ $x \neq 0$ $D = (-\infty, 0) \cup (0, +\infty)$



2) INTERSEZIONI CON GLI ASSI

INT. ASSE X $\Rightarrow$ ZERI DELLA FUNZIONE

$$\begin{cases} y = \dfrac{e^{2x-1} - 1}{e^x - 1} \\ y = 0 \end{cases} \Rightarrow \frac{e^{2x-1} - 1}{e^x - 1} = 0 \qquad e^{2x-1} = 1 \qquad 2x - 1 = 0$$

$$x = \frac{1}{2}$$

$A\left(\frac{1}{2}, 0\right)$

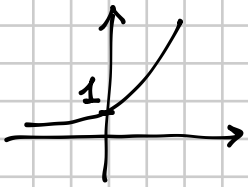
INT. ASSE Y $\rightarrow$ NON ESISTONO PERCHÉ $x = 0$ È ESCLUSO DAL DOMINIO

3) SEGNO DELLA FUNZIONE

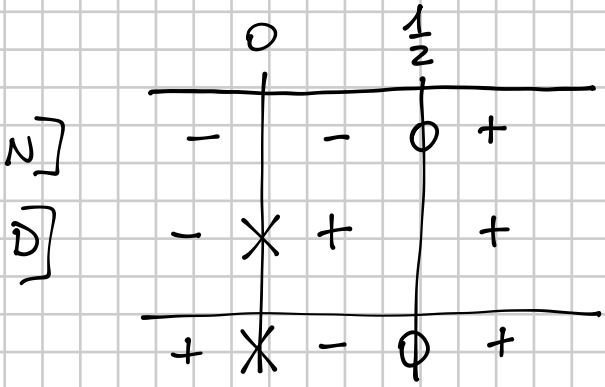
$$\frac{e^{2x-1}-1}{e^{x}-1} > 0$$

N] $e^{2x-1}-1>0 \quad e^{2x-1}>1 \quad 2x-1>0$

$x > \frac{1}{2}$



D] $e^{x}-1>0 \quad e^{x}>1 \quad x>0$



La funzione è positiva per $x<0 \vee x>\frac{1}{2}$

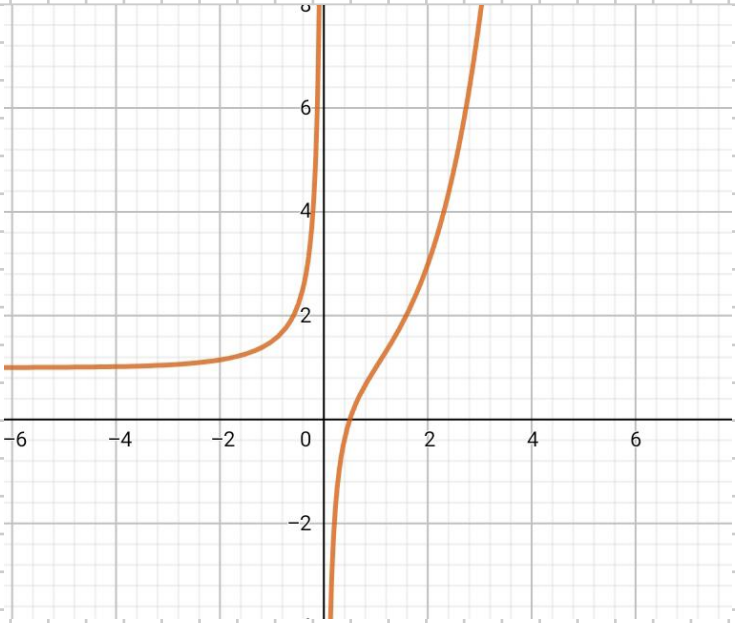


GRAFICO GEOGEBRA