Settimana: 13

Materia: Matematica
Classe: 5A
Data: 9/12/25

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$$f(x) = \frac{-x^2+x-1}{2x^2-3x+3}$$

(1) Dom f: $2x^2-3x+3 \neq 0$ $\quad \Delta = 9-24=-15$ Impossibile

$f: \mathbb{R} \longrightarrow \mathbb{R}$

(2) Assi: $x=0 \quad f(0) = -\frac{1}{3} \quad A=\left(0;-\frac{1}{3}\right)$

$y=0 \quad -x^2+x-1=0 \quad x^2-x+1=0$

$\Delta = 1-4=-3$ Impo

(3) Segno: $\frac{-x^2+x-1}{2x^2-3x+3} \geq 0 \qquad \frac{x^2-x+1}{2x^2-3x+3} \leq 0$

$N \geq 0$ Sempre vero
$D > 0$ Sempre vero
} Già fatte

N	+
D	+
	+

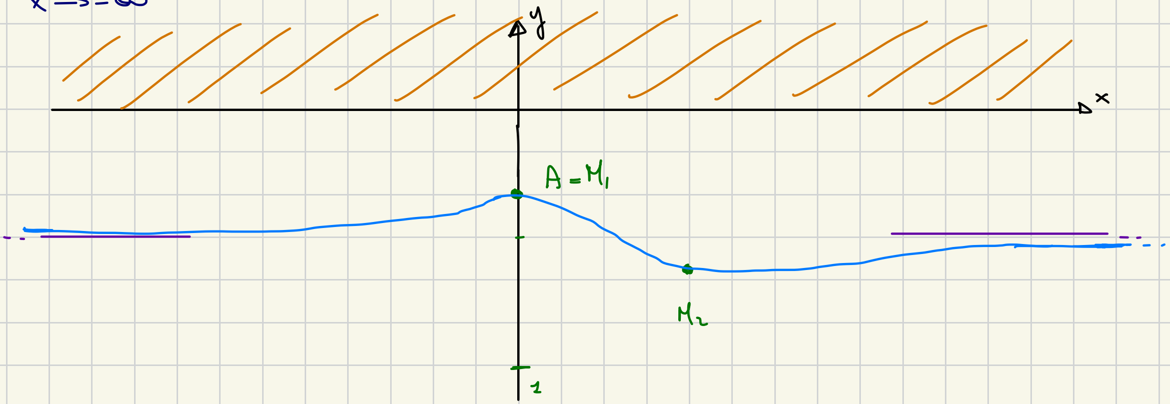
=> la funzione è SEMPRE NEGATIVA

(4) Limiti

$$\lim_{x\to+\infty} \frac{-x^2+x-1}{2x^2-3x+3} = \lim_{x\to+\infty} \frac{x^2\left(-1+\frac{1}{x}-\frac{1}{x^2}\right)}{x^2\left(2-\frac{3}{x}+\frac{3}{x^2}\right)} = -\frac{1}{2}$$

$$\lim_{x \to -\infty} f(x) = -\frac{1}{2}$$

Grafico



(5) Derivata Prima

$$f(x) = \frac{-x^2+x-1}{2x^2-3x+3} \quad \rightsquigarrow \quad f(2) = \frac{-4+2-1}{8-6+3} = -\frac{3}{5}$$

$$f'(x) = \frac{(-2x+1)(2x^2-3x+3) - (-x^2+x-1)(4x-3)}{(2x^2-3x+3)^2}$$

$$= \frac{-\cancel{4x^3}+6x^2-6x+2x^2-3x+3-[-\cancel{4x^3}+\overbrace{3x^2+4x^2}^{7x^2}-\overbrace{3x-4x}^{-7x}+3]}{(2x^2-3x+3)^2}$$

$$f'(x) = \frac{x^2-2x}{(2x^2-3x+3)^2}$$

Poniamo $f'(x) \geq 0$ $\quad N \geq 0 \quad x^2-2x \geq 0$ $\quad x = 0, 2 \quad x \leq 0 \vee x \geq 2$

$D > 0$ Sempre vero

		0		2	
N	+	•	−	•	+
D	+		+		+
	+ ↗		− ↘		+ ↗

Ho scoperto che
$x = 0$ max locale
$x = 2$ min locale

Calcolo $M_1 = (0; f(0)) = \left(0; -\frac{1}{3}\right) \leftarrow$ Massimo

$M_2 = (2; f(2)) = \left(2; -\frac{3}{5}\right) \leftarrow$ Minimo

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$$f(x) = \ln\left(\frac{x^2+7}{x-3}\right)$$

(1) Dom f: $\begin{cases} \frac{x^2+7}{x-3} > 0 \\ x-3 \neq 0 \end{cases}$ $\begin{cases} x > 3 \\ x \neq 3 \end{cases}$ $f: (3; +\infty) \longrightarrow \mathbb{R}$

(2) Assi: $x=0$ IMPOSS.

$y=0$ $\ln\left(\frac{x^2+7}{x-3}\right) = 0$ $\frac{x^2+7}{x-3} = 1$

$x^2+7 = x-3$ $x^2 - x + 10 = 0$ $\Delta = 1 - 40 < 0$

IMP

(3) Segno: $\ln\left(\frac{x^2+7}{x-3}\right) \geq 0$ $\frac{x^2-x+10}{x-3} \geq 0$ $\leadsto$ Sol $\boxed{x > 3}$

(4) Limiti: $\lim_{x \to +\infty} \ln\left(\frac{x^2+7}{x-3}\right) = +\infty$

$\lim_{x \to 3^+} \ln\left(\frac{x^2+7}{x-3}\right) = +\infty$

(5) Derivate: $f'(x) = \frac{1}{\frac{x^2+7}{\cancel{x-3}}} \cdot \frac{\overset{2x^2-6x-x^2-7}{2x(x-3) - (x^2+7)\cdot 1}}{(x-3)^{\cancel{2}}} =$

$$= \frac{x^2-6x-7}{(x^2+7)(x-3)} = \frac{(x-7)(x+1)}{(x^2+7)(x-3)}$$

$f'(x) \geq 0$

$N_1 \geq 0$ $x \geq 7$

$N_2 \geq 0$ $x \geq -1$

$D_1 > 0$ $x^2+7 > 0$ sempre

$D_2 > 0$ $x > 3$

		-1		3		7	
	−		−		−	0	+
	−	0	+		+		+
	+		+		+		+
	−		−	○	+		+
	−		+		−		+
	↘		↗		↘		↗

$M = (7; f(7)) =$

$= (7; \ln(14))$