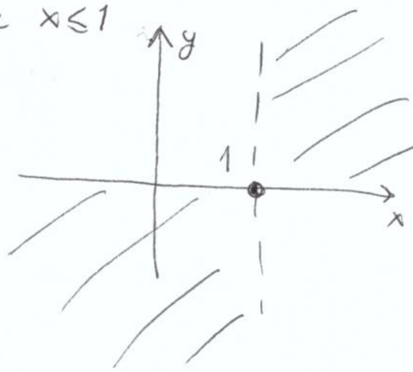
EX Studiare $f(x) = \dfrac{1-x}{x^2+1}$

Ris

dominio $A = \mathbb{R}$

segno $f(x) \geq 0$ sse $\dfrac{1-x}{x^2+1} \geq 0$ sse $1-x \geq 0$ sse $x \leq 1$



quindi $f(x) > 0$ sse $x < 1$

$f(x) = 0$ sse $x = 1$

$f(x) < 0$ sse $x > 1$

intersezione con assi: $(0,1)$ e $(1,0)$

$f \in C^1(\mathbb{R})$

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

$f'(x) \geq 0$ sse $x^2-2x-1 \geq 0$

$x^2-2x-1=0$ sse $x = 1 \pm \sqrt{2}$

f'	$+$	$1-\sqrt{2}$	$-$	$1+\sqrt{2}$	$+$
f	$\nearrow$	punto di max locale	$\searrow$	punto di minimo locale	$\nearrow$

$f(1-\sqrt{2}) = \dfrac{\sqrt{2}}{4-2\sqrt{2}}$

$f(1+\sqrt{2}) = \dfrac{-\sqrt{2}}{4+2\sqrt{2}}$

$$f''(x) = \frac{(2x-2)(x^2+1)^2 - (x^2-2x-1)\cdot 2(x^2+1)2x}{(x^2+1)^4} = \frac{-2x^3+6x^2+6x-2}{(x^2+1)^3} =$$

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

$f''(x) \geq 0$ sse $x < -1 \cup 2-\sqrt{3} \leq x \leq 2+\sqrt{3}$

		-1		$2-\sqrt{3}$		$2+\sqrt{3}$	
$-2(x+1)$	$+$	0	$-$		$-$		$-$
x^2-4x+1	$+$		$+$	0	$-$	0	$+$
$(x^2+1)^3$	$+$		$+$		$+$		$+$
$f''(x)$	$+$	0	$-$	0	$+$	0	$-$

EX 2 file B