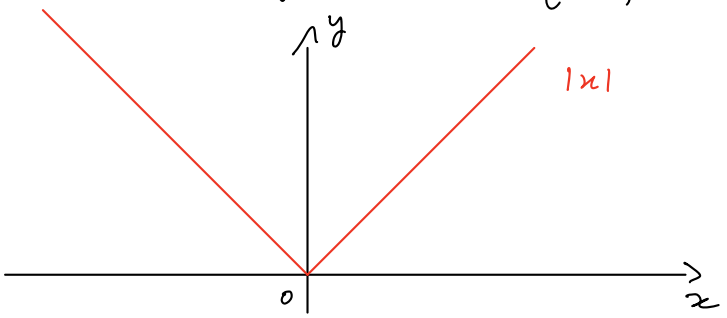
ES $f : D \subseteq \mathbb{R} \to \mathbb{R}$, $f(x) = |x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$, $D = \mathbb{R}$



$\text{Graf } f = \{(x,y) \in \mathbb{R} \times \mathbb{R} : x \in D,\ y = |x|\}$

$\text{Imm } f = [0, +\infty)$, limitata inferiormente, $\min f = 0 = f(0)$

$\sup f = +\infty$

f è pari ($f(-x) = f(x)$), f non è iniettiva

$\longleftrightarrow$

Risolvere equazioni e disequazioni in maniera grafica.

ES $e^x + e^{-x} = 2$

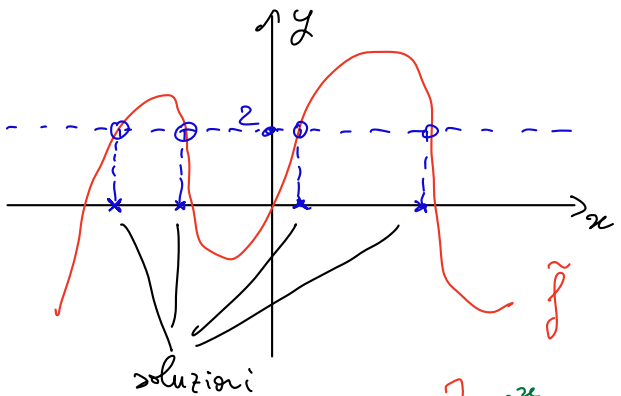
- $f(x) = e^x + e^{-x}$, $D = \mathbb{R}$, $\text{Imm } f \subseteq (0, +\infty)$

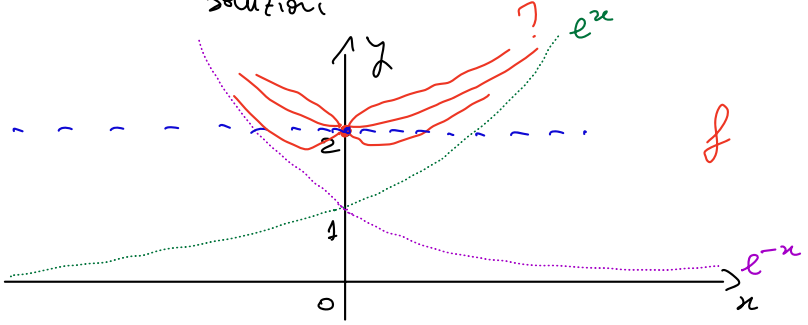
  Per quali $x \in D \subseteq \mathbb{R}$, $f(x) = 2$?

$f(-x) = e^{-x} + e^{-(-x)} =$

$= e^{-x} + e^x = f(x)$

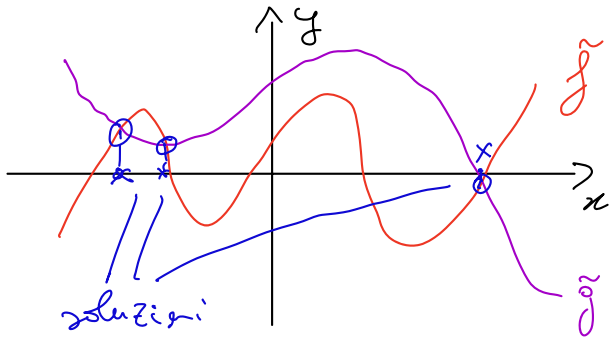
pari





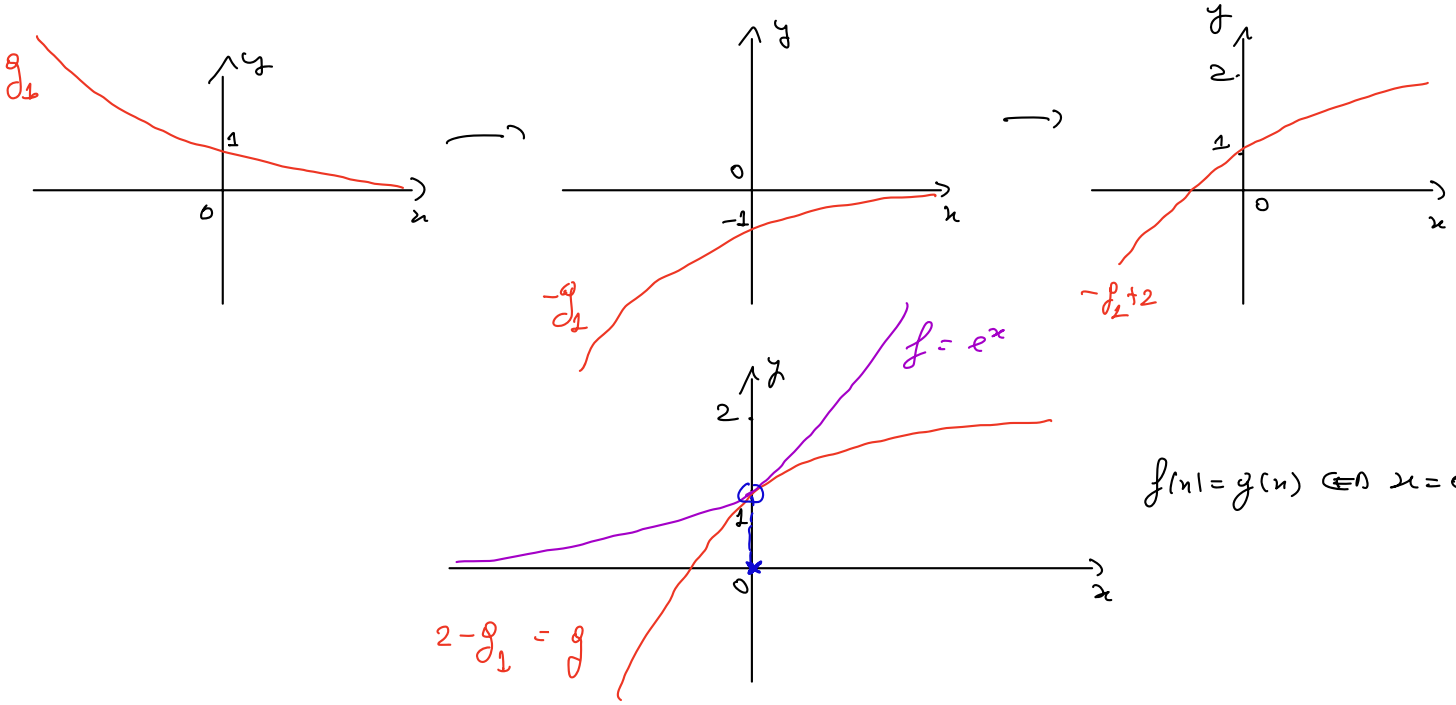
- $e^x + e^{-x} = 2 \iff e^x = 2 - e^{-x} \iff f(x) = g(x)$

$f(x) = e^x$, $g(x) = 2 - e^{-x}$



Graf g? $g(x) = 2 - e^{-x}$

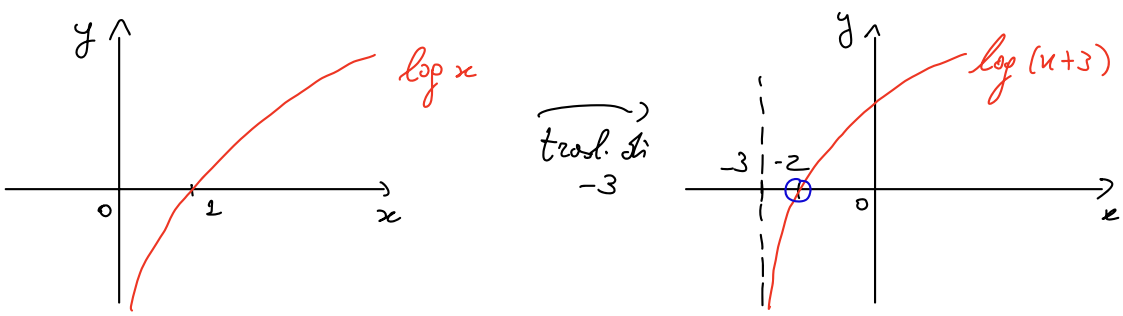
$g_1(x) = e^{-x} \longrightarrow -g_1(x) = -e^{-x} \longrightarrow 2 - g_1(x) = 2 - e^{-x}$



$f(x) = g(x) \iff x = 0$

ES $\log(x+3) = 0$, $f(x) = \log(x+3)$

Per quali $x \in D \subseteq \mathbb{R}$, $f(x) = 0$? $x = -2$



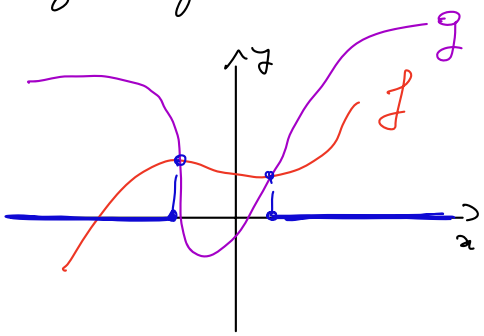
Per quali $x \in D \subseteq \mathbb{R}$,

$\log(x+3) < 0$, $f(x) < 0$ con $f(x) = \log_p(x+3)$

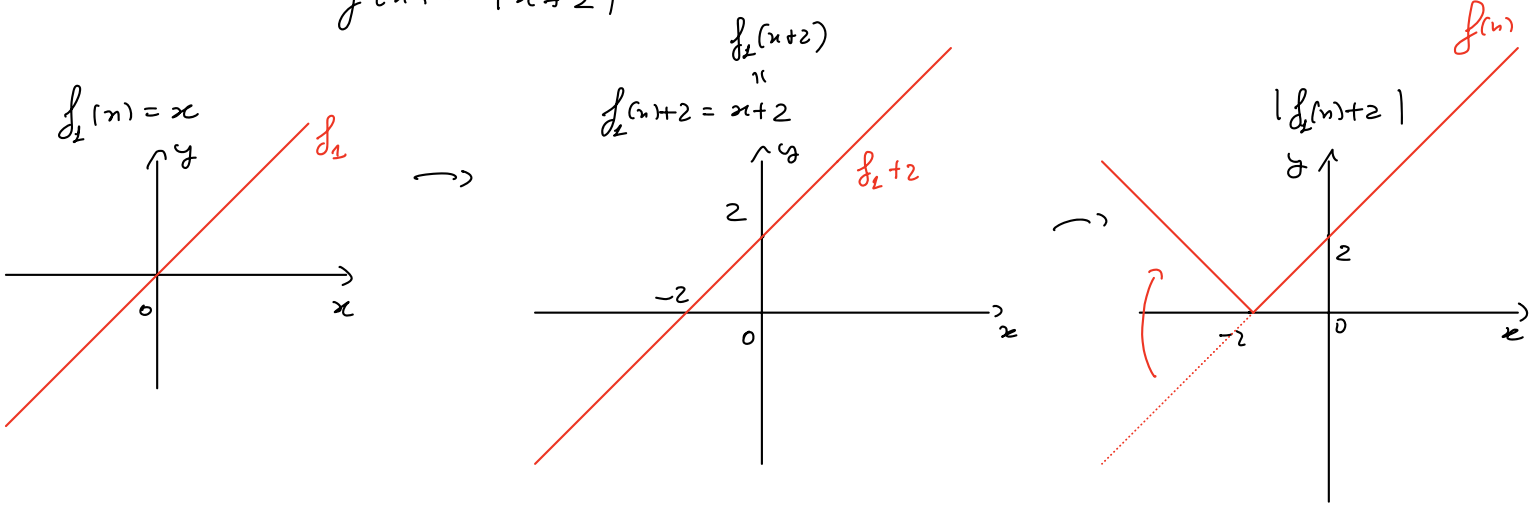
$-3 < x < -2$

ES $|x+2| \leq |2x-3| + 1$

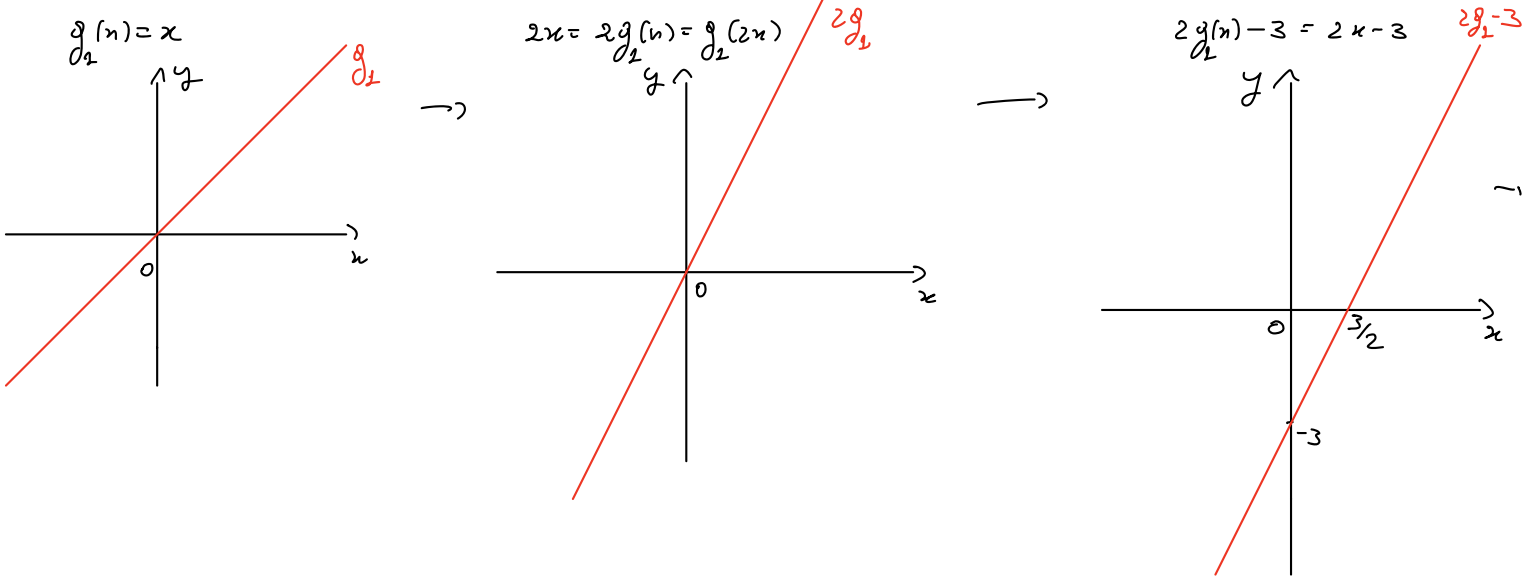
$f(x) \leq g(x)$



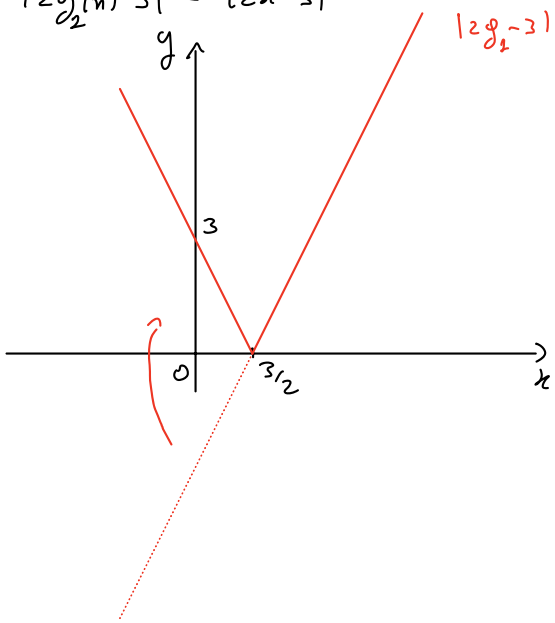
- $f(x) = |x+2|$



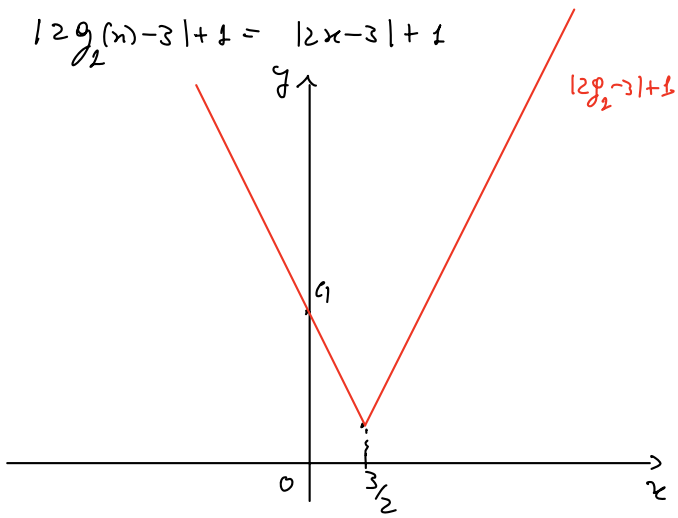
- $g(x) = |2x-3| + 1$



$|2g_2(x)-3| = |2x-3|$



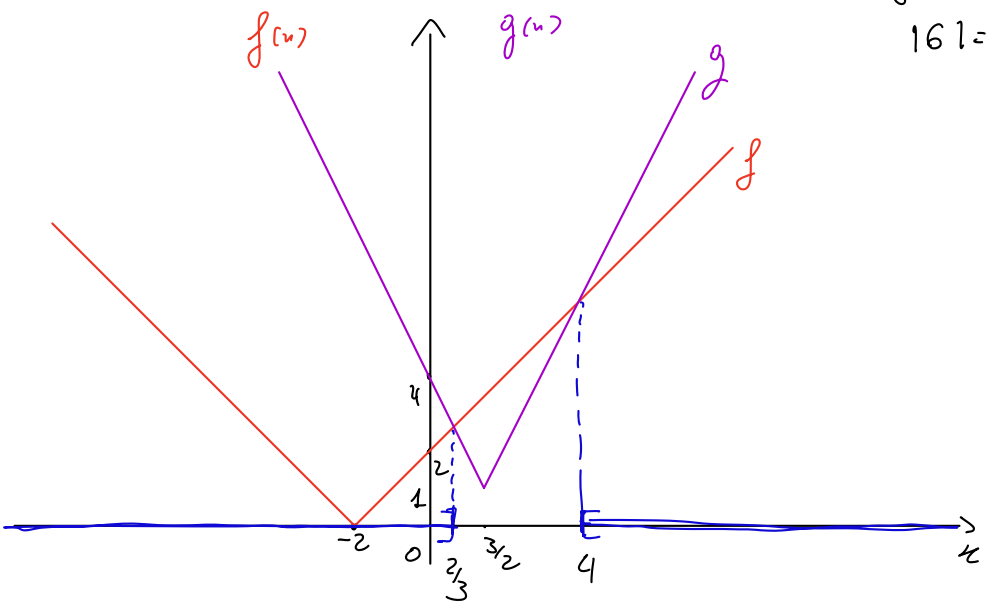
$|2g_2(x)-3|+1 = |2x-3|+1$



$|x+2| \leq |2x-3|+1$

$f(4) = g(4)$

$|6| = |8-3|+1$



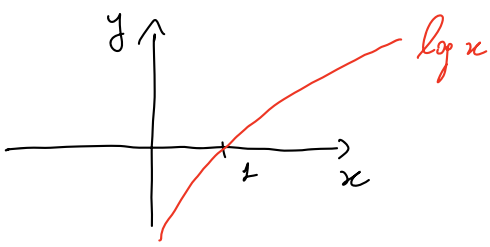
$x+2 = 3-2x+1$

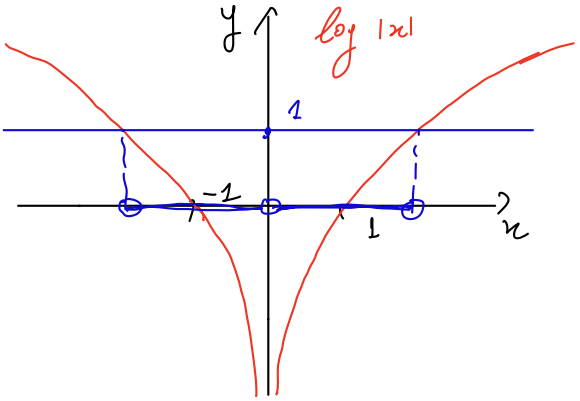
$3x = 2$

$x = 2/3$

$f(x) \leq g(x) \iff x \in (-\infty, 2/3] \cup [4, +\infty)$

ES $\log(|x|) < 1$, $f(x) = \log(|x|)$, $D = \{x \in \mathbb{R} : |x| > 0\} = \mathbb{R} \setminus \{0\}$





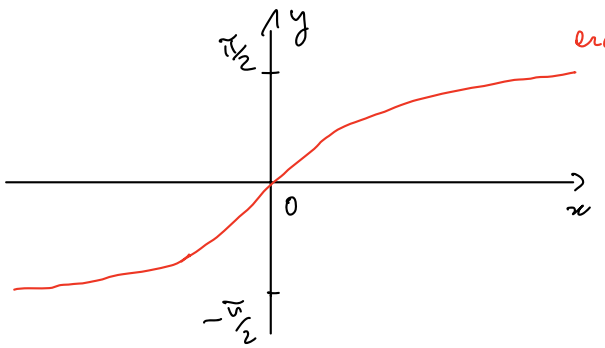
$\log_e x = 1$

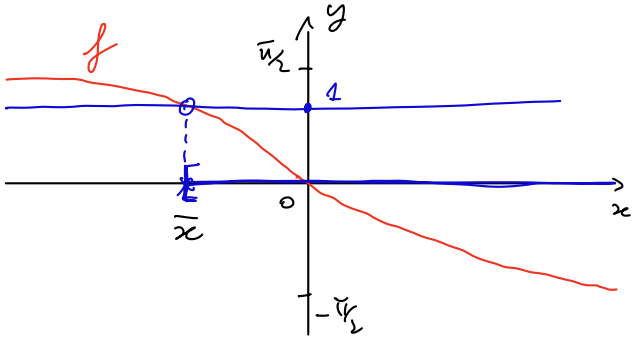
$e^{\log_e x} = x$

$e^1 = x$

$x \in (-e, e) \setminus \{0\}$

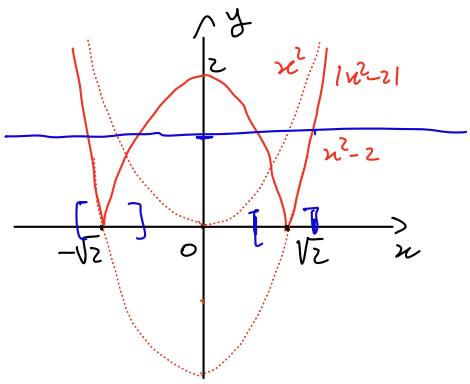
ES $\arctan(-x) \leq 1$, $f(x) = \arctan(-x)$, $D = \mathbb{R}$





$[\bar{x}, +\infty)$ $\quad \bar{x} = -1.5574$

ES $e^{|x^2-2|} \leq 2$



$\Leftrightarrow$ $|x^2-2| \leq \log 2$