n. 222 $f(x) = \frac{2-x}{3x+1}$

Suriettiva

$\forall y \in C \; \exists x \in D : f(x) = y$

$y = \frac{2-x}{3x+1}$, $3xy + y = 2 - x$

$3xy + x = 2 - y$ $\quad x(3y+1) = 2-y$

$x = \frac{2-y}{3y+1}$

Iniettiva

$\forall x_1, x_2 \in D$ con $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$

$\frac{2-x_1}{3x_1+1} - \frac{2-x_2}{3x_2+1} = 0$

$\frac{(2-x_1)(3x_2+1) - (2-x_2)(3x_1+1)}{(3x_1+1)(3x_2+1)} = 0$

$6x_2 + 2 - 3x_1x_2 - x_1 - 6x_1 - 2 + 3x_1x_2 + x_1 = 0$

$7x_2 - 7x_1 = 0$

$x_1 = x_2$

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

$$\frac{2-|x|}{3|x|+1} = \frac{2+x}{1-3x}$$

$x \geq 0$

0

$- \mid +$

a) $\begin{cases} x < 0 \\ \dfrac{2+x}{-3x+1} = \dfrac{2+x}{-3x+1} \end{cases}$

b) $\begin{cases} x \geq 0 \\ \dfrac{2-x}{3x+1} = \dfrac{2+x}{-3x+1} \end{cases}$

n. 162

$$y = \sqrt{x^2 + 3x + 2k}$$

$$x^2 + 3x + 2k \geq 0$$

$$\Delta = 9 - 8k \leq 0$$

$$y = x^3 + 3$$

$$\forall y \in \mathbb{R}\ \exists x \in \mathbb{R} : f(x) = y$$

$$x^3 + 3 = y \,;\quad x^3 = y - 3$$

$$x = \sqrt[3]{y - 3}$$

$$x^2 = -|y| - 3$$

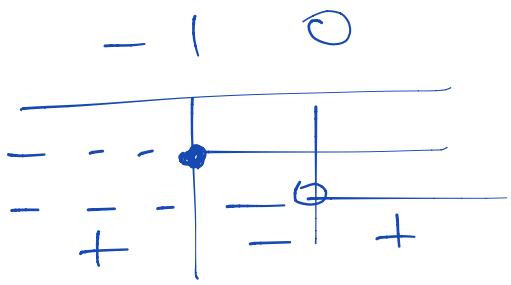
n. 30 $f(x) = 1 + \frac{1}{x} = \frac{x+1}{x}$

$D = \mathbb{R} - \{0\}$

$f(-x) = \frac{-x+1}{-x} = \frac{x-1}{x} \neq \pm f(x)$

$\frac{x+1}{x} \geq 0$ $N \geq 0$ $x \geq -1$

$D > 0$ $x > 0$



$A(-1; 0)$

Iniettiva

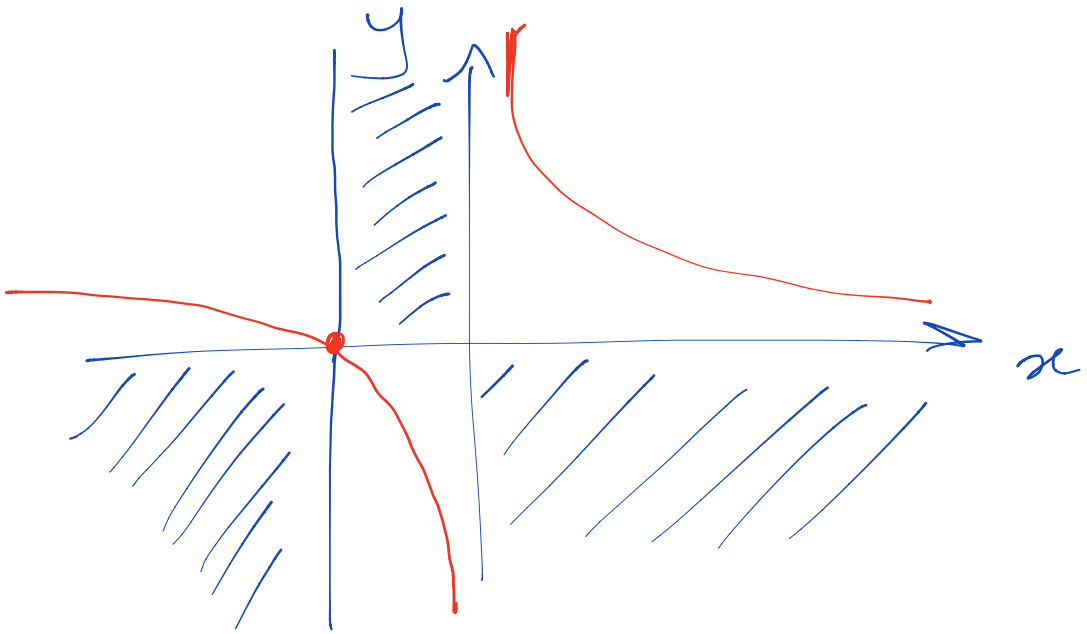
$1 + \frac{1}{x_1} = 1 + \frac{1}{x_2}$

$\frac{x_1 x_2 + x_2}{x_1 x_2} = \frac{x_1 x_2 + x_1}{x_1 x_2} \Rightarrow x_1 = x_2$

Inverse

$$y = 1 + \frac{1}{x} \Rightarrow xy = x + 1$$

$$xy - x = 1 \quad ; \quad x(y-1) = 1$$

$$x = \frac{1}{y-1}$$

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