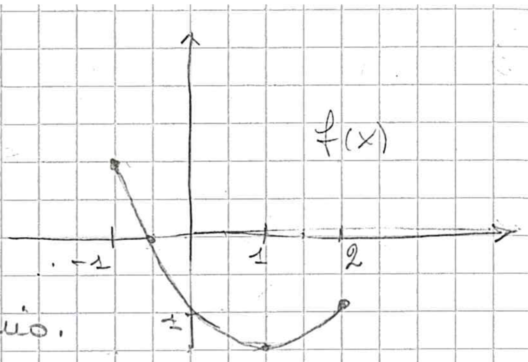
ESERCIZIO

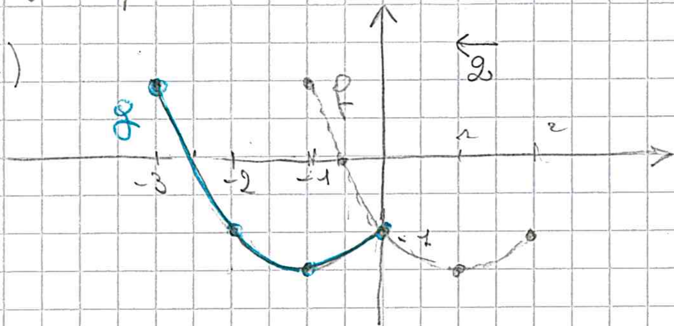
Sia $f(x)$ definita in $[-1; 2]$ rappresentata in figura.



Rappresentare $f(x+2)$; $f(x)+2$; $f(x-2)$; $f(x)-2$; $f(-x)$; $-f(x)$; $-f(-x)$ e precisare il nuovo dominio.

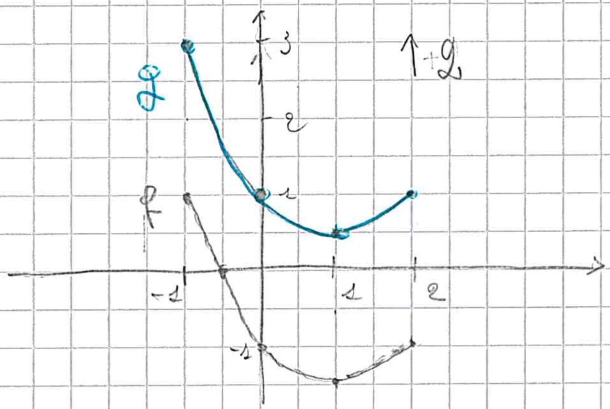
Soluzione:

a) $g(x) = f(x+2)$



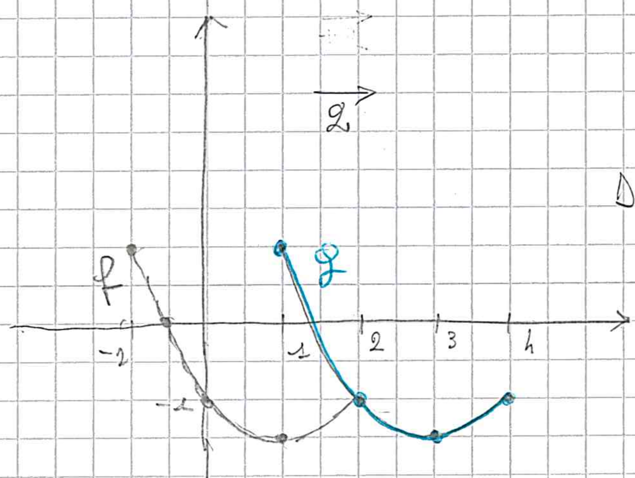
$D_g = [-3; 0]$

b) $g(x) = f(x)+2$



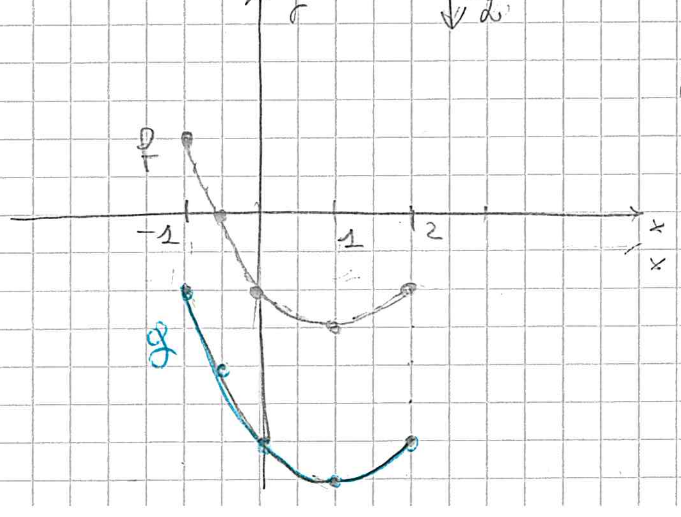
$D_g = [-1; 2]$

c) $g(x) = f(x-2)$



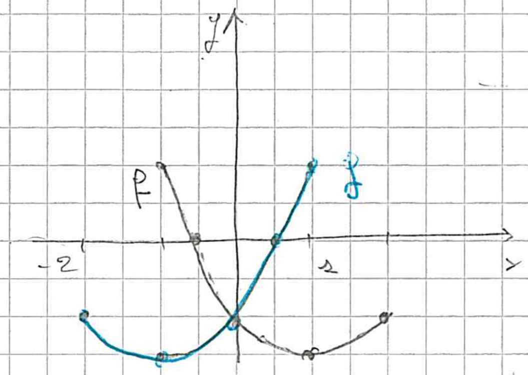
$D_g = [1; 4]$

d) $g(x) = f(x)-2$



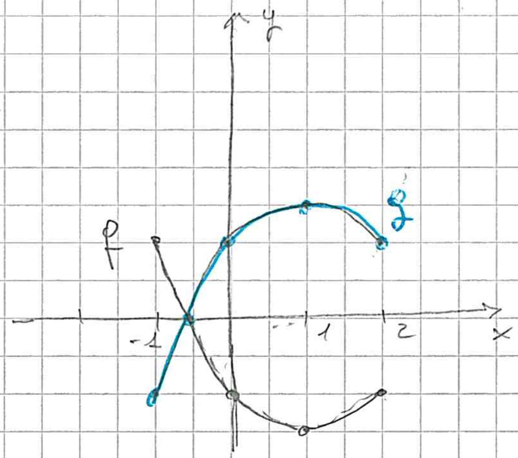
$D_g = [-1; 2]$

e) $g(x) = f(-x)$



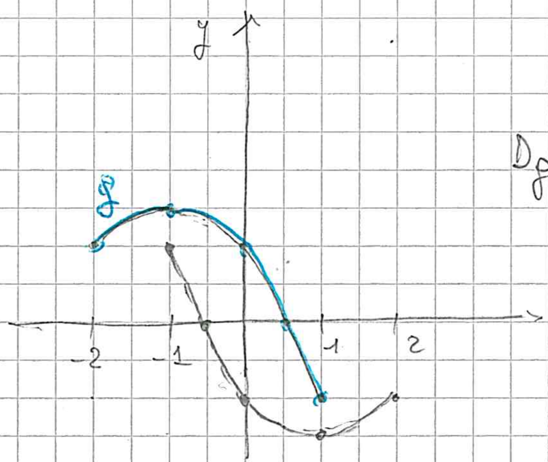
$D_g = [-2; 1]$

f) $g(x) = -f(x)$



$D_g = [-1; 2]$

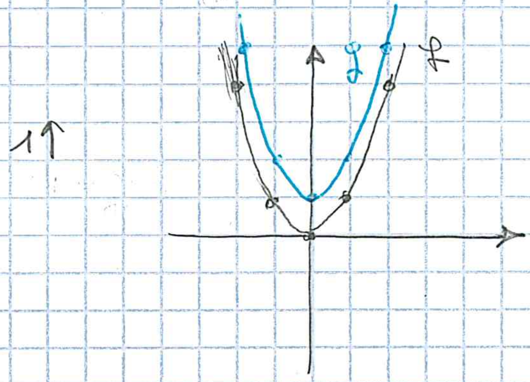
g) $g(x) = -f(-x)$



$D_g = [-2, 1]$

ESEMPI Rappresentare le seguenti funzioni usando le trasformazioni grafiche

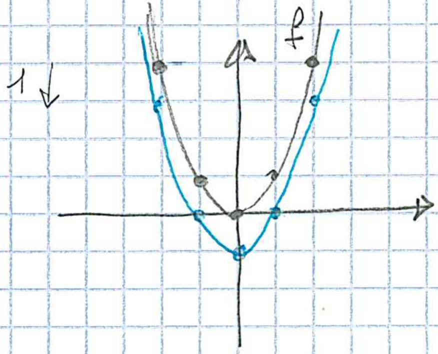
$g(x) = x^2+1$



Sol: $f(x) = x^2$

$f_1(x) = f(x)+1 = x^2+1 = g(x)$

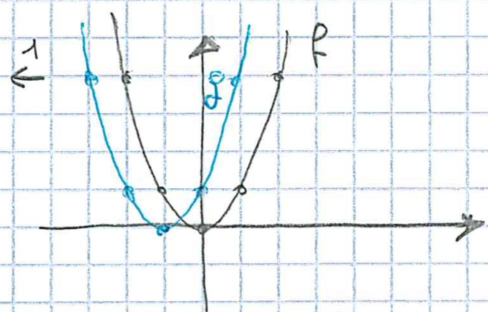
$g(x) = x^2-1$



Sol: $f(x) = x^2$

$f_1(x) = f(x)-1 = x^2-1 = g(x)$

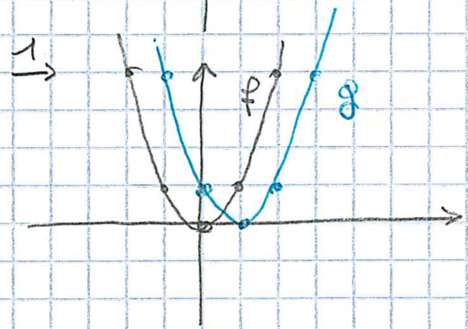
$g(x) = (x+1)^2$



Sol: $f(x) = x^2$

$f_1(x) = f(x+1) = (x+1)^2 = g(x)$

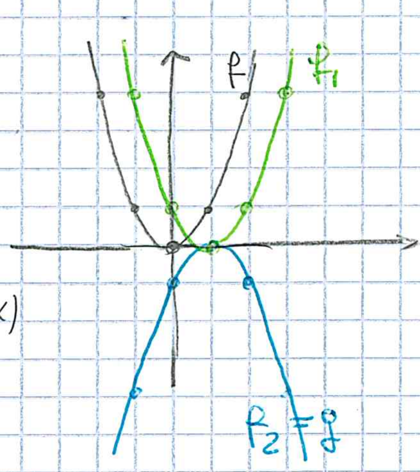
$g(x) = (x-1)^2$



Sol: $f(x) = x^2$

$f_1(x) = f(x-1) = (x-1)^2 = g(x)$

$g(x) = -(x-1)^2$

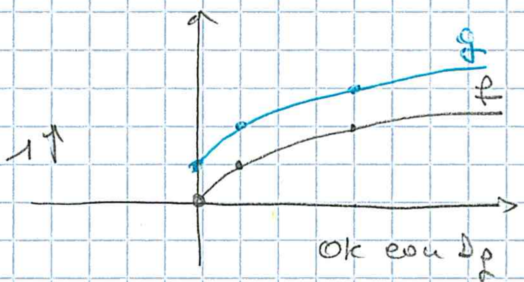


Sol: $f(x) = x^2$

$f_1(x) = f(x-1) = (x-1)^2$

$f_2(x) = -f_1(x) = -(x-1)^2 = g(x)$

$g(x) = \sqrt{x} + 1$ $\qquad D_g = [0, +\infty)$

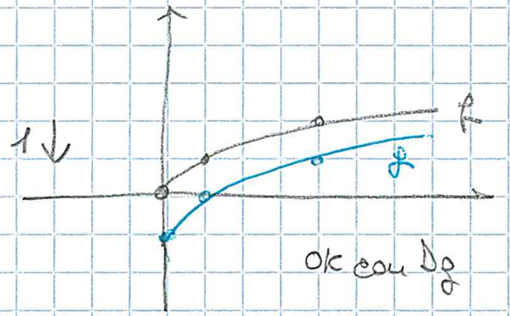


Sol: $\quad f(x) = \sqrt{x} \qquad D_f = [0, +\infty)$

$f_1(x) = f(x) + 1 = \sqrt{x} + 1 = g(x)$

ok con D_g

$g(x) = \sqrt{x} - 1$ $\qquad D_g = [0, +\infty)$



Sol: $\quad f(x) = \sqrt{x} \qquad D_f = [0, +\infty)$

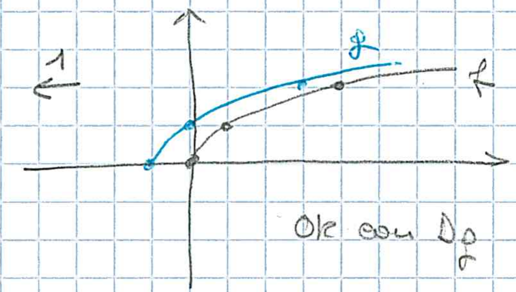
$f_1(x) = f(x) - 1 = \sqrt{x} - 1 = g(x)$

ok con D_g

$g(x) = \sqrt{x+1}$ $\qquad D_g: \ x + 1 \geq 0$

$x \geq -1$

$[-1; +\infty)$



Sol: $\quad f(x) = \sqrt{x} \qquad D_f: [0, +\infty)$

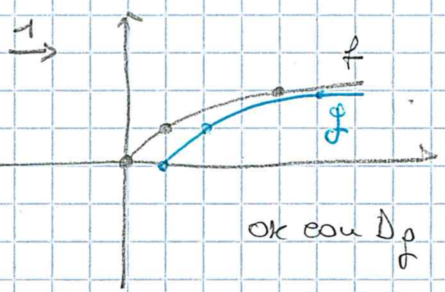
$f_1(x) = f(x+1) = \sqrt{x+1} = g(x)$

ok con D_g

$g(x) = \sqrt{x-1}$ $\qquad D_g: \ x - 1 \geq 0$

$x \geq 1$

$[1, +\infty)$

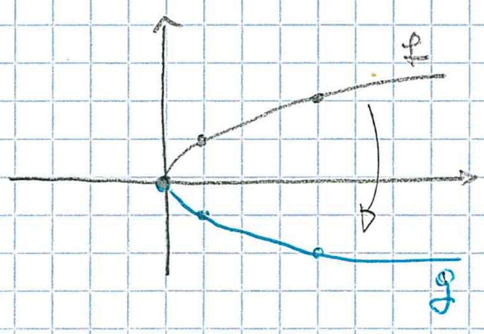


Sol: $\quad f(x) = \sqrt{x} \qquad D_f: [0, +\infty)$

$f_1(x) = f(x-1) = \sqrt{x-1} = g(x)$

ok con D_g

$g(x) = -\sqrt{x}$ $\qquad D_g = [0, +\infty)$



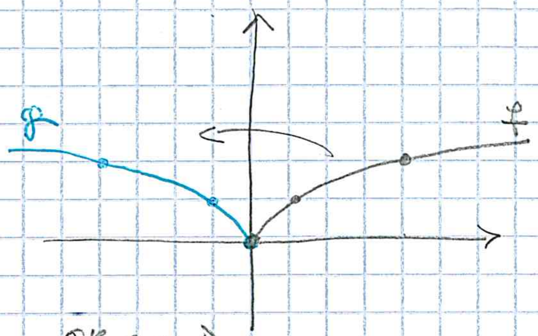
Sol: $\quad f(x) = \sqrt{x} \qquad D_f = [0, +\infty)$

$f_1(x) = -f(x) = -\sqrt{x} = g(x)$

ok con D_g

$g(x) = \sqrt{-x}$

$D_g: \ -x \geq 0$
$x \leq 0$
$(-\infty; 0]$



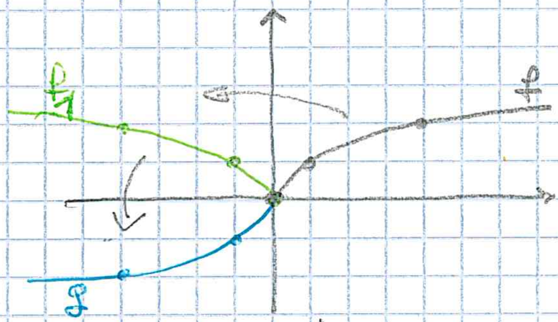
Sol: $f(x) = \sqrt{x}$ $\quad D_f: [0, +\infty)$

$f_1(x) = f(-x) = \sqrt{-x} = g(x)$

ok con D_g

$g(x) = -\sqrt{-x}$

Sol: $D_g = \ -x \geq 0$
$x \leq 0$
$(-\infty; 0]$



$f(x) = \sqrt{x}$

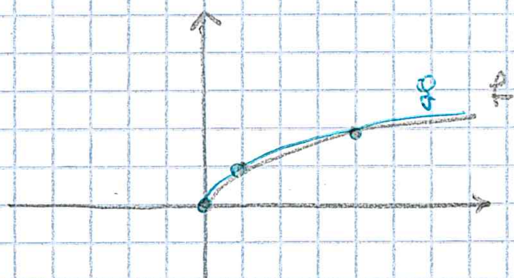
$f_1(x) = f(-x) = \sqrt{-x}$

$f_2(x) = -f_1(x) = -\sqrt{-x} = g(x)$

ok con D_g

$g(x) = |\sqrt{x}|$

Sol: $D_g = \ x \geq 0$
$[0, +\infty)$



$f(x) = \sqrt{x}$

$f_1(x) = |f(x)| = |\sqrt{x}| = g(x)$

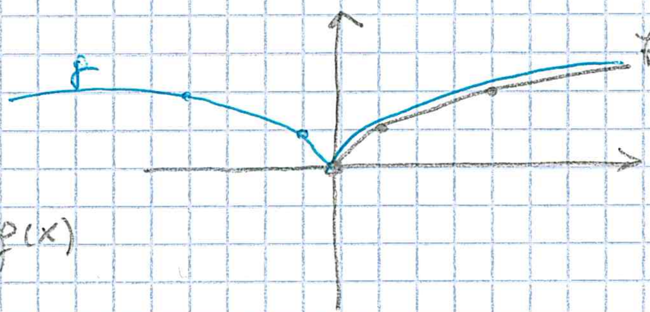
Il grafico di g coincide con il grafico di f

$g(x) = \sqrt{|x|}$

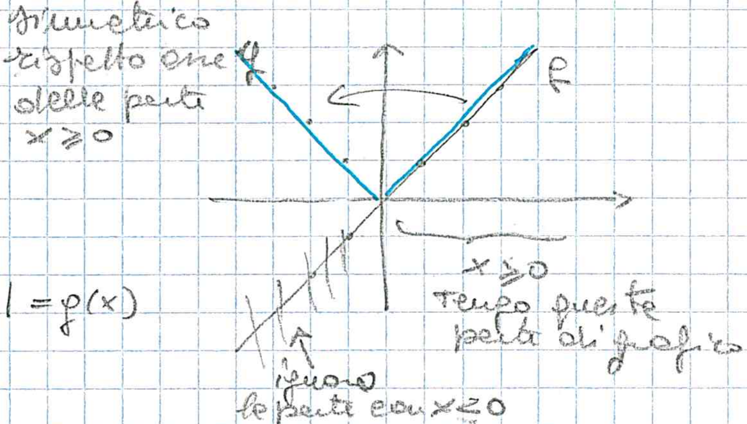
Sol: $D_g = \mathbb{R}$

$f(x) = \sqrt{x}$

$f_1(x) = f(|x|) = \sqrt{|x|} = g(x)$



$g(x) = |x|$



Sol: $D_g = \mathbb{R}$

$f(x) = x$

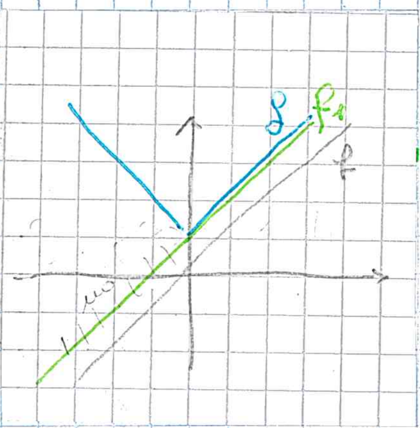
$f_1(x) = f(|x|) = |x| = g(x)$

NB:
costruisco il grafico di $g(x) = |x|$ usando le trasformazioni grafiche partendo da $f(x) = x$ [retta obliqua bisettrice del I e III quadrante]

e applicando la trasformazione $f(|x|)$ per ottenere il grafico di $g(x) = |x|$.

Quindi
- tengo le parti di grafico con $x \geq 0$, poi
- ignoro le parti di grafico con $x < 0$, poi
- per $x < 0$ aggiungo le parti di grafico che ottengo facendo il simmetrico rispetto asse y delle parte di grafico che è in $x \geq 0$

$g(x) = |x| + 1$

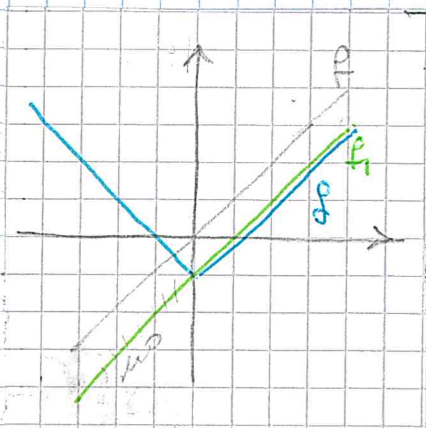


Sol: $f(x) = x$

sequenza corretta
$f_1(x) = f(x+1) = x+1$
$f_2(x) = f_1(|x|) = |x| + 1 = g(x)$ ok

sequenza NON corretta
$f(x) = x$
$f_1(x) = f(|x|) = |x|$
$f_2(x) = f(x+1) = |x+1| \neq g(x)$

$g(x) = |x| - 1$

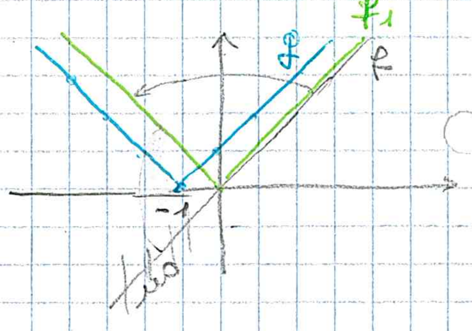


Sol

sequenza corretta
$f(x) = x$
$f_1(x) = f(x-1) = x-1$
$f_2(x) = f_1(|x|) = |x| - 1 = g(x)$ ok

sequenza NON corretta
$f(x) = x$
$f_1(x) = f(|x|) = |x|$
$f_2(x) = f_1(x-1) = |x-1| \neq g(x)$

$g(x) = |x+1|$



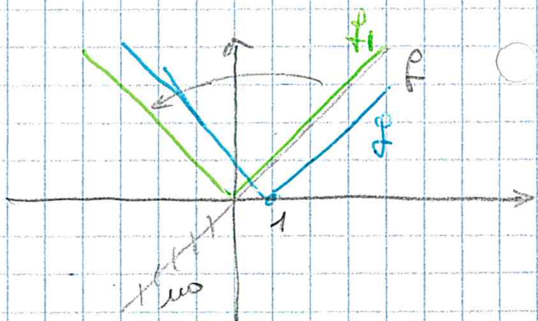
Sol :

repuense correlte
$$\left|\begin{array}{l} f(x) = x \\ f_1(x) = f(|x|) = |x| \\ f_2(x) = f(x+1) = |x+1| = g(x) \end{array}\right.$$

ok

repuense NON correlte
$$\left|\begin{array}{l} f(x) = x \\ f_1(x) = f(x+1) = x+1 \\ f_2(x) = f(|x|) = |x|+1 \neq g(x) \end{array}\right.$$

$g(x) = |x-1|$



Sol :

repuense correlte
$$\left|\begin{array}{l} f(x) = x \\ f_1(x) = f(|x|) = |x| \\ f_2(x) = f_1(x-1) = |x-1| = g(x) \end{array}\right.$$

ok

repuense NON correlte
$$\left|\begin{array}{l} f(x) = x \\ f_1(x) = f(x-1) = x-1 \\ f_2(x) = f_1(|x|) = |x|-1 \neq g(x) \end{array}\right.$$