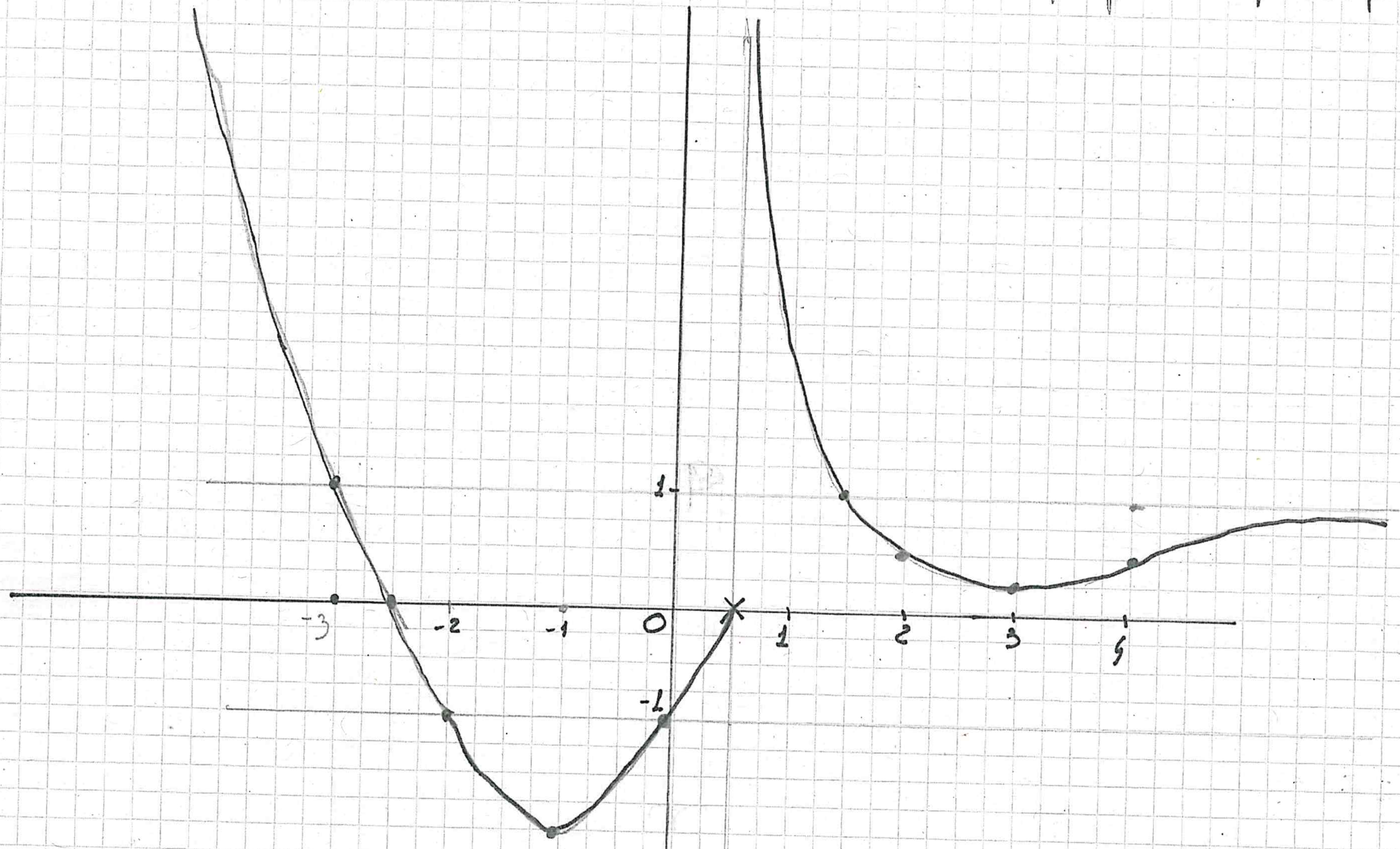
es-grafico_reciproca.pdf

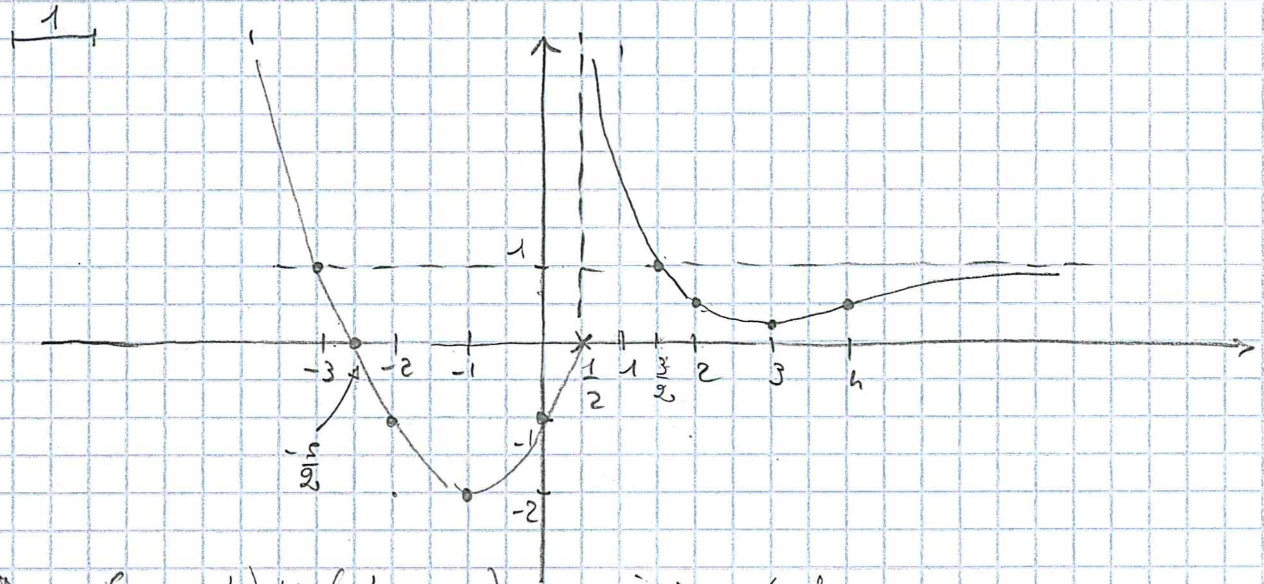


Dato il grafico della funzione $y = f(x)$ in figura, disegnare il grafico della funzione $y = 1/f(x)$

Il punto $\left(\frac{1}{2}, 0\right)$, indicato con $\times$, non appartiene al grafico

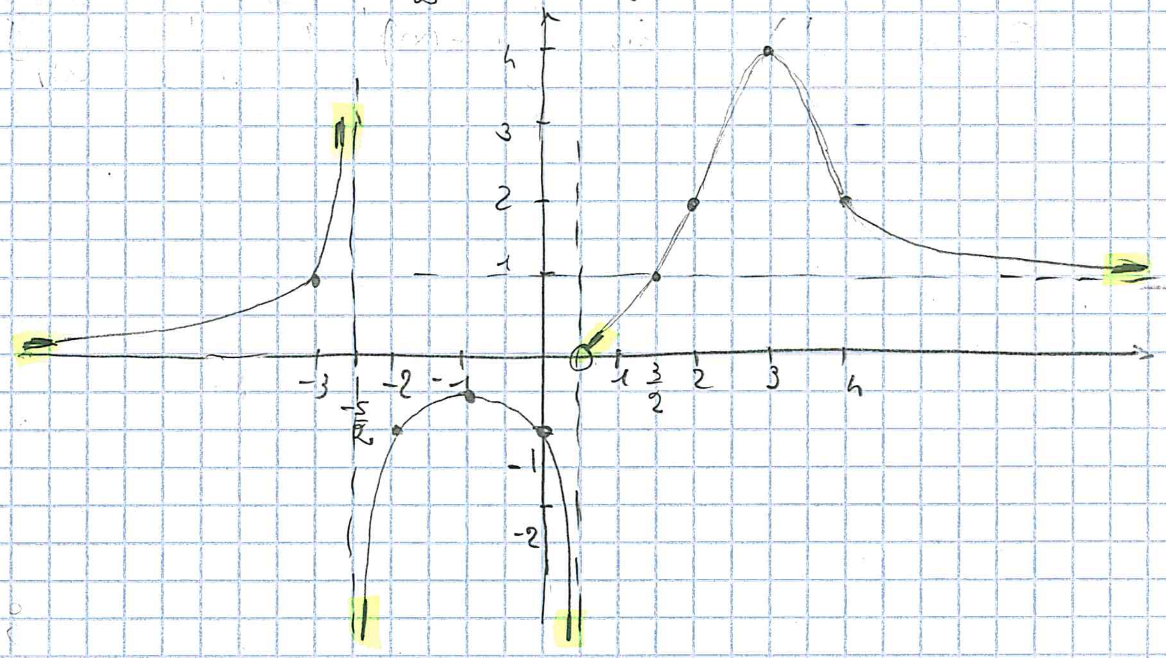
Dato il grafico della funzione $y = f(x)$ in figura, disegnare il grafico della funzione $g(x) = \dfrac{1}{f(x)}$

Il punto $\left(\frac{1}{2}; 0\right)$, marcato con x, non appartiene al grafico



$D_f = \left(-\infty; \frac{1}{2}\right) \cup \left(\frac{1}{2}; +\infty\right)$ cioè $x \neq \frac{1}{2}$

$f(x) = 0$ in $x = -\frac{5}{2}$ $\Rightarrow$ $D\, g(x) = D_f$ e $f(x) \neq 0$ $= x \neq \frac{1}{2}$



$f\left(\frac{3}{2}\right) = 1 \Rightarrow g\left(\frac{3}{2}\right) = \dfrac{1}{f\left(\frac{3}{2}\right)} = \dfrac{1}{1} = 1$

$f(2) = \frac{1}{2} \Rightarrow g(2) = \dfrac{1}{f(2)} = \dfrac{1}{\frac{1}{2}} = 1 \cdot \frac{2}{1} = 2$

$f(3) = \frac{1}{4} \Rightarrow g(3) = \dfrac{1}{f(3)} = \dfrac{1}{\frac{1}{4}} = 1 \cdot \frac{4}{1} = 4$

$f(4) = \frac{1}{2} \Rightarrow g(4) = \dfrac{1}{f(4)} = \dfrac{1}{\frac{1}{2}} = 1 \cdot \frac{2}{1} = 2$

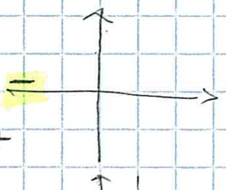
$f(0) = -1 \Rightarrow g(0) = \frac{1}{f(0)} = \frac{1}{-1} = -1$

$f(-1) = -2 \Rightarrow g(-1) = \frac{1}{f(-1)} = \frac{1}{-2} = -\frac{1}{2}$

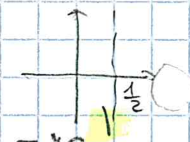
$f(-2) = -1 \Rightarrow g(-2) = \frac{1}{f(-2)} = \frac{1}{-1} = -1$

$f\left(-\frac{5}{2}\right) = 0 \Rightarrow g\left(-\frac{5}{2}\right) = \frac{1}{f\left(-\frac{5}{2}\right)} = \cancel{\frac{1}{0}}$ non ha significato

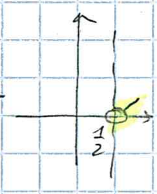
$f(-3) = 1 \Rightarrow g(-3) = \frac{1}{f(-3)} = \frac{1}{1} = 1$



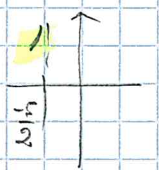
$\lim_{x \to -\infty} f(x) = +\infty \Rightarrow \lim_{x \to -\infty} g(x) = \lim_{x \to -\infty} \frac{1}{f(x)} = \left[\frac{1}{+\infty}\right] = 0^+$



$\lim_{x \to \left(\frac{1}{2}\right)^-} f(x) = 0^- \Rightarrow \lim_{x \to \left(\frac{1}{2}\right)^-} g(x) = \lim_{x \to \left(\frac{1}{2}\right)^-} \frac{1}{f(x)} = \left[\frac{1}{0^-}\right] = -\infty$

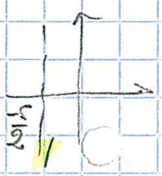


$\lim_{x \to \left(\frac{1}{2}\right)^+} f(x) = +\infty \Rightarrow \lim_{x \to \left(\frac{1}{2}\right)^+} g(x) = \lim_{x \to \left(\frac{1}{2}\right)^+} \frac{1}{f(x)} = \left[\frac{1}{+\infty}\right] = 0^+$



$f\left(-\frac{5}{2}\right) = 0 \Rightarrow$

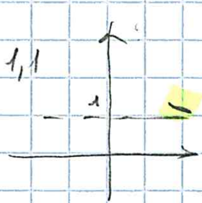
$\lim_{x \to \left(-\frac{5}{2}\right)^-} g(x) = \lim_{x \to \left(-\frac{5}{2}\right)^-} \frac{1}{f(x)} = \left[\frac{1}{0^+}\right] = +\infty$



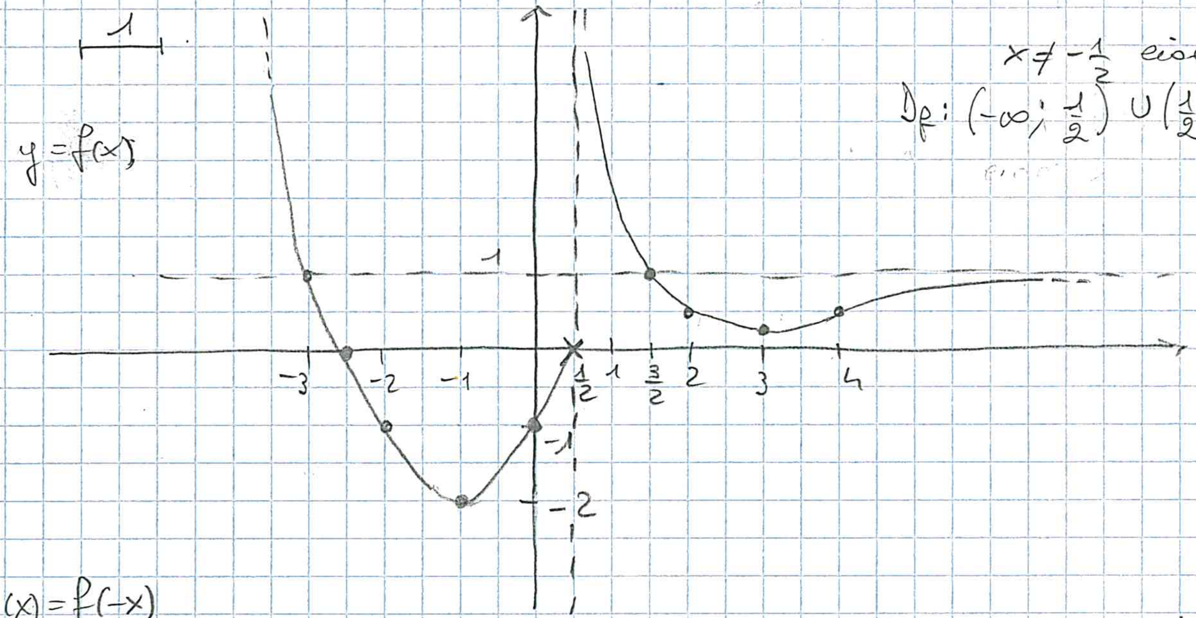
$\lim_{x \to \left(-\frac{5}{2}\right)^+} g(x) = \lim_{x \to \left(-\frac{5}{2}\right)^-} \frac{1}{f(x)} = \left[\frac{1}{0^-}\right] = -\infty$

$\lim_{x \to +\infty} f(x) = 1^- \Rightarrow \lim_{x \to +\infty} g(x) = \lim_{x \to +\infty} \frac{1}{f(x)} = \left[\frac{1}{1^-}\right] = 1^+$

cioè $\frac{1}{0,9} = 1,1$



Dato il grafico della funzione $y = f(x)$ in figura, disegnare il grafico di $g(x) = \frac{1}{f(-x)}$



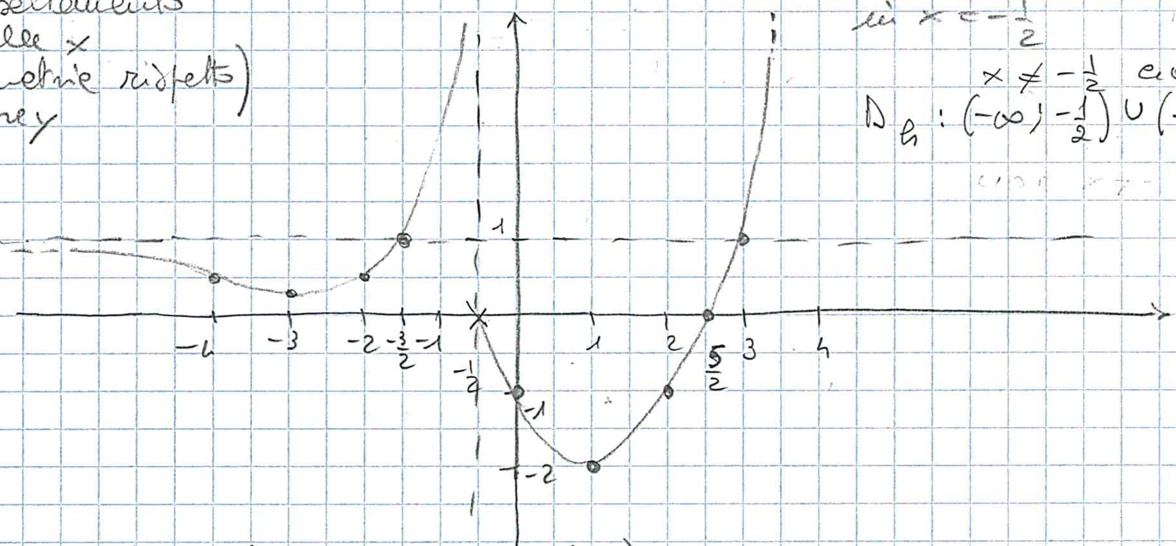
$x \neq -\frac{1}{2}$ cioè
$D_f: \left(-\infty; \frac{1}{2}\right) \cup \left(\frac{1}{2}; +\infty\right)$

$h(x) = f(-x)$

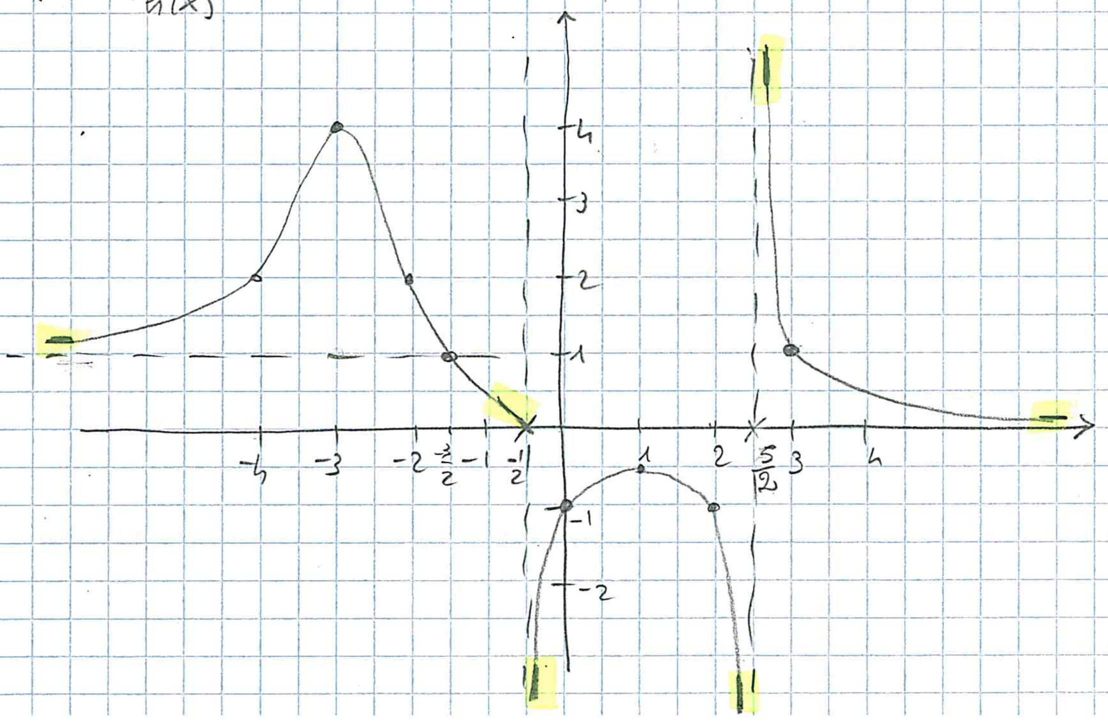
ribaltamento della x
(simmetria rispetto asse y)

NB. prima ribalto l'asintoto $x = \frac{1}{2}$ in $x = -\frac{1}{2}$

$x \neq -\frac{1}{2}$ cioè
$D_h: \left(-\infty; -\frac{1}{2}\right) \cup \left(-\frac{1}{2}; +\infty\right)$



$g(x) = \frac{1}{h(x)}$ (vedi i calcoli dietro)



D_g: D_h e $h(x) \neq 0$ cioè $x \neq -\frac{1}{2}$ e $x \neq \frac{5}{2}$

(poiché in $x = \frac{5}{2}$ la funzione h si annulla)

Punti di $h(x)$

$(0; -1)$

$(1, -2)$

$(2, -1)$

$(3, 1)$

$\Rightarrow \left(\frac{5}{2}, 0\right)$

$$\lim_{x \to +\infty} h(x) = +\infty$$

$$\lim_{x \to \left(-\frac{1}{2}\right)^+} h(x) = 0^-$$

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

$\left(-\frac{3}{2}; 1\right)$

$\left(-2; \frac{1}{2}\right)$

$\left(-3; \frac{1}{4}\right)$

$\left(-4; \frac{1}{2}\right)$

$$\lim_{x \to -\infty} h(x) = 1^-$$

Punti di $g(x) = \frac{1}{h(x)}$

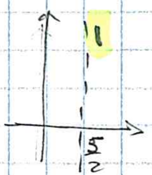
$\left(0, \frac{1}{-1}\right) = (0, -1)$

$\left(1; \frac{1}{-2}\right) = \left(1; -\frac{1}{2}\right)$

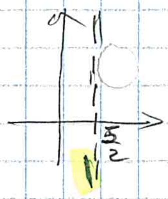
$\left(2; \frac{1}{-1}\right) = (2; -1)$

$\left(3, \frac{1}{1}\right) = (3, 1)$

$$\lim_{x \to \left(\frac{5}{2}\right)^+} g(x) = \lim_{x \to \left(\frac{5}{2}\right)^+} \frac{1}{h(x)} = \frac{1}{0^+} = +\infty$$

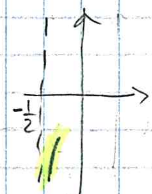


$$\lim_{x \to \left(\frac{5}{2}\right)^-} g(x) = \lim_{x \to \left(\frac{5}{2}\right)^-} \frac{1}{h(x)} = \frac{1}{0^-} = -\infty$$

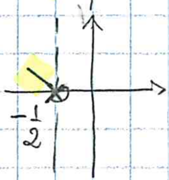


$$\lim_{x \to +\infty} g(x) = \lim_{x \to +\infty} \frac{1}{h(x)} = \frac{1}{+\infty} = 0^+$$

$$\lim_{x \to \left(-\frac{1}{2}\right)^+} h(x) = \lim_{x \to \left(-\frac{1}{2}\right)^+} \frac{1}{h(x)} = \frac{1}{0^-} = -\infty$$



$$\lim_{x \to \left(-\frac{1}{2}\right)^-} h(x) = \lim_{x \to \left(-\frac{1}{2}\right)^-} \frac{1}{h(x)} = \frac{1}{+\infty} = 0^+$$



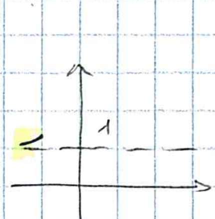
$\left(-\frac{3}{2}; \frac{1}{1}\right) = \left(-\frac{3}{2}; 1\right)$

$\left(-2; \frac{1}{\frac{1}{2}}\right) = (-2; 2)$

$\left(-3; \frac{1}{\frac{1}{4}}\right) = (-3; 4)$

$\left(-4; \frac{1}{\frac{1}{2}}\right) = (-4; 2)$

$$\lim_{x \to -\infty} g(x) = \lim_{x \to -\infty} \frac{1}{h(x)} = \frac{1}{1^-} = 1^+$$



cioè $\frac{1}{0{,}9} = 1{,}1$