10/12/2020

257 $\dfrac{x}{x+2} - \dfrac{1}{3x+6} < \dfrac{x}{5x+10}$ $\left[-2 < x < \dfrac{5}{12}\right]$

$$\frac{x}{x+2} - \frac{1}{3(x+2)} - \frac{x}{5(x+2)} < 0$$

$$\frac{15x - 5 - 3x}{15(x+2)} < 0$$

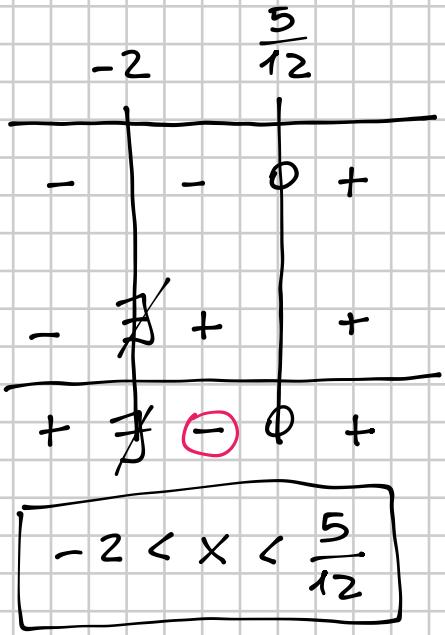
$$\frac{12x - 5}{\cancel{15}(x+2)} < 0$$

N] $\dfrac{12x-5}{x+2} < 0$

D]

$N > 0 \quad 12x - 5 > 0 \quad 12x > 5 \quad x > \dfrac{5}{12}$

$D > 0 \quad x + 2 > 0 \quad x > -2$



$$-2 < x < \frac{5}{12}$$

259 $-\dfrac{x}{4-25x^2} > 0$ $\left[-\dfrac{2}{5} < x < 0 \vee x > \dfrac{2}{5}\right]$

$$\frac{x}{25x^2-4} > 0$$

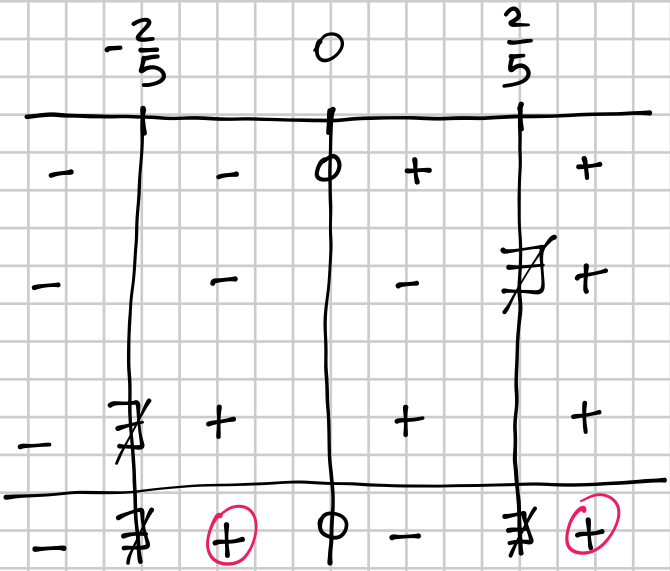
$$\frac{\boxed{N}\ x}{(5x-2)(5x+2)} > 0$$

$\boxed{D_1}$ $\boxed{D_2}$

$N > 0 \qquad x > 0$

$D_1 > 0 \qquad 5x-2 > 0 \qquad x > \frac{2}{5}$

$D_2 > 0 \qquad 5x+2 > 0 \qquad x > -\frac{2}{5}$



$$-\frac{2}{5} < x < 0 \quad \vee \quad x > \frac{2}{5}$$

261 $\dfrac{x^2-4x}{x^2+5x-6} \leq 0$ $\quad [-6 < x \leq 0 \vee 1 < x \leq 4]$

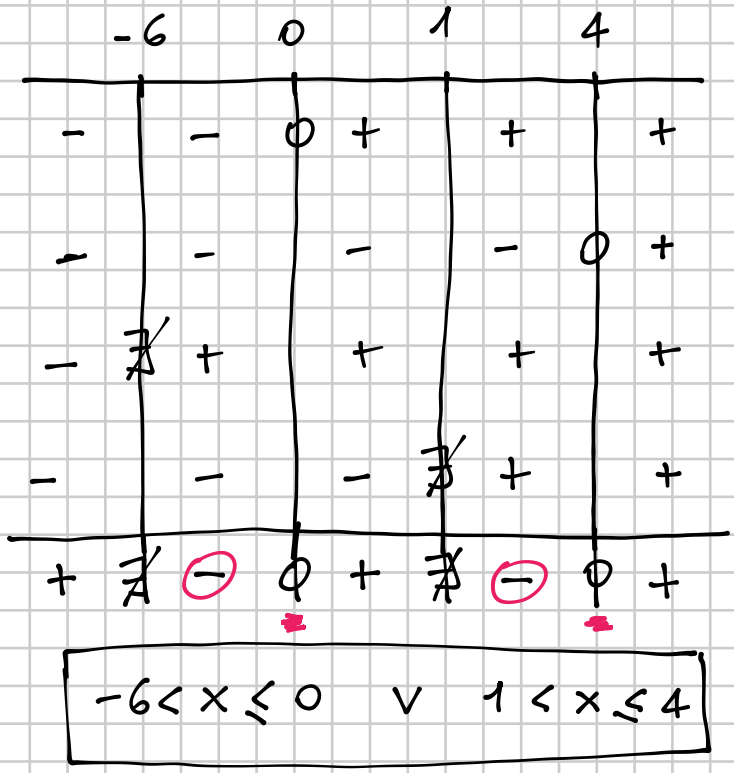
$$\frac{\overset{N_1}{x}\,\overset{N_2}{(x-4)}}{\underset{D_1}{(x+6)}\,\underset{D_2}{(x-1)}} \leq 0$$

$N_1 > 0 \quad x > 0$

$N_2 > 0 \quad x-4 > 0 \quad x > 4$

$D_1 > 0 \quad x+6 > 0 \quad x > -6$

$D_2 > 0 \quad x-1 > 0 \quad x > 1$



$-6 < x \leq 0 \quad \vee \quad 1 < x \leq 4$

256 $\dfrac{2}{2-x} > -\dfrac{x}{x-2}$ $[\forall x \in \mathbf{R} - \{2\}]$

$$\frac{2}{2-x} + \frac{x}{x-2} > 0$$

$-(x-2)$

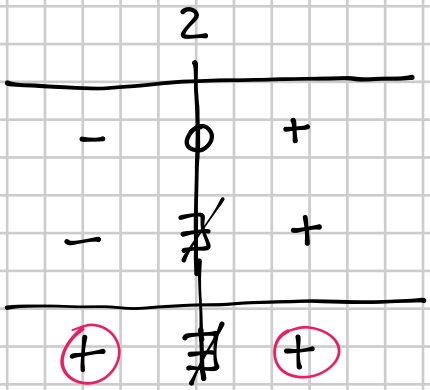
$$\frac{-2+x}{x-2} > 0$$

$$\frac{N}{D}\ \frac{x-2}{x-2} > 0$$

1] METODO STANDARD

$N > 0 \quad x-2>0 \quad x>2$

$D > 0 \quad x-2>0 \quad x>2$



$x < 2 \vee x > 2$

o più semplicemente $\forall x \in \mathbb{R} - \{2\}$

(oppure $\forall x \neq 2$)

2] ALTERNATIVO

perché $1 > 0$ è vero $[1 > 0 . x]$

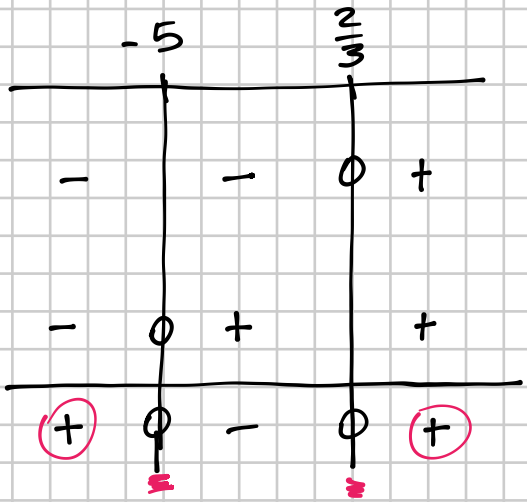
$$\frac{x-2}{x-2} > 0 \Rightarrow \begin{cases} 1 > 0 \\ x \neq 2 \end{cases} \quad \begin{cases} \forall x \in \mathbb{R} \\ x \neq 2 \end{cases} \Rightarrow \forall x \in \mathbb{R} - \{2\}$$

262 $(3x-2)(x+5) \geq 0$ $\left[x \leq -5 \vee x \geq \frac{2}{3}\right]$

N_1 N_2

$N_1 > 0 \quad 3x-2>0 \quad x > \frac{2}{3}$

$N_2 > 0 \quad x+5>0 \quad x>-5$



$x \leq -5 \quad \vee \quad x \geq \frac{2}{3}$

272 $x^2-4 > x(x^2-4)$ $[x<-2 \vee 1<x<2]$

$x^2-4 > x^3-4x$

$-x^3+x^2+4x-4>0$

$x^3-x^2-4x+4<0$

$x^2(x-1)-4(x-1)<0$

$(x-1)(x^2-4)<0$

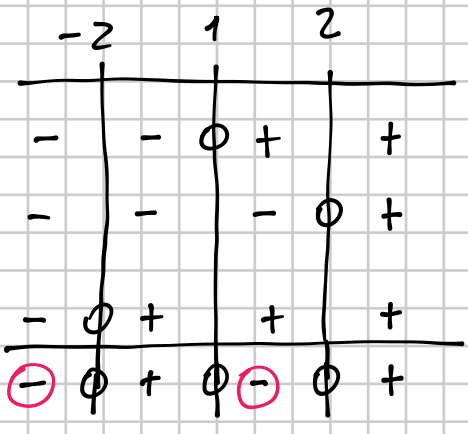
$(x-1)(x-2)(x+2)<0$ ← GUARDO L'ULTIMA

$N_1 \quad N_2 \quad N_3$

$N_1>0 \quad x-1>0 \quad x>1$

$N_2>0 \quad x-2>0 \quad x>2$

$N_3>0 \quad x+2>0 \quad x>-2$



$x<-2 \vee 1<x<2$

148 $\dfrac{25}{(x-1)^2} \geq 1$ $\quad [-4 \leq x \leq 6, \text{ con } x \neq 1]$

$$\frac{25}{(x-1)^2} - 1 \geqslant 0$$

$$\frac{25-(x-1)^2}{(x-1)^2} \geqslant 0$$

$$\frac{25-x^2-1+2x}{(x-1)^2} \geqslant 0$$

$$\frac{-x^2+2x+24}{(x-1)^2} \geqslant 0 \qquad \frac{x^2-2x-24}{(x-1)^2} \leqslant 0$$

$$\frac{(x-6)(x+4)}{(x-1)^2} \leqslant 0$$

1] METODO STANDARD

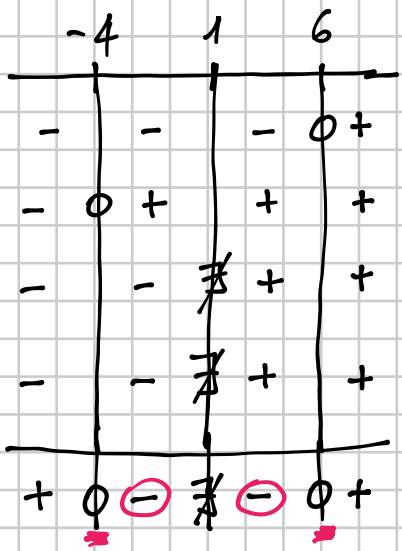
$$\frac{\overset{N_1}{(x-6)}\overset{N_2}{(x+4)}}{\underset{D_1}{(x-1)}\underset{D_2}{(x-1)}} \leqslant 0$$

$N_1 > 0 \quad x-6>0 \quad x>6$

$N_2 > 0 \quad x+4>0 \quad x>-4$

$D_1 > 0 \quad x-1>0 \quad x>1$

$D_2 > 0 \quad x-1>0 \quad x>1$



$$\boxed{-4 \leq x < 1 \quad \vee \quad 1 < x \leq 6}$$

In modo completo

$-4 \leq x \leq 6 \quad \wedge \quad x \neq 1$

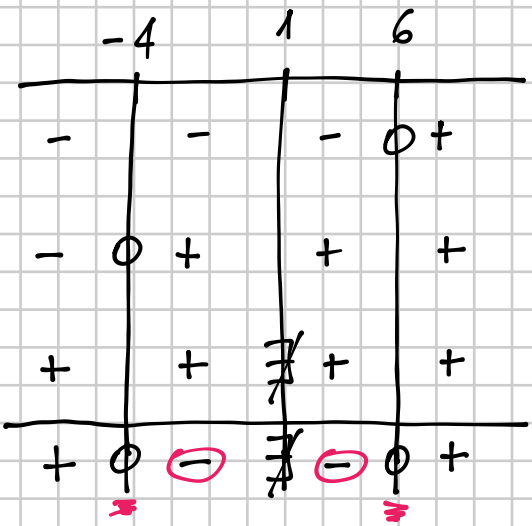
2] ALTERNATIVA

$$\frac{\overset{N_1}{(x-6)}\overset{N_2}{(x+4)}}{\underset{D}{(x-1)^2}} \leq 0$$

$N_1 > 0 \quad x-6>0 \quad x>6$

$N_2 > 0 \quad x+4>0 \quad x>-4$

$D > 0 \quad (x-1)^2>0 \quad \forall x \neq 1$



$$-4 \leq x < 1 \quad \vee \quad 1 < x \leq 6$$

SISTEMI DI DISEQUAZIONI

pg. 447

204 $\begin{cases} \frac{1}{2}(x-1) > x & \text{①} \\ 2(2-x) > 3x & \text{②} \end{cases}$ $[x < -1]$

① $\frac{1}{2}(x-1) > x$

$\frac{x-1}{2} > \frac{2x}{2}$ $\quad x - 2x > 1 \quad -x > 1 \quad x < -1$

② $4 - 2x > 3x$

$-2x - 3x > -4$

$-5x > -4$

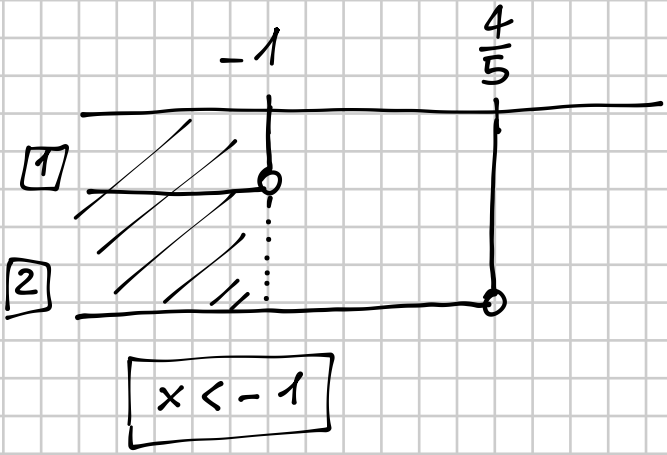
$5x < 4$

$x < \frac{4}{5}$

① $x < -1$

② $x < \frac{4}{5}$

↖ DEVO FARE ↙ L'INTERSEZIONE



$x < -1$

206 $\begin{cases} x+1>3(x-1) & \text{1} \\ -x<2(x+1) & \text{2} \end{cases}$ $\left[-\frac{2}{3}<x<2\right]$

1 $x+1>3x-3$

$x-3x>-3-1$

$-2x>-4$

$2x<4$ $\quad x<2$

2 $-x<2x+2$

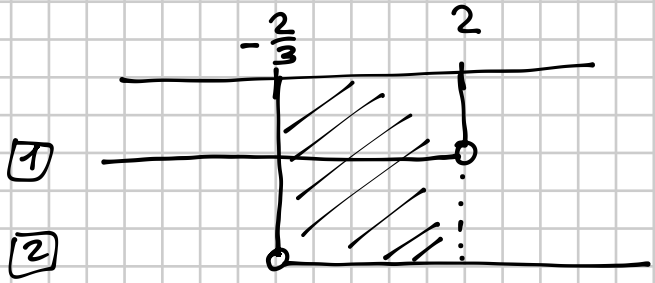
$-x-2x<2$

$-3x<2$

$3x>-2$ $\quad x>-\frac{2}{3}$

1 $x<2$

2 $x>-\frac{2}{3}$



$-\frac{2}{3}<x<2$

218 $\begin{cases} -x \geq 0 \\ 2(x+1) \geq x+1 \\ 1-(x+1) > -2 \end{cases}$ $[-1 \leq x \leq 0]$

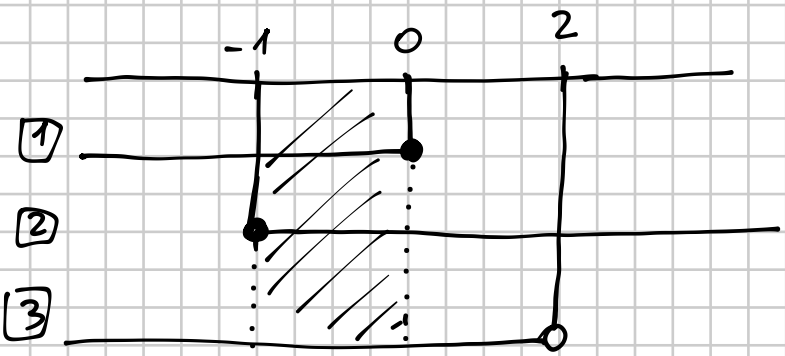
1) $-x \geq 0 \qquad x \leq 0$

2) $2x+2 \geq x+1$

$2x-x \geq 1-2 \qquad x \geq -1$

3) $1-x-1 > -2 \qquad x < 2$

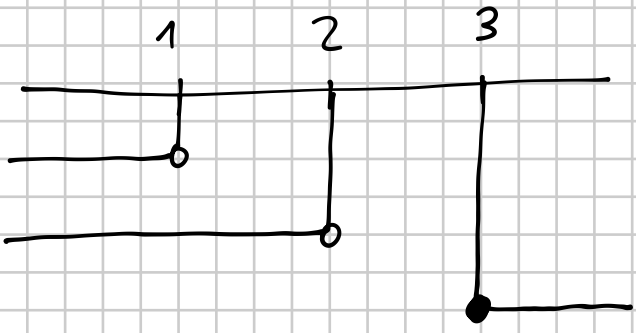
$\begin{cases} x \leq 0 \\ x \geq -1 \\ x < 2 \end{cases}$



$-1 \leq x \leq 0$

ATTENZIONE!

$\begin{cases} x < 1 \\ x < 2 \\ x \geq 3 \end{cases}$



non ci sono zone con 3 linee

INS. SOLUZIONE È $\emptyset$ $\Rightarrow$ SISTEMA IMPOSSIBILE

162

$$\begin{cases} \text{1)} \quad \dfrac{x}{x-1} \geq \dfrac{1}{2x-2} \\ \text{2)} \quad \dfrac{x-2}{3} \leq \dfrac{1-x}{2} \end{cases}$$

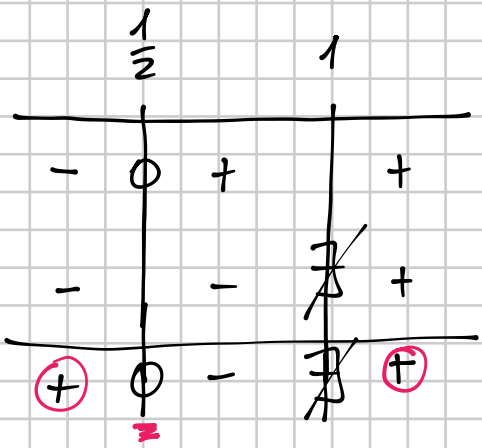
$$\left[x \leq \frac{1}{2} \vee 1 < x \leq \frac{7}{5}\right]$$

1) $\dfrac{x}{x-1} - \dfrac{1}{2x-2} \geq 0$ $\qquad$ $\dfrac{2x-1}{2(x-1)} \geq 0$

$\dfrac{2x-1}{x-1} \geq 0$

$N > 0 \quad 2x-1>0 \quad x > \frac{1}{2}$

$D > 0 \quad x-1>0 \quad x>1$



$x \leq \frac{1}{2} \quad \vee \quad x > 1$

2) $\dfrac{x-2}{3} \leq \dfrac{1-x}{2}$

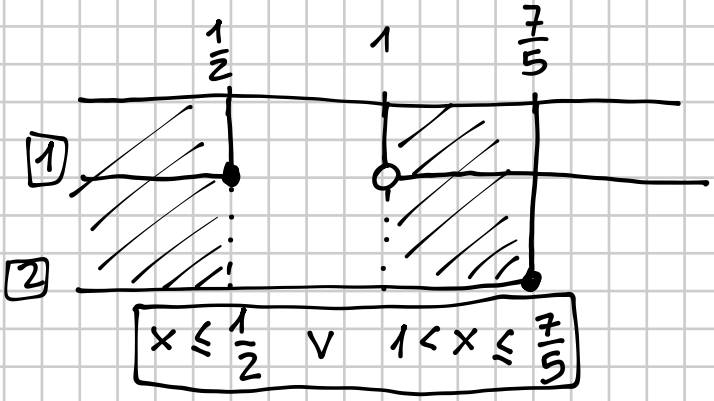
$\dfrac{2(x-2)}{6} \leq \dfrac{3(1-x)}{6}$ $\qquad$ $2x-4 \leq 3-3x$

$2x+3x \leq 3+4$

$5x \leq 7 \Rightarrow x \leq \frac{7}{5}$

1) $x \leq \frac{1}{2} \vee x > 1$

2) $x \leq \frac{7}{5}$



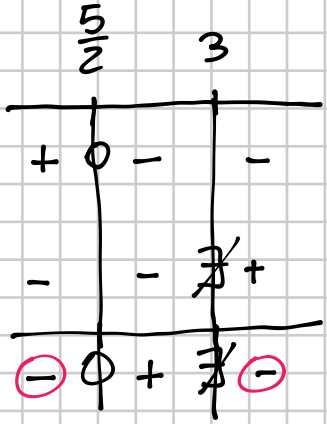
180

$$\begin{cases} \frac{1}{2x-6} < 1 + \frac{1}{x-3} & \text{①} \\ (7-2x)(5+x) \geq 0 & \text{②} \end{cases}$$

$$\left[-5 \leq x < \frac{5}{2} \vee 3 < x \leq \frac{7}{2}\right]$$

① $\frac{1}{2(x-3)} - 1 - \frac{1}{x-3} < 0 \qquad \frac{1-2(x-3)-2}{2(x-3)} < 0$

$\frac{1-2x+6-2}{x-3} < 0 \qquad \frac{N}{D}\ \frac{-2x+5}{x-3} < 0$

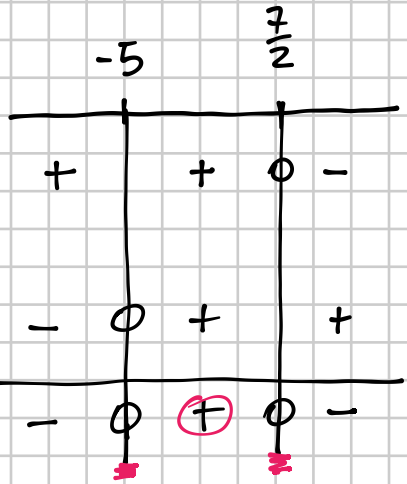


$N > 0 \quad -2x+5 > 0 \quad -2x > -5 \quad 2x < 5 \quad x < \frac{5}{2}$

$D > 0 \quad x-3 > 0 \quad x > 3$

$x < \frac{5}{2} \vee x > 3$

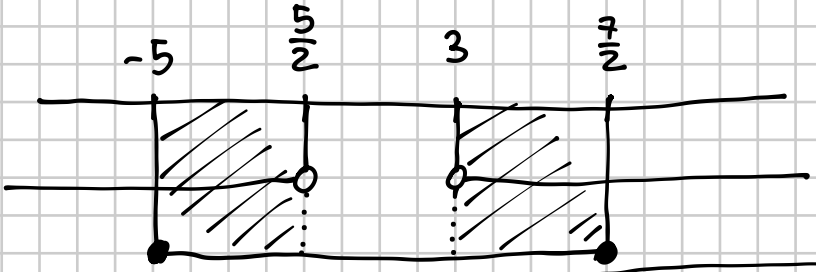
② $\underset{N_1}{(7-2x)}\underset{N_2}{(5+x)} \geq 0$



$N_1 \quad 7-2x > 0 \quad -2x > -7 \quad 2x < 7 \quad x < \frac{7}{2}$

$N_2 \quad 5+x > 0 \quad x > -5$

$-5 \leq x \leq \frac{7}{2}$



$$\begin{cases} x < \frac{5}{2} \vee x > 3 \\ -5 \leq x \leq \frac{7}{2} \end{cases}$$

$$\boxed{-5 \leq x < \frac{5}{2} \vee 3 < x \leq \frac{7}{2}}$$

181 $\begin{cases} x(x^2+x-6) \le 0 & \text{1)} \\ (-2x-1)(2x+1) \le -4x^2 & \text{2)} \end{cases}$ $[0 \le x \le 2]$

1) $x(x^2+x-6) \le 0$

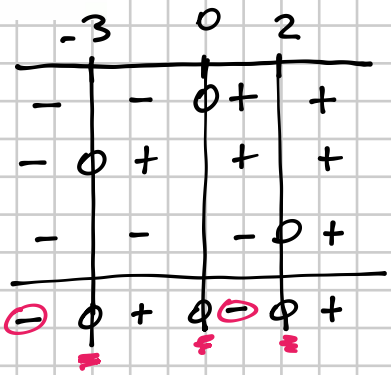
$N_1 \quad N_2 \quad N_3$

$x(x+3)(x-2) \le 0$

$N_1 > 0 \quad x > 0$

$N_2 > 0 \quad x+3>0 \quad x>-3$

$N_3 > 0 \quad x-2>0 \quad x>2$



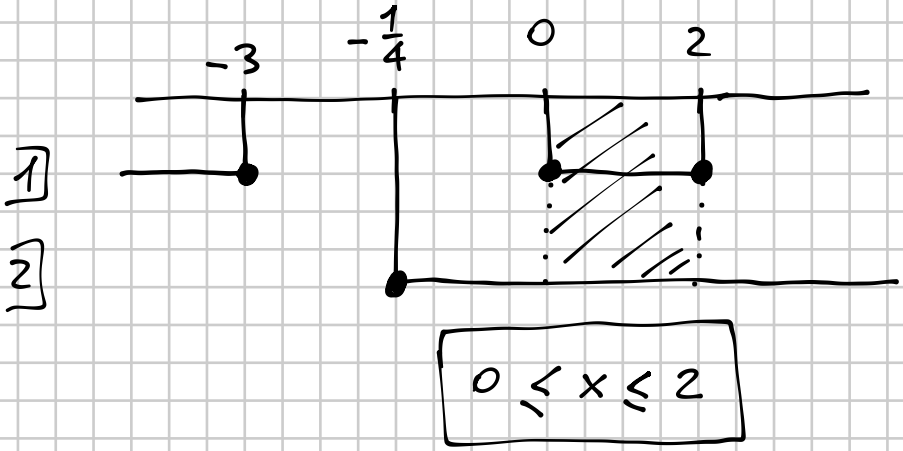
$x \le -3 \quad \vee \quad 0 \le x \le 2$

2) $-(2x+1)^2 \le -4x^2$

$-4x^2 - 1 - 4x \le -4x^2 \qquad -4x \le 1 \qquad 4x \ge -1$

$x \ge -\frac{1}{4}$

$\begin{cases} x \le -3 \quad \vee \quad 0 \le x \le 2 \\ x \ge -\frac{1}{4} \end{cases}$



$0 \le x \le 2$