

$$(f) \frac{-12}{x-4} \geq x+3$$

(c6: $x-4 \neq 0 \Leftrightarrow x \neq 4$)

$$\Leftrightarrow -\frac{12}{x-4} - (x+3) \geq 0$$

$$\Leftrightarrow \frac{-12 - (x-4)(x+3)}{x-4} \geq 0$$

$$\Leftrightarrow \frac{-12 - (x^2 - 4x + 3x - 12)}{x-4} \geq 0$$

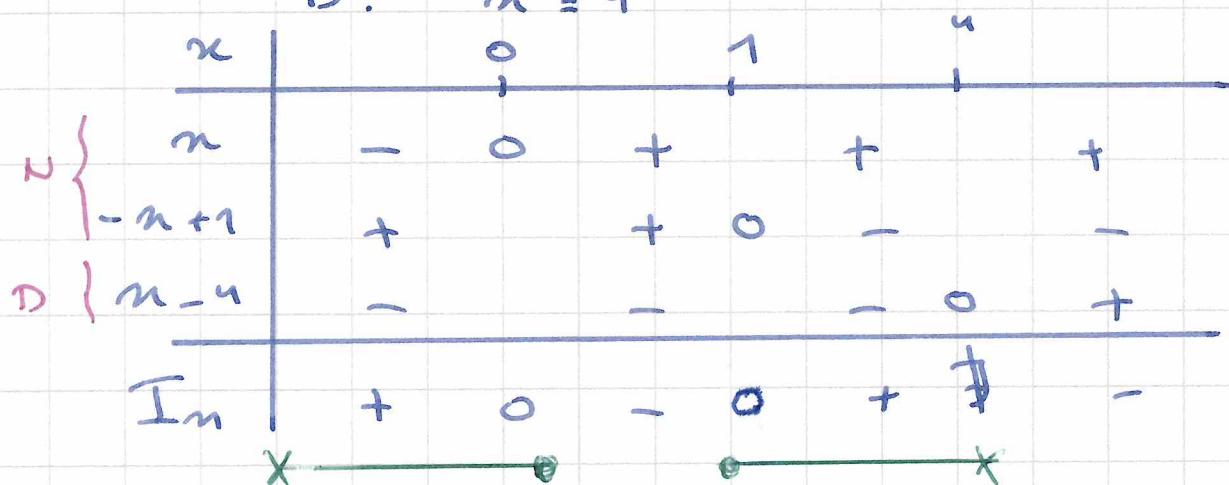
$$\Leftrightarrow \frac{-12 - x^2 + x + 12}{x-4} \geq 0$$

$$\Leftrightarrow \frac{-x^2 + x}{x-4} \geq 0$$

$$\Leftrightarrow \frac{x(-x+1)}{x-4} \geq 0$$

Zeros $\frac{N}{D}$: $x=0 ; x=1$

$D: x=4$



$$S: (-\infty, 0] \cup [1, 4]$$

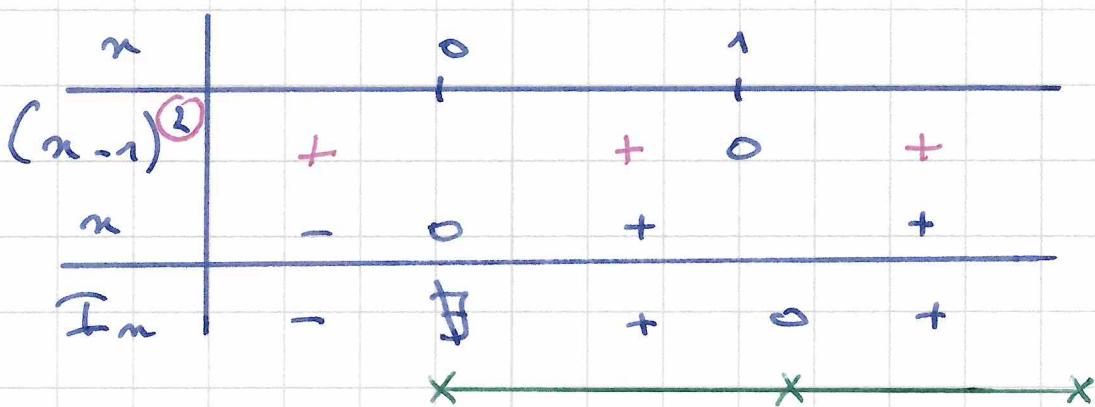
$$(g) x + \frac{1}{x} > 2$$

$$\Leftrightarrow x + \frac{1}{x} - 2 > 0 \Leftrightarrow \frac{x^2 + 1 - 2x}{x} > 0$$

$$\Leftrightarrow \frac{(x-1)^2}{x} > 0$$

zeros: N: $x=1$

D: $x=0$



$$S:]0, 1[\cup]1, +\infty$$

$$\text{ou } S: \mathbb{R}_0^+ \setminus \{1\}$$

$$(h) \frac{2x-3}{x-1} \leq x-1$$

$$\Leftrightarrow \frac{2x-3}{x-1} - x-1 \leq 0$$

$$\Leftrightarrow \frac{2x-3 - (x-1)^2}{x-1} \leq 0$$

$$\Leftrightarrow \frac{2x-3 - (x^2-2x+1)}{(x-1)} \leq 0$$

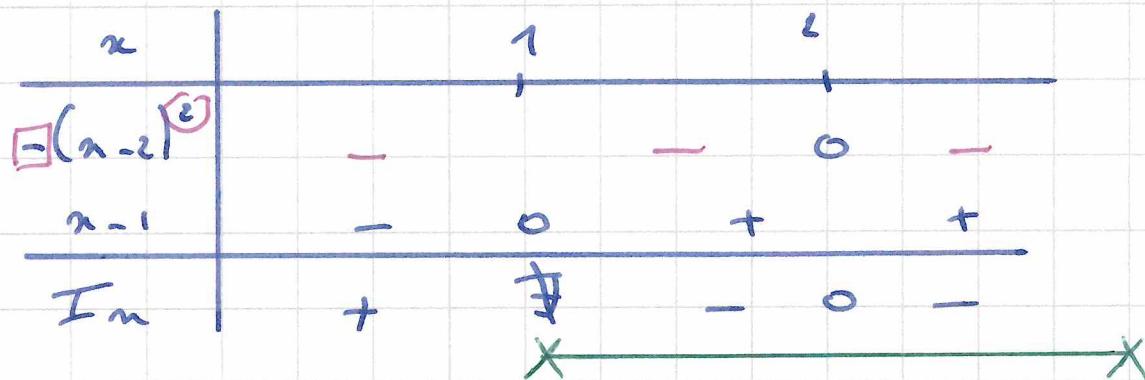
$$\Leftrightarrow \frac{-x^2+4x-4}{x-1} \leq 0$$

$$\Leftrightarrow \frac{-(x^2-4x+4)}{x-1} \leq 0$$

$$\Leftrightarrow \frac{-(x-2)^2}{x-1} \leq 0$$

Zeich: N: $x=2$

D: $x=1$



S: $]1, +\infty$

$$(i) 1 + \frac{1}{x+2} \leq \frac{x}{x-2}$$

$$\Leftrightarrow 1 + \frac{1}{x+2} - \frac{x}{x-2} \leq 0$$

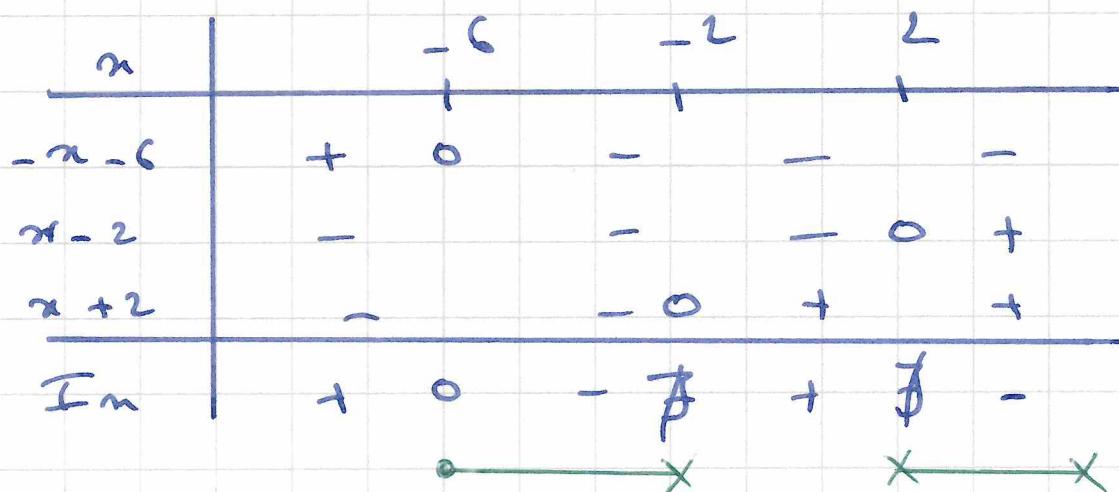
$$\Leftrightarrow \frac{(x+2)(x-2) + (x-2) - x(x+2)}{(x-2)(x+2)} \leq 0$$

$$\Leftrightarrow \frac{x^2 - 4 + x - 2 - x^2 - 2x}{D} \leq 0$$

$$\Leftrightarrow \frac{-x-6}{(x-2)(x+2)} \leq 0$$

Zeilen: N : $x = -6$

D : $x = -2, x = 2$



$$S: [-6, -2] \cup [2, +\infty)$$

$$(j) \frac{2}{(3x+2)(7x-1)} > \frac{1}{3x+2} + \frac{3}{7x-1}$$

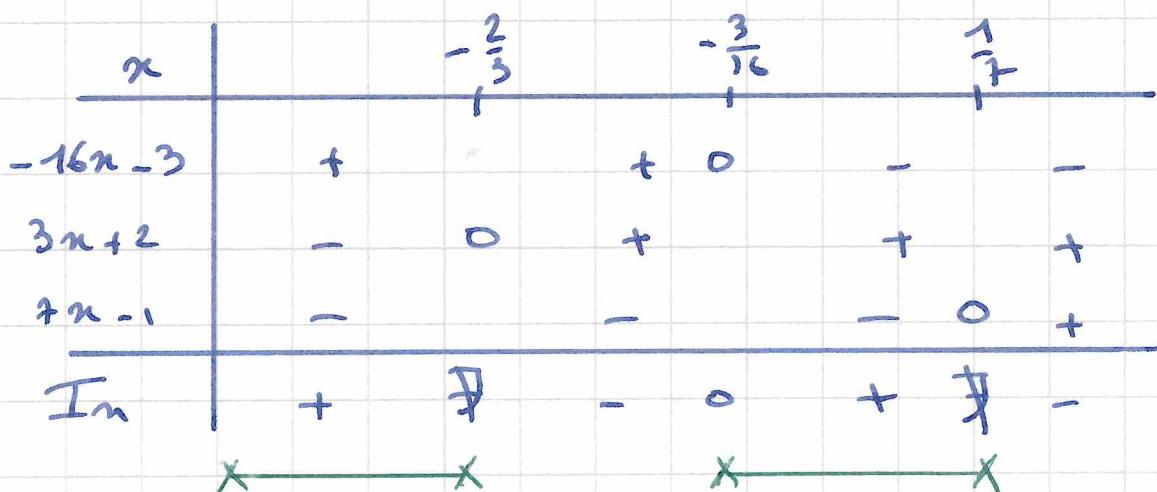
$$\Leftrightarrow \frac{2}{(3x+2)(7x-1)} - \frac{1}{3x+2} - \frac{3}{7x-1} > 0$$

$$\Leftrightarrow \frac{2 - (7x-1) - 3(3x+2)}{(3x+2)(7x-1)} > 0$$

$$\Leftrightarrow \frac{-16x - 3}{(3x+2)(7x-1)} > 0$$

Zeilen: N: $x = -\frac{3}{16}$

D: $x = -\frac{2}{3}, x = \frac{1}{7}$



S: $-\infty, -\frac{2}{3} [\cup] -\frac{3}{16}, \frac{1}{7} [$

$$(k) \frac{3}{x-2} + \frac{2}{2x^2+x-10} \geq \frac{1}{2x+5}$$

\hookrightarrow Mittern: $2x^2+x-10 = (x-2)(2x+5)$

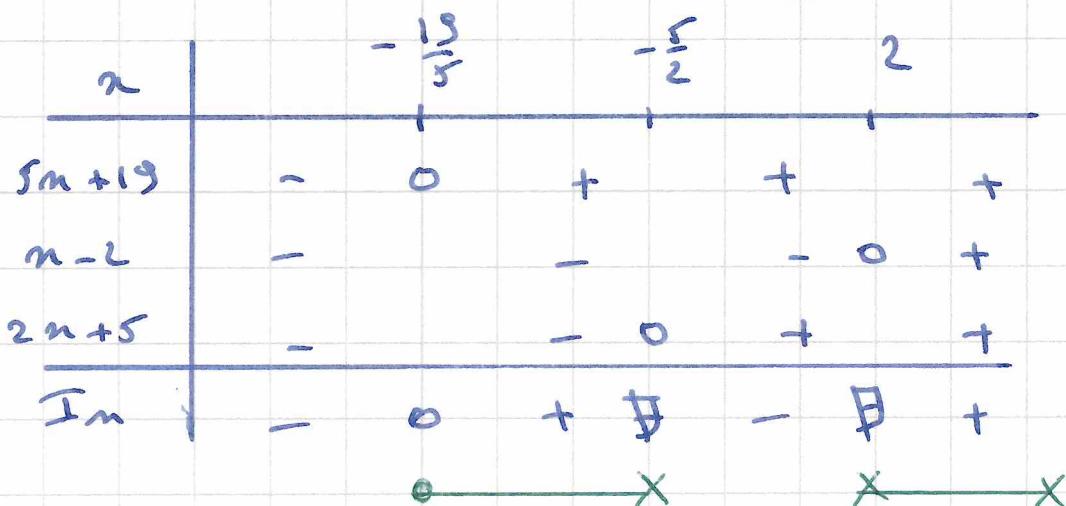
$$\Leftrightarrow \frac{3}{x-2} + \frac{2}{(x-2)(2x+5)} - \frac{1}{2x+5} \geq 0$$

$$\Leftrightarrow \frac{3(2x+5) + 2 - (x-2)}{(x-2)(2x+5)} \geq 0$$

$$\Leftrightarrow \frac{5x+19}{(x-2)(2x+5)} \geq 0$$

Zeilen: N: $x = -\frac{19}{5}$

D: $x = 2, x = -\frac{5}{2}$



S: $[-\frac{19}{5}, -\frac{5}{2}] \cup [2, +\infty)$

$$(1) \frac{x-1}{x} + \frac{x}{x-2} < \frac{4}{x^2 - 2x}$$

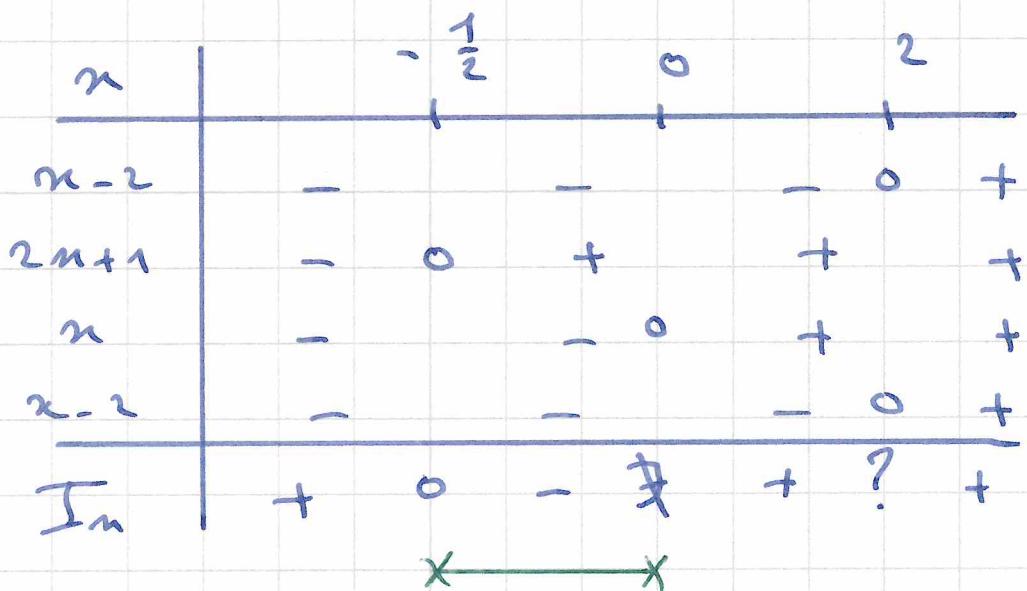
$$\Leftrightarrow \frac{x-1}{x} + \frac{x}{x-2} - \frac{4}{x(x-2)} < 0$$

$$\Leftrightarrow \frac{(x-1)(x-2) + x^2 - 4}{x(x-2)} < 0$$

$$\Leftrightarrow \frac{x^2 - 3x + 2 + x^2 - 4}{x(x-2)} < 0$$

$$\Leftrightarrow \frac{2x^2 - 3x - 2}{x(x-2)} < 0$$

zeros N: $x = 2, x = -\frac{1}{2}$ (Horner)
D: $x=0, x=2$ $(x-2)(2x+1)$



$$S:]-\frac{1}{2}, 0[$$

$$(m) \frac{x+1}{2x+4} + \frac{1}{x+1} < \frac{1}{x^2+3x+2}$$

\hookrightarrow Horner $(x+2)(x+1)$

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

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

$$\Leftrightarrow \frac{x^2 + 2x + 1 + 2x + 4 - 2}{D} < 0$$

$$\Leftrightarrow \frac{x^2 + 4x + 3}{2(x+2)(x+1)} < 0$$

Zeileis: N: $x = -3, x = -1$ (Horner)
 $(x+3)(x+1)$

$$D: n = -2, x = -1$$

x	-3	-2	-1
$x+3$	-	+	+
$x+1$	-	-	0
$x+2$	-	-	+
$x+1$	-	-	0
I_n	+	0	-

\times

$$S:]-3, -2[$$

$$(n) \frac{2}{3x-1} - \frac{-1}{2x-1} > \frac{1}{(3x-1)(2x-1)}$$

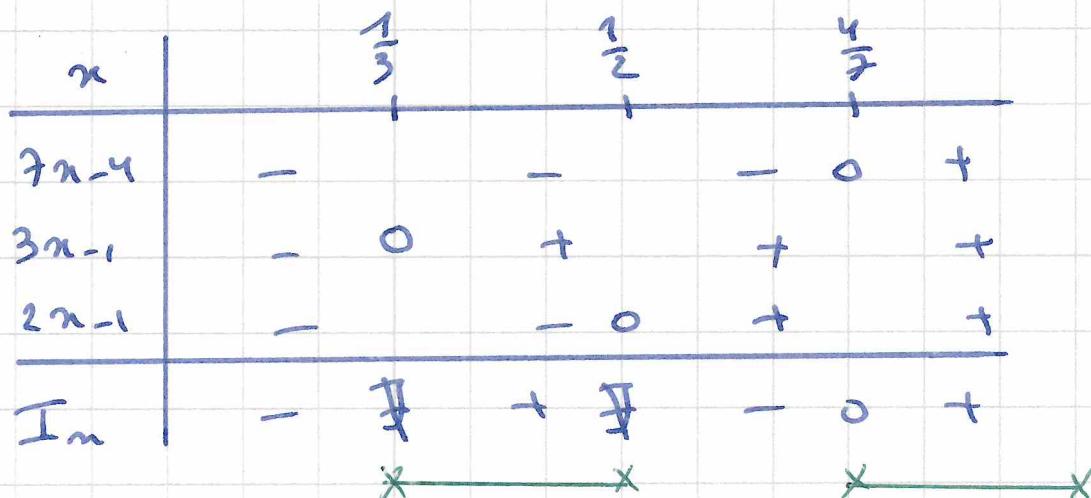
$$\Leftrightarrow \frac{2}{3x-1} + \frac{+1}{2x-1} - \frac{1}{(3x-1)(2x-1)} > 0$$

$$\Leftrightarrow \frac{2(2x-1) + (3x-1) - 1}{(3x-1)(2x-1)} > 0$$

$$\Leftrightarrow \frac{7x-4}{(3x-1)(2x-1)} > 0$$

zeile: N: $x = \frac{4}{7}$

$$D: x = \frac{1}{2}, x = \frac{1}{3}$$



$$S:]\frac{1}{3}, \frac{1}{2}[\cup]\frac{4}{7}, +\infty]$$

$$(o) \frac{-1}{x+3} - \frac{2}{x-1} \geq \frac{1}{x^2 + 2x - 3}$$

\hookrightarrow Manner: $(x+3)(x-1)$

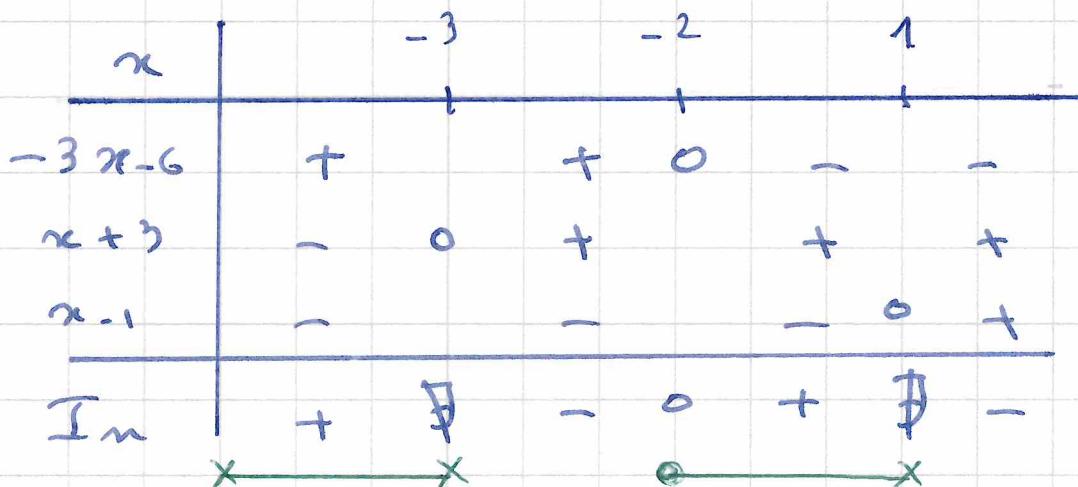
$$\Leftrightarrow \frac{-1}{x+3} - \frac{2}{x-1} - \frac{1}{(x+3)(x-1)} \geq 0$$

$$\Leftrightarrow \frac{-(x-1) - 2(x+3) - 1}{(x+3)(x-1)} \geq 0$$

$$\Leftrightarrow \frac{-3x - 6}{(x+3)(x-1)} \geq 0$$

gerade $N \quad n = -2$

D $n = 1, \quad n = -3$



$$S: -\infty, -3] \cup [-2, 1[$$