7/3/2022

432 $\dfrac{x}{x^2-1}-\dfrac{7}{3x+6}>\dfrac{1}{x^2+3x+2}$

$$\frac{x}{\underset{(x-1)(x+1)}{x^2-1}}-\frac{7}{\underset{3(x+2)}{3x+6}}-\frac{1}{\underset{(x+2)(x+1)}{x^2+3x+2}}>0$$

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

$$\frac{3x^2+6x-7x^2+7-3x+3}{\cancel{3}(x-1)(x+1)(x+2)}>0$$

$$\frac{-4x^2+3x+10}{(x-1)(x+1)(x+2)}>0 \qquad \frac{\overset{N}{4x^2-3x-10}}{\underset{D_1}{(x-1)}\underset{D_2}{(x+1)}\underset{D_3}{(x+2)}}<0$$

$N>0 \quad 4x^2-3x-10>0$

$$x=\frac{3\pm13}{8}= \begin{cases} -\frac{10}{8}=-\frac{5}{4} \\ 2 \end{cases}$$

$\Delta=9+160=169$ $\qquad x<-\frac{5}{4} \vee x>2$

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

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

$D_3>0 \quad x+2>0 \qquad x>-2$

		-2		$-\frac{5}{4}$		-1		1		2	
N	+		+	0	−		−		−	0	+
D_1	−		−		−		−	∄	+		+
D_2	−		−		−	∄	+		+		+
D_3	−	∄	+		+		+		+		+
	−	∄	+	0	−	∄	+	∄	−	0	+

$$\boxed{x<-2 \quad \vee \quad -\frac{5}{4}<x<-1 \quad \vee \quad 1<x<2}$$

433 $\dfrac{1}{x^2-2x+1}-\dfrac{1}{x^2-1}>\dfrac{1}{x+1}-\dfrac{1}{x-1}$

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

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

$$\cancel{x}+\cancel{1}-\cancel{x}+\cancel{1}-\cancel{x^2}-\cancel{1}+2x+\cancel{x^2}-\cancel{1}$$

$$\frac{\overset{N}{2x}}{\underset{D_1}{(x-1)^2}\,\underset{D_2}{(x+1)}}>0$$

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

D_1 $\quad (x-1)^2>0 \qquad x\neq 1$

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

		-1		0		1	
N	$-$		$-$	0	$+$		$+$
D_1	$+$		$+$		$+$	$\nexists$	$+$
D_2	$-$	$\nexists$	$+$		$+$		$+$
	$+$	$\nexists$	$-$	0	$+$	$\nexists$	$+$

$x<-1 \quad \vee \quad 0<x<1 \quad \vee \quad x>1$

$$\boxed{x<-1 \quad \vee \quad x>0 \quad \wedge \quad x\neq 1}$$

463 $\begin{cases} \dfrac{x}{x^2-1} \geq 0 \\ 2x^2 - 3x - 2 \leq 0 \end{cases}$ $\left[-\dfrac{1}{2} \leq x \leq 0 \vee 1 < x \leq 2\right]$

1) $\dfrac{\overset{N}{x}}{\underset{D}{x^2-1}} \geq 0$

$N \geq 0 \quad x \geq 0$

$D > 0 \quad x^2 - 1 > 0 \quad x < -1 \vee x > 1$

		-1		0		1	
N	$-$		$-$	0	$+$		$+$
D	$+$	$\nexists$	$-$		$-$	$\nexists$	$+$
	$-$	$\nexists$	$+$	0	$-$	$\nexists$	$+$

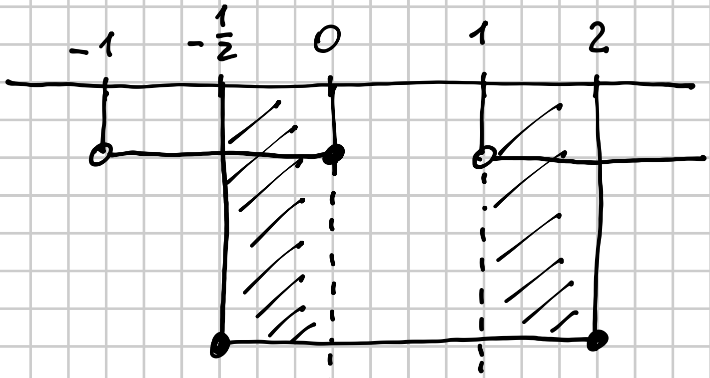
$-1 < x \leq 0 \quad \vee \quad x > 1$

2) $2x^2 - 3x - 2 \leq 0 \qquad -\dfrac{1}{2} \leq x \leq 2$

$\Delta = 9 + 16 = 25$

$x = \dfrac{3 \pm 5}{4} = \begin{cases} -\dfrac{2}{4} = -\dfrac{1}{2} \\ 2 \end{cases}$

$\begin{cases} -1 < x \leq 0 \quad \vee \quad x > 1 \\ \\ -\dfrac{1}{2} \leq x \leq 2 \end{cases}$



$\boxed{-\dfrac{1}{2} \leq x \leq 0 \quad \vee \quad 1 < x \leq 2}$

478 $\begin{cases} x^2+\sqrt{2}\,x>6 \\ \dfrac{x}{x-1}>\dfrac{2x}{x^2+3x-4} \end{cases}$ $\left[x<-4 \vee x>\dfrac{\sqrt{26}-\sqrt{2}}{2}\right]$

① $x^2+\sqrt{2}x-6>0$

$\Delta=(\sqrt{2})^2-4(-6)=2+24=26$

$x=\dfrac{-\sqrt{2}\pm\sqrt{26}}{2}$ $\qquad x<\dfrac{-\sqrt{2}-\sqrt{26}}{2} \vee x>\dfrac{-\sqrt{2}+\sqrt{26}}{2}$

② $\dfrac{x}{x-1}-\dfrac{2x}{(x+4)(x-1)}>0$

$\dfrac{x^2+4x-2x}{(x-1)(x+4)}>0$

$\dfrac{\overset{N}{x^2+2x}}{\underset{D_1}{(x-1)}\underset{D_2}{(x+4)}}>0$

$N>0 \quad x^2+2x>0 \quad x(x+2)>0 \quad x<-2 \vee x>0$

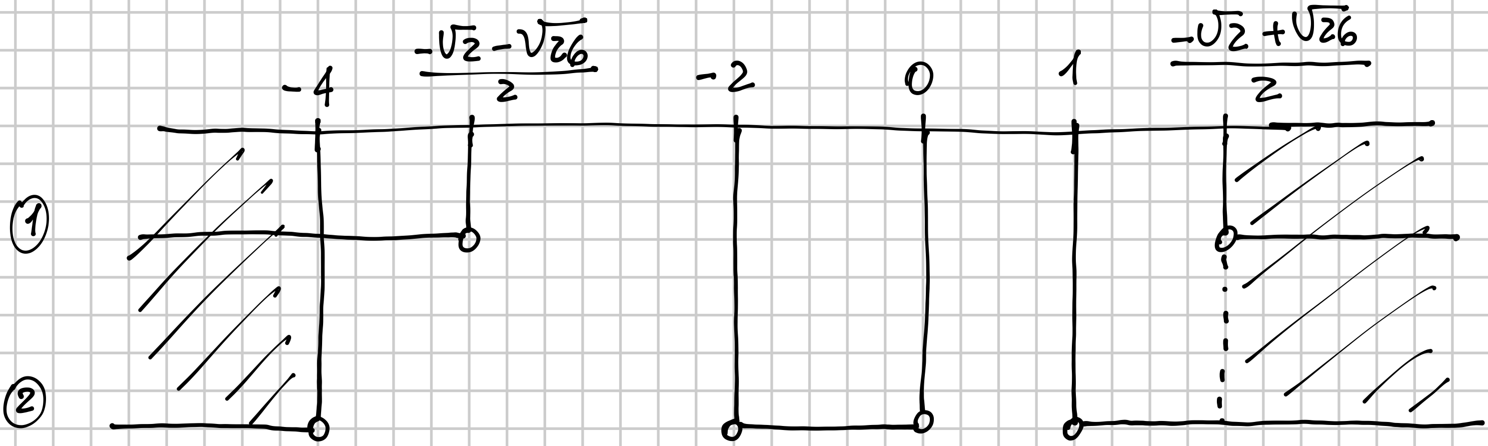
$D_1>0 \quad x-1>0 \quad x>1$

$D_2>0 \quad x+4>0 \quad x>-4$

	-4		-2		0		1	
+		+	0	−	0	+		+
−		−		−		−	∄	+
−	∄	+		+		+		+
(+)	∄	−	0	(+)	0	−	∄	(+)

$x<-4 \vee -2<x<0 \vee x>1$

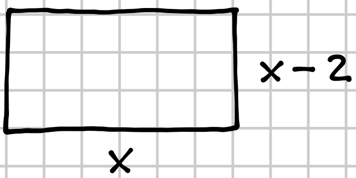
$$\begin{cases} (1)\quad x < \dfrac{-\sqrt{2}-\sqrt{26}}{2} \quad \vee \quad x > \dfrac{-\sqrt{2}+\sqrt{26}}{2} \\[2em] (2)\quad x < -4 \quad \vee \quad -2 < x < 0 \quad \vee \quad x > 1 \end{cases}$$



$$\boxed{x < -4 \quad \vee \quad x > \dfrac{-\sqrt{2}+\sqrt{26}}{2}}$$

593 In un rettangolo la misura x della base (in centimetri) supera di 2 la misura (sempre in cm) dell'altezza. Determina x in modo che il perimetro del rettangolo sia maggiore di 10 cm e l'area minore di 24 cm^2.

$$\left[\frac{7}{2} < x < 6\right]$$



C.E.

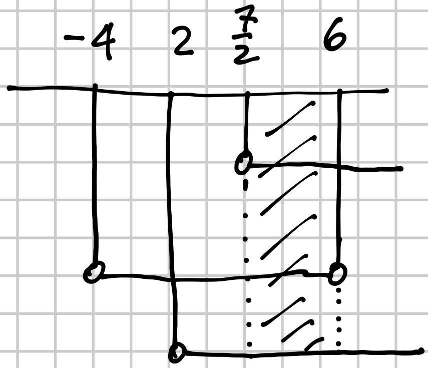
$$\begin{cases} x > 0 \\ x - 2 > 0 \end{cases} \Rightarrow \begin{cases} x > 0 \\ x > 2 \end{cases} \Rightarrow x > 2$$

$$2p = [x + (x-2)] \cdot 2 = [x + x - 2] \cdot 2 = 4x - 4$$

$$\mathcal{A} = x(x-2) = x^2 - 2x$$

$$\begin{cases} 4x - 4 > 10 \\ x^2 - 2x < 24 \\ x > 2 \end{cases} \qquad \begin{cases} 4x > 14 \\ x^2 - 2x - 24 < 0 \\ x > 2 \end{cases} \qquad \begin{cases} x > \frac{7}{2} \\ -4 < x < 6 \\ x > 2 \end{cases}$$

C.E.



$$x^2 - 2x - 24 < 0$$

$$\frac{\Delta}{4} = 1 + 24 = 25$$

$$x = 1 \pm 5 = \begin{cases} -4 \\ 6 \end{cases}$$

$$\boxed{\frac{7}{2} < x < 6}$$