23/2/2022

374 $\dfrac{x-3}{-x^2+x+6} \leq 0$ $\qquad [x > -2 \wedge x \neq 3]$

$$\frac{\overset{\boxed{N}}{x-3}}{\underset{\boxed{D}}{x^2-x-6}} \geq 0$$

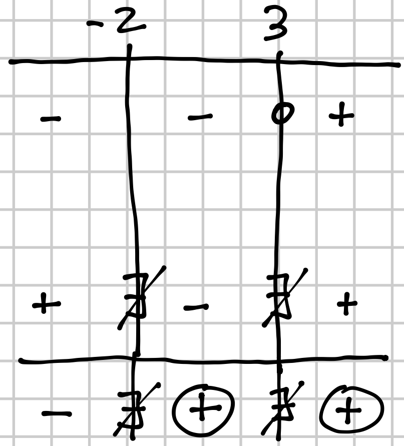
$N > 0 \qquad x-3>0 \qquad x>3$

$D > 0 \qquad x^2-x-6>0$

$(x-3)(x+2)>0 \qquad x<-2 \vee x>3$

$x_1=-2$

$x_2=3$



$$\boxed{-2<x<3 \vee x>3}$$

oppure $x>-2 \wedge x\neq 3$

OSSERVAZIONE IMPORTANTE

$\dfrac{x-3}{x^2-x-6} \geq 0 \qquad \dfrac{x-3}{(x-3)(x+2)} \geq 0$ è sbagliato semplificare

$\dfrac{\cancel{x-3}}{\cancel{(x-3)}(x+2)} \geq 0 \Rightarrow \dfrac{1}{x+2} \geq 0$

perché perdo $x \neq 3$

si può se scrivo $x\neq 3$

372 $\dfrac{x^2}{x^2-4} \geq 0$ $\quad [x = 0 \vee x < -2 \vee x > 2]$

N: x^2

D: x^2-4

$N > 0 \qquad x^2 > 0 \qquad x \neq 0$

$D > 0 \qquad x^2 - 4 > 0 \qquad x < -2 \vee x > 2$

$x_1 = -2$

$x_2 = 2$

		-2		0		2	
N	+		+	0	+		+
D	+	∄	−		−	∄	+
	+	∄	−	0	−	∄	+

$$\boxed{x < -2 \vee x > 2 \vee x = 0}$$

$\dfrac{x^2}{x^2-4}$ è maggiore o uguale a 0 se $x < -2$, o $x > 2$ o $x = 0$

N_1

382 $\dfrac{x^2-3x}{(x+1)(x^2+x-2)} \leq 0$

D_1 D_1 $[x<-2 \vee -1<x\leq 0 \vee 1<x\leq 3]$

$N_1>0$ $x^2-3x>0$ $x(x-3)>0$ $x<0 \vee x>3$

$x_1=0$

$x_2=3$

$D_1>0$ $x+1>0$ $x>-1$ $D_2>0$ $x^2+x-2>0$

$(x+2)(x-1)>0$

$x_1=-2$

$x_2=1$ $x<-2 \vee x>1$

		-2		-1		0		1		3	
N_1 $x<0 \vee x>3$	$+$		$+$		$+$	0	$-$		$-$	0	$+$
D_1 $x>-1$	$-$		$-$	$\nexists$	$+$		$+$		$+$		$+$
D_2 $x<-2 \vee x>1$	$+$	$\nexists$	$-$		$-$		$-$	$\nexists$	$+$		$+$
	$-$	$\nexists$	$+$	$\nexists$	$-$	0	$+$	$\nexists$	$-$	0	$+$

$$\boxed{x<-2 \vee -1<x\leq 0 \vee 1<x\leq 3}$$

$$\overset{N_1}{}\qquad\overset{N_2}{}$$

387 $\dfrac{(x^2-1)^2(x^2-4x)^3}{2x^2+1} \geq 0 \qquad [x \leq 0 \vee x = 1 \vee x \geq 4]$

D_1

$N_1 > 0 \qquad (x^2-1)^2 > 0 \qquad x^2-1 \neq 0 \qquad x \neq \pm 1$

$N_2 > 0 \qquad (x^2-4x)^3 > 0 \qquad x^2-4x > 0 \qquad x<0 \vee x>4$

$x(x-4) > 0$

$x_1 = 0$

$x_1 = 4$

$D_1 > 0 \qquad 2x^2+1 > 0 \qquad \forall x \in \mathbb{R}$

$\Delta = 0^2 - 4 \cdot 2 \cdot 1 = -8 < 0$

		-1		0		1		4	
$N_1 > 0 \quad x \neq \pm 1$	+	0	+		+	0	+		+
$N_2 > 0 \quad x<0 \vee x>4$	+		+	0	−		−	0	+
$D_1 > 0 \quad \forall x \in \mathbb{R}$	+		+		+		+		+
	+	0	+	0	−	0	−	0	+
		$\geq$		$\geq$		$\geq$		$\geq$	

$x \leq -1 \vee -1 \leq x \leq 0 \vee x = 1 \vee x \geq 4$

$$\boxed{x \leq 0 \vee x = 1 \vee x \geq 4}$$

388 $\dfrac{\overset{N_1}{(x^2-x+1)^4}\,\overset{N_2}{(-x^2-1)^3}}{\underset{D_1}{(x^2-4)^2}} < 0 \qquad [\forall x \in \mathbf{R} - \{\pm 2\}]$

$N_1 > 0 \quad (x^2 - x + 1)^4 > 0 \qquad x^2 - x + 1 \neq 0 \qquad \forall x \in \mathbb{R}$

$\Delta = (-1)^2 - 4 \cdot 1 \cdot 1 = -3 < 0$

$N_2 > 0 \quad (-x^2 - 1)^3 > 0 \qquad -x^2 - 1 > 0 \qquad x^2 + 1 < 0 \qquad \emptyset$

$\Delta < 0 \qquad \Downarrow$

SIGNIFICA CHE $(-x^2-1)^3$ NON È MAI >0, QUINDI È SEMPRE <0 (NON È MAI NEANCHE $=0$)

$D_1 > 0 \quad (x^2 - 4)^2 > 0 \qquad x^2 - 4 \neq 0 \qquad x \neq \pm 2$

			-2		2	
$N_1 > 0$	$\forall x \in \mathbb{R}$	$+$		$+$		$+$
$N_2 > 0$	$\emptyset$	$-$		$-$		$-$
$D_1 > 0$	$x \neq \pm 2$	$+$	$\nexists$	$+$	$\nexists$	$+$
		$-$	$\nexists$	$-$	$\nexists$	$-$

$x \neq \pm 2 \qquad \forall x \neq \pm 2 \qquad x \in \mathbb{R} - \{\pm 2\}$

modi alternativi di scrivere