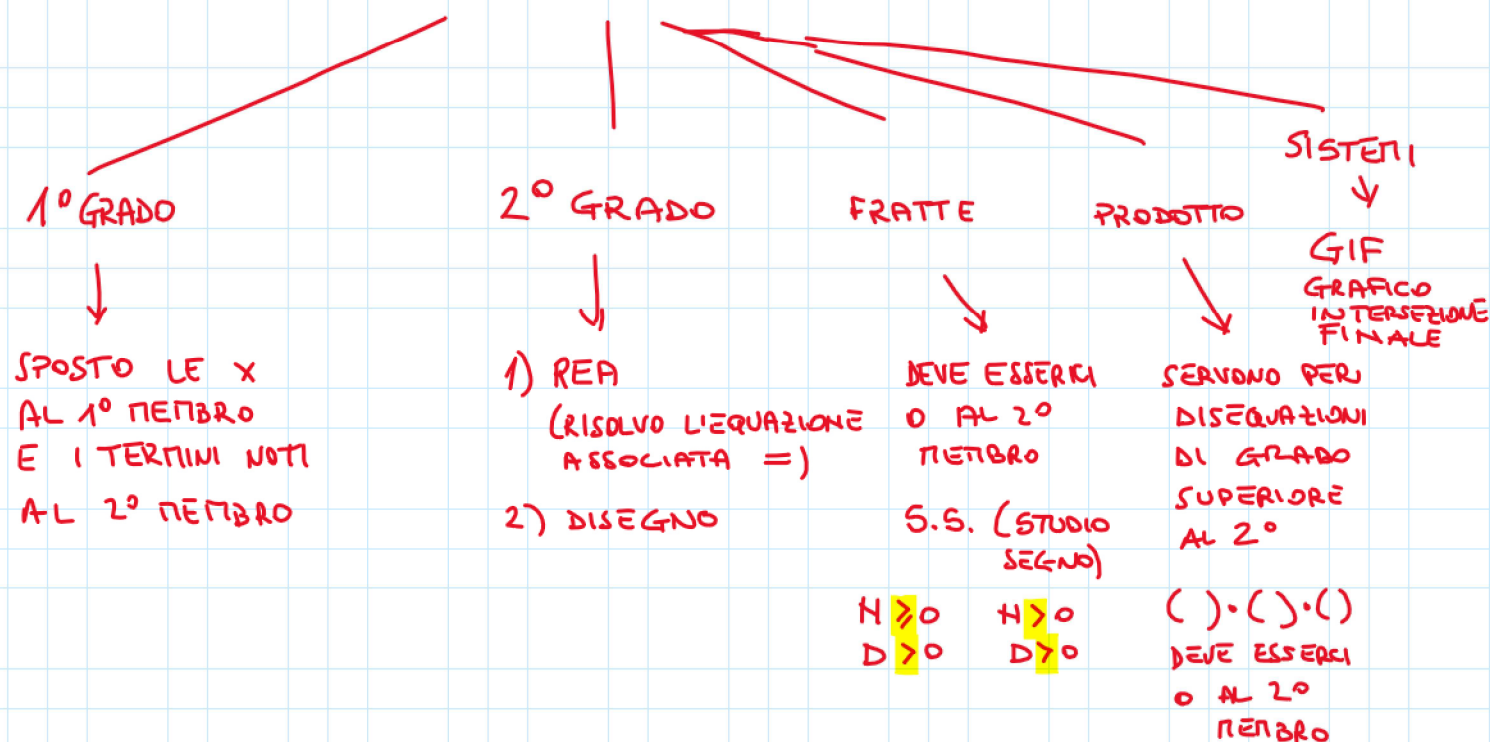


DISEQUAZIONI



2° GRADO

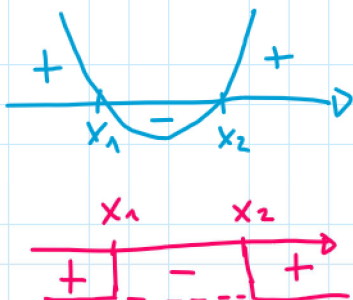
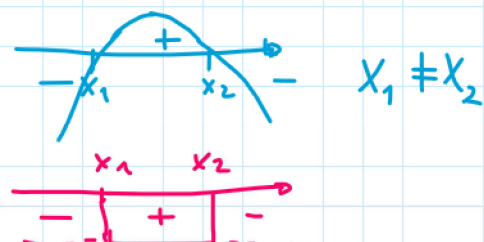
FORMA

$$\left. \begin{array}{l} ax^2 + bx + c \\ ax^2 + bx \\ ax^2 + c \\ ax^2 \end{array} \right\}$$

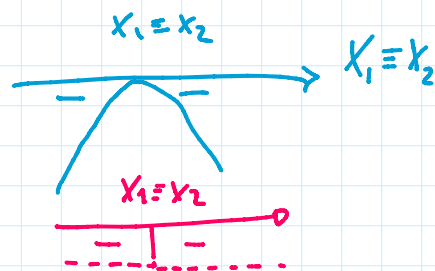
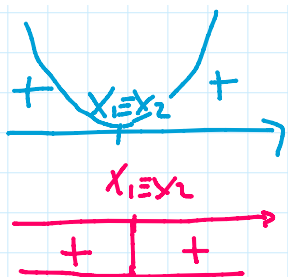
$$\left\{ \begin{array}{l} \geq 0 \\ \leq 0 \\ > 0 \\ < 0 \end{array} \right.$$

 Δ

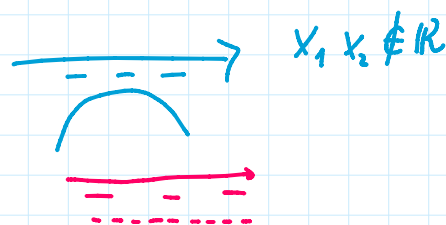
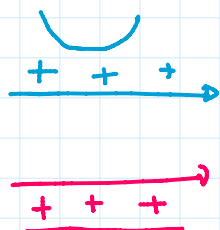
RACCOLGO X
SPOSTO C

COMANDA a ("NUMERO DI x^2 ") $a +$ $x_1 \neq x_2$  $a =$ 

$$x_1 \equiv x_2$$



$$x_1, x_2 \notin \mathbb{R}$$



DISQUAZIONI

$$(f(x))^{2m} \text{ (PARI)}$$

$$(f(x))^{2m+1} \text{ (DISPARI)}$$

$$(f(x))^{2m} \geq 0 \quad \forall x \in \mathbb{R}$$

$$(f(x))^{2m} > 0 \quad \forall x \in \mathbb{R} \quad f(x) \neq 0$$

$$(f(x))^{2m} \leq 0 \Rightarrow f(x) = 0$$

$$(f(x))^{2m} < 0 \quad \emptyset$$

$$(f(x))^{2m+1} \geq 0 > 0 < 0 \leq 0 \text{ CONTRA}$$

$(f(x)) \geq 0 > 0 < 0 \leq 0$ CONTA SOLO $f(x)$
 $f(x) \geq 0 > 0 < 0 \leq 0$ TALGO L'ESPON.

$$(f(x))^{2m} + K \geq 0 \quad \forall x \in \mathbb{R} \quad (K \in \mathbb{R}^+)$$

$$x^4 + \sqrt{7} \geq 0 \quad \forall x \in \mathbb{R}$$

$$(f(x))^{2m} + K > 0 \quad \forall x \in \mathbb{R} \quad (K \in \mathbb{R}^+)$$

$$x^{12} + 1 > 0 \quad \forall x \in \mathbb{R}$$

$$(f(x))^{2m} + K < 0 \leq 0 \quad \phi \quad (K \in \mathbb{R}^+)$$

$$x^2 + 8 < 0 \quad \phi$$

$$x^6 + 18 \leq 0 \quad \phi$$

$\neq$

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

$$2) \frac{x^2 - 3x}{x^2 + 2} > 0$$

$$2) \quad x^3 \quad x^2 \quad 10x \quad 0 \quad \dots$$

$$1) \quad x^3 \quad \dots \quad \dots$$

$$3) X^3 + X^2 - 10X + 8 > 0$$

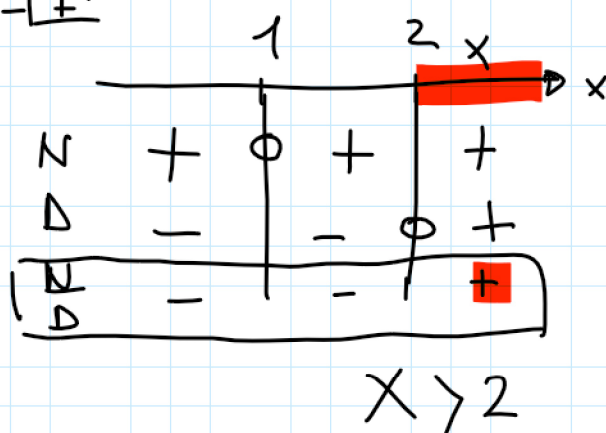
$$4) X^3 - 3X + 2 > 0$$

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

$$N > 0 \quad X^2 - 2X + 1 > 0 \quad (X-1)^2 > 0 \quad \forall X \in \mathbb{R}$$

$$D > 0 \quad X - 2 > 0 \quad X > 2 \quad \xrightarrow{-1+2}$$

S.S.

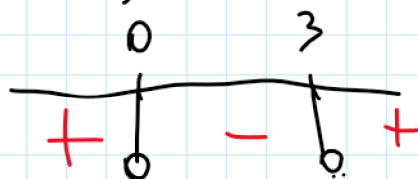


$$\frac{X^2 - 3X}{X^2 + 2} > 0 \quad \text{S.S.}$$

$$N > 0 \quad + X^2 - 3X > 0 \quad \text{REA}$$

$$X^2 - 3X = 0$$

$$X(X-3) = 0 \quad \begin{matrix} X=0 \\ X=3 \end{matrix}$$



$$D > 0 \quad X^2 + 2 > 0 \quad \forall X \in \mathbb{R}$$

S.S.

	0	3	
N	+	-	+
D	+	+	+
<u>N</u>	+	-	+
<u>D</u>			

$X < 0 \vee X > 3$

$$X^3 + X^2 - 10X + 8 > 0$$

1 1 -10 8

0

DEVO SCOMPORRE
() • ()

RUFFINI

1

"X ³ "	"X ² "	"X"	TERMINE NOTO
1	1	-10	8
1	1	2	-8
1	2	-8	0

CI RIPETTO LA X CON UN GRADO IN PIU' . ERA X³ PARTO DA X²

1 X² + 2X - 8 LO MOLTIPLICO PER

$$(X^2 + 2X - 8) \cdot (X - 1)$$

$$X - 1$$

↑ ASSO

$$(X^2 + 2X - 8) \cdot (X - 1) > 0$$

F₁ F₂

S.S.

$$F_1 > 0 \rightarrow X^2 + 2X - 8 > 0 \text{ REA}$$

$$X^2 + 2X - 8 = 0 \quad \Delta = 4 + 32 = 36$$

$$X_{1,2} = \frac{-2 \pm 6}{2} \quad \begin{cases} X_1 = 2 \\ X_2 = -4 \end{cases}$$

$$x_{1,2} = \frac{-(-4) \pm 0}{2} < \begin{matrix} x_1 = 4 \\ x_2 = -4 \end{matrix}$$

$$f_2 \quad x-1 > 0 \quad x > 1 \quad \frac{1}{-1+} \rightarrow$$

	-4	1	2	
f_1	+	-	-	+
f_2	-	-	+	+
PRODOTO	-	+	-	+

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

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

	x^3	x^2	x	l.m.
1	1	0	-3	2
		1	1	-2
			1	-2
				0

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

$$f_1 > 0 \quad x^2 + x - 2 > 0 \quad \text{REA} \quad x^2 + x - 2 = 0 \quad \begin{matrix} x_1 = 1 \\ x_2 = -2 \end{matrix} \quad \frac{-2 \quad 1}{+0-0+}$$

$$f_2 > 0 \quad x > 1 \quad \frac{1}{-1+} \rightarrow$$

	-2	1	
f_1	+	-	+
f_2	-	-	+
P	-	+	+

$$x > -2 \wedge x \neq 1$$

$$1) \quad \frac{x^3 - 2x^2 - 3x + 6}{x^4 + 8x - x^3 - 8} \leq 0$$

$$2) \quad \frac{x^3 - x^2 + 2x - 8}{2x^3 - x^2 - 5x - 2} > 0$$

$$c) \frac{2x^3 - x^2 - 5x - 2}{x^4}$$

$$\frac{x^3 - 2x^2 - 3x + 6}{x^4 + 8x - x^3 - 8} \leq 0 \quad x? \text{ LA FRAZIONE } \frac{-}{0}$$

$$S.S. \quad N \geq 0 \quad \frac{x^3 - 2x^2 - 3x + 6}{x^4 + 8x - x^3 - 8} \geq 0$$

$$x^2(x-2) - 3(x-2) \geq 0$$

$$(x-2)(x^2-3) \geq 0$$

$$N_1 \geq 0 \quad x \geq 2 \quad \frac{2}{- \quad +} \rightarrow$$

$$N_2 \geq 0 \quad x^2 - 3 \geq 0 \quad \text{REA}$$

$$x^2 - 3 = 0 \quad x^2 = 3 \quad x = \pm\sqrt{3}$$

$$D \geq 0 \quad \frac{x^4 + 8x - x^3 - 8}{x^4 + 8x - x^3 - 8} \geq 0$$

$$x(x^3 + 8) - 1(x^3 + 8) \geq 0$$

$$(x^3 + 8)(x - 1) \geq 0$$

$$D_1 \quad x^3 + 8 \geq 0 \quad x \geq -2 \quad x \geq -2$$

$$D_2 \quad x > 1 \quad \frac{1}{- \quad +}$$

	-2	$-\sqrt{3}$	1	$\sqrt{3}$	2	
N_1	-	-	-	-	-	+
N_2	+	+	-	-	+	+
D_1	-	+	+	+	+	+
D_2	-	-	-	+	+	+
$\frac{N}{D}$	-	+	-	+	-	+

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

$$2x^3 - x^2 - 5x - 2$$

$$\frac{X^3 - X^2 + 2X - 8}{2X^3 - X^2 - 5X - 2} > 0$$

FRATTA. S.S. $N > 0$ $\boxed{X^3} - \boxed{X^2} + 2\boxed{X} - \boxed{8} > 0$ 3° GRADO
 $(\cdot)(\cdot)$

$$X^2(X-1) + 2(X-4) > 0$$

↙ ≠ ↘

RUFFINI ? 1 1 - 1 + 2 - 8 ≠ 0 ~~1~~ - 8
 ? -1 -1 -1 -2 -8 ≠ 0 ~~-1~~

PROVO 2 SI SCRIVE $P(2) = (2)^3 - (2)^2 + 2(2) - 8$ ~~±~~ $\pm 2 \pm 4 \pm 8$
 $8 - 4 + 4 - 8 = \underline{\underline{0}}$ OK 2

DIVISORI
±

	"X ³ "	"X ² "	"X"	"t.m."
	1	-1	2	-8
2		2	2	8
	↓			
	1	1	4	<u>0</u>

$(X^2 + X + 4) \cdot (X - 2) > 0$

CAMBIO SEGNO

$N_1 > 0$ $X^2 + X + 4 > 0$ REA $X^2 + X + 4 = 0$ $\Delta = 1 - 16 < 0$
 $X_1, X_2 \notin \mathbb{R}$

$N_2 \geq 0$ $X \geq 2$ $\frac{2}{-0+}$

$\begin{array}{c} \text{---} \\ \text{+ + +} \end{array}$
 $\begin{array}{c} \text{---} \\ \text{+ + +} \end{array}$

$\Delta: 2X^3 - X^2 - 5X - 2 > 0$? 1 2 -1 -5 -2 ≠ 0
 ? -1 -2 -1 +5 -2 = 0 ✓
 | 2 -1 -5 | -2

$$\begin{array}{c|ccc|c} & 2 & -1 & -5 & -2 \\ -1 & & -2 & +3 & +2 \\ \hline & 2 & -3 & -2 & \end{array}$$

$$(2x^2 - 3x - 2)(x + 1) > 0$$

CAPIBLO ΔELO

$$D_1 > 0 \rightarrow 2x^2 - 3x - 2 > 0 \quad \text{REA } 2x^2 - 3x - 2 = 0$$

$$\Delta = 9 + 16 = 25$$

$$x_{1/2} = \frac{3 \pm 5}{4} < \frac{2}{-1/2}$$

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

$$\begin{array}{c} -1 \\ \hline - \quad + \end{array}$$

$$\begin{array}{c} -1/2 \quad 2 \\ \hline + \quad - \quad + \end{array} \quad \text{ST. BY}$$

S.S.

	$x < -1$	-1	$-1/2$	2	$x > 2$
N_1	+	+	+	+	+
N_2	-	-	-	0	+
D_1	+	+	0	-	+
D_2	-	0	+	+	+
D	+	-	+	+	+

$$x < -1$$

$$x > -\frac{1}{2} ; x \neq 2$$

ORRURE

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