27/4/2022

40 $|2 - x^2 + x| = 2$ $\left[\frac{1 \pm \sqrt{17}}{2}; 0; 1\right]$

① $\begin{cases} 2 - x^2 + x \geq 0 \\ 2 - x^2 + x = 2 \end{cases}$ $\vee$ ② $\begin{cases} 2 - x^2 + x < 0 \\ -(2 - x^2 + x) = 2 \end{cases}$

$x_1 = -1 \quad x_2 = 2$

① $\begin{cases} x^2 - x - 2 \leq 0 \\ x^2 - x = 0 \end{cases}$ $\begin{cases} (x-2)(x+1) \leq 0 \\ x(x-1) = 0 \end{cases}$ $\begin{cases} -1 \leq x \leq 2 \\ x = 0 \vee x = 1 \end{cases}$

$x = 0 \vee x = 1$

② $\begin{cases} x^2 - x - 2 > 0 \\ x^2 - x - 4 = 0 \end{cases}$ $\begin{cases} x < 0 \vee x > 1 \\ x = \frac{1 \pm \sqrt{17}}{2} \end{cases}$ $x = \frac{1 \pm \sqrt{17}}{2}$

$\Delta = 1 + 16 = 17$

$$x = 0 \vee x = 1 \vee x = \frac{1 \pm \sqrt{17}}{2}$$

44 $\left|x+\frac{1}{2}(x-1)-\frac{x}{3}\right|=\frac{2}{3}$ $\left[-\frac{1}{7};1\right]$

$$\left|\frac{6x+3(x-1)-2x}{6}\right|=\frac{2}{3}$$

$$\left|\frac{6x+3x-3-2x}{6}\right|=\frac{2}{3}$$

$$\left|\frac{7x-3}{6}\right|=\frac{2}{3}$$

$$\frac{|7x-3|}{|6|}=\frac{2}{3}$$

$$6\cdot\frac{|7x-3|}{|6|}=\frac{2}{3}\cdot 6^{2}$$

$$|7x-3|=4$$

$$\begin{cases} 7x-3\geq 0 \\ 7x-3=4 \end{cases} \vee \begin{cases} 7x-3<0 \\ -7x+3=4 \end{cases}$$

$$\begin{cases} x\geq \frac{3}{7} \\ x=1 \end{cases} \vee \begin{cases} x<\frac{3}{7} \\ x=-\frac{1}{7} \end{cases}$$

$$\boxed{x=1 \quad \vee \quad x=-\frac{1}{7}}$$

METODO DI RISOLUZIONE ALTERNATIVO (EQUIVALENTE)

$$|f(x)| = g(x)$$

$$\begin{cases} g(x) \geq 0 \\ f(x) = \pm g(x) \end{cases} \Rightarrow \begin{cases} g(x) \geq 0 \\ f(x) = g(x) \end{cases} \vee \begin{cases} g(x) \geq 0 \\ f(x) = -g(x) \end{cases}$$

66 $|x^2 - 2| = x$ [1; 2]

METODO NUOVO

$$\begin{cases} x \geq 0 \\ x^2 - 2 = \pm x \end{cases} \Rightarrow \textcircled{1} \begin{cases} x \geq 0 \\ x^2 - 2 = x \end{cases} \vee \textcircled{2} \begin{cases} x \geq 0 \\ x^2 - 2 = -x \end{cases}$$

① $\begin{cases} x \geq 0 \\ x^2 - x - 2 = 0 \end{cases}$ $\begin{cases} x \geq 0 \\ (x-2)(x+1) = 0 \end{cases}$ $\begin{cases} x \geq 0 \\ x = 2 \vee x = -1 \end{cases}$ N.ACC.

$x = 2$

② $\begin{cases} x \geq 0 \\ x^2 + x - 2 = 0 \end{cases}$ $\begin{cases} x \geq 0 \\ (x+2)(x-1) = 0 \end{cases}$ $\begin{cases} x \geq 0 \\ x = -2 \vee x = 1 \end{cases}$ N.ACC.

$x = 1$

$$\boxed{x = 1 \vee x = 2}$$

METODO VECCHIO

$|x^2-2|=x$

① $\begin{cases} x^2-2 \geq 0 \\ x^2-2=x \end{cases}$ $\vee$ ② $\begin{cases} x^2-2<0 \\ -x^2+2=x \end{cases}$

① $\begin{cases} x \leq -\sqrt{2} \vee x \geq \sqrt{2} \\ x^2-x-2=0 \end{cases}$ $\begin{cases} x \leq -\sqrt{2} \vee x \geq \sqrt{2} \\ (x-2)(x+1)=0 \end{cases}$ $\begin{cases} x \leq -\sqrt{2} \vee x \geq \sqrt{2} \\ x=2 \vee x=-1 \end{cases}$ N. ACC.

$x=2$

② $\begin{cases} -\sqrt{2}<x<\sqrt{2} \\ -x^2-x+2=0 \end{cases}$ $\begin{cases} -\sqrt{2}<x<\sqrt{2} \\ x^2+x-2=0 \end{cases}$ $\begin{cases} -\sqrt{2}<x<\sqrt{2} \\ (x+2)(x-1)=0 \end{cases}$

$\begin{cases} -\sqrt{2}<x<\sqrt{2} \\ \text{N. ACC.} \\ x=-2 \vee x=1 \end{cases}$

$x=1$

$\boxed{x=1 \vee x=2}$

ESEMPI

a) $|x-3| = 2$

$$\begin{cases} 2 \geq 0 \\ x-3 = \pm 2 \end{cases} \qquad \begin{cases} x \in \mathbb{R} \\ x-3 = \pm 2 \end{cases} \Rightarrow \quad x-3=2 \;\vee\; x-3=-2$$

$$\boxed{x = 5 \;\vee\; x = 1}$$

$2 \geq 0$ È VERA PER OGNI $x \in \mathbb{R}$

$\Downarrow$

$2 + 0 \cdot x \geq 0$ perché la immagino così

b) $|x-3| = -2$

$$\begin{cases} -2 \geq 0 \\ \dots \end{cases} \qquad \begin{cases} \varnothing \\ \dots \end{cases}$$

IMPOSSIBILE

75 $|x^3 - 4x| = x + 2$ $[-2; 1; 1 \pm \sqrt{2}]$

METODO VECCHIO

$$\begin{cases} x^3 - 4x \geq 0 \\ x^3 - 4x = x + 2 \end{cases} \vee \begin{cases} x^3 - 4x < 0 \\ -x^3 + 4x = x + 2 \end{cases}$$

METODO NUOVO

$$① \begin{cases} x + 2 \geq 0 \\ x^3 - 4x = x + 2 \end{cases} \vee ② \begin{cases} x + 2 \geq 0 \\ x^3 - 4x = -(x + 2) \end{cases}$$

$$① \begin{cases} x \geq -2 \\ x^3 - 5x - 2 = 0 \end{cases}$$

DIVISORI DI -2 : $\pm 1, \pm 2$

$+2 \mapsto 8 - 10 - 2 \neq 0$

$-2 \mapsto -8 + 10 - 2 = 0$ OK!

	1	0	−5	−2
−2		−2	4	2
	1	−2	−1	//

$(x^2 - 2x - 1)(x + 2) = 0$ $\quad x^2 - 2x - 1 = 0$ $\quad \frac{\Delta}{4} = 1 + 1 = 2$

$$\begin{cases} x = -2 \quad \vee \quad x = 1 \pm \sqrt{2} \\ x \geq -2 \end{cases}$$ tutte e tre accettabili

$x = -2 \vee x = 1 \pm \sqrt{2}$

(2)
$$\begin{cases} x+2 \geq 0 \\ x^3 - 4x = -(x+2) \end{cases}$$

$$\begin{cases} x \geq -2 \\ x^3 - 3x + 2 = 0 \end{cases}$$

	1	0	-3	2
1		1	1	-2
	1	1	-2	//

$$\begin{cases} x \geq -2 \\ (x^2 + x - 2)(x-1) = 0 \end{cases}$$

$$\begin{cases} x \geq -2 \\ (x+2)(x-1)(x-1) = 0 \end{cases} \qquad \begin{cases} x \geq -2 \\ (x+2)(x-1)^2 = 0 \end{cases} \qquad \begin{cases} x \geq -2 \\ x = -2 \ \vee \ x = 1 \end{cases}$$

entrambe accettabili

$x = -2 \vee x = 1$

Soluzione finale (1) $\vee$ (2)

$$\boxed{x = -2 \quad \vee \quad x = 1 \mp \sqrt{2} \quad \vee \quad x = 1}$$