

8/4/2021

**69**  $|x^2 - 2x| = x - 3$

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

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

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

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

$$\Delta = 9 - 12 < 0$$

$\emptyset$

$$\Delta = 1 + 12 = 13$$

$$x = \frac{1 \pm \sqrt{13}}{2}$$

$$\frac{1 - \sqrt{13}}{2} < 0 \text{ N.A.}$$

$$\frac{1 + \sqrt{13}}{2} < \frac{1 + 4}{2} < 3$$

N.A.

Non ci sono soluzioni  $\Rightarrow$  eq. IMPOSSIBILE

$$73 \quad \left| \frac{x-1}{x+2} \right| = 3+x$$

FRATTA!

C.E.

$$x \neq -2$$

$$\begin{cases} 3+x \geq 0 \\ \frac{x-1}{x+2} = \pm (3+x) \end{cases}$$

$$\begin{cases} x \geq -3 \\ \frac{x-1}{x+2} = 3+x \end{cases} \quad \vee \quad \begin{cases} x \geq -3 \\ \frac{x-1}{x+2} = -3-x \end{cases}$$

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

$$\begin{cases} x \geq -3 \\ x-1 = 3x+6+x^2+2x \end{cases} \quad \vee \quad \begin{cases} x \geq -3 \\ x-1 = -3x-6-x^2-2x \end{cases}$$

$$\begin{cases} x \geq -3 \\ x^2+4x+7=0 \end{cases} \quad \vee \quad \begin{cases} x \geq -3 \\ x^2+6x+5=0 \end{cases}$$

$$\frac{\Delta}{4} = 4-7 < 0 \quad \cancel{\emptyset}$$

$$\frac{\Delta}{4} = 9-5 = 4 \quad \text{N.A.}$$

$$x = -3 \pm 2$$

-5

-1

$$\boxed{x = -1}$$

(def controls C.E.)

75

$$|x^3 - 4x| = x + 2$$

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

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

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

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

$$\begin{array}{ccc|c} 1 & 0 & -5 & -2 \\ -2 & -2 & 4 & 2 \\ \hline 1 & -2 & -1 & // \end{array}$$

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

$$x^2 - 2x - 1 = 0 \quad \vee \quad x = -2$$

$$\frac{\Delta}{4} = 1 + 1 = 2$$

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

TUTTE  
ACCETTABILI

$$\begin{array}{ccc|c} 1 & 0 & -3 & 2 \\ 1 & 1 & 1 & -2 \\ \hline 1 & 1 & -2 & // \end{array}$$

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

$$x^2 + x - 2 = 0 \quad \vee \quad x = 1$$

$$\Delta = 1 + 8 = 9$$

$$x = \frac{-1 \pm 3}{2} = \begin{matrix} -2 \\ 1 \end{matrix}$$

TUTTE  
ACCETTABILI

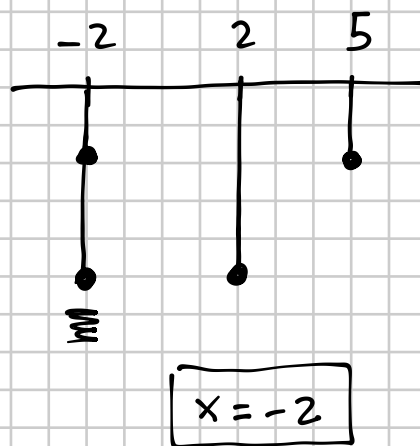
$$x = -2 \quad \vee \quad x = 1 \quad \vee \quad x = 1 \pm \sqrt{2}$$

**83**  $|x^2 - 3x - 10| + |x^2 - 4| = 0$

Deve essere  $x^2 - 3x - 10 = 0 \wedge x^2 - 4 = 0$  CONTEMPORANEAMENTE

$$\begin{cases} x^2 - 3x - 10 = 0 & x = \frac{3 \pm 7}{2} = \begin{cases} 5 \\ -2 \end{cases} \\ x^2 - 4 = 0 & x = \pm 2 \end{cases}$$

Devo prendere l'INTERSEZIONE delle soluzioni

$$\begin{cases} x = -2 \vee x = 5 \\ x = -2 \vee x = 2 \end{cases}$$


**79**  $|x| + |x^2 - 1| = \sqrt{2} - 2$  IMPOSSIBILE

$< 0$  (negativo)

**84**  $|x^2 - 1| = -2|x|$

$$\begin{cases} x^2 - 1 = 0 \\ x = 0 \end{cases} \quad \begin{cases} x = \pm 1 \\ x = 0 \end{cases} \quad \text{SIST. IMPOSSIBILE} \Rightarrow \text{ED. IMPOSSIBILE}$$

Se fosse  $|x^2 - 1| = -|1 - x|$  NON è impossibile perché 1 è soluzione

99

$$|x^2 + 5x| = |x^2 - 2x|$$

$$|f(x)| = \underbrace{|g(x)|}_{h(x)}$$

$$|f(x)| = h(x)$$

$$\begin{cases} h(x) \geq 0 \\ f(x) = \pm h(x) \end{cases}$$

$$\Rightarrow \begin{cases} \overbrace{|g(x)| \geq 0}^{\text{SEMPRE VERA}} \\ f(x) = \pm h(x) \end{cases}$$

$$x^2 + 5x = \pm (x^2 - 2x)$$

$$\cancel{x^2} + 5x = \cancel{x^2} - 2x \quad \vee \quad x^2 + 5x = -x^2 + 2x$$

$$7x = 0$$

 $\vee$ 

$$2x^2 + 3x = 0$$

$$x = 0$$

 $\vee$ 

$$x(2x + 3) = 0$$

$$x = 0 \quad \vee \quad x = -\frac{3}{2}$$

$$\boxed{x = 0 \quad \vee \quad x = -\frac{3}{2}}$$

 $\Downarrow$ 

$$f(x) = \pm h(x)$$

 $\Downarrow$ 

$$\boxed{f(x) = \pm g(x)}$$

**104**  $|x^3 - 4x| = |x + 2|$

$$x^3 - 4x = \pm(x + 2)$$

$$x^3 - 4x = x + 2$$

✓

$$x^3 - 5x - 2 = 0$$

$$\begin{array}{c|ccc|c} & 1 & 0 & -5 & -2 \\ -2 & & -2 & 4 & 2 \\ \hline & 1 & -2 & -1 & // \end{array}$$

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

$$x^2 - 2x - 1 = 0$$

$$\frac{\Delta}{4} = 1 + 1 = 2$$

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

$$x^3 - 4x = -x - 2$$

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

$$\begin{array}{c|ccc|c} & 1 & 0 & -3 & 2 \\ 1 & & 1 & 1 & -2 \\ \hline & 1 & 1 & -2 & // \end{array}$$

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

$$\Delta = 1 + 8 = 9$$

$$x = \frac{-1 \pm 3}{2} = \begin{matrix} -2 \\ 1 \end{matrix}$$

$$x = 1 \quad \vee \quad x = -2$$

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

**110**

$$|x + 1| + |2x - 1| = 3$$

$$1) \quad x + 1 \geq 0 \quad x \geq -1$$

$$2) \quad 2x - 1 \geq 0 \quad x \geq \frac{1}{2}$$

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

$$\textcircled{1} \begin{cases} x \leq -1 \\ -(x+1) - (2x-1) = 3 \end{cases} \quad \vee \quad \textcircled{2} \begin{cases} -1 < x \leq \frac{1}{2} \\ +(x+1) - (2x-1) = 3 \end{cases} \quad \vee$$

$$\vee \textcircled{3} \begin{cases} x > \frac{1}{2} \\ +(x+1) + (2x-1) = 3 \end{cases}$$

$$\textcircled{1} \begin{cases} x \leq -1 \\ -x-1-2x+1=3 \end{cases} \quad \begin{cases} x \leq -1 \\ -3x=3 \end{cases} \quad \begin{cases} x \leq -1 \\ x=-1 \end{cases} \quad x = -1$$

$$\textcircled{2} \begin{cases} -1 < x \leq \frac{1}{2} \\ x+1-2x+1=3 \end{cases} \quad \begin{cases} -1 < x \leq \frac{1}{2} \\ -x=1 \end{cases} \quad \begin{cases} -1 < x \leq \frac{1}{2} \\ x=-1 \end{cases} \quad \emptyset$$

$$\textcircled{3} \begin{cases} x > \frac{1}{2} \\ x+1+2x-1=3 \end{cases} \quad \begin{cases} x > \frac{1}{2} \\ 3x=3 \end{cases} \quad \begin{cases} x > \frac{1}{2} \\ x=1 \end{cases} \quad x = 1$$

$$\boxed{x = \pm 1}$$