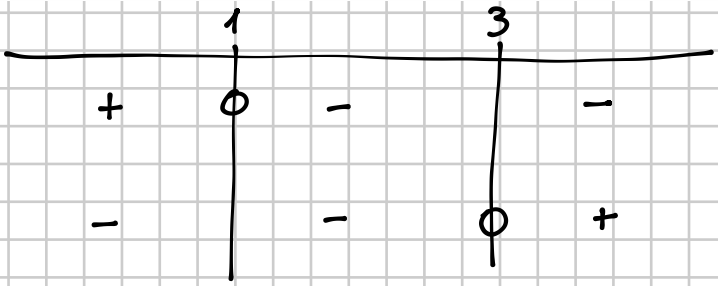
116 $|1-x|+|x-3|=x^2-x$ $\left[\frac{-1-\sqrt{17}}{2};2\right]$

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

$x-3>0 \quad x>3$



① $\begin{cases} x\leq 1 \\ 1-x-(x-3)=x^2-x \end{cases}$

② $\vee \begin{cases} 1\leq x\leq 3 \\ -(1-x)-(x-3)=x^2-x \end{cases}$

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

① $\begin{cases} x\leq 1 \\ 1-x-x+3=x^2-x \end{cases}$ $\begin{cases} x\leq 1 \\ x^2+x-4=0 \end{cases}$

$\Delta=1+16=17 \quad x=\frac{-1\pm\sqrt{17}}{2}=\begin{cases} \frac{-1+\sqrt{17}}{2} & \text{N.A.} \\ \frac{-1-\sqrt{17}}{2} & \end{cases}$

$x=\frac{-1-\sqrt{17}}{2}$

② $\begin{cases} 1\leq x\leq 3 \\ -1+x-x+3=x^2-x \end{cases}$ $\begin{cases} 1\leq x\leq 3 \\ x^2-x-2=0 \end{cases}$

$\Delta=1+8=9$

$x=\frac{1\pm 3}{2}=\begin{cases} -1 & \text{N.A.} \\ 2 & \end{cases}$ $\quad x=2$

③

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

$$x^2 - 3x + 4 = 0$$

$$\Delta = 9 - 16 < 0 \quad \text{IMPOSSIBILE}$$

$\varnothing$

$$\boxed{x = \frac{-1-\sqrt{17}}{2} \quad \vee \quad x = 2}$$

117 $x|x-1| = |x-4|$

		1		4	
$x-1>0$	$x>1$	$-$	0	$+$	$+$
$x-4>0$	$x>4$	$-$	$-$	0	$+$

① $\begin{cases} x \leq 1 \\ x \cdot [-(x-1)] = -(x-4) \end{cases}$ ② $\begin{cases} 1 \leq x \leq 4 \\ x(x-1) = -(x-4) \end{cases}$ ③ $\begin{cases} x \geq 4 \\ x(x-1) = x-4 \end{cases}$

① $\begin{cases} x \leq 1 \\ x^2 - x = x - 4 \end{cases} \qquad \begin{cases} x \leq 1 \\ x^2 - 2x + 4 = 0 \end{cases}$ IMP.

$$\Delta = 4 - 16 < 0$$

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

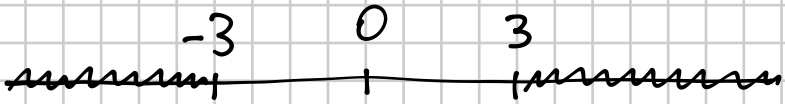
② $\begin{cases} 1 \leq x \leq 4 \\ x^2 - x + x - 4 = 0 \end{cases} \qquad \begin{cases} 1 \leq x \leq 4 \\ x = \pm 2 \end{cases} \quad x = 2$

$$\boxed{x = 2}$$

216 $|x^2 - 2x| > 3$

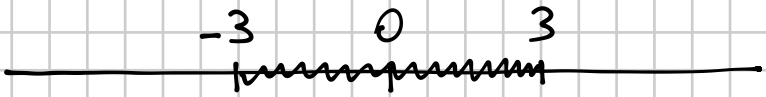
Ragioniamoci sopra...

$|x| > 3$



$x < -3 \quad \vee \quad x > 3$

$|x| < 3$



$-3 < x < 3$

$x > -3 \wedge x < 3$ $\quad \begin{cases} x > -3 \\ x < 3 \end{cases}$

Se abbiamo $k > 0$

$|f(x)| > k \qquad f(x) < -k \quad \vee \quad f(x) > k$

$|f(x)| < k \qquad -k < f(x) < k$

TORNIAMO A NOI...

216 $|x^2 - 2x| > 3$

Risolvo le 2 disequaz. e UNISCO gli insiemi soluzione

$x^2 - 2x < -3 \quad \vee \quad x^2 - 2x > 3$

$x^2 - 2x + 3 < 0 \quad \vee \quad x^2 - 2x - 3 > 0$

$\Delta = 4 - 12 < 0 \qquad \Delta = 4 + 12 = 16$

$\emptyset \qquad (x-3)(x+1) > 0$

$x_1 = 3 \quad x_2 = -1$

$\boxed{x < -1 \ \vee \ x > 3}$

221 $|x^2 + 5x + 6| \leq 2$

$$-2 \leq x^2 + 5x + 6 \leq 2$$

$$\Delta = 25 - 32 < 0$$

$$\begin{cases} x^2 + 5x + 6 \geq -2 \\ x^2 + 5x + 6 \leq 2 \end{cases} \qquad \begin{cases} x^2 + 5x + 8 \geq 0 \\ x^2 + 5x + 4 \leq 0 \end{cases} \qquad \begin{cases} \forall x \in \mathbb{R} \\ -4 \leq x \leq -1 \end{cases}$$

$$(x+4)(x+1) \leq 0$$

$$x_1 = -4 \quad x_2 = -1$$

$$\Downarrow$$

$$\boxed{-4 \leq x \leq -1}$$