

122 $|x - 2| + |x + 3| = 2|x|$

$\left[-\frac{5}{2}\right]$

9/5/2022

	-3	0	2	
-	-	-	+	
-	+	+	+	
-	-	+	+	

$x - 2 > 0 \quad x > 2$

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

$x > 0$

①

$x < -3$

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

②

$-3 \leq x < 0$

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

③

$0 \leq x < 2$

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

④

$x \geq 2$

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

①

$\begin{cases} x < -3 \\ -1 = 0 \end{cases}$

\emptyset
IMPOSS.

②

$\begin{cases} -3 \leq x < 0 \\ x = -\frac{5}{2} \end{cases}$

$x = -\frac{5}{2}$

③

$\begin{cases} 0 \leq x < 2 \\ x = \frac{5}{2} \end{cases}$

\emptyset IMPOSS.

④

$\begin{cases} x \geq 2 \\ 1 = 0 \end{cases}$

\emptyset IMPOSS.

$x = -\frac{5}{2}$

145 $y = 2 - |x| - |3 - x|$ Disegnare il grafico

studiare il segno degli argomenti dei moduli:

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

$$x < 0 \Rightarrow y = 2 - (-x) - (3 - x) = 2 + x - 3 + x = 2x - 1$$

$$0 \leq x < 3 \Rightarrow y = 2 - x - (3 - x) = 2 - \cancel{x} - 3 + \cancel{x} = -1$$

$$x \geq 3 \Rightarrow y = 2 - x + 3 - x = -2x + 5$$

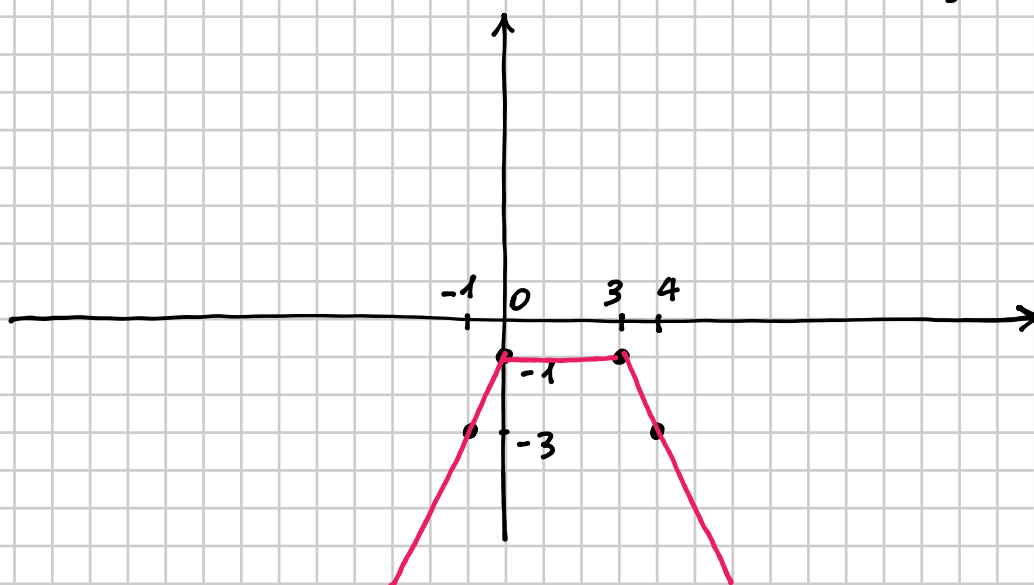
$$y = \begin{cases} 2x - 1 & \text{se } x < 0 \\ -1 & \text{se } 0 \leq x < 3 \\ -2x + 5 & \text{se } x \geq 3 \end{cases}$$

$$y = 2x - 1$$

x	y
0	-1
-1	-3

$$y = -2x + 5$$

x	y
3	-1
4	-3



DISEQUAZIONI CON VALORI ASSOLUTI

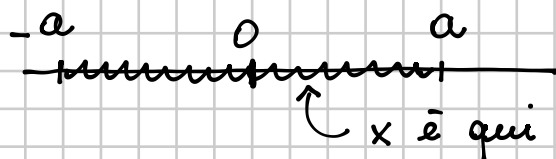
DISEQUAZIONI DEL TIPO

$$|f(x)| < K \quad \text{con } K \in \mathbb{R}, K > 0$$

ESEMPIO: $|2x-3| < 5$

Osserviamo che la disuguaglianza $|x| < a$ (dove a è un numero positivo) è verificata solo per i numeri x tali che

$$-a < x < a$$



$$\begin{array}{c} |x| < 3 \\ \Downarrow \\ -3 < x < 3 \end{array}$$

A horizontal number line with points labeled -3 , 0 , and 3 . The segment between -3 and 3 is marked with wavy lines.

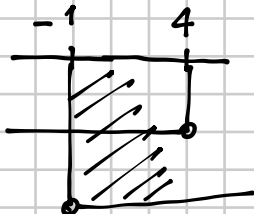
$$|2x-3| < 5$$

$$-5 < 2x-3 < 5$$

$$\begin{cases} 2x-3 < 5 \\ 2x-3 > -5 \end{cases}$$

$$\begin{cases} 2x < 8 \\ 2x > -2 \end{cases}$$

$$\begin{cases} x < 4 \\ x > -1 \end{cases}$$



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

REGOLA

$$|f(x)| < K \quad \text{con } K \in \mathbb{R}, K > 0$$

$$-K < f(x) < K \quad \text{cioè} \quad \begin{cases} f(x) < K \\ f(x) > -K \end{cases}$$

$$\text{Se fosse } |f(x)| \leq K, \text{ allora } \begin{cases} f(x) \leq K \\ f(x) \geq -K \end{cases}$$

220 $|x^2 - 1| \leq 8$

$[-3 \leq x \leq 3]$

$$-8 \leq x^2 - 1 \leq 8$$

$$\begin{cases} x^2 - 1 \leq 8 \\ x^2 - 1 \geq -8 \end{cases}$$

$$\begin{cases} x^2 \leq 9 \\ x^2 \geq -7 \end{cases}$$

$$\begin{cases} x^2 - 9 \leq 0 \\ x^2 + 7 \geq 0 \end{cases}$$

$$\begin{cases} -3 \leq x \leq 3 \\ x \in \mathbb{R} \end{cases}$$

