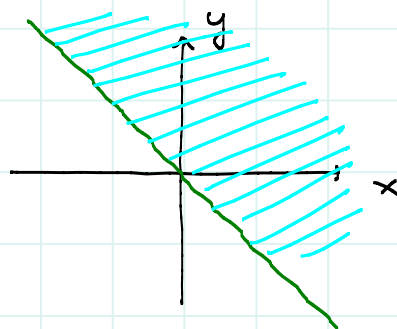


SOTTOINSIEMI DEL PIANO DESCRITTI DA DISEQUAZIONI

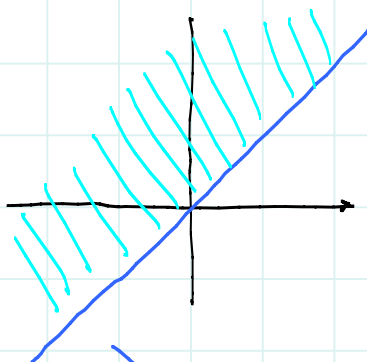
ES 1 $\{ (x,y) \in \mathbb{R}^2 : x+y > 0 \}$

$\leadsto y > -x \leadsto$ sopra la retta $y = -x$



ES 2 $\{ (x,y) \in \mathbb{R}^2 : x-y \leq 0 \}$

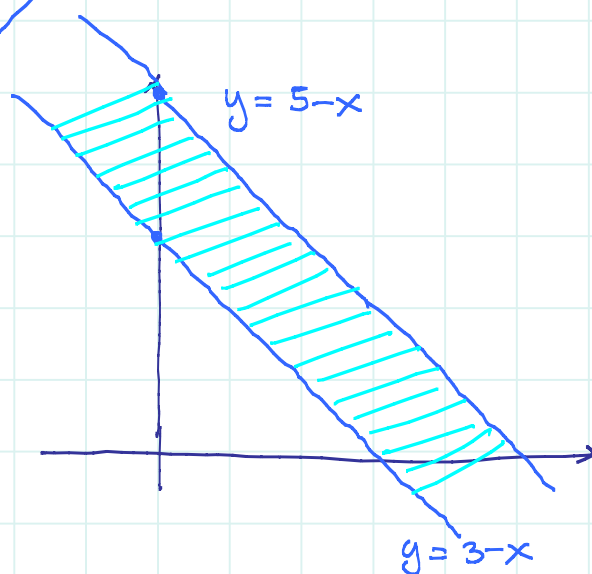
$\leadsto y \geq x$



ES 3 $3 \leq x+y \leq 5$

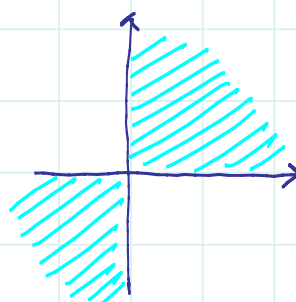
Due condizioni che devono essere vere contemporaneamente

$$\begin{cases} 3 \leq x+y \\ x+y \leq 5 \end{cases} \quad \begin{cases} y \geq -x+3 \\ y \leq -x+5 \end{cases}$$

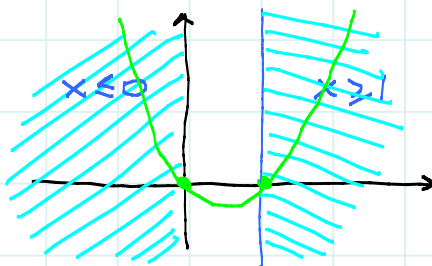


ES 4 $xy \geq 0$

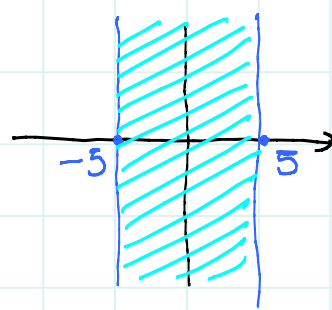
$\begin{cases} x \geq 0 \text{ e } y \geq 0 \leadsto 1^o \text{ quadrante} \\ x \leq 0 \text{ e } y \leq 0 \leadsto 3^o \text{ quadrante} \end{cases}$



ES 5 $x^2 - x \geq 0 \dots$ si intende $\{ (x,y) \in \mathbb{R}^2 : \underbrace{x^2 - x}_{\text{valori interi}} \geq 0 \}$
 $x \leq 0$ oppure $x \geq 1$

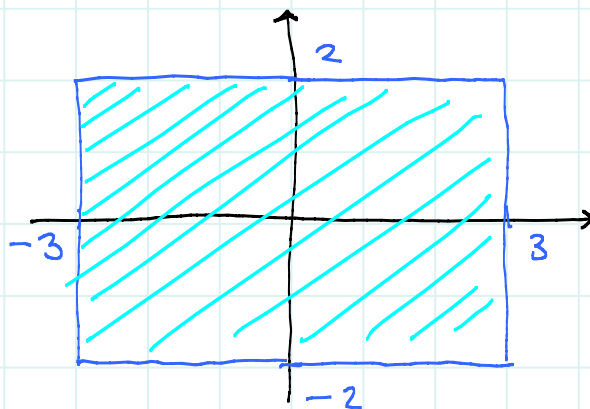


Es6 $\{(x,y) \in \mathbb{R}^2: |x| \leq 5\}$
 $-5 \leq x \leq 5$



Es7 $\{(x,y) \in \mathbb{R}^2: |x| \leq 3, |y| \leq 2\}$

Es7 bis $\{(x,y) \in \mathbb{R}^2: x^2 \leq 3, y^2 \leq 2\}$

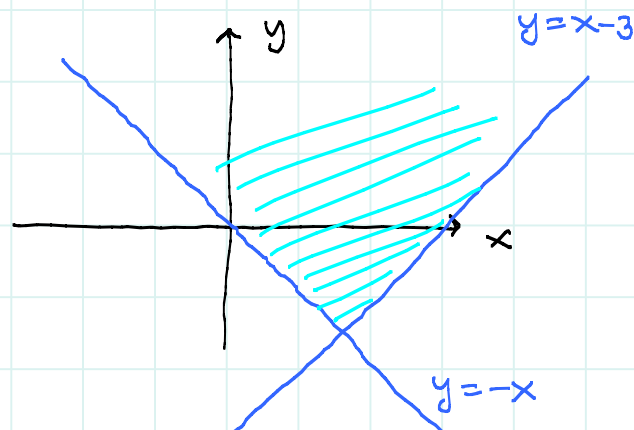


$\leadsto -\sqrt{3} \leq x \leq \sqrt{3}, -\sqrt{2} \leq y \leq \sqrt{2}$

$\leadsto$ rettangolo analogo a prima

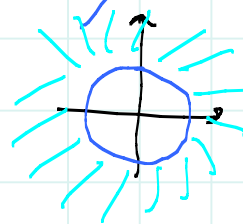
Es8 $x+y > 0$ e $x-y < 3$

$$\begin{cases} x+y > 0 \\ x-y < 3 \end{cases} \quad \begin{cases} y > -x \\ y > x-3 \end{cases}$$



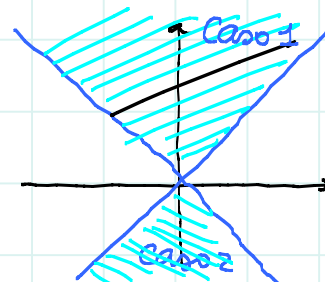
Es9 $x^2 + y^2 \geq 8$

$\leadsto$ Punti la cui distanza dall'origine
 è $\geq \sqrt{8} = 2\sqrt{2} \leadsto$ esterno della circ.
 (bordo compreso)



Es10 $x^2 + y^2 \leq 8 \leadsto$ interno della circ.
 (bordo compreso)

Es11 $x^2 - y^2 \leq 0$



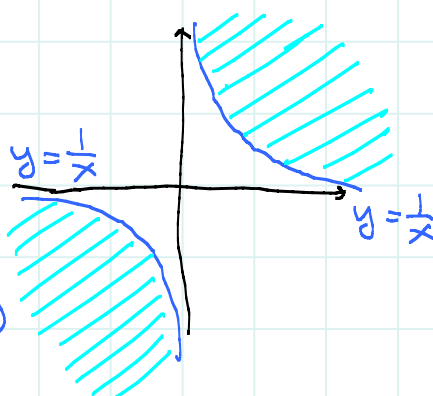
Se fosse $x^2 - y^2 = 0 \leadsto (x+y)(x-y) = 0 \leadsto x+y=0$ oppure $x-y=0$
 cioè le 2 bisettrici

Ora abbiamo $(x+y)(x-y) \leq 0$, quindi ci sono due casi

- $x+y \geq 0$ e $x-y \leq 0 \rightsquigarrow y \geq -x$ e $y \geq x \rightsquigarrow$ Caso 1
- $x+y \leq 0$ e $x-y \geq 0 \rightsquigarrow y \leq -x$ e $y \leq x \rightsquigarrow$ Caso 2

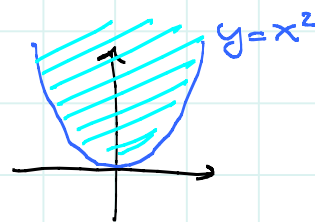
Es 12 $xy \geq 1$

$\rightsquigarrow y \geq \frac{1}{x}$ nel 1° quadr. (ho diviso per $x > 0$)

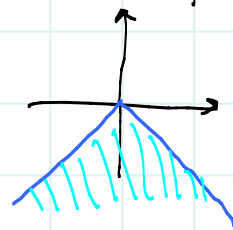


$\rightsquigarrow y \leq \frac{1}{x}$ nel 3° quadr. (ho diviso per $x < 0$)

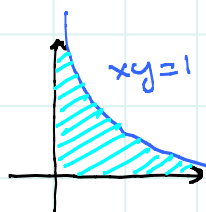
Es 13 $y - x^2 \geq 0 \rightsquigarrow y \geq x^2 \rightsquigarrow$ sopra la parabola



Es 14 $y + |x| \leq 0 \rightsquigarrow y \leq -|x| \rightsquigarrow$ sotto $-|x|$



Es 15 $\underbrace{x \geq 0, y \geq 0}_{1^\circ \text{ quadr.}}, \underbrace{xy \leq 1}_{y \leq \frac{1}{x}}$



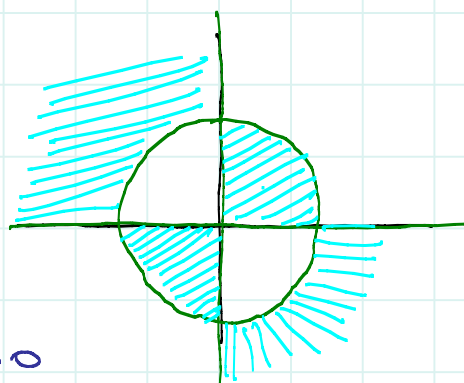
Es 16 $0 \leq x \leq 3, 0 \leq y \leq x^2$
 $\uparrow$
 $y \geq 0$ e sotto la parabola



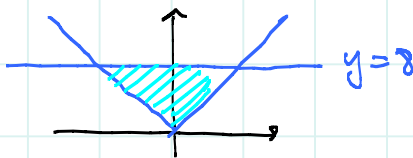
Es 17 $xy(x^2 + y^2 - 1) \leq 0$

Se fosse $= 0$ sarebbero gli assi e la circonferenza

- nel 1° e 3° quadrante si ha $xy > 0$
quindi deve essere $x^2 + y^2 - 1 \leq 0 \rightsquigarrow$ dentro la circ.
- nel 2° e 4° quadrante si ha $xy < 0$
quindi $x^2 + y^2 - 1 \geq 0 \rightsquigarrow$ fuori dalla circ.



Es 18 $|x| \leq y \leq 8$



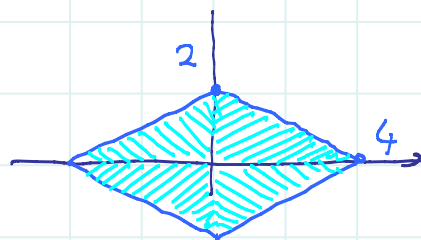
Es 19 $|x| + 2|y| \leq 4$

1^a oss Se cambio segno a x e y la cond. non cambia
 $\leadsto$ se capisco il 1^o quadrante, poi simmetrizzo

2^a oss Nel 1^o quadrante diventa $x + 2y \leq 4$, cioè $y \leq 2 - \frac{x}{2}$

Voleudo posso fare il conto in ogni quadrante

Nel 2^o sarebbe $-x + 2y \leq 4$
 $\leadsto y \leq 2 + \frac{x}{2}$



Es. 20 $x^2 - 2x + y^2 \leq 0$

$$x^2 - 2x + 1 + y^2 \leq 1 \leadsto (x-1)^2 + y^2 \leq 1$$

$\uparrow$
 distanza da (1,0)
 ≤ 1

— 0 — 0 —

