

# DISuguAZIONI

1)  $x < x^2$

R.  $x(x-1) > 0 \Rightarrow x < 0 \text{ o } x > 1$

2)  $3x^2 + 2x - x^2 < 1 + 2x^2$

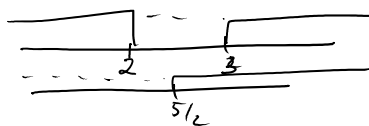
R.  $2x - 1 < 0 \Rightarrow x < 1/2$

3)  $(x^2 - 5x + 6)(2x - 5) \geq 0$

R.  $x^2 - 5x + 6 \geq 0 \quad x \geq 3 \text{ o } x \leq 2$

$2x - 5 \geq 0 \quad x \geq 5/2$

$\Rightarrow x \geq 3 \text{ o } 2 \leq x \leq 5/2$

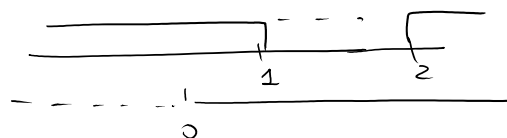


4)  $\frac{x-2}{x} \leq x-2$

R.  $x \neq 0 \quad \frac{x-2}{x} - x + 2 \leq 0 \quad \frac{x-2-x^2+2x}{x} \leq 0$

$-\frac{x^2+3x-2}{x} \leq 0 \quad \frac{x^2-3x+2}{x} \geq 0 \rightarrow x \leq 1 \text{ o } x \geq 2$

$\Rightarrow 0 < x \leq 1, x \geq 2$



5)  $\frac{1}{\alpha x} - 2x > 0, \alpha \in \mathbb{R}, \alpha \neq 0$

$\frac{1-2\alpha x^2}{\alpha x} > 0 \quad 1-2\alpha x^2 = 0 \quad x^2 = \frac{1}{2\alpha} \quad \alpha < 0$

$1-2\alpha x^2 > 0$

quindi  $\alpha < 0 \quad \frac{(\quad)}{(\quad)} > 0 \Rightarrow x < 0$

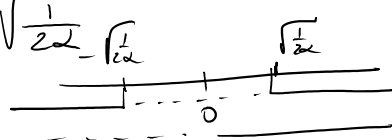
Se  $\alpha > 0 \quad 1-2\alpha x^2 = 0 \Leftrightarrow x = \pm \sqrt{\frac{1}{2\alpha}}$

$1-2\alpha x^2 > 0 \Leftrightarrow x < -\sqrt{\frac{1}{2\alpha}} \text{ o } x > \sqrt{\frac{1}{2\alpha}}$

$\alpha x > 0 \Leftrightarrow x > 0$  perché  $\alpha > 0$

quindi  $\alpha > 0 \quad -\sqrt{\frac{1}{2\alpha}} < x < 0, x > \sqrt{\frac{1}{2\alpha}}$

se  $\alpha < 0$  per  $x < 0$ .



6)  $|x-1| < |2x-3|$

a)  $x \geq \frac{3}{2} \quad |x-1| < 2x-3 \quad \text{case}$

$-(2x-3) \leq x-1 \leq 2x-3$

①  $x-1 > -2x+3 \Rightarrow 3x > 4 \quad x > 4/3 \quad \Rightarrow \{x > 2\} \cap \{x \geq \frac{3}{2}\}$

②  $x-1 < 2x-3 \Rightarrow x > 2 \quad \Rightarrow x > 2$

b)  $x < \frac{3}{2} \quad |x-1| < 3-2x \quad \text{case}$

$2x-3 \leq x-1 \leq 3-2x$

①  $2x-3 < x-1 \Rightarrow x < 2 \quad \Rightarrow \{x < 4/3\} \cap \{x < \frac{3}{2}\}$

②  $x-1 < 3-2x \Rightarrow 3x < 4 \Rightarrow x < 4/3 \quad \Rightarrow x < 4/3$

Quindi  $x < \frac{3}{2}$  o  $x > 2$ .

$$\Rightarrow x < \frac{3}{2}$$

$$7) |x|x + 5x - 6 > 0$$

$$\bullet x > 0 \quad x^2 + 5x - 6 > 0$$

$$x = \frac{-5 \pm \sqrt{25+24}}{2} = \frac{-5 \pm 7}{2} = \begin{matrix} -6 \\ 1 \end{matrix}$$

$x > 1$  o  $x < -6$  e poiché  $x > 0$   
 $\Rightarrow x > 1$

$$\bullet x < 0 \quad -x^2 + 5x - 6 > 0$$

$$x^2 - 5x + 6 < 0$$

$$x = \frac{5 \pm \sqrt{25-24}}{2} = \frac{5 \pm 1}{2} = \begin{matrix} 3 \\ 2 \end{matrix}$$

$2 < x < 3$  ma poiché  $x < 0$  non!

Quindi  $x > 1$ .

$$8) |5x-1| \geq x$$

$$\Rightarrow 5x-1 \geq x \quad \text{o} \quad 5x-1 \leq -x$$

$$\Downarrow$$

$$4x \geq 1 \quad \text{o} \quad 6x \leq 1$$

$$x \geq 1/4 \quad \text{o} \quad x \leq 1/6$$

$$9) x^2 + |x+1| \leq 4$$

$$x \geq -1 \Rightarrow x^2 + x - 3 \leq 0$$

$$x = \frac{-1 \pm \sqrt{1+12}}{2} = \frac{-1 \pm \sqrt{13}}{2}$$

$$-\frac{1-\sqrt{13}}{2} \leq x \leq \frac{-1+\sqrt{13}}{2} \quad \text{ma poiché } x \geq -1$$

$$\Downarrow$$

$$-1 \leq x \leq \frac{-1+\sqrt{13}}{2}$$

$x < -1 \quad x^2 - x - 5 \leq 0 \dots$  le soluzioni vanno  $\cap$  con  $x < -1$

$$10) \left| \frac{x-3}{x-5} \right| > 2x$$

$$R. \quad x \neq 5$$

$$\frac{x-3}{x-5} > 2x$$

$$\text{o} \quad \frac{x-3}{x-5} < -2x$$

$$\frac{x-3}{x-5} - 2x > 0$$

$$\frac{x-3-2x(x-5)}{x-5} > 0$$

$$\frac{-2x^2+11x-3}{x-5} > 0$$

$$\frac{x-3}{x-5} + 2x < 0$$

$$\frac{x-3+2x(x-5)}{x-5} < 0$$

$$\frac{2x^2-9x-3}{x-5} < 0$$

e ne fa l'U delle soluzioni.

~~---~~