

**ESERCITAZIONE**  
**MATEMATICA GENERALE**  
**CLEMIF**

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**Sistemi di Disequazioni**

Risolvere i seguenti sistemi di disequazioni:

$$(1) \quad \begin{cases} x^2 - 3x > 0 \\ x^2 + 3x - 40 < 0 \end{cases} \quad , \quad \begin{cases} \frac{3x-1}{2} - \frac{x}{6} < \frac{x+3}{3} \\ 4x^2 - 9x + 5 < 0 \end{cases} \quad , \quad \begin{cases} (x-4)^2 + 2(x+3) < 17 \\ 6(x-2) - 4(2x-1) + 14 > 0 \end{cases} .$$

Soluzioni (1) :  $[-8 < x < 0 \vee 3 < x < 5]$ ,  $[1 < x < \frac{5}{4}]$ ,  $[1 < x < 3]$

$$(2) \quad \begin{cases} x(x-1) > 6(x-2) \\ \frac{4}{3}x - \frac{x+1}{2} > x-2 \end{cases} \quad , \quad \begin{cases} x^2(x^2+1) \geq 0 \\ x^2 - 7x + 25 > 0 \end{cases} \quad , \quad \begin{cases} \frac{1}{2}(x+1) \geq \frac{5}{x-2} \\ (x-1)^3 > 0 \end{cases} .$$

Soluzioni (2) :  $[x < 3 \vee 4 < x < 9]$ ,  $[\mathbb{R}]$ ,  $[1 < x < 2 \vee x \leq 4]$

$$(3) \quad \begin{cases} \frac{5}{4}(x-2) - \frac{x+2}{8} > 2 + \frac{2(x-3)}{3} \\ x(9x-8) > 4(x-1) \end{cases} \quad , \quad \begin{cases} \frac{x^2+4x}{2} + 3 > \frac{3x+1}{2} \\ \frac{(x-2)^2}{4} > \frac{1}{2}x + 1 \end{cases} \quad , \quad \begin{cases} \frac{(2x-1)^2}{4} - x + 1 > \frac{1}{4} \\ (x+1)^2 + 2x > 1 \end{cases}$$

Soluzioni (3) :  $[x > 6]$ ,  $[x < 0 \vee x > 6]$ ,  $[x < -4 \vee x > 0 \wedge x \neq 1]$

$$(4) \quad \begin{cases} \frac{x+3}{2x-1} < 0 \\ \frac{3+x}{x-2} - \frac{x}{2x-4} \leq -\frac{3}{2} \end{cases} \quad , \quad \begin{cases} x^4 - 6x^2 + 8 \geq 0 \\ \frac{x-3}{x-5} > 0 \end{cases} \quad , \quad \begin{cases} \frac{x^4-81}{x^2} \geq 0 \\ (x^2 - 8x + 12)^5 < 0 \end{cases}$$

Soluzioni (4) :  $[0 \leq x < \frac{1}{2}]$ ,  $[x \leq -2 \vee -\sqrt{2} < x < \sqrt{2} \vee 2 < x < 3 \vee x > 5]$ ,  $[3 \leq x < 6]$

$$(5) \quad \begin{cases} \frac{7x-1}{1+3x} - \frac{5x-2}{3x-1} > \frac{63}{9x^2-1} \\ \frac{3x^2-5x-2}{x^4-1} \geq 0 \end{cases} \quad , \quad \begin{cases} \frac{x+1}{x+2} < 0 \\ \frac{3}{x+3} < \frac{2}{x+2} \end{cases} \quad , \quad \begin{cases} x > \frac{1}{4x-3} \\ \frac{x-8}{x-3} > \frac{x-5}{x+8} \end{cases}$$

Soluzioni (5) :  $[x < -\frac{5}{2} \vee -\frac{1}{3} < x < \frac{1}{3} \vee x > 4]$ ,  $[-2 < x < -1]$ ,

$$[-\frac{1}{4} < x < \frac{3}{4} \vee 1 < x < 3 \vee x > \frac{79}{8}]$$

$$(6) \quad \begin{cases} (x-2)^3 \leq 0 \\ x+14 > 0 \\ x^2+6x+9 \geq 0 \end{cases}, \quad \begin{cases} x^2-3x+5 > 0 \\ x^2+2 > 0 \\ x^2-9 < 0 \end{cases}, \quad \begin{cases} x^2-5x+6 > 0 \\ 2x > x+1 \\ 3x-2 < 2(x+1) \end{cases}$$

Soluzioni (6) :  $[-14 < x \leq 2]$ ,  $[-3 < x < 3]$ ,  $[1 < x < 2 \vee 3 < x < 4]$

$$(7) \quad \begin{cases} x^2-3x+2 > 0 \\ -x^2+6x-7 < 0 \\ -x+3 > 0 \end{cases}, \quad \begin{cases} 14x < 5+(2x+1)^2 \\ 4x(x-2) < 4x^2-10x+5 \\ 6(x-1)+5 > 0 \end{cases}, \quad \begin{cases} \frac{x+2}{4}-3 < \frac{x-4}{2}-\frac{x}{3} \\ \frac{5x-2}{3}+1 > \frac{2x-3}{2} \\ x^2-2x-3 > 0 \end{cases}$$

Soluzioni (7) :  $[x < 1]$ ,  $[\frac{1}{6} < x < 1 \vee \frac{3}{2} < x < \frac{5}{2}]$ ,  $[-\frac{11}{4} < x < -1 \vee 3 < x < 6]$

$$(8) \quad \begin{cases} \frac{x-1}{x-2} > 0 \\ 4x+1 > 3(x+\frac{1}{2}) \\ \frac{9x-6(x+1)-4}{x-4} > 1 \end{cases}, \quad \begin{cases} x^3+2x^2+x+2 \geq 0 \\ x^4-20x^2+64 \leq 0 \\ \frac{x^2+4}{3} > 0 \end{cases}, \quad \begin{cases} \frac{x-2}{x^2-2x-3} < -\frac{2}{x+1} \\ x^2(x-2)^3 \geq 0 \\ 2(1+3x^3)-x(x+5) \geq 0 \end{cases}$$

Soluzioni (8) :  $[\frac{1}{2} < x < 1 \vee 2 < x < 3 \vee x > 4]$ ,  $[x = -2 \vee 2 \leq x \leq 4]$ ,  $[\frac{8}{3} < x < 3]$

$$(9) \quad \begin{cases} \frac{x^3-27}{x^2+7} \geq 0 \\ \frac{x^2}{3x} > 0 \\ 2x+1 \geq 0 \end{cases}, \quad \begin{cases} (x-2)^3 \leq 4(x-2) \\ x^5-1 > 0 \\ 7x^3-7x^2-x+1 < 0 \end{cases}, \quad \begin{cases} \frac{x^2+1}{x} > 2 \\ 4x^3-7x+3 > 0 \\ \frac{x^4+16}{x^2+3}+1 < 0 \end{cases}$$

Soluzioni (9) :  $[x \geq 3]$ ,  $[\nexists x \in \mathbb{R}]$ ,  $[\nexists x \in \mathbb{R}]$