

## Esercizi per le classi seconde

**Risolvi le seguenti disequazioni :** 1)  $\frac{1}{x-3} - \frac{1}{x} < -\frac{x^2-2x-2}{x^2-3x}$       2)  $\frac{1+\frac{2}{x}}{\frac{2}{x}-1} - \frac{x+\frac{1}{6}}{x-\frac{1}{6}} > 0$

3)  $\frac{3x^2-5x-2}{x^4-1} \geq 0$       4)  $\frac{(4x^2+5)(3x^2+1)}{x^2+9} \leq 0$       5)  $\frac{x^3-2x^2+x}{2x^2+2} > 0$       6)  $\frac{5x(x+2)^4}{(x+3)^2} \geq 0$

7)  $\frac{x^3+6x^2+12x+8}{x^2-4x+4} \geq 0$       8)  $\frac{(2x-1)^2(x+2)^3}{x} \geq 0$       9)  $\frac{3x^2(x^2+2-2x\sqrt{2})}{x^3-27} < 0$

10)  $\frac{3(3-2x)}{x+2\sqrt{2}} \geq 2\sqrt{2}-x + \frac{1-x}{x+2\sqrt{2}}$       11)  $3 - \frac{x+1}{x-1} \geq \frac{2}{x^2-x} - \frac{1-x}{x}$       12)  $4x^3+4x^2-x-1 > 0$

13)  $27x^3+8 < 0$

Soluzioni delle disequazioni

1)  $0 < x < 3 \wedge x \neq 1$       2)  $-\frac{\sqrt{3}}{3} < x < \frac{1}{6} \vee \frac{\sqrt{3}}{3} < x < 2 \wedge x \neq 0$       3)  $x < -1 \vee -\frac{1}{3} \leq x < 1 \vee x \geq 2$

4)  $\emptyset$       5)  $x \geq 0$       6)  $x = -2 \vee x \geq 0$       7)  $x \geq -2 \wedge x \neq 2$       8)  $x \leq -2 \vee x > 0$

9)  $x < 3 \wedge x \neq 0 \wedge x \neq \sqrt{2}$       10)  $-2\sqrt{2} < x \leq 0 \vee x \geq 5$       11)  $x \leq -1 \vee 0 < x < 1 \vee x \geq 3$

12)  $-1 < x < -\frac{1}{2}; x > \frac{1}{2}$       13)  $x < -\frac{2}{3}$

**Risolvi i seguenti sistemi di disequazioni :**

1)  $\begin{cases} x(x-\sqrt{3}) - (x\sqrt{3}-1)^2 + (x+\sqrt{3})^2 \geq 8 \\ 2\left(x^2 - \frac{1}{2}\right) - (x-3)\frac{x+1}{2} > \frac{3}{2} - x \end{cases}$       2)  $\begin{cases} \frac{3x+7}{x+1} < \frac{3x-7}{x-1} \\ 3(x-1)^2 \leq 25-x \end{cases}$       3)  $\begin{cases} \frac{2x+1}{2x-1} \geq \frac{x-2}{x+2} \\ \frac{x+7}{x^2-9} < 0 \end{cases}$

4)  $\begin{cases} x^2+4x+16 > 0 \\ 3x-x^2 < 0 \\ 9-x^2 > 0 \end{cases}$       5)  $\begin{cases} -5(x^2+x+1) < 0 \\ \frac{(8-x)^2}{8} + \frac{(8+x)^2}{8} < 32 \\ 4x^2+64-32x < 0 \end{cases}$       6)  $\begin{cases} -\frac{1}{9}x^2 + \frac{4}{3}x - 4 < 0 \\ \frac{x^2-6x+7}{x-3} \geq 0 \\ \frac{x^2+x+1}{3x} - \frac{x+3}{4} > 1 - \frac{1}{x} \end{cases}$

$$7) \begin{cases} \frac{x^4 - 81}{-x^2} \leq 0 \\ (x^2 - 8x + 12) < 0 \end{cases} \quad 8) \begin{cases} \frac{3x^2 - 4x - 7}{x + 2} \leq 0 \\ x^3 - 6x^2 + 9x < 0 \end{cases} \quad 9) \begin{cases} \frac{2}{x} \leq \frac{1}{x-3} \\ \frac{x-1}{x-2} \geq \frac{1}{x-1} + \frac{1}{4} \end{cases}$$

Soluzioni dei sistemi di disequazioni

1)  $\sqrt{3} \leq x \leq 2\sqrt{3}$  ; 2)  $-2 \leq x < -1$ ;  $0 < x < 1$  ; 3)  $-2 < x \leq 0$ ;  $\frac{1}{2} < x < 3$  ; 4)  $-3 < x < 0$

5)  $\emptyset$  6)  $x > 16$  7)  $3 \leq x < 6$  8)  $x < -2$ ;  $-1 \leq x < 0$  9)  $x < 0$ ;  $3 < x \leq 6$

### Risolvi le equazioni ed i sistemi di equazioni che seguono

1)  $\frac{3x^2 - 7}{x^2 - 1} = 1 + \frac{2}{2x^2 - 5}$  2)  $2x^3 + 7x^2 + 7x + 2 = 0$  3)  $\sqrt{2}(x - \sqrt{3}) = \sqrt{3}(x - 2\sqrt{2})$

4)  $3(x-1) - \frac{9-4x}{x-2} = 1 - \frac{1}{x-2}$  5)  $\frac{2x}{x+3} - \frac{3-x}{2-x} = \frac{6}{x^2+x-6}$

6)  $\begin{cases} \frac{(2x+y)^2}{2} - (2x-1)^2 = \frac{(y+1)^2}{2} \\ \frac{2x+y}{2} = \frac{1}{2} + \frac{x+2y}{3} \end{cases}$  7)  $\begin{cases} \frac{3x+y-3}{x-1} = \frac{2x}{y-1} \\ \frac{5}{y+2} = \frac{1}{y-1} \end{cases}$  8)  $\begin{cases} x\sqrt{5} - y\sqrt{2} = 5 + 2\sqrt{2} \\ x\sqrt{5} + 2y\sqrt{2} = 5 - 4\sqrt{2} \end{cases}$

9)  $\begin{cases} x - y = 2 \\ \frac{x-z}{3} + 1 = y \\ x - 2y = 1 - z \end{cases}$  10)  $\begin{cases} x - 3y = 7 + z \\ 8x - 3z = 6 + 4y \\ 4x + 5y = 8 - 4z \end{cases}$  11)  $\begin{cases} \frac{3x-2y}{20} = 1 - \frac{4x+y}{30} \\ 3y - \frac{5x-6y}{2} = 10 - 2x \end{cases}$  12)  $\begin{cases} \frac{2}{x} - \frac{12}{xy} = -\frac{2}{y} \\ \frac{1}{y} - \frac{1}{x} = -\frac{2}{xy} \end{cases}$

13)  $\begin{cases} \frac{2}{x+y} + \frac{5}{x-y} = \frac{10}{x^2 - y^2} \\ \frac{xy+2x}{y} - x = \frac{3}{y} - 1 \end{cases}$  14)  $\begin{cases} 4x + 2y + z = 1 \\ 9x + 3y + z = 8 \\ (y-1)^2 - 4x(z+3) = 0 \end{cases}$

Soluzioni delle equazioni e dei sistemi di equazioni

1)  $x_{1,2} = \pm 2$   $x_{3,4} = \pm \sqrt{2}$  2)  $x_1 = -\frac{1}{2}$   $x_2 = -1$   $x_3 = -2$  3)  $x = 3\sqrt{2} + 2\sqrt{3}$  4)  $x = 0$

5)  $x_1 = 1$ ;  $x_2 = 3$  6)  $\left(\frac{1}{2}; -1\right)$  7)  $\left(\frac{1}{4}; \frac{7}{4}\right)$   $\left(\frac{15}{8}; \frac{7}{4}\right)$  8)  $(\sqrt{5}; -2)$  9)  $(4; 2; 1)$  10)  $(1; -4; 6)$

11)  $(4; 2)$  12)  $(2; 4)$  13)  $\emptyset$  14)  $(2; -3; -1)$ ,  $(18; -83; 95)$

Risolvi gli esercizi a pag. E 132 n. 239 - 240 - 242 - 245 - 246