

$$1. \quad \frac{1+3x}{3x+3} - \frac{2-x}{x+1} = 1$$

$$\frac{1+3x}{3(x+1)} - \frac{2-x}{x+1} = 1$$

$$\frac{1+3x-3(2-x)}{3(x+1)} = \frac{3(x+1)}{3(x+1)} \quad \text{c.a.: } x \neq -1$$

$$1+3x-6+3x = 3x+3$$

$$3x = 8$$

$$x = \frac{8}{3}$$

accettabile

$$2. \quad \begin{cases} 9x - 4y = 14 \\ y - 3x = -5 \end{cases}$$

Riscrivo il sistema in forma normale: $\begin{cases} 9x - 4y = 14 \\ -3x + y = -5 \end{cases}$

e applico il metodo di eliminazione, moltiplicando per 3 la seconda equazione e sommandola alla prima. Ricavato il valore della y lo sostituisco nella prima equazione per ricavare l'altra incognita:

$$\begin{cases} 9x - 4y = 14 \\ -9x + 3y = -15 \end{cases} \Rightarrow \begin{array}{l} -y = -1 \\ y = 1 \end{array}$$

$$\begin{cases} 9x - 4 = 14 \\ y = 1 \end{cases} \Rightarrow \begin{cases} 9x = 18 \\ y = 1 \end{cases} \Rightarrow \begin{cases} x = 2 \\ y = 1 \end{cases}$$

$$3. \quad 2(3x-2) + 3(2x+5)^2 > 4x(3x+5) - x - 3$$

$$6x - 4 + 3(4x^2 + 25 + 20x) > 12x^2 + 20x - x - 3$$

$$6x - 4 + 12x^2 + 75 + 60x > 12x^2 + 20x - x - 3 \quad 47x > -74$$

$$x > -\frac{74}{47}$$

$$4. \begin{cases} 3x - 11 - 2(x - 1) < -3(x - 4) + 20 \\ \frac{1-x}{2} + 1 \geq \frac{2}{3}x - \frac{4}{3} \end{cases}$$

$$\begin{cases} 3x - 11 - 2x + 2 < -3x + 12 + 20 \\ 3 - 3x + 6 \geq 4x - 8 \end{cases}$$

$$\begin{cases} 4x < 41 \\ -7x \geq -17 \end{cases} \quad \begin{cases} x < \frac{41}{4} \\ x \leq \frac{17}{7} \end{cases}$$

$$x \leq \frac{17}{7}$$

$$5. \sqrt{9 - \sqrt{17}} \cdot \sqrt{9 + \sqrt{17}} - \frac{8}{\sqrt{11} - \sqrt{3}} + \sqrt{3} \left(1 - \frac{8}{3} \sqrt{3} \right)$$

$$= \sqrt{81 - 17} - \frac{8}{\sqrt{11} - \sqrt{3}} \cdot \frac{\sqrt{11} + \sqrt{3}}{\sqrt{11} + \sqrt{3}} + \sqrt{3} - 8 =$$

$$= \sqrt{64} - \frac{8(\sqrt{11} + \sqrt{3})}{8} + \sqrt{3} - 8 = 8 - \sqrt{11} - \sqrt{3} + \sqrt{3} - 8 = -\sqrt{11}$$

$$6. (\sqrt{6} + \sqrt{2})^2 - (\sqrt{3} + \sqrt{27})^2 + 40$$

$$= 6 + 2 + 4\sqrt{3} - (\sqrt{3} + 3\sqrt{3})^2 + 40 = 8 + 4\sqrt{3} - (4\sqrt{3})^2 + 40 = 48 + 4\sqrt{3} - 48 = 4\sqrt{3}$$

$$7. \sqrt{2}(x - \sqrt{3}) - (x - \sqrt{3})(x + \sqrt{2}) = -x^2$$

$$x\sqrt{2} - \sqrt{6} - x^2 + x\sqrt{3} - x\sqrt{2} + \sqrt{6} = -x^2$$

$$x\sqrt{3} = 0$$

$$x = 0$$

$$8. \frac{6}{x^2 - 1} - \frac{3}{x - 1} = 1 - \frac{3}{x + 1}$$

$$\frac{6}{(x - 1)(x + 1)} - \frac{3}{x - 1} = 1 - \frac{3}{x + 1}$$

$$\frac{6 - 3(x + 1)}{(x - 1)(x + 1)} = \frac{(x - 1)(x + 1) - 3(x - 1)}{(x - 1)(x + 1)}$$

c.a.: $x \neq \pm 1$

$$6 - 3x - 3 = x^2 - 1 - 3x + 3$$

$$x^2 = 1 \qquad x = \pm 1 \quad \text{non accettabile per c.a.} \Rightarrow \text{imp.}$$

$$9. \quad x - 2 - \frac{5}{4}x = \frac{6 - 5x}{4} - 2 \left(\frac{1}{2}x - 1 \right)^2$$

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

$$x - 2 = \frac{3}{2} - \frac{1}{2}x^2 + 2x - 2$$

$$2x - 4 = 3 - x^2 + 4x - 4$$

$$x^2 - 2x - 3 = 0$$

$$x_{1,2} = \frac{1 \pm \sqrt{1 + 3}}{1} = \left\langle \begin{array}{l} 3 \\ -1 \end{array} \right.$$

$$x_1 = 3 \qquad x_2 = -1$$