

ESERCIZI

Risolvere i seguenti sistemi di 1° grado a due incognite:

$$1 \quad \begin{cases} 3x - 2y = 4 \\ 2x + 3y = 7 \end{cases} \quad [2; 1] \quad 2 \quad \begin{cases} 4x + 7y = 10 \\ x - y = -3 \end{cases} \quad [-1; 2]$$

$$3 \quad \begin{cases} 2x - 3y = 10 \\ 8x + 7y = -17 \end{cases} \quad \left[\frac{1}{2}; -3\right] \quad 4 \quad \begin{cases} 6x - 2y = 3 \\ 9x + 4y = 8 \end{cases} \quad \left[\frac{2}{3}; \frac{1}{2}\right]$$

$$5 \quad \begin{cases} 5x - 2y = 5 \\ y - 15x = 0 \end{cases} \quad \left[-\frac{1}{5}; -3\right] \quad 6 \quad \begin{cases} 2x + 3y = -9 \\ 3x - 2y = 6 \end{cases} \quad [0; -3]$$

$$7 \quad \begin{cases} 4x + y = -3 \\ 3x - 3y = -1 \end{cases} \quad \left[-\frac{2}{3}; -\frac{1}{3}\right] \quad 8 \quad \begin{cases} 2x + 8y = 16 \\ x - 2y = 11 \end{cases} \quad \left[10; -\frac{1}{2}\right]$$

$$9 \quad \begin{cases} 7x - y = -5 \\ 21x + 2y = 0 \end{cases} \quad \left[-\frac{2}{7}; 3\right] \quad 10 \quad \begin{cases} 4x - 7y = 1 \\ 12y + 2x = \frac{1}{2} \end{cases} \quad \left[\frac{1}{4}; 0\right]$$

$$11 \quad \begin{cases} 5x + 2y = -4 \\ 2x + 7y = 17 \end{cases} \quad [-2; 3] \quad 12 \quad \begin{cases} 4x + y = 0 \\ 5x - y = \frac{9}{2} \end{cases} \quad \left[\frac{1}{2}; -2\right]$$

$$13 \quad \begin{cases} x + 8y = 2 \\ 3x - y = 31 \end{cases} \quad [10; -1] \quad 14 \quad \begin{cases} 6x + 2y = 1 \\ x + \frac{2}{3}y = 1 \end{cases} \quad \left[-\frac{2}{3}; \frac{5}{2}\right]$$

$$15 \quad \begin{cases} 12x - 9y = 21 \\ 3x + 2y = 1 \end{cases} \quad [1; -1] \quad 16 \quad \begin{cases} 3x + y = 4 \\ x - 2y = -8 \end{cases} \quad [0; 4]$$

Trovare la soluzione dei seguenti sistemi e quindi eseguire la verifica:

$$17 \quad \begin{cases} 5x - 2y = 3 \\ x - y = 1 \end{cases} \quad 18 \quad \begin{cases} 10x + 13y = 24 \\ 2x - 3y = 16 \end{cases}$$

$$19 \quad \begin{cases} 8x + 2y = 7 \\ 4x - 6y = 5 \end{cases} \quad 20 \quad \begin{cases} 11x - y = 3 \\ 2x + y = 2 \end{cases}$$

$$21 \quad \begin{cases} 4x - y = \frac{1}{2} \\ 3x + 2y = 1 \end{cases}$$

$$22 \quad \begin{cases} x + y = 0 \\ 3x - y = \frac{4}{3} \end{cases}$$

$$23 \quad \begin{cases} 7x + 5y = 12 \\ 12x - 9y = 3 \end{cases}$$

$$\begin{cases} x + 12 = 2y \\ 3x - 1 = 3y \end{cases}$$

$$24 \quad \begin{cases} y + 2 = 3x \\ 2x - 3 = 4y \end{cases}$$

$$\begin{cases} 3x = 4 + 2y \\ 5y = 3 - 2x \end{cases}$$

Risolvere i seguenti sistemi:

$$25 \quad \begin{cases} \frac{4}{3}x + \frac{1}{2}y = -\frac{15}{4} \\ \frac{y-x}{2} - 1 = \frac{3}{4} \end{cases} \quad \left[-3; \frac{1}{2}\right]$$

$$26 \quad \begin{cases} \frac{x+2}{3} - \frac{2y-1}{2} = 1 \\ \frac{x+y-3}{2} = 5 \end{cases} \quad \left[\frac{77}{8}; \frac{27}{8}\right]$$

$$27 \quad \begin{cases} (x-1)^2 - 3y = x^2 - 7 \\ \frac{3x-y}{2} + 3 = y + \frac{3}{2} \end{cases} \quad [1; 2]$$

$$28 \quad \begin{cases} \frac{y-2x}{3} + x = 1 \\ x + 5y + 1 = 12 \end{cases} \quad [1; 2]$$

$$29 \quad \begin{cases} \frac{3x-2y}{3} - (y-x) = 0 \\ 2x + \frac{1}{2}y - 3 = \frac{7x-5}{3} \end{cases} \quad [5; 6]$$

$$30 \quad \begin{cases} \frac{2x+4y}{3} + \frac{1}{2}x + 1 = 0 \\ 2(5+2x-y) + \frac{x+2y}{3} = 0 \end{cases} \quad [-2; 1]$$

$$31 \quad \begin{cases} \frac{4x-5y}{3} - \frac{2x+y-56}{5} = 0 \\ 3x + y + 1 = 0 \end{cases} \quad [-2; 5]$$

$$32 \quad \begin{cases} \frac{x+y}{16} - \frac{x-y}{4} = 1 \\ 5x - 3y = 0 \end{cases} \quad [3; 5]$$

$$33 \quad \begin{cases} \frac{1-x}{2} + \frac{2-y}{3} = 0 \\ \frac{2+x}{3} - \frac{1-y}{2} = 0 \end{cases} \quad \left[\frac{23}{5}; -\frac{17}{5}\right]$$

$$34 \quad \begin{cases} \frac{x-1}{3} + \frac{y+6}{2} = 3 \\ \frac{x+y}{2} + x = 5 \end{cases} \quad [4; -2]$$

$$35 \quad \begin{cases} (2x-3y)^2 - 4x(x+1) = 3y(3y-4x+1) - 7 \\ 3x - 2y = 1 \end{cases} \quad [1; 1]$$

$$36 \quad \begin{cases} (x+2)(5-y) + 2 = x(1-y) \\ 2(x-3y) - 3(x+y) + 16 = 0 \end{cases} \quad [-2; 2]$$

$$37 \quad \begin{cases} \frac{x+2y-3}{2} - \frac{2x-y+1}{3} = 1 \\ (x+3)^2 - x(x+1) - 2(y+5) = 1 \end{cases} \quad \left[\frac{25}{19}; \frac{87}{38}\right]$$

$$38 \quad \begin{cases} (3x-1)^2 + 4x + 5 = (3x-1)(3x+1) + y \\ \frac{y-x+1}{2} = \frac{x+y}{5} \end{cases} \quad [2; 3]$$

$$39 \quad \begin{cases} (x-2)(x+2) - (x+1)^2 - y = -3 \\ \frac{2x-y}{3} - \frac{x+2y}{2} = \frac{8}{3} \end{cases} \quad [0; -2]$$

$$40 \quad \begin{cases} \frac{3x-4y}{2} + \frac{y-2x}{4} = -\frac{25}{4} \\ \frac{x-y}{\frac{1}{2}} - \frac{2x+y}{1-\frac{3}{2}} = x-5 \end{cases} \quad [-1; 3]$$

$$41 \quad \begin{cases} (x-y)^2 + \frac{2x+7y}{2} = x(x-2y) + y^2 - 1 \\ 3x - \frac{y-2}{2} = 1 \end{cases} \quad \left[-\frac{1}{22}; -\frac{3}{11}\right]$$

$$42 \quad \begin{cases} \frac{4x-y}{3} - \frac{x+y}{1+\frac{1}{2}} = \frac{3-x}{2} \\ \frac{y-2}{2} - \frac{2y+x}{3} - 1 = 2x - \frac{1}{2} \end{cases} \quad \left[-\frac{45}{91}; -\frac{27}{13}\right]$$

$$43 \quad \begin{cases} \frac{3x-3y}{2} - 2x + \frac{y}{3} = \frac{5}{3} \\ \frac{2x+3y}{3} - \frac{x-y}{2} - y = -\frac{2}{3} \end{cases} \quad [-1; -1]$$

$$44 \quad \begin{cases} \frac{6x+4y-32}{3} + 2x = 4y - \frac{7x-5y+13}{2} \\ 4x+30 - \frac{48x+18y-72}{5} = 24-5x \end{cases} \quad [4; 5]$$

$$45 \quad \begin{cases} (x-2)^2 + (y-1)^2 = (x+1)(x-3) + (y-2)(y+2) \\ 3x+x(2x-y) - 2y(x+y) = 2(x+y)(x-y) - 3y(x-2) + 1 \end{cases} \quad \left[\frac{37}{9}; \frac{17}{9}\right]$$

$$46 \quad \begin{cases} \frac{3x-2y}{9} = \frac{5-2y}{2} - \frac{x-y}{3} \\ (x-2y)(x+2y) - (x-1)^2 + (2y+1)^2 = 0 \end{cases} \quad \left[\frac{45}{8}; -\frac{45}{16}\right]$$

$$47 \quad \begin{cases} \left(x + \frac{1}{2}\right)\left(y - \frac{3}{2}\right) = xy - \frac{7}{4} \\ (2x-1)(3y+2) = 6xy + \frac{3}{2} \end{cases} \quad \left[\frac{1}{2}; -\frac{1}{2}\right]$$

$$48 \quad \begin{cases} \frac{4x-3y}{1-\frac{1}{2}} + \frac{5y-2x}{\frac{1}{2}-1} = \frac{2x-4}{3} + 39 \\ 7x-4y = \frac{3}{2} + 10 \end{cases} \quad \left[\frac{1}{2}; -2\right]$$

- 49
$$\begin{cases} (2-x)^2 - (x-1)(x+1) - 2y = 3y + 24 \\ (x-1)^3 + 4y - 1 = x^2(x-3) + 4y - 5 \end{cases} \quad [-1; -3]$$
- 50
$$\begin{cases} x + \frac{1}{2} \cdot \frac{2x-y}{3} + 2 \left(1 - \frac{x-3y}{6} \right) + \frac{1}{6} = \frac{4}{3} \\ 3 \left(\frac{x+y-1}{2} - \frac{3x-y+2}{4} \right) - \frac{1}{2} \left(\frac{3y+1}{2} - x \right) + \frac{19}{4} = 0 \end{cases} \quad [0; -1]$$
- 51
$$\begin{cases} \frac{4}{3} \cdot \frac{x+y+1}{2} - 2 \cdot \frac{2x-y-1}{3} + 4 = 0 \\ \frac{1}{3} \left(\frac{3x+2y}{4} - \frac{y+3}{2} \right) + 1 = 2x+y \end{cases} \quad [2; -3]$$
- 52
$$\begin{cases} 3 + \left[\frac{x-3y}{2} - \left(\frac{1-x}{2} + \frac{y+6}{4} \right) \right] = 2x+1 \\ 2 - \left[1 - \left(\frac{x+2y}{3} - \frac{y-x}{2} \right) \right] = y+1 \end{cases} \quad [0; 0]$$
- 53
$$\begin{cases} \frac{2x-1}{3} + \frac{5-y}{2} + 1 = 0 \\ \frac{4x+1}{3} + \frac{1-2y}{2} + 5 = 0 \end{cases} \quad [\text{impossibile}]$$
- 54
$$\begin{cases} \frac{x+2}{3} - \frac{3+5y}{6} = 2 \\ \frac{11+3x}{5} = x-y \end{cases} \quad [\text{indeterminato}]$$

Dire quali dei seguenti sistemi sono determinati, quali indeterminati e quali impossibili:

- 55
$$\begin{cases} 3x - 7y = 5 \\ 2x - 4y = 7 \end{cases} \quad \begin{cases} 2x - y = 4 \\ 4x - 2y = 7 \end{cases}$$
- 56
$$\begin{cases} 3x + 4y = 1 \\ 3x + 4y = 5 \end{cases} \quad \begin{cases} x - 8y = 2 \\ 2x - 16y = 4 \end{cases}$$
- 57
$$\begin{cases} 3x + 15y = 1 \\ 15y + 3x = 1 \end{cases} \quad \begin{cases} \frac{11x-y}{2} - \frac{x+2y}{3} - \frac{x+3}{6} = 1 \\ 10x - \frac{7}{3}y - 3 = 0 \end{cases}$$
- 58
$$\begin{cases} \frac{2x-y}{3} - x = 5 \\ \frac{3y-x}{2} + x - y = -15 \end{cases} \quad \begin{cases} \frac{x-y}{3} - \frac{y-x}{2} = 0 \\ \frac{x-y}{2} + \frac{x+y}{3} = 1 \end{cases}$$

Risolvere i seguenti sistemi ed interpretare poi graficamente le soluzioni rappresentando in un piano cartesiano le due rette corrispondenti alle equazioni che li formano:

$$60 \quad \begin{cases} 4x - y = 10 \\ x + 3y = 9 \end{cases}$$

$$61 \quad \begin{cases} 2x - y = 3 \\ x + 3y = -2 \end{cases}$$

$$62 \quad \begin{cases} x + y = 3 \\ x + 2y = 1 \end{cases}$$

$$63 \quad \begin{cases} x + 3y = 0 \\ 2x + 7y = 1 \end{cases}$$

$$64 \quad \begin{cases} 2x + y = 2 \\ 3x + 2y = 4 \end{cases}$$

$$65 \quad \begin{cases} x + y = 10 \\ x - y = 6 \end{cases}$$

$$66 \quad \begin{cases} x - y = 0 \\ -4x - y = 5 \end{cases}$$

$$67 \quad \begin{cases} y - 2x = 5 \\ x + 2y = 0 \end{cases}$$

$$68 \quad \begin{cases} x + y = 1 \\ 2x - 4y = -1 \end{cases}$$

$$69 \quad \begin{cases} x + y = 0 \\ \frac{x}{2} + 2y = -15 \end{cases}$$

$$70 \quad \begin{cases} x - 4y = 5 \\ \frac{x}{3} - \frac{y}{2} = 0 \end{cases}$$

$$71 \quad \begin{cases} x + y = 12 \\ \frac{x}{2} - \frac{y}{3} = 6 \end{cases}$$

$$72 \quad \begin{cases} 3x - 4y = 0 \\ x + 11y = 0 \end{cases}$$

$$73 \quad \begin{cases} 13x - y = 1 \\ 8x + 2y = -2 \end{cases}$$

Risolvere e discutere i seguenti sistemi numerici fratti:

$$74 \quad \begin{cases} \frac{x-1}{y} = 2 \\ \frac{y+2}{x} = 3 \end{cases} \quad \left[\frac{3}{5}; -\frac{1}{5} \right]$$

$$75 \quad \begin{cases} \frac{3x-y}{x-1} - 2 = 0 \\ \frac{x+4y}{x+1} + 1 = 0 \end{cases} \quad \left[-\frac{3}{2}; \frac{1}{2} \right]$$

$$76 \quad \begin{cases} \frac{x-1}{y} = 1 \\ \frac{y+2}{x} = 2 \end{cases} \quad [\text{impossibile}]$$

$$77 \quad \begin{cases} \frac{1}{x+4} = \frac{1}{1-y} \\ \frac{5x}{1+3y} = 1 \end{cases} \quad [-1; -2]$$

$$78 \quad \begin{cases} \frac{y+3}{x-1} = 9 \\ \frac{y-5}{x+3} = \frac{1}{5} \end{cases} \quad [2; 6]$$

$$79 \quad \begin{cases} \frac{x-1}{2y} = 1 \\ \frac{y+2}{2} = x \end{cases} \quad [\text{impossibile}]$$

$$80 \quad \begin{cases} \frac{x+y}{x-y} - \frac{x-y}{x+y} = \frac{4xy}{x^2-y^2} + \frac{x+y-1}{y^2-x^2} \\ x+y+3=4 \end{cases} \quad \left[\text{indeterminato, eccetto per le} \right. \\ \left. \text{coppie con } x = \pm y \right]$$

- 127 $\begin{cases} 2x + y + 4z = 2 \\ x - y + 2z = 4 \\ x - 2y + 6z = 8 \end{cases} \quad \left[1; -2; \frac{1}{2}\right]$
- 128 $\begin{cases} 3x - 2y + z = 2 \\ x + 4y - z = -2 \\ 3x + 5y + \frac{z}{2} = 1 \end{cases} \quad [0; 0; 2]$
- 129 $\begin{cases} \frac{x-y}{2} + z = 3 \\ \frac{2x+y}{2} + 2z = 0 \\ 1 - \frac{1}{2} \\ x + y + z = -1 \end{cases} \quad [1; -3; 1]$
- 130 $\begin{cases} x - 3y + 5z = 1 \\ 2x - 6y + 10z = 1 \\ x + y = 4 \end{cases} \quad [\text{imposs.}]$
- 131 $\begin{cases} 2x - 4y + 3z = 4 \\ x - 2y + z = 2 \\ 3x - 6y + 4z = 6 \end{cases} \quad [\text{indet.}]$
- 132 $\begin{cases} x + 2y - z = -2 \\ 3x - y - 5z = 2 \\ x + y - z = 0 \end{cases} \quad [5; -2; 3]$
- 133 $\begin{cases} 2(x - 2y) + 3z = 10 \\ \frac{x+y}{2} - z = -\frac{5}{2} \\ 3x - y + 2z = 5 \end{cases} \quad [0; -1; 2]$
- 134 $\begin{cases} (x-2)(y+1) - z = x(y-1) + 3 \\ x + y + 4z = 0 \\ (x-1)^2 + 3(y+z) = x^2 - 5 \end{cases} \quad [3; 1; -1]$
- 135 $\begin{cases} \frac{x+y}{2} - \frac{x-z}{3} = 2 \\ \frac{2-x+2y}{3} + z = y + \frac{1}{3} \\ 3x - z = y - 1 \end{cases} \quad [1; 3; 1]$
- 136 $\begin{cases} 3x + 2y + 4z = 2 \\ \frac{x-2y}{2} + \frac{x+z}{3} + 1 = 0 \\ \frac{x+y+z}{2} + \frac{1}{2} = y \end{cases} \quad [0; 1; 0]$
- 137 $\begin{cases} (x-y)(x-1) + z = x(x-y) - 6 \\ \frac{x+z}{3} - y = 4 \\ (z+1)^2 - z(z+2) + y + x = 1 \end{cases} \quad [3; -3; 0]$
- 138 $\begin{cases} 2x - y + z - u = 1 \\ x + 2y + 3u = 0 \\ y + z - 2u = 2 \\ 3x - 4y + 5z = -6 \end{cases} \quad [1; 1; -1; -1]$
- 139 $\begin{cases} x + y - z + t = 4 \\ 2x + y - t = 4 \\ x - 2y + 3z = -6 \\ 3y - 2z + 3t = 8 \end{cases} \quad [1; 2; -1; 0]$
- 140 $\begin{cases} x - y + 2z = -1 \\ 2x + y - z = -3 \\ x - 4y + 7z = 2 \end{cases} \quad [\text{impossibile}]$
- 141 $\begin{cases} 2x - y + 3z = 3 \\ 3x + y - 5z = 0 \\ 4x - y + z = 3 \end{cases} \quad [1; 2; 1]$
- 142 $\begin{cases} x + 2y + 3z - 4t = 10 \\ 2x - y - 2z - 3t = 8 \\ 3x + 2y - z + 2t = 4 \\ 2x - 3y + 2z + t = -8 \end{cases} \quad [1; 2; -1; -2]$
- 143 $\begin{cases} x - 2y + 3z - 4t = 4 \\ y - z + t = -3 \\ x + 3y - 3t = 1 \\ -7y + 3z + t = -3 \end{cases} \quad [\text{indeterminato}]$