



Sistemas de Ecuaciones Lineales

100 Problemas de Sistemas de Ecuaciones Lineales

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Contenido

1. Sistemas de Ecuaciones Lineales

2

1

Sistemas de Ecuaciones Lineales

Resolver los siguientes sistemas de ecuaciones lineales por el método de Gauss.

1.

$$\begin{aligned}x + y + z &= -1 \\x + y - z &= 1 \\-x + y + z &= 1\end{aligned}$$

Solución $(-1, 1, -1)$

2.

$$\begin{aligned}x + y - z &= -1 \\x - y - z &= 1 \\x - y + z &= -1\end{aligned}$$

Solución $(-1, -1, -1)$

3.

$$\begin{aligned}-x + y + z &= -1 \\-x - y - z &= -1 \\-x + y - z &= 1\end{aligned}$$

Solución $(1, 1, -1)$

4.

$$\begin{aligned}x - y + z &= 1 \\x - y - z &= -1 \\x + y - z &= 1\end{aligned}$$

Solución $(1, 1, 1)$

5.

$$\begin{aligned}x - y + z &= 1 \\x + y + z &= -1 \\x + y - z &= 1\end{aligned}$$

Solución $(1, -1, -1)$

6.

$$\begin{aligned}x + y - z &= 2 \\2x + 2y - z &= 1 \\x + 2y + z &= -1\end{aligned}$$

Solución $(-4, 3, -3)$

7.

$$\begin{aligned}2x + y - z &= 2 \\-x - y - z &= 2 \\x + y + 2z &= 2\end{aligned}$$

Solución $(12, -18, 4)$

8.

$$\begin{aligned}-x + y + z &= 2 \\x + y - z &= 2 \\2x - y + z &= 1\end{aligned}$$

Solución $(1, 2, 1)$

9.

$$\begin{aligned}x + y + z &= 2 \\x + 2y + 2z &= -1 \\-x + 2y + z &= -1\end{aligned}$$

Solución $(5, 7, -10)$

10.

$$\begin{aligned}2x + y + 3z &= 1 \\x - 2y + z &= -1 \\x + 2y + 2z &= 1\end{aligned}$$

Solución $(3, 1, -2)$

11.

$$\begin{aligned}x + 3y + z &= -1 \\3x - y + z &= -1 \\x + y + 2z &= -1\end{aligned}$$

Solución $(-\frac{2}{7}, -\frac{1}{7}, -\frac{2}{7})$

12.

$$\begin{aligned}3x + y + z &= 1 \\ x + 3y + z &= 1 \\ x + y + 3z &= 1\end{aligned}$$

Solución $(\frac{1}{5}, \frac{1}{5}, \frac{1}{5})$

13.

$$\begin{aligned}-x + y + 3z &= 3 \\ x - y + 2z &= 2 \\ x + y - z &= 3\end{aligned}$$

Solución $(2, 2, 1)$

14.

$$\begin{aligned}2x + y + z &= -1 \\ -x - 2y + z &= 2 \\ 2x - y - 2z &= -2\end{aligned}$$

Solución $(-\frac{3}{5}, -\frac{2}{5}, \frac{3}{5})$

15.

$$\begin{aligned}3x + y - z &= 2 \\ x - 3y + z &= -2 \\ -x + y + 3z &= 2\end{aligned}$$

Solución $(\frac{1}{2}, 1, \frac{1}{2})$

16.

$$\begin{aligned}x + y - z &= 2 \\ x - 3y + z &= -2 \\ -x + y + z &= 2\end{aligned}$$

Solución $(2, 2, 2)$

17.

$$\begin{aligned}4x + y - z &= 1 \\ 2x + y + z &= -1 \\ -x + y + z &= 2\end{aligned}$$

Solución $(-1, 3, -2)$

18.

$$\begin{aligned}5x + y + z &= -1 \\ 2x + 2y + 3z &= 1 \\ 3x + y + z &= 1\end{aligned}$$

Solución $(-1, 9, -5)$

19.

$$\begin{aligned}x + 3y + z &= 1 \\7x - 6y + 3z &= 1 \\4x - y + 2z &= 2\end{aligned}$$

Solución (7, 2, -12)

20.

$$\begin{aligned}4x + y + 7z &= 8 \\3x + 3y + 4z &= 5 \\3x + y + 7z &= 4\end{aligned}$$

Solución (4, -1, -1)

21.

$$\begin{aligned}2x + 5y + 4z &= 7 \\2x + 8y + 6z &= 10 \\2x + 9y + 7z &= 5\end{aligned}$$

Solución (7, 13, -18)

22.

$$\begin{aligned}7x + 3y + 6z &= -3 \\5x + 5y + 6z &= 7 \\7x + 4y + 8z &= 10\end{aligned}$$

Solución (-6, -1, 7)

23.

$$\begin{aligned}5x + 7y + 5z &= 1 \\2x + 10y + 6z &= 10 \\4x + 5y + 3z &= 8\end{aligned}$$

Solución (1, 8, -12)

24.

$$\begin{aligned}-2x + 8y - 2z &= 8 \\3y + 3z &= 4 \\-9x - 6y - 6z &= -5\end{aligned}$$

Solución $(-\frac{1}{3}, 1, \frac{1}{3})$

25.

$$\begin{aligned}-6x + 6y - 4z &= 36 \\-4x + 2y - 7z &= 33 \\-2x - 5y - 6z &= 12\end{aligned}$$

Solución (-2, 2, -3)

26.

$$\begin{aligned} 2x - 4y + 2z &= -10 \\ -2x + 3y - 2z &= 9 \\ 5x - 4y + z &= 1 \end{aligned}$$

Solución $(2, 1, -5)$

27.

$$\begin{aligned} -x + y + 4z &= -9 \\ x - 4y + 4z &= -19 \\ -2x + y - 4z &= 2 \end{aligned}$$

Solución $(5, 4, -2)$

28.

$$\begin{aligned} -2x - 5y - z &= 20 \\ -2x - y + 2z &= 1 \\ x + 4y + 2z &= -19 \end{aligned}$$

Solución $(-5, -1, -5)$

29.

$$\begin{aligned} 4x - 5y - 4z &= 37 \\ -x + 5y - 2z &= -4 \\ -2x + 3y + 3z &= -22 \end{aligned}$$

Solución $(5, -1, -3)$

30.

$$\begin{aligned} 2x - y &= 0 \\ 2x - 2y - z &= -2 \\ 2x + 3y - z &= 2 \end{aligned}$$

Solución $(\frac{2}{5}, \frac{4}{5}, \frac{6}{5})$

31.

$$\begin{aligned} x - 2z &= 0 \\ -3x - y - 3z &= 1 \\ 2z &= -2 \end{aligned}$$

Solución $(-2, 8, -1)$

32.

$$\begin{aligned} 2x + 3y - z &= -1 \\ 2x + 2y + 2z &= 2 \\ 2x + 2y - 2z &= 1 \end{aligned}$$

Solución $(3, -\frac{9}{4}, \frac{1}{4})$

33.

$$\begin{aligned} -x + 2y - z &= -1 \\ 2x - 2y + 2z &= 3 \\ -x + 2y &= -2 \end{aligned}$$

Solución $(3, \frac{1}{2}, -1)$

34.

$$\begin{aligned} -x - 2y &= 3 \\ 2x - 3y - z &= 1 \\ -2x + 2y + 2z &= 0 \end{aligned}$$

Solución $(-1, -1, 0)$

35.

$$\begin{aligned} 3x + 2z &= -1 \\ -3x - y - z &= -2 \\ x - y + 2z &= -1 \end{aligned}$$

Solución $(-5, 10, 7)$

36.

$$\begin{aligned} -2x - 3y &= 1 \\ -3x - 3y - 2z &= 3 \\ -x - 3y + z &= 2 \end{aligned}$$

Solución $(4, -3, -3)$

37.

$$\begin{aligned} -2y - 2z &= -2 \\ 3x + y + 3z &= -3 \\ x - 3y - 3z &= 2 \end{aligned}$$

Solución $(5, \frac{21}{2}, -\frac{19}{2})$

38.

$$\begin{aligned} x - y &= -1 \\ -x - y + 2z &= 3 \\ -3x + y - z &= 2 \end{aligned}$$

Solución $(-1, 0, 1)$

39.

$$\begin{aligned} 2x - 2y &= -2 \\ -x + 2y + z &= 2 \\ -x + 3y - 3z &= -2 \end{aligned}$$

Solución $(-1, 0, 1)$

40.

$$\begin{aligned} 3x + 2y + 2z &= 3 \\ x + 2y - 2z &= -2 \\ -3x + y - 2z &= -3 \end{aligned}$$

Solución $(\frac{1}{4}, 0, \frac{9}{8})$

41.

$$\begin{aligned} -x & - 3z &= 3 \\ -x + y & &= 1 \\ x + 2y + z & &= 1 \end{aligned}$$

Solución $(0, 1, -1)$

42.

$$\begin{aligned} 3x - 3y - z &= -3 \\ x - y + z &= -1 \\ -x - 2y + 3z &= 2 \end{aligned}$$

Solución $(-\frac{4}{3}, -\frac{1}{3}, 0)$

43.

$$\begin{aligned} -3x + y - z &= -3 \\ -2x + 2y - z &= -1 \\ -x + y - z &= 1 \end{aligned}$$

Solución $(2, 0, -3)$

44.

$$\begin{aligned} x - 3y + z &= -3 \\ -2x + 2y + 2z &= 3 \\ -3x - 3y + 3z &= 3 \end{aligned}$$

Solución $(-\frac{7}{4}, \frac{1}{4}, -\frac{1}{2})$

45.

$$\begin{aligned} -x + y - z &= 2 \\ x + y + z &= -3 \\ 2x + 2y + 3z &= 5 \end{aligned}$$

Solución $(-\frac{27}{2}, -\frac{1}{2}, 11)$

46.

$$\begin{aligned} x - y + z &= 2 \\ 4x + 4y + 3z &= 2 \\ -2x + 4y - 2z &= 2 \end{aligned}$$

Solución $(-25, 3, 30)$

47.

$$\begin{aligned} 2x - y + 4z &= 4 \\ 5x - 2y - z &= 5 \\ -3x + y + 2z &= 2 \end{aligned}$$

Solución $(-12, -32, -1)$

48.

$$\begin{aligned} -x - 5y + 9z &= -5 \\ 2x + 4y + z &= 2 \\ -4x - 7y - 3z &= 6 \end{aligned}$$

Solución $(-29, 14, 4)$

49.

$$\begin{aligned} 8x + 5y + 8z &= 3 \\ -7x - 4y - z &= -3 \\ 4x + 3y + 6z &= 2 \end{aligned}$$

Solución $(-\frac{1}{2}, \frac{5}{3}, -\frac{1}{6})$

50.

$$\begin{aligned} 2x + 8y - 2z &= 6 \\ -4x - y + 2z &= -6 \\ 4x + 9y - 3z &= 3 \end{aligned}$$

Solución $(-42, -12, -93)$

51.

$$\begin{aligned} 10x - 10y - 6z &= 10 \\ 5x - 9y - z &= -1 \\ 2x + 9y - 6z &= 8 \end{aligned}$$

Solución $(-14, -6, -15)$

52.

$$\begin{aligned} -x - y - 2z &= 5 \\ -9x + 4y + 9z &= 9 \\ 5x - y - 3z &= -8 \end{aligned}$$

Solución $(-\frac{16}{7}, -\frac{9}{7}, -\frac{5}{7})$

53.

$$\begin{aligned} -3x + 4y - 2z &= 5 \\ -8x + 8y - 6z &= -2 \\ -3x + 2y + z &= -2 \end{aligned}$$

Solución $(\frac{33}{7}, \frac{38}{7}, \frac{9}{7})$

54.

$$\begin{aligned} 8x + 6y - 7z &= -1 \\ 8x + 2y - 7z &= -3 \\ 6x - 10y - 4z &= -4 \end{aligned}$$

$$\text{Solución } \left(\frac{23}{10}, \frac{1}{2}, \frac{16}{5} \right)$$

55.

$$\begin{aligned} 5x - y + 2z &= 10 \\ 2x - y + 6z &= -6 \\ -5x + y + 3z &= 6 \end{aligned}$$

$$\text{Solución } \left(\frac{48}{5}, \frac{222}{5}, \frac{16}{5} \right)$$

56.

$$\begin{aligned} 8x + 8y + 2z &= 0 \\ 7x + y + 3z &= -2 \\ 8x + 10y + 2z &= 6 \end{aligned}$$

$$\text{Solución } \left(-\frac{31}{5}, 3, \frac{64}{5} \right)$$

57.

$$\begin{aligned} 8x + 17y + 15z &= 1 \\ -8x - 17y - 18z &= 1 \\ -2x - 5y - 13z &= 1 \end{aligned}$$

$$\text{Solución } \left(-\frac{113}{9}, \frac{59}{9}, -\frac{2}{3} \right)$$

58.

$$\begin{aligned} 18x + 18y - 7z &= 2 \\ 4x - 10z &= 2 \\ -18x - 14y + 15z &= -1 \end{aligned}$$

$$\text{Solución } \left(-\frac{111}{8}, \frac{47}{4}, -\frac{23}{4} \right)$$

59.

$$\begin{aligned} 9x + 3y - 2z &= -2 \\ 9x + 16y + 5z &= 18 \\ 3x - 3y - 3z &= -5 \end{aligned}$$

$$\text{Solución } \left(-\frac{101}{21}, 7, -\frac{71}{7} \right)$$

60.

$$\begin{aligned} -5x + 14y - 4z &= -7 \\ -6x - 5y + 6z &= -9 \\ 15x + 2y - 10z &= 15 \end{aligned}$$

Solución $(\frac{247}{11}, \frac{195}{11}, \frac{393}{11})$

61.

$$\begin{aligned} -x + y + z + w &= 1 \\ y - w &= -1 \\ x - w &= 0 \\ x + z - w &= -1 \end{aligned}$$

Solución (3, 2, -1, 3)

62.

$$\begin{aligned} x + y - w &= -1 \\ -y &= -1 \\ x - y - z - w &= 0 \\ x + z + w &= 1 \end{aligned}$$

Solución (1, 1, -3, 3)

63.

$$\begin{aligned} x - w &= 0 \\ -x + y - z &= 1 \\ x - y + w &= 1 \\ -x + z - w &= 1 \end{aligned}$$

Solución (-3, -7, -5, -3)

64.

$$\begin{aligned} x + y - w &= -1 \\ x - y &= -1 \\ x - y - z - w &= 1 \\ -x - y - z - w &= 1 \end{aligned}$$

Solución (0, 1, -4, 2)

65.

$$\begin{aligned} x + w &= 0 \\ -y + z + w &= -1 \\ -x + z + w &= -1 \\ x - y + w &= 1 \end{aligned}$$

Solución (-1, -1, -3, 1)

66.

$$\begin{aligned}x + y + z - w &= 1 \\ -x - y + z &= 1 \\ x + y + z + w &= -1 \\ -x + y + z + w &= 1\end{aligned}$$

Solución $(-1, \frac{1}{2}, \frac{1}{2}, -1)$

67.

$$\begin{aligned}x + y + z + w &= -1 \\ x - y + z &= -1 \\ x - y + z + w &= 1 \\ x - y - z - w &= 1\end{aligned}$$

Solución $(0, -1, -2, 2)$

68.

$$\begin{aligned}-x + y - z - w &= 1 \\ -x - y + z - w &= -1 \\ x + y + z - w &= 1 \\ x - y - z - w &= 1\end{aligned}$$

Solución $(\frac{1}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{1}{2})$

69.

$$\begin{aligned}-x + y - z - w &= 1 \\ -x + y - z + w &= -1 \\ -x + y + z + w &= 1 \\ -x - y - z + w &= -1\end{aligned}$$

Solución $(-1, 0, 1, -1)$

70.

$$\begin{aligned}-x + y - z + w &= -1 \\ x + y + z + w &= -1 \\ -x - y + z - w &= -1 \\ -x + y + z - w &= 1\end{aligned}$$

Solución $(1, 1, -1, -2)$

71.

$$\begin{aligned}-x - y - z + w &= 1 \\ -x + y - z - w &= 1 \\ x - y - z + w &= 1 \\ x - y - z - w &= -1\end{aligned}$$

Solución $(0, 1, -1, 1)$

72.

$$\begin{aligned}x + y - z + w &= -1 \\x - y - z - w &= -1 \\-x + y - z - w &= 1 \\-x - y - z + w &= -1\end{aligned}$$

Solución $(-\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, -\frac{1}{2})$

73.

$$\begin{aligned}x - y - z - w &= -1 \\-x - y + z - w &= -1 \\x + y - z + 2w &= -1 \\-x - y - z + w &= -1\end{aligned}$$

Solución $(-2, 3, -2, -2)$

74.

$$\begin{aligned}x - y - z + w &= 1 \\x + y - z - w &= 1 \\x - y - z - w &= -1 \\x + 2y + z + 2w &= -1\end{aligned}$$

Solución $(-2, 1, -3, 1)$

75.

$$\begin{aligned}-x + y + 2z + 2w &= -1 \\-x + y + z - w &= 1 \\x - y - z - w &= 1 \\-x + 2y - z + w &= -1\end{aligned}$$

Solución $(3, 2, 1, -1)$

76.

$$\begin{aligned}x + y + z + 2w &= 2 \\-x + y + 2z + w &= 1 \\-x + 2y - z - w &= 2 \\x - y + 2z - w &= 1\end{aligned}$$

Solución $(1, \frac{3}{2}, \frac{1}{2}, -\frac{1}{2})$

77.

$$\begin{aligned}2x + 2y + z + 2w &= 3 \\-x + 3y + 2z + w &= 2 \\3x + 2y + z + 2w &= -1 \\2x + y + 2z + 3w &= 3\end{aligned}$$

Solución $(-4, \frac{9}{8}, -\frac{13}{2}, \frac{61}{8})$

78.

$$\begin{aligned} 2x + 2y + 2z + 2w &= 2 \\ 2x + 2y + z - w &= 1 \\ x - y + 2z + w &= -1 \\ 3x - y + 2z + 3w &= -1 \end{aligned}$$

Solución $(-\frac{1}{3}, 1, 0, \frac{1}{3})$

79.

$$\begin{aligned} 2x + y + 2z + 2w &= -1 \\ 2x + 3y + z + 2w &= 2 \\ 3x + y + 2z + 2w &= -1 \\ 2x - y - z + 2w &= 1 \end{aligned}$$

Solución $(0, \frac{7}{8}, -\frac{5}{4}, \frac{5}{16})$

80.

$$\begin{aligned} x - y + 2z + 2w &= 2 \\ 2x + 2y + 2z - w &= 2 \\ 3x + 2y + 2z - w &= 3 \\ 2x + y + 2z + 2w &= 1 \end{aligned}$$

Solución $(1, -1, \frac{2}{3}, -\frac{2}{3})$

81.

$$\begin{aligned} x + y - z + 3w &= 2 \\ 2x + 3y + 2z + 2w &= 1 \\ 3x + 3y + 2z + w &= 2 \\ x + 2y + z + 2w &= -1 \end{aligned}$$

Solución $(9, -19, 12, 8)$

82.

$$\begin{aligned} 3x + y + 2z + 2w &= 2 \\ x + 3y + 3z + 2w &= 2 \\ -x - y - z - w &= 2 \\ 2x + 3y + 2z + 3w &= -1 \end{aligned}$$

Solución $(-17, -23, 12, 26)$

83.

$$\begin{aligned} 3x + 3y + 2z + 2w &= 1 \\ 3x + 2y + 2z + 2w &= 2 \\ 2x - y + 2z + w &= 2 \\ 3x + y + z + 2w &= 2 \end{aligned}$$

Solución $(-4, -1, 1, 7)$

84.

$$\begin{aligned}x + 2y + 2z + 2w &= 2 \\x - y + z + 3w &= 2 \\x + y + z + w &= 2 \\x + 2y + z + 3w &= -1\end{aligned}$$

Solución $(2, -1, 2, -1)$

85.

$$\begin{aligned}3x + 2y + 2z + 3w &= 3 \\2x + 2y - z - w &= 2 \\3x + y + 2z - w &= 2 \\x + y + z + 3w &= 2\end{aligned}$$

Solución $(-13, 17, 10, -4)$

86.

$$\begin{aligned}2x + 2y - z - w &= 2 \\2x + y - z - w &= 3 \\2x + 2y + 2z + 3w &= 1 \\x + y + 2z + 3w &= 2\end{aligned}$$

Solución $(0, -1, -15, 11)$

87.

$$\begin{aligned}2x + 2y + z + 3w &= 2 \\-x + 3y + z + 2w &= -1 \\2x + 2y + 2z + 3w &= 3 \\3x + y - z + 3w &= -1\end{aligned}$$

Solución $(\frac{13}{2}, \frac{15}{2}, 1, -9)$

88.

$$\begin{aligned}2x + 2y + z + 3w &= 2 \\-x + 3y + z + 2w &= -1 \\2x + 2y + 2z + 3w &= 3 \\3x + y - z + 3w &= -1\end{aligned}$$

Solución $(\frac{13}{2}, \frac{15}{2}, 1, -9)$

89.

$$\begin{aligned}2x + 2y + 2z + w &= 2 \\3x + y - z + 3w &= 2 \\3x + 2y + 2z + 2w &= 2 \\2x + y + z + w &= 2\end{aligned}$$

Solución $(2, 1, -1, -2)$

90.

$$\begin{aligned}x + 1y + z + 3w &= 3 \\2x + 2y + 2z + 2w &= 2 \\2x + 2y + z + 2w &= 2 \\x + 2y + 2z + 2w &= -1\end{aligned}$$

Solución $(3, -3, 0, 1)$

91.

$$\begin{aligned}-x + 2y + 2z + 2w &= 3 \\2x + 2y - z + w &= -1 \\3x + 2y + z + w &= 2 \\x + y + 3z + w &= 2\end{aligned}$$

Solución $(-5, 18, 4, -23)$

92.

$$\begin{aligned}3x + 2y + 3z + 3w &= 3 \\-x + y - z + w &= 2 \\-x + y + 2z + 3w &= -1 \\2x + y + 3z + 2w &= 2\end{aligned}$$

Solución $(-2, 9, 3, -6)$

93.

$$\begin{aligned}-x - y + 3z + 2w &= 3 \\5x + 2y + 2z - w &= 2 \\3x + 2y - z - w &= 2 \\4x + y + z - w &= 1\end{aligned}$$

Solución $(\frac{6}{5}, \frac{3}{5}, -\frac{4}{5}, \frac{18}{5})$

94.

$$\begin{aligned}2x - y - z - w &= 2 \\4x - y - z - w &= 4 \\3x + 2y + z + 3w &= 4 \\3x + 2y + 4z - 3w &= 1\end{aligned}$$

Solución $(1, 1, -1, 0)$

95.

$$\begin{aligned}x + 5y + 2z + w &= 2 \\2x + 5y + 3z + 2w &= 5 \\2x - y + z + 4w &= 1 \\3x + 2y + 2z + 4w &= 5\end{aligned}$$

Solución $(\frac{21}{5}, -\frac{2}{5}, 1, -\frac{11}{5})$

96.

$$\begin{aligned}x + 3y + 3z + w &= 1 \\2x + 2y + 2z + 3w &= 2 \\2x + y + 4z + 4w &= 2 \\2x + 3y + 2z + 2w &= 3\end{aligned}$$

Solución $(\frac{9}{2}, -1, \frac{1}{2}, -2)$

97.

$$\begin{aligned}x - y + z - w &= 4 \\2x + 5y + 2z + w &= 2 \\2x + 4y + 2z + w &= 1 \\2x + 2y + z + 2w &= 5\end{aligned}$$

Solución $(11, 1, -\frac{31}{3}, -\frac{13}{3})$

98.

$$\begin{aligned}-x + 4y - z - w &= 2 \\3x + 3y + 2z + 2w &= -1 \\4x + 3y - z + 5w &= -1 \\2x + 2y + 5z - w &= 2\end{aligned}$$

Solución $(36, -3, -19, -31)$

99.

$$\begin{aligned}4x + 2y + 5z + 3w &= 3 \\4x + 2y + 3z + 2w &= 3 \\2x + 3y + z + 3w &= 3 \\4x + 1y + 2z + w &= 2\end{aligned}$$

Solución $(\frac{1}{5}, \frac{6}{5}, \frac{1}{5}, -\frac{2}{5})$

100.

$$\begin{aligned}2x + 4y - z + 4w &= 3 \\2x + 2y - z + 2w &= -1 \\x + 2y + z + w &= 5 \\x + 2y + 5z - w &= -1\end{aligned}$$

Solución $(-9, 25, -13, -23)$