

Solve the systems of equations

1.

$$\begin{aligned} 2x_1 - x_2 &= 4 \\ 3x_1 + x_2 &= 5 \end{aligned}$$

$$[\vec{x} = (\frac{9}{5}, -\frac{2}{5})]$$

2.

$$\begin{aligned} 3x_1 + x_2 &= 6 \\ 7x_1 - 2x_2 &= 5 \end{aligned}$$

$$[\vec{x} = (\frac{17}{13}, \frac{27}{13})]$$

3.

$$\begin{aligned} x_1 - 2x_2 &= 4 \\ 3x_1 - 4x_2 &= 6 \end{aligned}$$

$$[\vec{x} = (-2, -3)]$$

Solve the systems of equations

1.

$$\begin{aligned} x_1 + 2x_2 - 5x_3 + x_4 &= -2 \\ 3x_1 + x_2 - 4x_3 + 6x_4 &= -2 \\ -x_1 + 2x_2 - x_3 + x_4 &= 6 \\ x_2 + 3x_3 - 4x_4 &= 1 \end{aligned}$$

$$[\vec{x} = (-2, 2, 1, 1)]$$

2.

$$\begin{aligned} x_1 + x_2 + 2x_3 + 3x_4 &= -1 \\ 3x_1 - x_2 - x_3 - 2x_4 &= -4 \\ 2x_1 + 3x_2 - x_3 - x_4 &= -6 \\ x_1 + 2x_2 + 3x_3 - x_4 &= -4 \end{aligned}$$

$$[\vec{x} = (-1, -1, 0, 1)]$$

3.

$$\begin{aligned} x_1 + 3x_2 - 2x_3 + x_4 &= 0 \\ 2x_1 + 5x_2 - 3x_3 + 3x_4 &= 0 \\ x_1 + 2x_3 - 2x_4 &= 9 \\ 2x_1 - x_2 + 4x_3 + 9x_4 &= 3 \end{aligned}$$

$$[\vec{x} = (1, 2, 3, -1)]$$

4.

$$\begin{aligned} x_1 + x_2 + x_3 + 4x_4 &= 0 \\ x_1 + x_2 + 5x_4 &= 0 \\ 2x_1 + x_2 + 3x_3 + 4x_4 &= 0 \\ x_1 - 3x_2 + 2x_3 - 9x_4 &= 0 \end{aligned}$$

$$[\vec{x} = (-2t, -3t, t, t)]$$

4.

$$\begin{aligned} 2x_1 - x_2 + 3x_3 &= 12 \\ x_1 + x_2 - x_3 &= -3 \\ x_1 + 2x_2 - 3x_3 &= -10 \end{aligned}$$

$$[\vec{x} = (1, -1, 3)]$$

5.

$$\begin{aligned} 2x_1 - 3x_3 + 4x_4 &= 0 \\ x_1 + x_2 - 3x_3 &= 4 \\ 3x_1 + 2x_2 - x_3 &= 0 \end{aligned}$$

$$[\vec{x} = (\frac{2}{3}, -\frac{28}{15}, -\frac{26}{15})]$$

6.

$$\begin{aligned} 2x_1 + x_2 + x_3 &= 0 \\ 4x_1 + 3x_2 + 2x_3 &= 2 \\ 2x_1 - x_2 - 3x_3 &= 0 \end{aligned}$$

$$[\vec{x} = (-\frac{1}{2}, 2, -1)]$$

5.

$$\begin{aligned} x_1 + 3x_2 - 2x_3 + x_4 &= 0 \\ 2x_1 + 5x_2 - 3x_3 + 3x_4 &= 0 \\ x_1 + 2x_3 - 2x_4 &= 9 \\ 5x_1 + 10x_2 - 4x_3 + 4x_4 &= 10 \end{aligned}$$

$$[\text{no solution}]$$

6.

$$\begin{aligned} 4x_1 - 3x_2 + 2x_3 &= 0 \\ x_1 + 2x_2 + 3x_3 &= 0 \\ x_1 + x_2 + x_3 &= 0 \end{aligned}$$

$$[\vec{x} = (0, 0, 0)]$$

7.

$$\begin{aligned} x_1 - 2x_2 + x_3 &= 4 \\ 2x_1 + 3x_2 - x_3 &= 3 \\ 4x_1 - x_2 + x_3 &= 11 \end{aligned}$$

$$[\vec{x} = (\frac{18}{7} - \frac{1}{7}t, \frac{3}{7}t - \frac{5}{7}, t)]$$

8.

$$\begin{aligned} 3x_1 - x_2 - 3x_3 - x_4 &= -2 \\ 2x_1 - 2x_2 - 6x_3 - 6x_4 &= -4 \\ 2x_1 - x_2 - 3x_3 - 2x_4 &= -2 \\ 3x_1 + x_2 + 3x_3 + 7x_4 &= 2 \end{aligned}$$

$$[\vec{x} = (-t, -3s - t + 2, s, t)]$$

9.

$$\begin{aligned}
x_1 + x_2 + 5x_4 &= 1 \\
x_1 + x_3 + 2x_4 &= 1 \\
x_1 - 3x_2 + 4x_3 - 7x_4 &= 1 \\
x_2 - x_3 + 3x_4 &= 0
\end{aligned}$$

$$[\vec{x} = (-s - 2t + 1, s - 3t, s, t)]$$

10.

$$\begin{aligned}
x_1 + 2x_3 + x_4 + 4x_5 &= 1 \\
x_2 + x_3 - 3x_4 &= -2 \\
4x_1 - 3x_2 + 5x_3 + 13x_4 + 16x_5 &= 10 \\
x_1 + 2x_2 + 4x_3 - 5x_4 + 4x_5 &= -3
\end{aligned}$$

$$[\vec{x} = (-2r - s - 4t + 1, -r + 3s - 2, r, s, t)]$$

11.

$$\begin{aligned}
2x_1 + 3x_2 - 4x_3 + 6x_4 + 2x_5 &= -5 \\
4x_1 - x_2 - 3x_4 + 6x_5 &= 13 \\
2x_2 + 6x_3 - 4x_4 - 13x_5 &= 10 \\
2x_1 + 5x_2 + 2x_3 + 2x_4 - 11x_5 &= 5
\end{aligned}$$

$$[\vec{x} = (\frac{1}{2}s - t + 3, -s + 2t - 1, s + \frac{3}{2}t + 2, s, t)]$$

12.

$$\begin{aligned}
x_1 - 2x_2 + 3x_3 - x_4 + 2x_5 &= 2 \\
3x_1 - x_2 + 5x_3 - 3x_4 - x_5 &= 6 \\
2x_1 + x_2 + 2x_3 - 2x_4 - 3x_5 &= 8
\end{aligned}$$

[no solution]

13.

$$\begin{aligned}
x_1 + 3x_2 + 5x_3 - 4x_4 &= 1 \\
x_1 + 3x_2 + 2x_3 - 2x_4 + x_5 &= -1 \\
x_1 - 2x_2 + x_3 - x_4 - x_5 &= 3 \\
x_1 - 4x_2 + x_3 + x_4 - x_5 &= 3 \\
x_1 + 2x_2 + x_3 - x_4 + x_5 &= -1
\end{aligned}$$

$$[\vec{x} = (-\frac{1}{2}t, -1 - \frac{1}{2}t, 0, -1 - \frac{1}{2}t, t)]$$

14.

$$\begin{aligned}
x_1 + x_2 + x_3 + x_4 &= 1 \\
2x_1 + 2x_2 + 2x_3 &= 0 \\
x_1 + x_2 + 5x_3 - x_4 + 6x_5 &= 1 \\
x_1 + x_2 - 3x_3 + x_4 - 6x_5 &= -1
\end{aligned}$$

$$[\vec{x} = (-\frac{1}{2} - s + \frac{3}{2}t, s, \frac{1}{2} - \frac{3}{2}t, 1, t)]$$