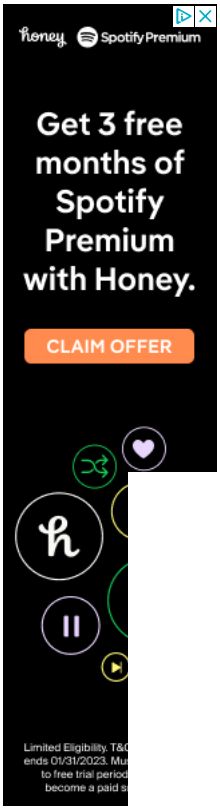
Matrix calculator

Matrix calculator
System of equations calculator ✓
Determinant calculator
Eigenvalues calculator
Wikipedia:Matrices



Hide Ads

System of equations calculator

Enter coefficients of your system into the input fields. Leave cells empty for variables, which do not participate in your equations. To input fractions use / : 1/3 .

System of equations:

4 x_1 +	2 x_2 +	0 x_3 +	0 x_4 +	0 x_5 +	0 x_6 +	0 x_7 +	-2 x_8 +	-1 x_9 =	
1 x_1 +	0 x_2 +	0 x_3 +	-2 x_4 +	0 x_5 +	0 x_6 +	0 x_7 +	0 x_8 +	0 x_9 =	
6 x_1 +	0 x_2 +	1 x_3 +	-3 x_4 +	-3 x_5 +	0 x_6 +	0 x_7 +	-1 x_8 +	0 x_9 =	
6 x_1 +	0 x_2 +	0 x_3 +	0 x_4 +	0 x_5 +	-1 x_6 +	0 x_7 +	0 x_8 +	0 x_9 =	
6 x_1 +	0 x_2 +	0 x_3 +	0 x_4 +	0 x_5 +	0 x_6 +	0 x_7 +	0 x_8 +	-1 x_9 =	
0 x_1 +	2 x_2 +	0 x_3 +	0 x_4 +	-2 x_5 +	0 x_6 +	0 x_7 +	0 x_8 +	0 x_9 =	
0 x_1 +	7 x_2 +	4 x_3 +	-12 x_4 +	-12 x_5 +	-2 x_6 +	-1 x_7 +	-4 x_8 +	-3 x_9 =	
0 x_1 +	0 x_2 +	2 x_3 +	0 x_4 +	0 x_5 +	0 x_6 +	-2 x_7 +	0 x_8 +	0 x_9 =	
x_1 +	x_2 +	x_3 +	x_4 +	x_5 +	x_6 +	x_7 +	x_8 +	x_9 =	

Cells + −

Solve by Gaussian elimination Solve

☐ Display decimals Clean

Solution by Gaussian elimination

Convert the augmented matrix into the row echelon form:

$$\left(\begin{array}{ccccccccc|c} \mathbf{4} & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 1 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 & 0 \\ 6 & 0 & 1 & -3 & -3 & 0 & 0 & -1 & 0 & 0 \\ 6 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 \\ 6 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times\left(\frac{-1}{4}\right)$$

$$R_2 - \left(\frac{1}{4}\right)\cdot R_1 \to R_2$$

$$\left(\begin{array}{ccccccccc|c} \mathbf{4} & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 6 & 0 & 1 & -3 & -3 & 0 & 0 & -1 & 0 & 0 \\ 6 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 \\ 6 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times\left(\frac{-3}{2}\right)$$

$$R_3 - \left(\frac{3}{2}\right)\cdot R_1 \to R_3$$

$$\left(\begin{array}{ccccccccc|c} \mathbf{4} & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & -3 & 1 & -3 & -3 & 0 & 0 & 2 & \frac{3}{2} & 0 \\ 6 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 \\ 6 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times\left(\frac{-3}{2}\right)$$

$$R_4 - \left(\frac{3}{2}\right)\cdot R_1 \to R_4$$

$$\left(\begin{array}{ccccccccc|c} \boxed{4} & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & -3 & 1 & -3 & -3 & 0 & 0 & 2 & \frac{3}{2} & 0 \\ 0 & -3 & 0 & 0 & 0 & -1 & 0 & 3 & \frac{3}{2} & 0 \\ 6 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times\left(\frac{-3}{2}\right)$$

$R_5 - \left(\frac{3}{2}\right) \cdot \widetilde{R}_1 \to R_5$

$$\left(\begin{array}{ccccccccc|c} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \boxed{\frac{-1}{2}} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & -3 & 1 & -3 & -3 & 0 & 0 & 2 & \frac{3}{2} & 0 \\ 0 & -3 & 0 & 0 & 0 & -1 & 0 & 3 & \frac{3}{2} & 0 \\ 0 & -3 & 0 & 0 & 0 & 0 & 0 & 3 & \frac{1}{2} & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times(-6)$$

$R_3 - 6 \cdot \widetilde{R}_2 \to R_3$

$$\left(\begin{array}{ccccccccc|c} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \boxed{\frac{-1}{2}} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & -3 & 0 & 0 & 0 & -1 & 0 & 3 & \frac{3}{2} & 0 \\ 0 & -3 & 0 & 0 & 0 & 0 & 0 & 3 & \frac{1}{2} & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times(-6)$$

$R_4 - 6 \cdot \widetilde{R}_2 \to R_4$

$$\left(\begin{array}{ccccccccc|c} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \boxed{\frac{-1}{2}} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & -3 & 0 & 0 & 0 & 0 & 0 & 3 & \frac{1}{2} & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times(-6)$$

$R_5 - 6 \cdot \widetilde{R}_2 \to R_5$

$$\left(\begin{array}{ccccccccc|c} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \boxed{\frac{-1}{2}} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times(4)$$

$R_6 - (-4) \cdot \widetilde{R}_2 \to R_6$

$$\left(\begin{array}{ccccccccc|c} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \boxed{\frac{-1}{2}} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -8 & -2 & 0 & 0 & 2 & 1 & 0 \\ 0 & 7 & 4 & -12 & -12 & -2 & -1 & -4 & -3 & 0 \\ 0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 \end{array}\right) \times(14)$$

$R_7 - (-14)\widetilde{\cdot} R_2 \to R_7$

$$\left(\begin{array}{cccccccccc|c}
4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\
0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\
0 & 0 & \boxed{1} & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\
0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 12 & 0 & 0 & 0 & 0 & -1 & 0 \\
0 & 0 & 0 & -8 & -2 & 0 & 0 & 2 & 1 & 0 \\
0 & 0 & 4 & -40 & -12 & -2 & -1 & 3 & \frac{1}{2} & 0 \\
0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0
\end{array}\right) \times(-4)$$

$R_7 - 4 \cdot \widetilde{R}_3 \to R_7$

$$\left(\begin{array}{cccccccccc|c}
4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\
0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\
0 & 0 & \boxed{1} & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\
0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 12 & 0 & 0 & 0 & 0 & -1 & 0 \\
0 & 0 & 0 & -8 & -2 & 0 & 0 & 2 & 1 & 0 \\
0 & 0 & 0 & -76 & 0 & -2 & -1 & 7 & \frac{1}{2} & 0 \\
0 & 0 & 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0
\end{array}\right) \times(-2)$$

$R_8 - 2 \cdot \widetilde{R}_3 \to R_8$

$$\left(\begin{array}{cccccccccc|c}
4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\
0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\
0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\
0 & 0 & 0 & \boxed{12} & 0 & -1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 12 & 0 & 0 & 0 & 0 & -1 & 0 \\
0 & 0 & 0 & -8 & -2 & 0 & 0 & 2 & 1 & 0 \\
0 & 0 & 0 & -76 & 0 & -2 & -1 & 7 & \frac{1}{2} & 0 \\
0 & 0 & 0 & -18 & 6 & 0 & -2 & 2 & 0 & 0
\end{array}\right) \times(-1)$$

$R_5 - 1 \cdot \widetilde{R}_4 \to R_5$

$$\left(\begin{array}{cccccccccc|c}
4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\
0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\
0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\
0 & 0 & 0 & \boxed{12} & 0 & -1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 & 0 \\
0 & 0 & 0 & -8 & -2 & 0 & 0 & 2 & 1 & 0 \\
0 & 0 & 0 & -76 & 0 & -2 & -1 & 7 & \frac{1}{2} & 0 \\
0 & 0 & 0 & -18 & 6 & 0 & -2 & 2 & 0 & 0
\end{array}\right) \times\left(\frac{2}{3}\right)$$

$R_6 - \left(\frac{-2}{3}\right)\widetilde{\cdot} R_4 \to R_6$

$$\left(\begin{array}{cccccccccc|c}
4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\
0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\
0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\
0 & 0 & 0 & \boxed{12} & 0 & -1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 & 0 \\
0 & 0 & 0 & 0 & -2 & \frac{-2}{3} & 0 & 2 & 1 & 0 \\
0 & 0 & 0 & -76 & 0 & -2 & -1 & 7 & \frac{1}{2} & 0 \\
0 & 0 & 0 & -18 & 6 & 0 & -2 & 2 & 0 & 0
\end{array}\right) \times\left(\frac{19}{3}\right)$$

$R_7 - \left(\frac{-19}{3}\right)\widetilde{\cdot} R_4 \to R_7$

$$\left(\begin{array}{cccccccccc|c}
4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\
0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\
0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\
0 & 0 & 0 & \boxed{12} & 0 & -1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 & 0 \\
0 & 0 & 0 & 0 & -2 & \frac{-2}{3} & 0 & 2 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & \frac{-25}{3} & -1 & 7 & \frac{1}{2} & 0 \\
0 & 0 & 0 & -18 & 6 & 0 & -2 & 2 & 0 & 0
\end{array}\right) \times\left(\frac{3}{2}\right)$$

$$R_8 - \left(\frac{-3}{2}\right) \cdot R_4 \to R_8 \begin{pmatrix} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & -2 & \frac{-2}{3} & 0 & 2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{-25}{3} & -1 & 7 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 6 & \frac{-3}{2} & -2 & 2 & 0 & 0 \end{pmatrix}$$

$$R_6 \leftrightarrow R_5 \begin{pmatrix} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \textcircled{-2} & \frac{-2}{3} & 0 & 2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{-25}{3} & -1 & 7 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 6 & \frac{-3}{2} & -2 & 2 & 0 & 0 \end{pmatrix} \times(3)$$

$$R_8 - (-3) \cdot R_5 \to R_8$$

$$\begin{pmatrix} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -2 & \frac{-2}{3} & 0 & 2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & \textcircled{1} & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{-25}{3} & -1 & 7 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{-7}{2} & -2 & 8 & 3 & 0 \end{pmatrix} \times\left(\frac{25}{3}\right)$$

$$R_7 - \left(\frac{-25}{3}\right) \cdot R_6 \to R_7$$

$$\begin{pmatrix} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -2 & \frac{-2}{3} & 0 & 2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & \textcircled{1} & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -1 & 7 & \frac{-47}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{-7}{2} & -2 & 8 & 3 & 0 \end{pmatrix} \times\left(\frac{7}{2}\right)$$

$$R_8 - \left(\frac{-7}{2}\right) \cdot R_6 \to R_8$$

$$\left(\begin{array}{ccccccccc|c} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -2 & \frac{-2}{3} & 0 & 2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \boxed{-1} & 7 & \frac{-47}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -2 & 8 & \frac{-1}{2} & 0 \end{array}\right) \times(-2)$$

$$R_8 - 2 \cdot \widetilde{R}_7 \to R_8 \left(\begin{array}{ccccccccc|c} 4 & 2 & 0 & 0 & 0 & 0 & 0 & -2 & -1 & 0 \\ 0 & \frac{-1}{2} & 0 & -2 & 0 & 0 & 0 & \frac{1}{2} & \frac{1}{4} & 0 \\ 0 & 0 & 1 & 9 & -3 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 12 & 0 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -2 & \frac{-2}{3} & 0 & 2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -1 & 7 & \frac{-47}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -6 & \frac{91}{6} & 0 \end{array}\right)$$

$$\begin{cases} 4 \cdot x_1 + 2 \cdot x_2 - 2 \cdot x_8 - x_9 = 0 \ (1) \\ \frac{-1}{2} \cdot x_2 - 2 \cdot x_4 + \frac{1}{2} \cdot x_8 + \frac{1}{4} \cdot x_9 = 0 \\ x_3 + 9 \cdot x_4 - 3 \cdot x_5 - x_8 = 0 \\ 12 \cdot x_4 - x_6 = 0 \\ -2 \cdot x_5 - \frac{2}{3} \cdot x_6 + 2 \cdot x_8 + x_9 = 0 \\ x_6 - x_9 = 0 \\ -1 \cdot x_7 + 7 \cdot x_8 - \frac{47}{6} \cdot x_9 = 0 \\ -6 \cdot x_8 + \frac{91}{6} \cdot x_9 = 0 \end{cases}$$

- Find the variable x_8 from the equation 8 of the system (1):

  $-6x_8 = \frac{-91}{6} \cdot x_9$

  $\boldsymbol{x_8 = \frac{91}{36} \cdot x_9}$
- Find the variable x_7 from the equation 7 of the system (1):

  $-x_7 = -7x_8 + \frac{47}{6} \cdot x_9 = -7 \cdot \left(\frac{91}{36} \cdot x_9\right) + \frac{47}{6} \cdot x_9 = \frac{-355}{36} \cdot x_9$

  $\boldsymbol{x_7 = \frac{355}{36} \cdot x_9}$
- Find the variable x_6 from the equation 6 of the system (1):

  $x_6 = x_9$
- Find the variable x_5 from the equation 5 of the system (1):

  $-2x_5 = \frac{2}{3} \cdot x_6 - 2x_8 - x_9 = \frac{2}{3} \cdot x_9 - 2 \cdot \left(\frac{91}{36} \cdot x_9\right) - x_9 = \frac{-97}{18} \cdot x_9$

  $\boldsymbol{x_5 = \frac{97}{36} \cdot x_9}$
- Find the variable x_4 from the equation 4 of the system (1):

  $12x_4 = x_6 = x_9 = x_9$

  $\boldsymbol{x_4 = \frac{1}{12} \cdot x_9}$

- Find the variable x_3 from the equation 3 of the system

  (1):

  $x_3 = -9x_4 + 3x_5 + x_8 = -9\cdot\left(\frac{1}{12}\cdot x_9\right) + 3\cdot\left(\frac{97}{36}\cdot x_9\right) + \frac{91}{36}\cdot x_9 = \frac{355}{36}\cdot x_9$
- Find the variable x_2 from the equation 2 of the system

  (1):

  $\frac{-1}{2}\cdot x_2 = 2x_4 - \frac{1}{2}\cdot x_8 - \frac{1}{4}\cdot x_9 = 2\cdot\left(\frac{1}{12}\cdot x_9\right) - \frac{1}{2}\cdot\left(\frac{91}{36}\cdot x_9\right) - \frac{1}{4}\cdot x_9 = \frac{-97}{72}\cdot x_9$

  $\boldsymbol{x_2 = \frac{97}{36}\cdot x_9}$
- Find the variable x_1 from the equation 1 of the system

  (1):

  $4x_1 = -2x_2 + 2x_8 + x_9 = -2\cdot\left(\frac{97}{36}\cdot x_9\right) + 2\cdot\left(\frac{91}{36}\cdot x_9\right) + x_9 = \frac{2}{3}\cdot x_9$

  $\boldsymbol{x_1 = \frac{1}{6}\cdot x_9}$

Answer:

$x_1 = \frac{1}{6}\cdot x_9$

$x_2 = \frac{97}{36}\cdot x_9$

$x_3 = \frac{355}{36}\cdot x_9$

$x_4 = \frac{1}{12}\cdot x_9$

$x_5 = \frac{97}{36}\cdot x_9$

$x_6 = x_9$

$x_7 = \frac{355}{36}\cdot x_9$

$x_8 = \frac{91}{36}\cdot x_9$

$x_9 = x_9$

General Solution : $X = \begin{pmatrix} \frac{1}{6}\cdot x_9 \\ \frac{97}{36}\cdot x_9 \\ \frac{355}{36}\cdot x_9 \\ \frac{1}{12}\cdot x_9 \\ \frac{97}{36}\cdot x_9 \\ x_9 \\ \frac{355}{36}\cdot x_9 \\ \frac{91}{36}\cdot x_9 \\ x_9 \end{pmatrix}$

The solution set: $\left\{ x_9 \cdot \begin{pmatrix} \frac{1}{6} \\ \frac{97}{36} \\ \frac{355}{36} \\ \frac{1}{12} \\ \frac{97}{36} \\ 1 \\ \frac{355}{36} \\ \frac{91}{36} \\ 1 \end{pmatrix} \right\}$

- Show how to input the following system:

```
2x-2y+z=-3
x+3y-2z=1
3x-y-z=2
```

This calculator solves Systems of Linear Equations with steps shown, using Gaussian Elimination Method , Inverse

Matrix Method , or Cramer's rule . Also you can compute a number of solutions in a system (analyse the compatibility) using Rouché–Capelli theorem .

- Leave extra cells *empty* to enter non-square matrices.
- ► You can use decimal fractions or mathematical expressions:
- Use ↵ Enter, Space, ← ↑ ↓ →, ⌫, and Delete to navigate between cells, Ctrl + C / Ctrl + V to copy/paste matrices.
- Drag-and-drop matrices from the results, or even from/to a text editor.
- To learn more about matrices use Wikipedia .

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☕ Support

► Thanks to: