

CRAMER.8xp

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This program will solve a square system of linear equations using Cramer's rule. The user will input an invertible square into matrix A . They will then call the program which will solve a system of 2, 3, or 4 variables and equations. The user will be asked to input the dimension (number of variables) and then enter the constants, C, D, E, F depending on the dimension.

Suppose you are given the system

$$\begin{aligned}a_{1,1}w + a_{1,2}x + a_{1,3}y + a_{1,4}z &= C \\a_{2,1}w + a_{2,2}x + a_{2,3}y + a_{2,4}z &= D \\a_{3,1}w + a_{3,2}x + a_{3,3}y + a_{3,4}z &= E \\a_{4,1}w + a_{4,2}x + a_{4,3}y + a_{4,4}z &= F\end{aligned}$$

It will then calculate the determinant $\begin{vmatrix} C & a_{1,2} & a_{1,3} & a_{1,4} \\ D & a_{2,2} & a_{2,3} & a_{2,4} \\ E & a_{3,2} & a_{3,3} & a_{3,4} \\ F & a_{4,2} & a_{4,3} & a_{4,4} \end{vmatrix}$ and

store this value as N . It repeats this process like such: calculating

$\begin{vmatrix} a_{1,1} & C & a_{1,3} & a_{1,4} \\ a_{2,1} & D & a_{2,3} & a_{2,4} \\ a_{3,1} & E & a_{3,3} & a_{3,4} \\ a_{4,1} & F & a_{4,3} & a_{4,4} \end{vmatrix}$ and store this as O . And repeat calculating

determinants shifting the constant values column through the matrix until, N , O , P , and Q are solved. It will then calculate the w, x, y, z using $w = \frac{N}{M}$, $x = \frac{O}{M}$, $y = \frac{P}{M}$, $z = \frac{Q}{M}$ and then display the values for w, x, y, z which is the intersection of the four lines. It will repeat this similar process for 3×3 and 2×2 systems.