CRAMER'S RULE
A Method for Solving Systems of Linear Equations

To Solve Two Equations

Given the system $\begin{cases} a_1x + b_1y = c_1 \\ a_2x + b_2y = c_2 \end{cases}$ then $x = \dfrac{D_x}{D}$ and $y = \dfrac{D_y}{D}$

where $D \neq 0$ and $D = \begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}$ (Form the determinant of the coefficients of x and y.)

$D_x = \begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}$ (Replace the x-coefficients with the constants c_1 and c_2.)

$D_y = \begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}$ (Replace the y-coefficients with the constants c_1 and c_2.)

To Solve Three Equations

Given the system $\begin{cases} a_1x + b_1y + c_1z = d_1 \\ a_2x + b_2y + c_2z = d_2 \\ a_3x + b_3y + c_3z = d_3 \end{cases}$ where $D \neq 0$ then $x = \dfrac{D_x}{D}$, $y = \dfrac{D_y}{D}$ and $z = \dfrac{D_z}{D}$.

where $D \neq 0$ and $D = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ (Form the determinant of the coefficients of x, y and z.)

$D_x = \begin{vmatrix} d_1 & b_1 & c_1 \\ d_2 & b_2 & c_2 \\ d_3 & b_3 & c_3 \end{vmatrix}$ (Replace the x-coefficients with the constants d_1, d_2 and d_3.)

$D_y = \begin{vmatrix} a_1 & d_1 & c_1 \\ a_2 & d_2 & c_2 \\ a_3 & d_3 & c_3 \end{vmatrix}$ (Replace the y-coefficients with the constants d_1, d_2 and d_3.)

$D_z = \begin{vmatrix} a_1 & b_1 & d_1 \\ a_2 & b_2 & d_2 \\ a_3 & b_3 & d_3 \end{vmatrix}$ (Replace the z-coefficients with the constants d_1, d_2 and d_3.)

If $D = 0$, then the system is either inconsistent or contains dependent equations. To determine whether the system is inconsistent or dependent, it may be solved by other methods, such as by substitution or elimination.