

## Solving System of Equation Using Cramer's Rule (3x3 Matrix)

ex.  $4x + 5y - 6z = -14$   
 $3x - 2y + 7z = 47$   
 $7x - 6y - 8z = 15$

$$\begin{vmatrix} 4 & 5 & -6 & | & -14 & 5 \\ 3 & -2 & 7 & | & 47 & -2 \\ 7 & -6 & -8 & | & 15 & -6 \end{vmatrix}$$

$$\begin{aligned} & 64 + 245 + 108 = 417 \\ & 84 - 168 - 120 = -204 \\ & \hline & 621 \end{aligned}$$

X:

$$\begin{vmatrix} -14 & 5 & -6 & | & -14 & 5 \\ 47 & -2 & 7 & | & 47 & -2 \\ 15 & -6 & -8 & | & 15 & -6 \end{vmatrix}$$

$$\begin{aligned} & -224 + 525 + 1692 = 1993 \\ & 180 + 588 - 1880 = -1112 \\ & \hline & 3105 \end{aligned}$$

$$X: \frac{3105}{621} = 5$$

Determinant of the original matrix = 621

Determinant of x matrix = 3105

$$\text{So } x = \frac{3105}{621} = 5$$

$$\begin{vmatrix} 4 & -14 & -6 & | & 4 & -19 \\ 3 & 42 & 7 & | & 3 & 47 \\ 7 & 15 & -8 & | & 7 & 15 \end{vmatrix}$$

$$-1504 - 686 - 270 = -2460$$

$$-1974 + 420 + 336 = -1218$$


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$$\frac{-1242}{-1242} = 1$$

$$\frac{-1242}{621} = -2$$


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$$\begin{vmatrix} 4 & 5 & -14 & | & 4 & 5 \\ 3 & -2 & 47 & | & 3 & -2 \\ 7 & -6 & 15 & | & 7 & -6 \end{vmatrix}$$

$$-120 + 1645 + 252 = 1777$$

$$196 - 1128 + 225 = -707$$


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$$\frac{2484}{621} = 4$$

Determinant of matrix y = -1242

$$\text{So } y = \frac{-1242}{621} = -2$$

Determinant of matrix z = 2484

$$\text{So } z = \frac{2484}{621} = 4$$

Therefore, the solution to the system is (5, -2, 4)