

Solving Systems of Equations in Three Variables Using Cramer's Rule

18. $4x - 2y + 7z = 26$

$$5x + 3y - 5z = -50$$

$$-7x - 8y - 3z = 49$$

$$\begin{vmatrix} 4 & -2 & 7 & | & 26 & -2 \\ 5 & 3 & -5 & | & -50 & 3 \\ -7 & -8 & -3 & | & -7 & -8 \end{vmatrix}$$

$$-36 - 70 - 280 = -386$$

$$-147 + 160 + 30 = 43$$

$$\frac{43}{-429}$$

$$X: \begin{array}{ccc|cc} 26 & -2 & 7 & 26 & -2 \\ -50 & 3 & -5 & -50 & 3 \\ 49 & -8 & -3 & 49 & -8 \end{array}$$

$$-237 + 490 + 2800 = 3056$$

$$1029 + 1040 - 300 = \frac{1769}{1287}$$

$$X = \frac{1287}{-429} = -3$$

$$Y: \begin{array}{ccc|cc} 4 & 26 & 7 & 4 & 26 \\ 5 & -50 & -5 & 5 & -50 \\ -7 & 49 & -3 & -7 & 49 \end{array}$$

$$600 + 910 + 1715 = 3225$$

$$2450 + 980 + -390 = 1080$$

$$Y = \frac{2145}{-429} = -5$$

$$\frac{2145}{2145}$$

$$z: \begin{array}{ccc|cc} 4 & -2 & 26 & 4 & -2 \\ 5 & 3 & -50 & 5 & 3 \\ -7 & -8 & 42 & -7 & -8 \end{array}$$

$$\begin{array}{r} 588 - 700 - 1040 = -1152 \\ -546 + 1600 - 490 = \underline{564} \\ -1716 \end{array}$$

$$z = \frac{-1716}{-429} = 4$$

$$(-3, -5, 4)$$