Cramer's Rule

Problem: 4.

$$6x + 7y + 9z = 47$$
$$4x + y - 6z = -12$$
$$-9x + 6y - 90z = -267$$

Solution:

Here,

$$\begin{bmatrix} 6 & 7 & 9 \\ 4 & 1 & -6 \\ -9 & 6 & -90 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 47 \\ -12 \\ -267 \end{bmatrix}$$

$$\therefore A = \begin{bmatrix} 6 & 7 & 9 \\ 4 & 1 & -6 \\ -9 & 6 & -90 \end{bmatrix}$$

$$\therefore \text{Determinat of } [A] = |A| = 6(-90+36) - 7(-360-54) + 9(24+9)$$

$$= 2871$$

$$\therefore x = \frac{\begin{vmatrix} 47 & 7 & 9 \\ -12 & 1 & -6 \\ -267 & 6 & -90 \end{vmatrix}}{|A|}$$

$$= \frac{47(-90+36) - 7(1080-1607) + 9(-72+267)}{2871}$$

$$= \frac{2906}{2871}$$

$$= 1.012$$