Cramer's Rule

Problem: 2.

$$-6x + 7y + 5z = 120$$
$$9x + 2y - 6z = 100$$
$$-20x - 6y + 70z = 200$$

Solution:

Here,

$$\begin{bmatrix} -6 & 7 & 5 \\ 9 & 2 & -6 \\ -20 & -6 & 70 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 120 \\ 100 \\ 200 \end{bmatrix}$$

$$\therefore A = \begin{bmatrix} -6 & 7 & 5 \\ 9 & 2 & -6 \\ -20 & -6 & 70 \end{bmatrix}$$

$\therefore$ Diterminat of $[A] = |A| =$

$$-6(140 - 36) - 7(630 - 120) + 5(-54 + 40)$$

$$= -624 - 3570 - 70 = -4264$$

$$\therefore x = \frac{\begin{vmatrix} 120 & 7 & 5 \\ 100 & 2 & -6 \\ 200 & -6 & 70 \end{vmatrix}}{|A|}$$

$$= \frac{120(140 - 36) - 7(7000 + 1200) + 5(-600 - 400)}{-4264}$$

$$= \frac{-5820}{-4264} \quad \frac{-49920}{-4264}$$

$$= 11.707$$