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Ans NO:01

The augmented matrix for the system is

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 2 & 5 & -2 & 1 & 1 \\ 5 & 12 & -7 & 6 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 3 \\ 2 & 5 & -2 & 1 & 1 \\ 1 & 2 & -3 & 4 & 2 \end{bmatrix}$$ swap matrix $R_1 \leftrightarrow R_3$

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 3 \\ 0 & \frac{1}{5} & \frac{4}{5} & -\frac{7}{5} & -\frac{1}{5} \\ 0 & -\frac{2}{5} & -\frac{8}{5} & \frac{14}{5} & \frac{7}{5} \end{bmatrix}$$

In $R_2 = R_2 - \frac{2}{5} \cdot R_1$

In $R_3 = R_3 - \frac{1}{5} \cdot R_1$

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 3 \\ 0 & -\frac{2}{5} & -\frac{8}{5} & \frac{14}{5} & \frac{7}{5} \\ 0 & \frac{1}{5} & \frac{4}{5} & -\frac{7}{5} & -\frac{1}{5} \end{bmatrix}$$ swap matrix $R_2 \leftrightarrow R_3$

(P.T.O)

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 3 \\ 0 & -\frac{2}{5} & -\frac{8}{5} & \frac{14}{5} & \frac{7}{5} \\ 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix} \quad \text{In } R_3 = R_3 + \frac{1}{2} \cdot R_2$$

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 3 \\ 0 & -\frac{2}{5} & \frac{-8}{5} & \frac{14}{5} & \frac{7}{5} \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$ Multiply matrix row by constant $R_3 = 2 \cdot R_3$

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 3 \\ 0 & \frac{-2}{5} & \frac{-8}{5} & \frac{14}{5} & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \quad \text{In } R_2 = R_2 - \frac{7}{5} \cdot R_3$$

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 0 \\ 0 & \frac{-2}{5} & \frac{-8}{5} & \frac{14}{5} & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \quad \text{In } R_1 = R_1 - 3 \cdot R_3$$

(P.T.O)

$$= \begin{bmatrix} 5 & 12 & -7 & 6 & 0 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$ Multiply matrix row by constant $R_2 = -\frac{5}{2} \cdot R_2$

$$= \begin{bmatrix} 5 & 0 & -55 & 90 & 0 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$ In $R_1 = R_1 - 12 \cdot R_2$

$$= \begin{bmatrix} 1 & 0 & -11 & 18 & 0 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$ Multiply matrix row by costant $R_1 = \frac{1}{5} \cdot R_1$

$$x_1 + 11x_3 + 18x_4 = 0$$
$$x_2 + 4x_3 - 7x_4 = 0$$

(P.T.O)

Solving the leading variable we obtain.

$$x_1 = 12x_3 + 18x_4$$

$$x_3 = \frac{4x_3 - 2x_4}{4}$$