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Ans. to the Ques. no.-2

$$A = \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}$$

$$A^2 = \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix} \cdot \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}$$

$$= \begin{bmatrix} 25+49+1 & -35-56+2 & 5+14+4 \\ -35-56+2 & 49+64+4 & -7+16+8 \\ 5-14-4 & -7+16-8 & 1+4-16 \end{bmatrix}$$

$$= \begin{bmatrix} 75 & -89 & -5 \\ -89 & 117 & 17 \\ -13 & 1 & -11 \end{bmatrix}$$

$$2A = 2 \cdot \begin{bmatrix} 10 & -14 & 2 \\ -14 & 16 & 4 \\ 2 & 4 & -8 \end{bmatrix}$$

$$A^T = \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}$$

Now,

$$A^2 \text{ tra}(A^T) = (5+8-4)$$

$$= 9$$

Now, $A^2 + 2A + 9I$,

$$\begin{bmatrix} 75 & -89 & -5 \\ -89 & 117 & 17 \\ -13 & 1 & -11 \end{bmatrix} + \begin{bmatrix} 10 & -14 & 2 \\ -14 & 16 & 4 \\ 2 & 4 & -8 \end{bmatrix} + \begin{bmatrix} 9 & 0 & 0 \\ 0 & 9 & 0 \\ 0 & 0 & 9 \end{bmatrix}$$

$$= \begin{bmatrix} 94 & -103 & -3 \\ -103 & 142 & 21 \\ -11 & 5 & -10 \end{bmatrix}$$

(Ans.)

Ans. to the Ques.no-1

The augmented matrix is

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

$$= \begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 2 & -22 & -14 & -7 \end{bmatrix} \begin{matrix} (1\text{st row} \times -2) + 2\text{nd row} \\ (1\text{st row} \times -5) + 3\text{rd row} \end{matrix}$$

$$= \begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 0 & -30 & -28 & -13 \end{bmatrix} \quad (2\text{nd row} \times -2) + 3\text{rd row}$$

$$= \begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 0 & 1 & \frac{14}{15} & \frac{13}{30} \end{bmatrix} \quad \frac{1}{-30} \times 3\text{rd row}$$

$$= \begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & & & \end{bmatrix}$$

$$x_1 + 2x_2 - 3x_3 + 4x_4 = 2$$

$$x_2 + 4x_3 - 7x_4 = -3$$

$$x_3 + \frac{14}{15}x_4 = \frac{13}{30}$$

$$x_1 = 2 - 2x_2 + 3x_3 - 4x_4$$

$$x_2 = -4x_3 + 7x_4 + 3$$

$$x_3 = \frac{13}{30} - \frac{14}{15}x_4$$

if now we have x_4 free variable. We will take this as arbitrary value as t. then we will have infinite many solution.

So, we can say that, we will have infinite many solution from these equation.