



Algebra of Matrices Ex 5.3 Q24(i)

Given,

$$\begin{bmatrix} 1 & 1 & x \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = 0$$

$$\Rightarrow \begin{bmatrix} 1+0+2x & 0+2+x & 2+1+0 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = 0$$

$$\Rightarrow \begin{bmatrix} 2x+1 & 2+x & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = 0$$

$$\Rightarrow [2x+1+2+x+3] = 0$$

$$\Rightarrow 3x+6=0$$

$$\Rightarrow x = -\frac{6}{3}$$

$$\Rightarrow x = -2$$

Algebra of Matrices Ex 5.3 Q24(ii)

$$\text{Given that } \begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix} \begin{bmatrix} 1 & -3 \\ -2 & 4 \end{bmatrix} = \begin{bmatrix} -4 & 6 \\ -9 & x \end{bmatrix}$$

By multiplication of matrices, we have,

$$\begin{bmatrix} 2 \times 1 + 3 \times (-2) & 2 \times (-3) + 3 \times 4 \\ 5 \times 1 + 7 \times (-2) & 5 \times (-3) + 7 \times 4 \end{bmatrix} = \begin{bmatrix} -4 & 6 \\ -9 & x \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} -4 & 6 \\ -9 & 13 \end{bmatrix} = \begin{bmatrix} -4 & 6 \\ -9 & x \end{bmatrix}$$

$$\Rightarrow x = 13$$

Algebra of Matrices Ex 5.3 Q25

Given,

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

$$\Rightarrow \begin{bmatrix} 2x + 4 + 0 & x + 0 + 2 & 2x + 8 - 4 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ -1 \end{bmatrix} = 0$$

$$\Rightarrow \begin{bmatrix} 2x + 4 & x + 2 & 2x + 4 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ -1 \end{bmatrix} = 0$$

$$\Rightarrow [(2x + 4)x + 4(x + 2) - 1(2x + 4)] = 0$$

$$\Rightarrow 2x^2 + 4x + 4x + 8 - 2x - 4 = 0$$

$$\Rightarrow 2x + 6x + 4 = 0$$

$$\Rightarrow 2x^2 + 2x + 4x + 4 = 0$$

$$\Rightarrow 2x(x + 1) + 4(x + 1) = 0$$

$$\Rightarrow (x + 1)(2x + 4) = 0$$

$$\Rightarrow x + 1 = 0 \text{ or } 2x + 4 = 0$$

$$\Rightarrow x = -1 \text{ or } x = -2$$

Hence, $x = -1$ or -2

Algebra of Matrices Ex 5.3 Q26

Given,

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

$$\Rightarrow \begin{bmatrix} 0 - 2 + x & 1 - 1 + x & -1 - 3 + x \end{bmatrix} \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} = 0$$

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

$$\Rightarrow [0(x - 2) + x \cdot 1 + 1 \cdot (x - 4)] = 0$$

$$\Rightarrow 0 + x + x - 4 = 0$$

$$\Rightarrow 2x - 4 = 0$$

$$\Rightarrow x = 2$$

Hence,

$$x = 2$$

***** END *****