

Algebra of Matrices Ex 5.2 Q16 Given,

$$2\begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 6 & 8 \\ 10 & 2x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 6+1 & 8+y \\ 10+0 & 2x+1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 7 & 8+y \\ 10 & 2x+1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$$

Since corresponding entries of equal matrices are equal, So

And

$$2x + 1 = 5$$

$$2x = 5 - 1$$

$$X = \frac{4}{2}$$

$$x = 2$$

Hence,

$$x = 2, y = -8$$

Algebra of Matrices Ex 5.2 Q17

Given,

$$\lambda \begin{bmatrix} 1 & 0 & 2 \\ 3 & 4 & 5 \end{bmatrix} + 2 \begin{bmatrix} 1 & 2 & 3 \\ -1 & -3 & 2 \end{bmatrix} = \begin{bmatrix} 4 & 4 & 10 \\ 4 & 2 & 14 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} \lambda & 0 & 2\lambda \\ 3\lambda & 4\lambda & 5\lambda \end{bmatrix} + \begin{bmatrix} 2 & 4 & 6 \\ -2 & -6 & 4 \end{bmatrix} = \begin{bmatrix} 4 & 4 & 10 \\ 4 & 2 & 14 \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} \lambda + 2 & 4 & 2\lambda + 6 \\ 3\lambda - 2 & 4\lambda - 6 & 5\nu + 4 \end{bmatrix} = \begin{bmatrix} 4 & 4 & 10 \\ 4 & 2 & 14 \end{bmatrix}$$

Since corresponding entries of equal matrices are equal, So

$$\lambda = 2 = 4$$

$$\Rightarrow \lambda = 2$$

and

$$3\lambda - 2 = 4$$

$$3\lambda = 6$$

$$\Rightarrow \lambda = 2$$

Hence,

$$\lambda = 2$$

Algebra of Matrices Ex 5.2 Q18(i)

Given,

$$A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$$

and

$$2A + B + x = 0$$

$$\Rightarrow \qquad x = -2A - B$$

$$\Rightarrow \qquad x = -2 \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix} - \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$$

$$\Rightarrow \qquad x = \begin{bmatrix} 2 & -4 \\ -6 & -8 \end{bmatrix} - \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$$

$$\Rightarrow \qquad x = \begin{bmatrix} 2-3 & -4+2 \\ -6-1 & -8-5 \end{bmatrix}$$

$$\Rightarrow \qquad x = \begin{bmatrix} -1 & -2 \\ -7 & -13 \end{bmatrix}$$

Hence,

$$X = \begin{bmatrix} -1 & -2 \\ -7 & -13 \end{bmatrix}$$

Algebra of Matrices Ex 5.2 Q18(ii)

Given,
$$A = \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$$
 and $\begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$

Also we have 2A + 3X = 5BThus, we have, 3X = 5B - 2A

$$\Rightarrow 3x = 5 \begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix} - 2 \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$$

$$\Rightarrow 3x = \begin{bmatrix} 10 & -10 \\ 20 & 10 \\ -25 & 5 \end{bmatrix} - \begin{bmatrix} 16 & 0 \\ 8 & -4 \\ 6 & 12 \end{bmatrix}$$

$$\Rightarrow 3x = \begin{bmatrix} 10 - 16 & -10 - 0 \\ 20 - 8 & 10 - (-4) \\ -25 - 6 & 5 - 12 \end{bmatrix}$$

$$\Rightarrow 3x = \begin{bmatrix} -6 & -10 \\ 12 & 14 \\ -31 & -7 \end{bmatrix}$$

$$\Rightarrow x = \begin{vmatrix} -2 & \frac{-10}{3} \\ 4 & \frac{14}{3} \\ \frac{-31}{3} & \frac{-7}{3} \end{vmatrix}$$
