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

$$8+y=0$$

$$y=-8$$

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,

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

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

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

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

$$2A + B + X = 0$$

$$\Rightarrow \quad X = -2A - B$$

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

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

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

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

Hence,

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

Algebra of Matrices Ex 5.2 Q18(ii)

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

$$Also\ we\ have\ 2A + 3X = 5B$$

$$Thus, we\ have, 3X = 5B - 2A$$

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

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

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

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

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

********** END **********