

Assignment 1

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Question 7(c) \Rightarrow Given $\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} M = 6I$, where M is a matrix and I is unit matrix of order 2×2 .

- (i) State the order of matrix M
- (ii) Find the matrix M

solution (i)

$$\Rightarrow \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} M = 6I$$

here I is unit matrix.

we have to find order of matrix M

let the order the matrix M is

$$\Rightarrow a \times b$$

we know that for multiply two matrix their order must be in the form of (x,y) (y,z) here $x, y, z \in N$ hence order of matrix will be $2 \times b$.

so overall left hand side order is

$$\Rightarrow (2 \times 2) \times (2 \times b) = (2 \times b)$$

for comparing LHS=RHS their order must be same so

order of LHS= $(2 \times b)$, RHS= (2×2) hence $b = 2$.

hence the order of matrix M is (2×2) .

solution (ii)

$$A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} \quad (1)$$

$$AM = 6I \quad (2)$$

$$\text{multiply by } A^{-1} \quad (3)$$

$$M = A^{-1} \times 6I \quad \therefore I \times M = M \quad (4)$$

by calculation we get

$$A^{-1} = \begin{bmatrix} \frac{1}{6} & \frac{-1}{3} \\ \frac{1}{6} & \frac{2}{3} \end{bmatrix} \quad (5)$$

$$6I = \begin{bmatrix} 6 & 0 \\ 0 & 6 \end{bmatrix} \quad (6)$$

by calculation we get

$$M = \begin{bmatrix} 1 & -2 \\ 1 & 4 \end{bmatrix} \quad (7)$$