Assignment 1

Suraj kumar
AI21BTECH11029

ICSE 2019 Grade 10

Question 7(c) $\Rightarrow$ Given $\begin{pmatrix} 4 & 2 \\ -1 & 1 \end{pmatrix} M = 6I$,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)

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

here I is unit matrix.
we have to find order of matrix M
let the order the matrix M is

$$\Rightarrow \quad a \times b$$

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

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

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)

$$A = \begin{pmatrix} 4 & 2 \\ -1 & 1 \end{pmatrix} \tag{1}$$

$$AM = 6I \tag{2}$$

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

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

by calculation we get

$$A^{-1} = \begin{pmatrix} \frac{1}{6} & \frac{-1}{3} \\ \frac{1}{6} & \frac{2}{3} \end{pmatrix} \tag{5}$$

$$6I = \begin{pmatrix} 6 & 0 \\ 0 & 6 \end{pmatrix} \tag{6}$$

by calculation we get

$$M = \begin{pmatrix} 1 & -2 \\ 1 & 4 \end{pmatrix} \tag{7}$$