

Class – 12<sup>th</sup>

Chapter-5

Subject Maths

Worksheet-18

Inverse of a Matrix and Linear Equations

- If matrix  $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$  then
  - Find the adjoint of A ( $adjA$ )
  - Prove that  $A.(adjA) = |A|I_2 = (adjA).A$
  - Find  $A^{-1}$
  - Prove that  $(A^{-1})^T = (A^T)^{-1}$
- If matrix  $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$  then find  $A^{-1}$
- If matrix  $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$  then find  $A^{-1}$  and prove that  $A^{-1}A = I_3$ .
- If matrix  $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} 6 & 8 \\ 7 & 9 \end{bmatrix}$  then prove that  $(AB)^{-1} = B^{-1}A^{-1}$ .
- If matrix  $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$  then prove that  $A^2 - 4A + I = O$ , where  $O = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$  and  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$  and find  $A^{-1}$ .
- For what value of  $x$  is the matrix  $\begin{bmatrix} 1 & -2 & 3 \\ 1 & 2 & 1 \\ x & 2 & -3 \end{bmatrix}$  singular?