National Institute of Open Schooling
Senior Secondary Course : Mathematics
Lesson 22 : Inverse of a Matrix and its Applications
Worksheet – 22

1. Differentiate between singular and non-singular matrix with examples.

2. Write any two 3x3 singular matrices and 2x2 non-singular matrices by taking one digit number as elements of the matrices.

3. Find adjoint and determinant value of the of the matrix $\begin{bmatrix} 2 & -4 \\ 7 & -3 \end{bmatrix}$

4. Write any two matrices (A and B) of order 2x2 and verify for the following cases
   i. A (Adjoint A) = (Adjoint A) A
   ii. B (Adjoint B) = (Adjoint B) B

5. Using elementary transformations, find the inverse of the matrix
   $A = \begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$

6. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, then show that: $A^2 - 7A - 2I = 0$.

7. Write any two matrices (X and Y) of order 2x2 such that XY = YX = I

8. If $A = \begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 7 \\ 1 & 4 \end{bmatrix}$

   Find $(AB)^{-1}$ and $B^{-1}A^{-1}$

9. Verify the possibility of inverse of the matrix and also verify $A^{-1}A = AA^{-1} = I$, If A =
$$\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$$

10. Solve the system of simultaneous equations using matrix inversion method as:
$$2x + 3y + z = 6$$
$$x + y + 2z = 5$$
$$3x + 2y - z = 12$$