

Class – 12<sup>th</sup>

Chapter-5

Subject Maths

Worksheet-25

Inverse of a Matrix and Linear Equations

1. If  $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$  then prove that  $A^2 - 4A - 5I = 0$  and using this find  $A^{-1}$ .

2. Solve the following system of equations using the matrix method.

(i) $5x - 7y = 2$	(ii) $3x + y + z = 3$	(iii) $x + 2y - 2z + 5 = 0$
$7x - 5y = 3$	$2x - y - z = 2$	$-x + 3y + 4 = 0$
	$-x - y + z = 1$	$-2y + z - 4 = 0$

3. Find the area triangle ABC for the vertices given below:

(i)  $A(-3, 5), B(3, -6), C(7, 2)$                       (ii)  $A(2, 7), B(2, 2), C(10, 8)$

4. If the points  $(2, -3), (\lambda, -2)$  and  $(0, 5)$  are collinear then find the value of  $\lambda$ .

Find the matrix A where

$$\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix} A \begin{bmatrix} 4 & 7 \\ 3 & 5 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

5. If  $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$  then find  $A^{-1}$  and using this solve the equations:

$$x + y + 2z = 0, \quad x + 2y - z = 9, \quad x - 3y + 3z = -14$$

6. If  $A = \begin{bmatrix} a & b \\ c & \frac{1+bc}{a} \end{bmatrix}$  then find  $A^{-1}$  and solve that  $aA^{-1} = (a^2 + bc + 1)I - aA$ .