# CM 1606 Computational Mathematics

## Tutorial No 08

1) Find the inverse of the matrices $A=\begin{bmatrix}-1 & 3\\ 2 & 0\end{bmatrix}$ and $B=\begin{bmatrix}2 & -1\\ 5 & 2\end{bmatrix}$

Show that

i) $(AB)^{-1}=B^{-1}A^{-1}$

ii) $(BA)^{-1}=A^{-1}B^{-1}$

iii) $(A+B)^{-1}\neq A^{-1}+B^{-1}$ and

iv) Find $(A-B)^{-1}$

2) Find the value of x for following.

i) $\begin{vmatrix}-2 & 1\\ 4 & x\end{vmatrix}=-10$

ii) $\begin{vmatrix}1 & -2\\ 3 & x\end{vmatrix}+2\begin{vmatrix}-1 & 0\\ 4 & x\end{vmatrix}=8$

3) Show that the matrices $A=\begin{bmatrix}5 & -2\\ 2 & -1\end{bmatrix}$ and $B=\begin{bmatrix}1 & -2\\ 2 & -5\end{bmatrix}$ are the inverse of each other.

4) Find the inverse of the following matrices (if possible).

i) $\begin{bmatrix}2 & 5\\ -3 & 7\end{bmatrix}$

ii) $\begin{bmatrix}3 & 6\\ 2 & 4\end{bmatrix}$

iii) $\begin{bmatrix}-1 & 3\\ -2 & 2\end{bmatrix}$

5) Find the determinant of the matrix $A=\begin{bmatrix}-1 & 2 & 2\\ 5 & 0 & -1\\ 1 & 1 & -2\end{bmatrix}$ using the

i) Diagonal method

ii) Method of minors

6) Find the inverse of the matrices given.

i) $\begin{bmatrix} -1 & 0 & 2 \\ 4 & 2 & 3 \\ 1 & -5 & 2 \end{bmatrix}$

ii) $\begin{bmatrix} 1 & -2 & 2 \\ 2 & 1 & -3 \\ 1 & 0 & 2 \end{bmatrix}$

7) If $\begin{bmatrix} 2 & 3 & 1 \\ 0 & -2 & 1 \\ 1 & -1 & 4 \end{bmatrix}^{-1} = \frac{1}{9}\begin{bmatrix} 7 & 13 & -5 \\ -1 & -7 & x \\ -2 & -5 & 4 \end{bmatrix}$, find the value of $x$.

8) Show that $(AB)^{-1} = B^{-1}A^{-1}$ for any two invertible square matrices A and B of the same size.

9) Use matrix algebra to solve the following systems of equations.

i) $-2x + y = -1$
$3x + 5y = 8$

ii) $3x + 7y = -3$
$x - 8y = -1$

iii) $-3x + y = -9$
$2x + 3y = -5$

iv) $2x + 3y - 5z = -4$
$-3x + y + 2z = -5$
$4x - 2y + z = 8$

v) $-7x + 6y = 19$
$2x - 3y + z = -7$
$4y - 5z = 3$

10) Using the determinant find the area of the triangles with the given vertices.

i) $(-2, -3), (3,2), (-1, -8)$

ii) $(2, -6), (5,4), (-2,4)$

iii) Discuss how this property works in identifying three colinear points.

Hint: Area of the triangle with the vertices $(x_I, y_1), (x_2, y_2), (x_3, y_3)$ is given by the **absolute value** of the determinant, $\frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$