Tutorial 6

1. Find the transpose of below matrices.

   i) $(1 \quad 12)$

   ii) $\begin{pmatrix} 2 & 5 \\ -5 & 7 \end{pmatrix}$

   iii) $\begin{pmatrix} 2 & 1 \\ 3 & 0 \\ 5 & 1 \end{pmatrix}$

   iv) $\begin{pmatrix} a & d & e \\ d & b & f \\ e & f & c \end{pmatrix}$ Symmetric matrix $A^T=A$

   v) $\begin{pmatrix} 0 & d & e \\ -d & 0 & f \\ -e & -f & 0 \end{pmatrix}$ Skew- symmetric matrix $A^T=-A$

2. Show that

   i) $(A^T)^T = A$

   ii) $(A+B)^T = A^T+B^T$

   iii) $(AB)^T = B^TA^T$

   iv) $(3A)^T=3A^T$

3. Find the determinant of the given matrices.

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

   ii) $\begin{pmatrix} 6 & 2 & 0 \\ 2 & 3 & 0 \\ 0 & 0 & -1 \end{pmatrix}$

   iii) $\begin{pmatrix} 0 & 2 & 1 \\ -6 & 4 & 2 \\ 8 & 4 & 2 \end{pmatrix}$

4. Follow the given steps below to find the inverse of given matrices.

Steps:

a) Find the minors and cofactors of all elements.

b) Find the cofactor matrix.

c) Find the adjoint matrix.

d) Find the determinant of the matrix.

e) Find the inverse of the matrix.

i) $\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 1 \\ 1 & 0 & 2 \end{pmatrix}$

ii) $\begin{pmatrix} 4 & 1 & -1 \\ 3 & -1 & 2 \\ 4 & 0 & -3 \end{pmatrix}$

iii) $\begin{pmatrix} 3 & -2 & 1 \\ 1 & 1 & -1 \\ 1 & 0 & 1 \end{pmatrix}$

5. Solve the given linear systems.
Hint: Find the inverse matrix using cofactor method.

i) $2x_1-3x_2 = 2$

$x_1+2x_2 = 4$

ii) $3x_1-2x_2+x_3 = 4$

$x_1+x_2-x_3 = 2$

$x_1+x_3 = 1$