Assignment 1

1. Show that every square matrix can be uniquely expressed as the sum of a symmetric matrix and a skew-symmetric matrix.

2. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \\ 7 & 8 \end{pmatrix}$ **and** $B = \begin{pmatrix} 0 & 6 & 1 \\ 3 & 8 & -2 \end{pmatrix}$**, then what is** AB**?**

3. Show that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

4. Evaluate without expanding $\begin{vmatrix} 1 & a & a^2 & a^3+bcd \\ 1 & b & b^2 & b^3+cda \\ 1 & c & c^2 & c^3+abd \\ 1 & d & d^2 & d^3+abc \end{vmatrix}$

5. Let $A = \begin{pmatrix} 3 & 5 & 7 \\ 6 & 9 & 5 \\ 4 & 6 & 8 \end{pmatrix}$**, then find the co-factor of an element** $7 (= a_{13})$ **in a matrix** A**?**

6. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 1 & -1 & 1 \\ 2 & 3 & -1 \end{pmatrix}$**, find** $adj(A)$ **and inverse of the matrix** A **(using determinant method)?**

7. Solve the system by Cramer's Rule

$$3x + y + z = 4$$
$$x - y + 2z = 6$$
$$x + 2y - z = -3$$