Assignment 3

Determinant and Inverse of Matrix

1. Find the determinant of these matrices using either Sarrus method or cofactor expansion:

   a. $A = \begin{pmatrix} 9 & -2 \\ 7 & 4 \end{pmatrix}$.

   b. $B = \begin{pmatrix} 1 & -2 & 3 \\ -4 & 5 & -4 \\ 3 & 2 & 1 \end{pmatrix}$.

   c. $C = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 0 & 0 & 3 \\ 3 & 0 & 0 & 2 \\ 4 & 3 & 2 & 1 \end{pmatrix}$.

2. Use Cramer's Rule to Solve these systems of linear equations:

   a. $\begin{aligned} 3x + 8y &= 10 \\ -4x + 3y &= 9 \end{aligned}$.

   b. $\begin{aligned} x + 2y - 3z &= 1 \\ 3x - y + 2z &= 2 \\ -2x + 3y + z &= 3 \end{aligned}$.

3. Find the inverses of these matrices using determinant and adjoint formula:

   a. $A = \begin{pmatrix} 11 & 13 \\ 17 & 19 \end{pmatrix}$

   b. $B = \begin{pmatrix} 3 & -1 & 0 \\ -2 & 0 & 1 \\ 0 & -3 & 2 \end{pmatrix}$

4. Using the results of no.3, find the solution of these system of linear equations:

   a. $\begin{aligned} 11x + 13y &= 23 \\ 17x + 19y &= 29 \end{aligned}$

   b. $\begin{aligned} 3x - y &= 4 \\ -2x + z &= 5 \\ -3y + 2z &= 6 \end{aligned}$

5. Find the determinants and the inverses of these matrices using elementary row operations:

   a. $A = \begin{pmatrix} 2 & 0 & 1 \\ 3 & 0 & 2 \\ 0 & 1 & 3 \end{pmatrix}$.

   b. $B = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & -1 & 1 & -1 \\ 1 & 1 & -1 & -1 \\ 1 & -1 & -1 & 1 \end{pmatrix}$.