Homework assignment #3

Problem 1. Evaluate the following determinants:

(i) $\begin{vmatrix} 5 & -2 \\ -8 & 4 \end{vmatrix}$, **(ii)** $\begin{vmatrix} 3 & 1 & 2 \\ 2 & 4 & 5 \\ 2 & 4 & 5 \end{vmatrix}$, **(iii)** $\begin{vmatrix} 4 & 3 & 0 \\ 3 & 1 & 2 \\ 5 & -1 & -4 \end{vmatrix}$,

(iv) $\begin{vmatrix} 1 & 3 & 2 \\ 4 & 1 & -2 \\ 2 & 1 & 3 \end{vmatrix}$, **(v)** $\begin{vmatrix} 2 & -1 & 2 \\ 1 & 3 & 2 \\ 5 & 1 & 6 \end{vmatrix}$, **(vi)** $\begin{vmatrix} 2 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 1 & 6 & 2 & 0 \\ 1 & 1 & -2 & 3 \end{vmatrix}$.

Problem 2. Compute the determinant of the following matrix and state whether the matrix is invertible or singular:

$$\begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & -1 & 3 & 2 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 7 & 3 \end{pmatrix}.$$

Problem 3. Find all values of the parameter c that would make the following matrix singular:

$$\begin{pmatrix} 1 & 1 & 1 \\ 1 & 9 & c \\ 1 & c & 3 \end{pmatrix}.$$

Problem 4. Let A and B be 3×3 matrices with $\det(A) = 4$ and $\det(B) = 5$. Compute the following determinants: **(i)** $\det(2AB)$, **(ii)** $\det(AB^{-1}A)$.