Homework assignment #2

Problem 1. Let $A = \begin{pmatrix} 3 & 1 & 4 \\ -2 & 0 & 1 \\ 1 & 2 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 0 & 2 \\ -3 & 1 & 1 \\ 2 & -4 & 1 \end{pmatrix}$.

Compute the following matrices: **(i)** $A + B$, **(ii)** $2A - 3B$, **(iii)** AB, **(iv)** BA.

Problem 2. Let $A = \begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{pmatrix}$. Show that $A^n = O$ for $n \geq 4$.

Problem 3. Find the inverse of each of the following matrices:

(i) $\begin{pmatrix} 2 & 6 \\ 3 & 8 \end{pmatrix}$, **(ii)** $\begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix}$, **(iii)** $\begin{pmatrix} 1 & 0 & 1 \\ -1 & 1 & 1 \\ -1 & -2 & -3 \end{pmatrix}$.

Problem 4. Let $A = \begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$. Compute A^{-1} and use it to:

(i) find a 2×2 matrix X such that $AX = B$,
(ii) find a 2×2 matrix Y such that $YA = B$.