Problems

1) If $A = \begin{bmatrix} -3 & 8 \\ 3 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -8 \\ 3 & -5 \end{bmatrix}$ find $B - A$.

2) If $B = \begin{bmatrix} 2 & -3 \\ -1 & 9 \end{bmatrix}$, find B^T

3) If $B = \begin{bmatrix} 1 & 0 \\ 4 & 7 \end{bmatrix}$, find $2B$ and $-3B$.

4) If $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 1 \\ 0 & 3 \end{bmatrix}$, find AB and BA.

5) If $A = \begin{bmatrix} 7 & 3 & -5 \\ 0 & 4 & 2 \\ 1 & 5 & 4 \end{bmatrix}$ and $B = 3A$, $C = B + 2A - 5I$. find matrix D such that $D = 2A + B - C$.

6) If $A = \begin{bmatrix} 6 & 3 \\ -3 & 9 \\ 12 & -6 \end{bmatrix}$ find the matrix B such that $2A^T + 3B = 0$.

7) Find AB and BA, where $A = \begin{bmatrix} 1 & -1 & 1 \\ -3 & 2 & -1 \\ -2 & 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 1 & 2 & 3 \end{bmatrix}$

8) If $A = \begin{bmatrix} 2 & 6 \\ 7 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 5 \\ 0 & 8 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 7 \\ 9 & 5 \end{bmatrix}$ Prove that

$A(BC) = (AB)C$

9) If $A = \begin{bmatrix} 1 & 3 \\ 0 & 2 \\ -1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 & -4 \\ 2 & 0 & -2 & 1 \end{bmatrix}$ find AB.

10) If $A = \begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$ Prove that $A^2 = I$

11) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ satisfies the following equation, $A^2 - 4A - 5I = 0$, where 0 is a null matrix and I is a unit matrix

12) If $A = [1 \ 2 \ 3]$ and $B = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$ find AB & BB^1.

13) If $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$, find $A + A^T$.

14) If $A = \begin{bmatrix} 2 & 5 & 7 \\ 2 & -1 & 0 \\ 3 & 4 & 8 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 4 & 9 \\ 3 & -2 & 4 \\ -5 & 6 & 8 \end{bmatrix}$ Verify that

i) $(A+B)^T = A^T + B^T$ and

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

15) If $A = \begin{bmatrix} 2 & 4 & 4 \\ 4 & 2 & 4 \\ 4 & 4 & 2 \end{bmatrix}$ Prove that $A^2 - 2A - 20I = 0$

16) PT $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ satisfies the equation $A^2 - 4A - 5I = 0$

17) If $A = \begin{bmatrix} 2 & 1 & 1 \\ -1 & 0 & 1 \\ 1 & 3 & -1 \end{bmatrix}$ find $A^2 - 5A + 9I$ where I is an identity matrix.

18) If $A = \begin{bmatrix} 9 & 1 \\ 4 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$ find x such that

$2A + 5B + 2x = 0$ where 0 is null matrix.