1. Solve the equation $A = B$ where

$$A = \begin{bmatrix} 1 & -2 \\ 3 & 1 \\ -1 & 2 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & x \\ y-x & 1 \\ -1 & 2 \end{bmatrix} \text{ for } x \text{ and } y.$$

2. Given that

$$A = \begin{bmatrix} 1 & 2 & -3 \\ -1 & 0 & 4 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & -1 & 3 \\ 4 & 1 & 2 \end{bmatrix}$$

Find the matrices $A + B$, $A - B$, and $2A - 3B$.

3. Taking 3 appropriate matrices verify the distributive law $A(B+C) = AB + AC$ and the associative law $A(BC) = (AB)C$

4. Show that $A + A^T$ is a symmetric matrix, and that $A - A^T$ is skew symmetric.

If $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & -2 \\ 1 & -1 & 1 \end{bmatrix}$

5. Let

$$A = \begin{bmatrix} 1 & 3 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$$

Write down A^T, and find the products AA^T and A^TA

6. Let

$$A = \begin{bmatrix} 1 & 0 & 0 \\ a & -1 & 0 \\ b & c & 1 \end{bmatrix}$$ Find A^2

For what relation between a, b and c is $A^2 = I_3$?