Show absolutely all work (no scratch paper calculations unreported) on this sheet in a clearly organized way, labeling problems, parts and expressions written down.

1. Write down a typical example of:
   a) a $3 \times 3$ upper triangular matrix
   b) a diagonal $2 \times 2$ matrix.

2. Write out explicitly the identity matrix $I_3$ and the zero matrix $0_{3\times3}$.

3. Evaluate a) $2A - B$, b) $AB$ for $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$.

4. $B = \begin{bmatrix} 2 & -3 & 4 & 13 \\ 3 & -1 & -1 & -2 \\ 5 & 4 & 1 & 3 \end{bmatrix}$ is the augmented matrix of a linear system of equations in the variables $x_i$.

   a) Write out the (scalar) equations explicitly.
   b) Show that the triple $(1, -1, 2)$ is a solution of this system.