MA 232 - Linear Algebra

Homework 1 (due February 12 at 5pm)

Problem 1 [20pts] Draw $u = \begin{bmatrix} 4 \\ 1 \end{bmatrix}$, $w = \begin{bmatrix} -2 \\ 2 \end{bmatrix}$ and $(u + w)$, $(u - w)$ in the plane.

Problem 2 [20pts] Find vectors u and w such that $u + w = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$ and $u - w = \begin{bmatrix} 2 \\ 5 \\ 8 \end{bmatrix}$.

Problem 3 [20pts] Find two nontrivial vectors u and w which are perpendicular to $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$ and to each other.

Problem 4 [20pts] How long is the vector $u = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$?

Problem 5 [20 pts] Consider the following system of equations: $\begin{cases} 2x + 3y + z = 8 \\ 4x + 7y + 5z = 20 \\ -2y + 2z = 0 \end{cases}$

(i) Apply Gauss Elimination in order to solve it;

(ii) Transform the above system of equations in matrix form and apply the Gauss Elimination in matrix form (indicate all matrices you used in the process).