MATH 251 QUIZ I

1) For which values of κ, μ is the following system solvable?

$$\kappa x + y = 0$$
$$x + \mu y = 1$$

2) Find the solutions if any:

$$i) \quad \begin{pmatrix} 1 & 1 \\ 5 & 2 \end{pmatrix} \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

$$ii) \quad \begin{pmatrix} 1 & 1 & 1 \\ 2 & 0 & 1 \\ 5 & 1 & 3 \end{pmatrix} \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \\ 5 \end{pmatrix}$$

$$iii) \quad \begin{pmatrix} 1 & 1 & 1 \\ 2 & 0 & 1 \\ 5 & 1 & 3 \end{pmatrix} \begin{pmatrix} a \\ b \\ c \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \\ 4 \end{pmatrix}$$

3) Show that the set of all real-valued functions on the real line with the usual notions of addition and scalar multiplication forms a vector space.

4) Show that the set of continuous real-valued functions on the real line form a subspace of the linear space of all real-valued functions on the real line.

5) What is the span of the vectors made by the columns of the matrix in problems 2 *ii, iii*?

6) Are the columns of that matrix linearly independent? How about the rows?