T5 - Assignment 5

1. Define the following.
   a. Vector space.
   b. Subspace.
   c. Span of Vectors.
   d. Linear Independent Vectors.
   e. Basis and Dimension of Vector space.

2. Determine if the following vectors are linearly dependent or independent.
   a. $\{(1,2,1), (2,4,3), (0,1,1)\}$.
   b. $\{(3,0,0), (0,3,0), (0,0,3)\}$.
   c. $\{(1,0,0,1), (0,1,0,1), (0,0,1,1), (0,0,0,1)\}$
   d. $\{(1,0,0,1), (0,1,0,1), (0,0,1,1), (0,0,0,0)\}$

3. Determine if the following sets are subspaces. If so, calculate the basis and dimension.
   a. $W = \{f : \mathbb{R} \to \mathbb{R} \mid f(0) = 1\}$
   b. $W = \{f : \mathbb{R} \to \mathbb{R} \mid f(0) = 0\}$

4. Determine if the set of all symmetric 2 X 2 matrices forms a subspace of $\mathbb{R}^{2 \times 2}$.