Assignment 1.2

1. Let S be the set of all functions f: \mathbb{R} \rightarrow \mathbb{R} such that f(x) = x^2 for all x in \mathbb{R}. Determine if S is a vector space under the usual operations of vector addition and scalar multiplication. Prove your answer.

2. Let T be the set of all functions g: \mathbb{R} \rightarrow \mathbb{R} such that g(x) = \sin(x) for all x in \mathbb{R}. Determine if T is a vector space under the usual operations of vector addition and scalar multiplication. Prove your answer.

3. Let U be the set of all functions h: \mathbb{R} \rightarrow \mathbb{R} such that h(x) = e^x for all x in \mathbb{R}. Determine if U is a vector space under the usual operations of vector addition and scalar multiplication. Prove your answer.

4. Let V be the set of all functions j: \mathbb{R} \rightarrow \mathbb{R} such that j(x) = \cos(x) for all x in \mathbb{R}. Determine if V is a vector space under the usual operations of vector addition and scalar multiplication. Prove your answer.