Homework assignment 4  
Due date: September 27

pp. 33-34

Exercise 1. If $F$ is a field verify that the $n$-tuple space $F^n$ is a vector space over the field $F$.

Exercise 3. If $\mathbb{C}$ is the field of complex numbers, which vectors in $\mathbb{C}^3$ are linear combinations of $(1,0,-1),(0,1,1)$ and $(1,1,1)$?

Exercise 6. Let $V$ be the set of all complex-valued functions $f$ on the real line such that (for all $t$ in $\mathbb{R}$)

$$f(-t) = \overline{f(t)}.$$ 

The bar denotes complex conjugation, i.e. $a + bi = a - bi$. Show that $V$ is a vector space over the field of real numbers. Give an example of a function in $V$ that is not real-valued.

Exercise 7. Let $V$ be the set of pairs $(x, y)$ of real numbers. Define

$$(x, y) + (x_1, y_1) = (x + x_1, 0)$$

$$c(x, y) = (cx, 0).$$

Is $V$, with these operations, a vector space?