MATH 24
Book problems for Homework 2
Assigned Wednesday, March 31.
Due Friday, April 9.

Problem 12 A real valued function f defined on the real line is called an even function if $f(-t) = f(t)$. Prove that the set of even functions is a vector space with vector addition defined by $(f + g)(t) = f(t) + g(t)$ and scalar multiplication by $(cf)(t) = cf(t)$ for all $c \in \mathbb{R}$.

Problem 18 Let $V = \{(a_1, a_2) : a_1, a_2 \in \mathbb{R}\}$. For $(a_1, a_2), (b_1, b_2) \in V$ and $c \in \mathbb{R}$ define

$$(a_1, a_2) + (b_1, b_2) = (a_1 + 2b_1, a_2 + 3b_2) \text{ and } c(a_1, a_2) = (ca_1, ca_2).$$

Is V a vector space over $\mathbb{R}$ with these operations. Justify your answer.