Homework 1
Due 10/4/2019

1. Do Problem 1.2 on page 5. If you answer yes, verify your answer by checking each axiom of vector space. If you answer no, give a counterexample showing how one of the axioms is violated.

2. Do Problem 1.7 on page 5. Make sure to write your arguments coherently in full sentences.

3. Do Problem 1.8 on page 5. Make sure to write your arguments coherently in full sentences.

*Do the following problem for 6 bonus points.*

4. Consider a set $V = \mathbb{R}$ and the field of real numbers $F = \mathbb{R}$. The addition on $V$ is the usual addition of real numbers. But the scalar multiplication is defined differently as follows: $a \ast b = 2ab$ for all $a \in F$ and $b \in V$. Here the multiplication on the right hand side is the usual multiplication of real numbers. Is $V$, with operations $+$ and $\ast$, a vector space over $F$? Verify your answer.