## 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 \* 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 \*, a vector space over F? Verify your answer.