MAT-150: Linear Algebra

Homework 1

Due: 9/1/2017

Book Problems

Please turn in your solution for each of the following exercises.

§1.8: 15, 18

§1.9: 8, 12

§2.1: 24, 25

§2.2: 25, 26

Other Problems

Problem 1

Let T be a linear transformation. Use the definition of a linear transformation on p. 66 to prove the *superposition principle:*

$$T(c_1v_1 + \cdots + c_pv_p) = c_1T(v_1) + \cdots + c_pT(v_p),$$

where $c_1, \ldots, c_p$ are scalars and $v_1, \ldots, v_p$ are vectors in the domain of T. Then, show that

$$T(0) = 0.$$

Lastly, prove that T is one-to-one if and only if $T(x) = 0$ has only the trivial solution.

Problem 2

Use the definition of matrix multiplication on p. 97 to prove the left and right distributive laws in Theorem 2 on p. 99.

Problem 3

Make the proof of Theorem 8 on p. 114 your own. First read the proof until you understand it fully, then rewrite it in your own words in a way that is both clear and concise.