Linear Algebra (MATH 3333) Fall 2007 Sections 1/4
Homework 7

Due: Mon. Oct. 8, start of class

Instructions: You may **not** use a calculator (or computer). Make sure to write your name, course and section numbers in the top right corner of your solution set, as well as the assignment number on top.

Conceptual Questions

1. What is the span of one vector? Of two vectors? Of more?

2. Section 4.3: # 3, 4.

Written Assignment

20 points

Section 4.3 (pp. 205–206): 2 (2 pts), 5(a)(d) (2pts), 6(b)(d) (2pts)

Section 4.4 (p. 215): 1(a)(c) (2pts), 2(a)(b) (2pts), 5 (4pts). *You need not give explanations for 5. Note that in 5, R_2 is the same as $\mathbb{R}^2$ with (x, y) written as $[x \ y]$.*

Problem A. (2pts) Prove Theorem 4.4 when S is an infinite subset of V. (*Note: while you can prove this with equations, a simple 2–3 sentence argument in words will suffice. The key term being "finite linear combinations."*)

Problem B. (4pts) Prove Proposition 7 from class: Let V be any vector space. Then any subspace W of V is of the form $W = span(S)$ for some (possibly infinite) subset S of V. (*Hint: Take $S = W$, so all you need to show is $span(W) = W$. Then remember the general way to show $A = B$ for two sets A and B is to show it in two steps: i) $A \subseteq B$, and ii) $A \supseteq B$, which then forces $A = B$. For one of these steps you can use Theorem 4.4.*)