Linear Algebra (MATH 3333) Fall 2007 Sections 1/4
Homework 8

Due: Moment of Frustration Day[1], 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.

Reading

(Optional) You may want to read parts of Section 2.2 if you are having trouble with the method of solving systems of linear equations, though beware it is done slightly differently in the text.

Conceptual Questions

1. What does linear dependence/independence mean geometrically?
2. What does linear dependence/independence have to do with span?

Written Assignment

14 points

Section 2.2 (p. 113): 1, 5(a) (solve the system in 5 by any method you like, except for cheating—unless you like cheating) (2 pts each)

Section 4.4 (p. 215): 3 (4 pts)

Section 4.5 (p. 227): 1, 2, 3 (2pts each)

Bonus. Let v_1, v_2 and v_3 be vectors in $\mathbb{R}^3$. Let

$$W = \left\{ \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} \mid a_1v_1 + a_2v_2 + a_3v_3 = 0 \right\} \subseteq \mathbb{R}^3.$$

What is W (geometrically) when
(i) $span\{v_1, v_2, v_3\}$ is a point?
(ii) $span\{v_1, v_2, v_3\}$ is a line?
(iii) $span\{v_1, v_2, v_3\}$ is a plane?
(iv) $span\{v_1, v_2, v_3\}$ all of $\mathbb{R}^3$?

[1] Fri. Oct. 12, though it is my opinion this holiday would have better coincided with a different homework set.