UH - Math 4377 - Dr. Heier - Spring 2010
HW 4 – due 02/18 at the beginning of class

1. Section 1.6, Problem 1 (Just say true or false, no further explanation necessary.)

2. Section 1.6, Problem 5

3. Section 1.6, Problem 7

4. Section 1.6, Problem 8

5. Section 1.6, Problem 11

6. Section 1.6, Problem 13

7. Section 1.6, Problem 14

8. Section 1.6, Problem 16

The next two problems give examples of how the Replacement Theorem 1.10 discussed in class works in concrete situations.

9. Let $G = \{(1, -1, 0, 1), (1, 0, 1, 0), (1, 2, 2, 2), (0, 2, 2, 2)\}$. Let $L = \{(-1, 4, 2, 0)\}$.

(a) Show that G spans $\mathbb{R}^4$. (Since it has 4 elements, G is then automatically a basis, but we are only interested in the spanning property.)

(b) Find a subset $H \subset G$ of cardinality 3 such that $H \cup L$ spans $\mathbb{R}^4$. Prove the spanning property with an explicit computation.

10. Let $L = \{(1, 2, 1, 3), (0, 0, 1, 1)\}$. Let $G = \{v_1 = (1, 2, -2, 0), v_2 = (1, 0, 0, -1), v_3 = (0, 1, 1, 1), v_4 = (1, 2, 2, 4)\}$. You can assume without proof that G spans $\mathbb{R}^4$. Find two vectors in G that can be replaced by the two elements of L in such a way that the spanning property is preserved.

11. (extra credit) Section 1.6, Problem 23