HOMEWORK 2 (MATH 115A, SPRING 2013)

Read: **Friedberg**, sections 1.5, 1.6

Solve: problems

- 2 b,d,f,h,j, 3, 8 a, 13 (the field is $\mathbb{R}$), 18 (Section 1.5)
- 2 b,d, 3 b,d, 6 (only the 2×2 matrices over $\mathbb{R}$ part), 8, 10 b,d, 11, 16 (assume that $n = 4$ here) (Section 1.6)

and the following three:

I. Let $V = \mathbb{R}^3$. *a*) Find 4 vectors such that every three of them form a basis. *b*) Find 5 vectors such that every three of them form a basis.

II. Suppose $S = \{v_1, v_2, v_3\}$ is a basis of $V = \mathbb{R}^3$. Prove that $\{-3v_2 + v_3, v_1 - v_3, v_1 + v_3\}$ is also a basis of V.

III. Find dimension and a basis in each of the following vector spaces:

a) $V = \{f(x) = ax^3 + bx^2 + cx + d,\ f(1) = 0\}$
b) $V = \{f(x) = ax^3 + bx^2 + cx + d,\ f'(2) = 0\}$
c) $V = \{f(x) = ax^3 + bx^2 + cx + d,\ f(-1) = 0,\ f(1) + f'(2) = 0\}$
d) $V = \{f(x) = ax^3 + bx^2 + cx + d,\ f''''(-1) = 0\}$
e) $V = \{f(x) = ae^x + be^{2x} + ce^{3x},\ f(0) = 0\}$
f) $V = \{f(x) = ae^x + be^{2x} + ce^{3x},\ f(0) = 0,\ f'(0) = 0\}$

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This Homework is due Wednesday April 17, at 12:59:59 pm. (right before class, no delays allowed even by 1 minute).

Please read the collaboration policy on the course web page. Make sure you write your name in the beginning and your collaborators' names at the end.

You must **box** all answers. Remember that answers are not enough, you also need to prove the results, i.e. provide an explanation exhibiting your logic.