Homework #4.5 PRACTICE — not collected or graded

taken from Math 205, Spring 2014 for Spring 2016 practice

You must show your work in order to receive full credit; correct answers with no, or insufficient work, may not receive credit. Problems 1–4 cover material of Sections 4.2–4.4; problems 5 & 6 covered week 6 material, sections 4.5 & 4.6 and are omitted.

1. Determine whether the following subsets of $C^2(\mathbb{R})$ are vector spaces or not (that is, whether they're subspaces of $C^2(\mathbb{R})$ or not).
   (a) The set of functions f satisfying $f(1) = 0$.
   (b) The set of functions f satisfying $f(1) = -1$.

2. Consider the matrix
$$A = \begin{bmatrix} -2 & 1 & 1 & -1 \\ 1 & -1 & 1 & 2 \\ -1 & 0 & 2 & 1 \end{bmatrix}.$$
   (a) Find the nullspace of A.
   (b) Now finding a spanning set for the nullspace of A.

3. Consider the following set of three vectors in $\mathbb{R}^3$
$$\{(2, 2, 7), (1, 5, 11), (-1, 3, 4)\}.$$
   Determine whether or not these vectors span $\mathbb{R}^3$. If not, write one of the vectors as a linear combination of the other two.

4. Consider the vectors $v_1 = (6, 1, -3)$ and $v_2 = (-3, 3, 2)$ in $\mathbb{R}^3$. Is $(3, 4, -3)$ in $\text{span}\{v_1, v_2\}$? If so, write it as a linear combination of v_1 and v_2. If not, say why not.

WEEK 6

5. Determine whether the following sets of vectors are linearly independent or not. Give a reason. [Omitted]

6. Determine whether or not the following sets of vectors [in $\mathbb{R}^3$] form a basis. [Omitted]