Linear Algebra
MATH 224W – Spring 2016

Week 10: Linear Independence, Basis, Dimension

Writing Assignment #9 **due ~~Monday, Apr. 4~~ Tuesday, Apr. 5**

§4.5 #20, 24

AP #1 Let $\mathbf{u}, \mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k$ be vectors in a vector space. If $\{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k\}$ is linearly independent and $\mathbf{u} \notin \text{span}\{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k\}$, prove that $\{\mathbf{u}, \mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k\}$ is also linearly independent. *Hint: consider proving the contrapositive, but remember that "and changes to or."*

Homework #9 **due ~~Thursday, Apr. 7~~ Friday, Apr. 8**

Important!!

From now on, you can use a computer (http://www.wolframalpha.com is one option) to perform your row reductions as long as you clearly state what you have done.

§4.5 #12(a)(b), 13(a)(c), 15(a)(b)

§4.6 #2(a)(c), 4(a)(c),10, 11, 13, 20(b), 22, 30

For #13, identify each polynomial $a + bt + ct^2 + d^3$ with the 4-vector $\begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix}$ (or $\begin{bmatrix} d \\ c \\ b \\ a \end{bmatrix}$ - but be consistent), and then follow the same approach as for #11. But, make sure that the answer you provide consists of polynomials (and not 4-vectors).

When asked to "Generalize to M_{mn}" in exercise #30, make sure to describe a basis for M_{mn} **and** give the dimension of M_{mn}.