Linear Algebra
MATH 224W – Spring 2015

Week 9: Subspaces and Span

Homework #8 **due Thursday, Oct. 22**

§4.2 #2, 4, 7, 8, 10
For #7, 8, 10 please **change the directions** to
"Give **one** property of Definition 4.4 that fails to hold."

§4.3 #2, 6, 8(b), 10(b)(c), 16, 18, 30, 33(a)(b)
For #8, see Example 4 in Section 4.2 for the definition of $\mathbb{R}_n$.
Note: when using the Subspace Criteria Theorem, don't forget to show that the set in question is nonempty.

Writing Assignment #8 **due Monday, Oct. 26**

§4.2 #25

AP #1 Prove that the set of all $n \times n$ symmetric matrices is a subspace of $M_{n\times n}$.
Note: again, when using the Subspace Criteria Theorem, don't forget to show that the set in question is nonempty.

AP #2 Let $A \in M_{n\times n}$, and let $\lambda \in \mathbb{R}$. Let W be the subset of $\mathbb{R}^n$ defined by

$$W := \{\mathbf{v} \in \mathbb{R}^n \mid A\mathbf{v} = \lambda \mathbf{v}\}.$$

Prove that W is a subspace of $\mathbb{R}^n$.

AP #3 Let $W = \{A \in M_{2\times 2} \mid \operatorname{tr}(A) = 0\}$. (Recall that we proved that W is a subspace of $M_{2\times 2}$.) Prove that W is spanned by the set

$$S = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix} \right\}.$$