HOMEWORK 3 - 51 TRACK

Instructions: Complete the following problems.

(1) From Levandosky’s Linear Algebra, do the following exercises:

- Section 11: 5
- Section 12: 13
- Section 13: 1, 4, 8, 11, 15, 17, 18
- Section 14: 3, 4, 11
- Section 15: 1, 3

(2) Let $A$ be a $4 \times 4$ matrix and let $\vec{b}$ and $\vec{c}$ be two vectors in $\mathbb{R}^4$. We are told that the system $A \vec{x} = \vec{b}$ has a unique solution. What can you say about the number of solutions of the system $A \vec{x} = \vec{c}$?

(3) Let $A$ be a $4 \times 4$ matrix and let $\vec{b}$ and $\vec{c}$ be two vectors in $\mathbb{R}^4$. We are told that the system $A \vec{x} = \vec{b}$ is inconsistent. What can you say about the number of solutions of the system $A \vec{x} = \vec{c}$?

(4) Let $A$ be a $4 \times 3$ matrix and let $\vec{b}$ and $\vec{c}$ be two vectors in $\mathbb{R}^4$. We are told that the system $A \vec{x} = \vec{b}$ has a unique solution. What can you say about the number of solutions of the system $A \vec{x} = \vec{c}$?

(5) Can you find a $3 \times 3$ matrix so that $N(A) = C(A)$? (Hint: think about the rank-nullity theorem).

(6) Consider two subspaces $V$ and $W$ of $\mathbb{R}^n$, where $V$ is itself a subset of $W$. Prove that $\dim(V) \leq \dim(W)$. 