DUE Wednesday, November 5, 2014.

Problems to work but not hand in:
§4.5: #3, 6, 11.
§5.1: #1.

Problems to turn in:
WeBWork Homework 11
§4.4: #16 (4).

A. (3) Let $A$ be an $m \times n$ matrix with $\dim N(A) = k$. Suppose $W \subset \mathbb{R}^m$ is an $\ell$-dimensional subspace. You can easily check (but I won’t ask you to) that $V = \{x \in \mathbb{R}^n : Ax \in W\}$ is subspace.*

(i) Show that if $W \subset C(A)$, then $\dim V = k + \ell$. (Hint: Give a basis for $V$.)

(ii) Conclude, more generally, that $k \leq \dim V \leq k + \ell$. (Hint: Consider $W \cap C(A)$.)

§4.5: #2a,b,e (3), 4 (3), 5 (2), 9 (2).
§5.1: #2† (3), 8 (3).

Challenge problems (Turn in separately):
§4.4: #18 (4).
§4.5: #10 (5), 12 (3), 13 (4), 14 (2).

*If $A = [T]$, then $V = T^{-1}(W)$.
†Hint: See Exercise 2.3.2. Since there are two ways $X$ can fail to be compact, you will need to give a function $f$ for each of those cases.