Math 311, Homework 8

due March 19

- Section 3.5C (p. 142), problems 1, 3, 4, 11.
- Section 3.6A (p. 148), problems 3, 5, 6, 8, 15, 17.

Extra problems

1. Let $L : \mathcal{P}_2 \to \mathcal{P}_2$ be the linear transformation defined by
   $$L[p] = (x^2 + 2)p'' + (x - 1)p' - 4p.$$ Find the matrix for $L$. Find bases of polynomials for the image and null space of $L$.

2. Let $A$ be the matrix
   $$
   
   \begin{pmatrix}
   1 & -2 & 3 & 3 \\
   2 & -5 & 7 & 3 \\
   -1 & 3 & -4 & 3 
   \end{pmatrix}.
   $$
   Find the dimension of the image of $A$. Use it and problem 3.5C.11 to find the dimension of the null space of $A$.

3. Suppose that $B$ is a $7 \times 10$ matrix, and that the dimension of the null space of $B$ is 5. What is the dimension of the image (column space) of $B$?