

## Math 311, Homework 6

due October 16

- Section 3.5B (page 137), problems 3, 8, 10, 13, 17, 27, 35, 40, 41.
- Section 3.5C (page 142), problems 1, 3, 4, 11.

### Extra problems (required)

1. Let  $L : \mathcal{P}_2 \rightarrow \mathcal{P}_2$  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  $B$ ?