Linear Algebra (MATH 3333) Spring 2009 Section 2

Homework 10

Due: Wed. Apr. 22, start of class

Instructions: Please read the homework policies and guidelines posted on the course webpage. You may *not* use a calculator (or computer). Make sure to write your name, course and section numbers in the top right corner of your solution set, as well as the assignment number on top. Page/section numbers refer to the course text.

Reading

Sections 7.1 and 7.2

Written Assignment

Total: 100 points

Problem A: (60 pts) For each of the following matrices, find (i) the characteristic polynomial, (ii) the eigenvalues and (iii) the corresponding eigenspaces.
(a) The matrix from Exercise 5(d) on p. 450.
(b) The matrix from Exercise 6(a) on p. 450.
(c) The matrix from Exercise 6(b) on p. 450.
(b) The matrix from Exercise 7(b) on p. 450.

Section 7.1 (p. 450): 11 (20 pts)— you may just prove it in the case where A is a 3×3 upper triangular matrix, i.e.,

$$A = \begin{pmatrix} a & b & c \\ 0 & d & e \\ 0 & 0 & f \end{pmatrix},$$

for some real numbers a, b, c, d, e, f. The general case is similar.

Problem B. (20 pts) For each of the following matrices A, (i) find a basis T of $\mathbb{R}^2$ consisting of eigenvectors for A, and (ii) compute the matrix $[A]_T$ using transition matrices (i.e., the way you did them for the previous homework). This computation should agree with Theorem 7.4.
(a) The matrix from Problem A, part (a).
(b) The matrix from Problem A, part (b).