HOMEWORK #3 (DUE WEDNESDAY, MARCH. 25).

03/12/2015

Note: *Turn in only the "starred" problems; out of these, selected problems will be graded.*

Section 12.1: Exercises 2, 6, 9*, 17, 18, 19, 21*.
Section 12.2: Exercises 6, 8, 18*, 19.
Section 12.3: Exercises 1, 2, 17*, 25, 26*, 31, 32*, 33, 34*.

Additional problems:

1. Prove that if N is a nilpotent matrix, then $I + N$ is invertible.

2*. Let E be a finite dimensional vector space over a field k and let $A : E \longrightarrow E$ be a k-linear endomorphism. We say that A is diagonalizable if there exists a basis of E consisting of eigenvectors of A. Prove that A is diagonalizable if and only if the minimal polynomial $q_A(t)$ has the form

$$q_A(t) = \prod_{i=1}^{d}(t - \lambda_i)$$

with $\lambda_1, \ldots, \lambda_d$ distinct elements of k.