MAT-150: Linear Algebra
EFY 6

Due: October 20, 2017

Definition of the Eigenvalue and Eigenvector. Let A be an $n \times n$ matrix. Give two equivalent definitions of an eigenvalue and corresponding eigenvector of A.

Upper-Triangular Matrix Let A be an $n \times n$ upper-triangular matrix. Prove that the eigenvalues of A are the diagonal entries of A.

Linear Independence of Eigenvectors. Let A be an $n \times n$ matrix with distinct eigenvalues $\lambda_1, \ldots, \lambda_p$. Prove that the corresponding eigenvectors $v_1, \ldots, v_p$ are linearly independent.
Hint: See Theorem 2 in Section 5.1, but be sure to put it into your own words.

Similar Matrices. Let A and B be $n \times n$ matrices that are similar. Prove that A and B have the same characteristic polynomial, and therefore share the same eigenvalues.
Hint: See Theorem 4 in Section 5.2, but be sure to put it into your own words.