

# Math 132 - HW 2

## due January 14

January 7, 2015

1. True/False: Determine which of the following statements are true. For each true statement, give a proof and for each false statement produce a counterexample.
  - (a) Every linear operator on an  $n$ -dimensional space has  $n$  distinct eigenvalues.
  - (b) If a real matrix has one eigenvector, then it has infinitely many.
  - (c) There exists a square matrix with no eigenvectors.
  - (d) Eigenvalues must be non-zero scalars.
  - (e) Any two eigenvectors are linearly independent.
  - (f) The sum of two eigenvalues of a linear operator  $T$  is always an eigenvalue of  $T$ .
  - (g) The sum of two eigenvectors of a linear operator  $T$  is always an eigenvector of  $T$ .
2. Do problem 1 from HW 1 again. This time use determinants to compute the characteristic polynomial, eigenvalues and eigenvectors if you used row reduction on HW 1 and use row reduction if you used determinants.