Math 4A Week 10 – December 8, 2014

1. An elementary row operation on A does not change the determinant. True or false?

2. Matrix A has eigenvalue $\lambda = 2$ and eigenvector $x = (3,1)$. Find $A^{10}x$.

3. Let λ be an eigenvalue of an invertible matrix A. What is the eigenvalue of A^{-1}?

4. Are two diagonal matrices always similar?

5. Prove: If A and B are similar, they have the same characteristic polynomial.

6. A is an $n \times n$ matrix. True or False:
   (i). If $\mathbb{R}^n$ has a basis of eigenvectors of A, then A is diagonalizable.

   (ii). If A is diagonalizable, then A is invertible.

   (iii). A is diagonalizable if A has n eigenvectors.

   (iv). If A is diagonalizable, then A has n distinct eigenvalues.

7. Diagonalize the following matrix if possible:

$$A = \begin{bmatrix} 5 & 0 & 0 & 0 \\ 0 & 5 & 0 & 0 \\ 1 & 4 & -3 & 0 \\ -1 & -2 & 0 & -3 \end{bmatrix}$$

Solution: See Section 5.3 Example 6.