Math 532 — Homework 10 — Due: Wednesday, April 15, 2015

1. Show that — as claimed on slide #183 — $R(\mathsf{A}^\dagger) = R(\mathsf{A}^T)$, where A is an arbitrary $m \times n$ matrix.

2. Do Exercise 5.13.12 in the textbook.

3. Do Exercise 6.2.17 in the textbook.

4. Show that any singular matrix A has at least one zero eigenvalue, and vice versa, if $\lambda = 0$ is an eigenvalue of A then A is singular.

5. Show that the eigenvalues of A^{-1} are the reciprocals of the eigenvalues of A, and that the corresponding eigenvectors are the same.

6. Show that the eigenvalues of the block upper triangular matrix $\begin{pmatrix} \mathsf{A} & \mathsf{O} \\ \mathsf{B} & \mathsf{C} \end{pmatrix}$ are given by the union of the eigenvalues of A and those of C.