Homework Set 7

MATH 201 — WINTER 2015

Due Tuesday, March 3

Section 4.6
Problems 2, 6, 18, 24, 30.
Section 5.1
Problems 8, 14, 18, 26.
Section 5.2
Problems 8, 14, 18, 22.

PROBLEM 7.1. Let A be an $m \times n$-matrix and B be an $n \times p$-matrix. Show that $\mathrm{rank}(AB) \leq \mathrm{rank}(A)$.

PROBLEM 7.2. Let B be an $m \times n$-matrix.

(a). Let A be an invertible $m \times m$-matrix. Prove that $\mathrm{rank}(AB) = \mathrm{rank}(B)$.

(b). Let C be an invertible $n \times n$-matrix. Prove that $\mathrm{rank}(BC) = \mathrm{rank}(B)$.

PROBLEM 7.3. (a). Find a 3×3-matrix A whose only eigenvalue is 17 such that the dimension of the eigenspace corresponding to 17 is 3.

(b). The same as (a) but for the dimension of the eigenspace equal to 2.

(c). The same as (a) but for the dimension of the eigenspace equal to 1.