

Math 341 – Homework #9
Due Wednesday, April 8, 2015

For this assignment, you should refer to the definitions and theorems of Sections 1.2-1.6, 2.1-2.5, 3.1-3.4, and 4.1-4.2 of our textbook, as well as notes from lecture. (You might also check out Section 4.4).

1. Let A and B be 2×2 matrices over some field F . Prove that $\det(AB) = \det(A) \det(B)$.
2. Prove that if an $n \times n$ matrix A has a row which is all zeroes, then $\det(A) = 0$. This proof is supposed to be a corollary of Theorem 4.3 on page 213, which states that the determinant is linear in each row (“ n -linearity” or “multilinearity” of the determinant function). Please don’t use theorems from later in the chapter in your proof.
3. Find the determinant of the matrix

$$A = \begin{pmatrix} 1 & 0 & -2 & 3 \\ -3 & 1 & 1 & 2 \\ 0 & 4 & -1 & 1 \\ 2 & 3 & 0 & 1 \end{pmatrix}.$$

Do the computation two different ways (you should, of course, get the same answer each way).