

Homework 3, due Friday 9/16

1. Recall that we defined $\det(A) = a_{11}a_{22} - a_{12}a_{21}$ for a 2×2 -matrix $A = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$. Show that $\det(AB) = \det(A)\det(B)$ for any 2×2 -matrices A and B . Hint, write $A = (a_{ij})$, $B = (b_{ij})$, now compute $\det(AB)$ and $\det(A)\det(B)$ separately, you get two expressions in terms of a_{ij} and b_{ij} . Show that they are the same.
2. Let A and B be two 2×2 -matrices. Is it always true that $\det(A + B) = \det(A) + \det(B)$? If yes, then explain why, if not, give a counterexample.
3. Let A be a 2×2 -matrix with $\det(A) = 5$. Now let B be the result of interchanging the two rows of A . What is $\det(B)$?
4. p. 145, problem 1
5. p. 145, problems 3 (a), (b), (d) and furthermore find the rank for these matrices.
6. Find the row-echelon form for the matrices of the previous problem.