

**Linear Algebra 1 for the B.I.C.S. programme, Homework 13 (graded), Version 6**

Instructions: *Return your paper* together with the question sheet (as a file or printed) *at latest Monday January 15th to Binbin Xu's mailbox*, binbin.xu@uni.lu, *or by postal mail to* Dr. Binbin Xu, Mathematics Research Unit, Université du Luxembourg, Maison du Nombre, 6, Avenue de la Fonte, L-4364 Esch-sur-Alzette.

**Exercise 42.** Let  $M := \begin{pmatrix} 5 & 6 & 4 & 8 \\ 2 & 6 & 3 & 7 \\ 4 & 0 & 2 & 1 \\ 5 & 0 & 5 & 7 \end{pmatrix}$  Is  $M$  invertible? If so, compute the adjoint matrix of

$M$  and the inverse  $M^{-1}$ . Check that  $M \cdot M^{-1}$  is the identity matrix.

**Exercise 43.** Let  $M$  as in the above exercise, and let  $N := M - \begin{pmatrix} 0 & 0 & x & 0 \\ 0 & x & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix}$ .

Find all the values for  $x \in \mathbb{R}$  such that  $N$  is **not** invertible.