

Homework 4

Sections 3.1 and 3.2

Due: 4-1-16

1. Let A be the 5×5 matrix

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

Use the method of cofactor expansion to show that $\det A = -45$. **You must show all of your work and use cofactor expansion** to receive credit, and your final answer must equal -45 (otherwise you've made a mistake somewhere!) While this problem will be tedious, it's purpose is to give your practice with cofactor expansions and to force you to write a clear and detailed solution – if you're sloppy at all you'll end up making an error!

2. Let A and B be 10×10 matrices. Denote the rows of A by: A_1, A_2, \dots, A_{10} ; and the rows of B by: B_1, B_2, \dots, B_{10} . Suppose the rows of matrix B are constructed as follows:

$$\begin{aligned} B_1 &= A_1 \\ B_2 &= A_2 + 2A_4 \\ B_3 &= A_3 \\ B_4 &= A_6 \\ B_5 &= 3A_8 \\ B_6 &= A_9 \\ B_7 &= A_7 - 3A_1 \\ B_8 &= 2A_5 \\ B_9 &= A_4 \\ B_{10} &= A_{10} \end{aligned}$$

If $\det A = 3$ what is $\det B^{-1}$?