

## Homework 4

Sections 3.1 & 3.2

Due: 11-9-15

1. Let  $A$  be the  $5 \times 5$  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 to receive credit, and your final answer must equal  $-45$  (otherwise you've made a mistake somewhere!) While this problem will be tedious, its 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  $10 \times 10$  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  $\det B^{-1}$ ?