

Second Exam

Thursday, September 29, 2016

This exam is closed book, but you may use calculators that do not have computer algebra systems. Make sure your name is on all pages. Show all work, and show it in a logical and organized manner: You will be graded on what you show, in addition to your answer. Check your work carefully. Each entire problem is worth 20 points.

1. Use row reduction (Gaussian elimination with back-substitution) to compute the inverse of the following matrix. It is important you show each step, and you give an exact answer. Keep track of the number of times you have switched rows (if any) and the multiplying factors when making leading non-zeros equal to 1. Be very careful!

$$A = \begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & 0 \\ 2 & 2 & 2 \end{bmatrix}.$$

2. Find all values of x and y for which B is symmetric, where

$$B = \begin{bmatrix} 1 & x - y & x \\ x + y & 2 & -y \\ x & y & 3 \end{bmatrix}.$$

3. Compute $\det(A)$ using the “arrow” method, where A is as in Problem 1.
4. Compute the determinant of the following matrix by expansion by minors. It is important you show each step.

$$C = \begin{bmatrix} 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & 0 \\ 2 & 0 & 3 & 1 \\ -1 & 0 & 1 & 2 \end{bmatrix}.$$

5. Compute the determinant of the matrix A from Problem 1 by row reduction. It is important you show each step.