Exam 2

Linear Algebra, Dave Bayer, October 19, 2006

Name: ______________________________

[**1**] (5 pts)	[**2**] (5 pts)	[**3**] (5 pts)	[**4**] (5 pts)	[**5**] (5 pts)	**TOTAL**

Please work only one problem per page, starting with the pages provided, and number all continuations clearly. Only work which can be found in this way will be graded.

Please do not use calculators or decimal notation.

[**1**] What is the formula for the inverse to the following matrix?

$$\begin{bmatrix} A & B & D \\ 0 & C & E \\ 0 & 0 & F \end{bmatrix}$$

Continued on (back of) page: ______

[2] Using Cramer's rule, solve for y in the following system of equations:

$$\begin{bmatrix} A & B & D \\ 0 & C & E \\ 0 & 0 & F \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$$

Continued on (back of) page: ______

[**3**] Find a basis for the rowspace, and find a basis for the column space, of the matrix

$$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 2 & 0 & 1 & 2 \\ 1 & 2 & 0 & 1 & 2 & 0 \\ 2 & 0 & 1 & 2 & 0 & 1 \end{bmatrix}$$

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[4] Find a basis for the nullspace (homogeneous solutions) of the matrix shown. Extend this basis to a basis for all of $\mathbb{R}^5$.

$$\begin{bmatrix} 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 1 \\ 1 & 0 & 0 & 0 & -1 \end{bmatrix}$$

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[**5**] Let A be the 3×3 matrix determined by

$$A \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 2 \end{bmatrix}, \qquad A \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ -1 \\ 2 \end{bmatrix}, \qquad A \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$$

Find A.

Continued on (back of) page: ______

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