

--	--	--

Exam 1

Linear Algebra, Dave Bayer, February 13, 2007

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. Clearly label your answer. If a problem continues on a new page, clearly state this fact on both the old and the new pages.

Do not use calculators or decimal notation.

[1] What is the set of all solutions to the following system of equations?

$$\begin{bmatrix} 2 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 2 \\ 0 \end{bmatrix}$$

[2] What is the set of all solutions to each of the following systems of equations?

$$\begin{bmatrix} 1 & 2 & 0 & 1 \\ 1 & 2 & 1 & 0 \\ 2 & 4 & 1 & 1 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \quad \begin{bmatrix} 1 & 2 & 0 & 1 \\ 1 & 2 & 1 & 0 \\ 2 & 4 & 1 & 1 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$$

[3] Use Gaussian elimination to find the inverse of the matrix

$$A = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 3 \end{bmatrix}$$

[4] Express A as a product of elementary matrices, where

$$A = \begin{bmatrix} 2 & 3 \\ 1 & 3 \end{bmatrix}$$

[5] Express A^{-1} as a product of elementary matrices, where

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