Exam 1

Linear Algebra, Dave Bayer, October 2, 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] Use Gaussian elimination to find the inverse of the matrix

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

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

$$\begin{bmatrix} 0 & 1 & 1 & 0 & 2 & 0 & 4 \\ 0 & 0 & 0 & 1 & 3 & 0 & 5 \\ 0 & 1 & 1 & 0 & 2 & 1 & 10 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \\ d \\ e \\ f \\ g \end{bmatrix} = \begin{bmatrix} 7 \\ 8 \\ 16 \end{bmatrix}$$

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

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

[4] Find a matrix representing the linear map from $\mathbb{R}^2$ to $\mathbb{R}^2$ which reflects first across the line $y = x$, then across the line $y = 2x$.

[**5**] Compute a matrix giving the number of walks of length 4 between pairs of vertices of the following directed graph:
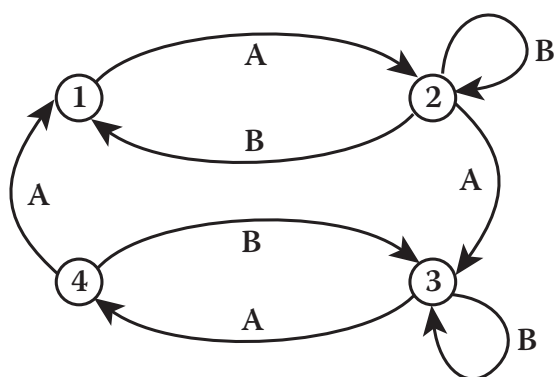
How many of these paths are labeled ABAB ?

[6]

[7]