

Quiz 2, Math. 415,

Friday, June 19th, 2009

Explain your answers carefully. Write complete sentences, not just formulas.

1. (15 points) Consider a 2×2 system $A\mathbf{x} = \mathbf{b}$ (two equations in two variables). Explain why it is not possible that the system has *exactly* two solutions.

2. (15 points) Find the 3×3 matrix E such that

$$E \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} x \\ y \\ 3x + z \end{pmatrix}.$$

3a. (15 points) Find the inverse of $A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$ or explain A is not invertible.

3b. (15 points) Find the inverse of $A = \begin{pmatrix} 1 & 2 & 0 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{pmatrix}$ or explain A is not invertible.

4a. (15 points) Find the LU decomposition of $A = \begin{pmatrix} 1 & 4 \\ 2 & 9 \end{pmatrix}$.

4b. (15 points) Solve the system $A\mathbf{x} = \begin{pmatrix} 5 \\ 11 \end{pmatrix}$ for the above $A = \begin{pmatrix} 1 & 4 \\ 2 & 9 \end{pmatrix}$.