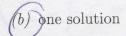
Name Solution

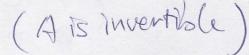
Section J Subsection left center right Row number 1 2 3 4 5 6 7 8

Mathematics 1553 Quiz 5 Prof. Margalit

Prof. Margalit 26 February 2016

- 1. Suppose that A is an $n \times n$ matrix and that Ax = b is consistent for all b in \mathbb{R}^n . How many solutions can Ax = 0 have? Circle all that apply.
 - (a) no solutions





- (c) two solutions
- (d) infinitely many solutions
- 2. Find an LU decomposition of the matrix

$$A = \left(\begin{array}{cc} 1 & -1\\ 1 & 3\\ 0 & 8 \end{array}\right)$$

$$\begin{pmatrix} 1 & -1 \\ 3 & -1 \\ 0 & 8 \end{pmatrix} - R_1 + R_2 \rightarrow R_2 \begin{pmatrix} 1 & -1 \\ 0 & 4 \\ 0 & 8 \end{pmatrix} - 2R_2 + R_3 \rightarrow R_3 \begin{pmatrix} 0 & 4 \\ 0 & 0 \\ 0 & -1 \end{pmatrix}$$

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 0 & 0 \end{pmatrix} \begin{pmatrix} 1 & -1 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$$
Turn the page over! 0 2 1

3. Use the LU decomposition

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

to solve Ax = b where

$$b = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

Show clearly the two steps.