

## 314 '09-QUIZ 1

Name:-----

February 12, 2009

**1** < 10pts >

Use Gauss-Jordan elimination to solve the system  $A\mathbf{x} = \mathbf{b}$  where

$$\mathbf{A} = \begin{pmatrix} 1 & 3 & 1 & 1 \\ 2 & -2 & 1 & 2 \\ 3 & 1 & 2 & -1 \end{pmatrix}, \mathbf{b} = \begin{pmatrix} 3 \\ 8 \\ -1 \end{pmatrix}.$$

Determine if the system is consistent or inconsistent. If it is consistent, find all solutions.

**Solution**

**2**   < 10pts >

Use Gauss-Jordan elimination to find the inverse  $\mathbf{A}^{-1}$  if

$$\mathbf{A} = \begin{pmatrix} 1 & 0 & 1 \\ 2 & 2 & 3 \\ 3 & 3 & 4 \end{pmatrix}$$

**Solution**

**3**    $< 10pts >$

Consider a linear system whose augmented matrix is of the form

$$\mathbf{A} = \left( \begin{array}{ccc|c} 1 & 1 & 3 & 2 \\ 1 & 2 & 4 & 3 \\ 1 & 3 & a & b \end{array} \right)$$

1. For what values of  $a, b$  will the system have infinitely many solutions?
2. For what values of  $a, b$  will the system be inconsistent?

**Solution**

#### 4 < 10pts >

Assume that the row echelon form for the matrix  $\mathbf{A}$  involves no free variables.  
Answer **True** or **False** (with brief justification!):

1. The system  $\mathbf{Ax} = \mathbf{b}$  will have infinitely many solutions.
2. The system  $\mathbf{Ax} = \mathbf{b}$  will be inconsistent.
3. The system  $\mathbf{Ax} = \mathbf{b}$  will be consistent.
4.  $\mathbf{A}$  is nonsingular.
5. The system  $\mathbf{Ax} = \mathbf{0}$  will have a unique solution.

**Solution**