MthU343 Professor Gilmore
Northeastern University Aug. 9, 2007
DiffEQs & Linear Alg. for Engineering Quiz #5
30 Minutes Name: _____.

Show All Your Work

1. Consider the system of linear equations :
$$\begin{aligned} x + 3y + 2z &= -1 \\ 2x + y + 4z &= 3 \\ 3x + 5y + 6z &= -2 \end{aligned}$$

Calculate the row-echelon form of an appropriate matrix and interpret the result to describe all solutions to this system of equations. **Document** your steps so I can grasp what you did.

2. Give all solutions to the following systems of linear equations:
Explain your reasoning in each case.

a.
$$\begin{aligned} x + y + z &= 3 \\ y + z &= 1 \\ y + z &= 2 \end{aligned}$$

b.
$$\begin{aligned} x + y + z &= 3 \\ y + z &= 1 \\ 2y + 2z &= 2 \end{aligned}$$

$$
\begin{aligned}
x + y + z &= 3 \\
y + z &= 2 \\
z &= 1
\end{aligned}
$$

c.

3. Find the determinant of the following matrix, working by hand.
Document your steps so I can grasp what you did.

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

4. Consider the three vectors in 3-space, **u** = (5, 5, 4), **v** = (2, 3, 1) and **w** = (4, 1, 5). Find whether they are linearly independent or not. If they are linearly dependent, give a linear combination of **u** and **v** which equals **w**. (You do **NOT** have to do this by hand.)