Your name:

Instructor (please circle): Samantha Allen Angelica Babei

Math 22 Fall 2018 Homework 1, due Fri Sept 21 4:00 pm in homework boxes in front of Kemeny 108 *Please show your work, and check your answers. No credit is given for solutions without work or justification.*

(1) Given the system of equations, answer the following questions.

$$\begin{aligned} x_3 + 2x_4 &= 7 \\ -2x_1 - 8x_2 + x_3 + 6x_4 &= 17 \\ x_1 + 4x_2 + x_3 + 3x_4 &= 14 \end{aligned}$$

(a) Write the augmented matrix and transform it to reduced echelon form, showing all your steps:

(b) Write the *general* solution to the linear system, if there is one.

(2) True or false (no working needed, just circle the answer):

(a) T / F: Two matrices are row equivalent if they have the same number of rows.

(b) T / F: A consistent system has one or more solutions.

(c) T / F: If every column of an augmented matrix contains a pivot, then the corresponding system is consistent.

(d) T / F: A consistent system of 3 equations in 5 variables always has free variables.

(e) T / F: A system of 5 equations in 3 variables is never consistent.

(3) For which value(s) of the coefficient **a** does the linear system below have infinitely many solutions?

$$\begin{aligned} x_1 \qquad\quad + \mathbf{a}x_3 &= 3 \\ 3x_1 + 2x_2 + 3x_3 &= 6 \\ 2x_1 + 2x_2 + 5x_3 &= 3 \end{aligned}$$

Show the row operations that you performed, and explain why your value(s) for **a** lead(s) to infinitely many solutions.