Homework #2

MATH 237 — Linear Algebra I
due Thursday, Sep 3, in class

Please print your name:

Problem 1. For what values of h is the following system consistent?

$$\begin{aligned} x_1 + x_2 &= h \\ x_1 + 2x_2 &= 0 \\ x_1 - x_2 &= 1 \end{aligned}$$

Problem 2. Consider the following system of linear equations:

$$\begin{aligned} 3x_2 - 6x_3 + 6x_4 + 4x_5 &= -5 \\ 3x_1 - 7x_2 + 8x_3 - 5x_4 + 8x_5 &= 9 \\ 3x_1 - 9x_2 + 12x_3 - 9x_4 + 6x_5 &= 15 \end{aligned}$$

(a) Starting with the augmented matrix, perform Gaussian elimination (that is, apply elementary row operations to obtain an equivalent matrix in echelon form). (*Hint*: interchange rows first. Record all your row operations!)

(b) From the matrix in echelon form, decide whether this linear system is consistent. If it is consistent, does it have a unique solution or infinitely many?

(c) Further reduce the matrix in echelon form to row-reduced echelon form. (This is often called Gauss–Jordan elimination.) (As always, record all your row operations!)

(d) From the matrix in reduced echelon form, read off the general solution of the linear system.

Armin Straub
straub@southalabama.edu