Math 54 Fall 2016: Discussion 102/105 Quiz#1

GSI: Christopher Eur
Office hours: Th 4-6pm, 1064 Evans
Website: `https://math.berkeley.edu/~ceur/course_pages/math54f16.html`

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Problem 1. (5 points) Find the general solution to the following linear system of equations.

$$\begin{aligned} x_1 - x_2 - 2x_3 &= 1 \\ x_1 + 2x_2 + 4x_3 + x_4 &= 7 \\ 2x_1 + 2x_4 &= 10 \end{aligned}$$

Problem 2. Suppose M is a 3×3 coefficient matrix such that the 3×4 augmented matrix

$$\left[\begin{array}{cc} & 1 \\ M & 2 \\ & 1 \end{array}\right]$$

is consistent (i.e. has a solution although not necessarily unique).

(a) (3 points) Show that a 3×4 augmented matrix $\left[\begin{array}{cc} & c \\ M & 2c \\ & c \end{array}\right]$ is also consistent for any values of c.

(b) (1 points) Give an example of M (satisfying the above properties) such that $\left[\begin{array}{cc} & 1 \\ M & 3 \\ & 1 \end{array}\right]$ is NOT consistent.

(c) (3 points) Now, suppose that the original augmented matrix $\left[\begin{array}{cc} & 1 \\ M & 2 \\ & 1 \end{array}\right]$ has a **unique** solution. Then show that for any numbers s, t, u, the augmented system $\left[\begin{array}{cc} & s \\ M & t \\ & u \end{array}\right]$ is in fact consistent.