Math 254 Exam 2a: 9/19/6
Please read the exam instructions.

Notes, books, papers, calculators and electronic aids are all forbidden for this exam. Please write your answers on **separate paper**, indicate clearly what work goes with which problem, and put your name on every sheet. Cross out work you do not wish graded; incorrect work can lower your grade, even compared with no work at all. Keep this list of problems for your records. Show all necessary work in your solutions; if you are unsure, show it. Extra credit may be earned by handing in revised work in class on Thursday 9/21; for details see the syllabus. Each problem is worth 10 points. You have approximately 30 minutes.

1. Carefully state the definition of "linear equation". Give two examples, one in standard form and one NOT in standard form.

2. Solve the following system, using back-substitution. Show your work.

$$
\begin{aligned}
3x_1 - 5x_2 + 2x_3 + 2x_4 &= -3 \\
6x_2 - 8x_3 - 3x_4 &= -3 \\
6x_3 - x_4 &= -5 \\
3x_4 &= 15
\end{aligned}
$$

3. Give three examples of 2×2 systems of linear equations. One should have no solutions, one should have one solution, and one should have infinitely many solutions. Justify your answers, providing all solutions to each system.

4. Find the line of best fit for the following set of points: $\{(-1,0), (0,3), (2,5)\}$.

5. Solve the following system of linear equations.

$$
\begin{aligned}
4x - 3z &= 0 \\
-2x + 3y + 2z &= -1 \\
6x - 6y - 6z &= 1
\end{aligned}
$$