Math 254-2 Exam 2a: 9/23/8

Please read the exam instructions.

Notes, books, papers, calculators and electronic aids are all forbidden for this exam. Please write your answers on **the attached page only** (front and back if necessary). Indicate clearly what work goes with which problem. Cross out work you do not wish graded; incorrect work can lower your grade. You may use this first page as scratch paper; keep it 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 9/25; for details see the syllabus. Each problem is worth 10 points; your total will be scaled to the standard 100 point scale. 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.

$$\begin{aligned} 5x_1 + 4x_2 + 3x_3 + 2x_4 &= 1 \\ 3x_2 - 2x_3 + 2x_4 &= -2 \\ 4x_3 - x_4 &= 1 \\ 2x_4 &= 6 \end{aligned}$$

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. Demonstrate each system geometrically, and find all solutions algebraically.

4. Find the line of best fit for the following set of points: $\{(0,0),(3,0),(0,4),(2,9)\}$.

5. Solve the following system of linear equations using Gaussian elimination and back-substitution.

$$\begin{aligned} 3x + y + 2z &= 1 \\ -6x - 3z &= 1 \\ 9x - 4y - 10z &= 5 \end{aligned}$$

Please hand in ONLY the second page; keep this first page.

ID Code: _____

Please write all solutions on this page (front and back if necessary).