

Math 254-1 Exam 2b: 9/29/8

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 Wednesday 10/1; 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 “dependent”, in the context of this course. Give two examples from \mathbb{R}^2 .

The remaining problems all concern the following system:

$$\begin{aligned}x_1 - 2x_2 + 2x_3 &= 1 \\2x_1 - 3x_2 + 4x_3 + 5x_4 &= 8 \\2x_2 + 16x_4 &= 18 \\-2x_1 + 2x_2 - 4x_3 + 2x_4 &= -2 \\3x_1 - 6x_2 + 6x_3 + 6x_4 &= 9\end{aligned}$$

2. Write the above system as a matrix equation.
3. Write the above system as an augmented matrix. Put this in echelon form, justifying each step using elementary row operations. Using the echelon form, find all solutions to the system.
4. Write the above system as an augmented matrix. Put this in row canonical form, justifying each step using elementary row operations. Using the row canonical form, find all solutions to the system.
5. Write the homogeneous system associated to the above system. Solve this homogeneous system. Then use the particular solution $(1, 1, 1, 1)$ to give the general solution to the original system.

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).