Homework Eight
Linear Algebra
College of the Atlantic
Due Friday, May 24, 2024

There are two parts to this assignment.

Part 1: WeBWorK. Do Homework 08 which you will find the WeBWorK page here: https://webwork-hosting.runestone.academy/webwork2/coa-feldman-es2048im-spring2024 I recommend doing the WeBWorK part of the homework first. This will enable you to benefit from WeBWorK's instant feedback before you do part two. **Note: I've extended the WeBWorK until next week, since it covers material from chapter 3.5 that we won't cover until this Friday.**

Part 2: Non WeBWorK Problems. Here are some instructions for how to submit this part of the assignment.

- Do the problems by hand using pencil (or pen) and paper, with assistance from sage as needed. There is no need to type this assignment.

- If you like working on a tablet, go for it.

- Make a pdf scan of your work using genius scan or some similar scanning app. Please make the homework into a single pdf, not multiple pdfs.

- Submit the assignment on google classroom. Please don't email it to me. (Between my two classes I will be receiving around 45 assignments a week. Keeping track of them all in email is challenging.)

Homework Expectations and Guidelines

1. Consider the following matrix:
$$A = \begin{bmatrix} 1 & -10 & -24 & -42 \\ 1 & -8 & -18 & -32 \\ -2 & 20 & 51 & 87 \end{bmatrix} \sim \begin{bmatrix} 1 & -10 & -24 & -42 \\ 0 & 2 & 6 & 10 \\ 0 & 0 & 3 & 3 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 1 \end{bmatrix} \quad (1)$$

   (a) Determine a basis for $\text{Col}(A)$.

   (b) What is $\text{rank}(A)$?

   (c) Determine a basis for $\text{Nul}(A)$.

   (d) What is the dimension of $\text{Nul}(A)$?

2. Chapter 4.1, problem 1

3. Chapter 4.1, problem 10