

## 1.5 Handwrite

**Welcoming Environment:** Actively listen to others and encourage everyone to participate! Keep an open mind as you engage in our class activities, explore consensus and employ collective thinking across barriers. Maintain a professional tone, show respect and courtesy, and make your contributions matter.

Discuss and keep track of any questions your group has. Ask me questions during group work time as well as when I bring us back together. Try to help each other solidify and review the language of linear algebra, algebra, visualizations and intuition from this section, including those related to:

- algebra of homogeneous systems:  $A\vec{x} = \vec{0}$
- algebraic solutions of homogenous systems always include the trivial solution  $= \vec{0}$ . nontrivial solutions, if any exist, are parameterized in parametric vector form using free variables to express those as well as the variables with pivots and then decomposed algebraically to showcase the algebra and geometry giving  $t\vec{v}$  or  $s\vec{u} + t\vec{v}$  or similar, where each free variable is attached to a vector.
- geometry of solutions of homogeneous systems are geometric spaces through the origin like lines, planes, or hyperplanes
- algebra of nonhomogeneous systems:  $A\vec{x} = \vec{b}$
- solutions of nonhomogeneous systems in parametric vector form can be decomposed algebraically to showcase the algebra and geometry like  $\vec{p} + t\vec{v}$  vectors
- ending on the line parallel or ending on the plane parallel
- geometry of solutions of nonhomogeneous systems are geometric spaces translated away from the origin

Take out your notes from the activities due today as well as the fill-in guide. Use them and each other to respond to the following by handwriting in the language of our class. Use only what we have covered so far in our readings, videos and quizzes.

1. **Building Community:** What are the preferred first names of those sitting near you? If you weren't able to be there, give reference to anyone you had help from or write N/A otherwise.
  
2. True/False: The effect of adding  $\vec{p}$  to a line through the origin is a line that is parallel to  $\vec{p}$ .
  - a) Handwrite the statement.
  - b) Identify the statement as true or false.
  - c) If this statement is false, provide a specific counterexample or give a reason it is false. If it is true, quote a phrase from the glossary or a phrase and page number from our book in support.

3. For the system

$$2x_1 + 2x_2 + 4x_3 = 0$$

$$-4x_1 - 4x_2 - 8x_3 = 0$$

$$-3x_2 - 3x_3 = 0$$

- a) Write the augmented matrix.
- b) Show the elementary row operations (like  $r'_2 = -5r_1 + r_2$ ) to use the strict method of Gaussian elimination to put the matrix in row echelon form and provide the reduced matrix (stop at ref and don't scale the rows but do use replacement and row swapping!).
- c) From strict Gaussian, write the solutions and show work.
- d) If they aren't already so, write the solutions in parametric vector form.
- e) What is the geometry of the solution set (point, line, plane...)?

Next, as time allows before I bring us back together, work on the additional activities including any pollev activities and respond in your notes rather than here.

**Help each other and PDF responses to ASULearn:** If you are finished with the handwrite and additional activities before I bring us back together, first ensure that your entire group is finished too, and if not, help each other. Then submit your handwrite, continue reviewing and solidifying or discuss upcoming class work.

Collate your handwritten responses, preferably on this handout, into one full size multipage PDF for submission in the ASULearn assignment. I recommend you turn it in sometime today, but you have until the morning before the next class.