# 1.2 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:

- matrix of a linear system: row echelon form (Gaussian), reduced row echelon form (Gauss-Jordan)
- pivots: pivot position of a matrix, pivot column of a matrix
- row reduction algorithm we will most commonly use: elimination by forward phase and back substitution to row echelon form
- solution set: inconsistent: 0 solutions; consistent: 1 unique solution or infinite solutions with free variables and parametric solutions

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. A system of linear equations with more equations than unknowns is sometimes called an *overdetermined* system. Can an overdetermined system of three equations in two unknowns be consistent? Either illustrate visually a specific system of three equations in two unknowns that is consistent or explain why it can never be.

3. Given the matrix $\begin{bmatrix} 3 & -2 & 4 & 0 \\ 9 & -6 & 12 & 0 \\ 6 & -4 & 8 & 0 \end{bmatrix}$

   a) Show the elementary row operations (like $r_2' = -5r_1 + r_2$ but the ones relevant for this system) and work to use the strict method of Gaussian elimination to put the matrix in row echelon form and provide the reduced matrix (don't scale the rows and do stop at ref. Do use replacement!).

   b) Circle the pivots.

   c) Write out the solution(s), if any, and show work for back substitution after strict Gaussian. If there are infinite solutions then write them in parametric form (like $x_3 = t$ and more for any variables without pivots and work from the bottom up to solve for variables with pivots in terms of the parameters).

   d) If there are solutions, then what is the geometry of the solution set (point, infinite line, infinite plane, infinite volume...)?

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.