Homework Week 1

MATH 204: Linear Algebra Due August 31, 2018 **by 1:55pm**

Remember that although you may discuss this assignment with others, your write up should be your own. **Do not share your write-up, look at other's write-ups, discuss word for word how something should be proved, etc.** Be sure to note with whom you collaborate if you do collaborate. Complete these exercises on a separate paper.

1. Consider the system of linear equations consisting of $2x + y = 3$ and $8x + 4y = b$. For what value(s) of b is the system inconsistent? For what value(s) of b does the system have infinitely many solutions? For what value(s) of b does the system have a unique solution? Show your work and justify your answers.

2. Consider the matrix $\begin{bmatrix} 1 & 3 & 0 & -2 & -7 \\ 0 & 1 & 0 & 3 & 6 \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 1 & -2 \end{bmatrix}$. Reduce it to reduced row echelon form and determine the solution if there is one; if not, explain why not. Use matrix notation and label each step. Note that each step should consist of a SINGLE elementary row operation.

3. Consider the matrix $\begin{bmatrix} 1 & -5 & 4 & -3 \\ 2 & -7 & 3 & -2 \\ -2 & 1 & 7 & -1 \end{bmatrix}$. Reduce it to reduced row echelon form and determine the solution if there is one; if not, explain why not. Use matrix notation and label each step. Note that each step should consist of a SINGLE elementary row operation.

4. Complete Number 18 from Section 1.1, page 10. How does this question translate into a question about systems of equations? (Be sure to answer this question as part of your solution!) Use matrix notation to solve the relevant system, and show your work/reasoning.