Math 2135 Fall 2019 - Review for Midterm 1

1. **Matrices.**
   (1) elementary row operations, (reduced) row echelon form, pivot columns
   (2) multiplication of matrix by column vector
2. **Systems of linear equations.**
   (1) coefficient and augmented matrix
   (2) solving a linear system by row reduction, pivot columns, free variables, give solution in parametrized vector form
   (3) consistency and number of solutions of systems
   (4) solutions of homogenous systems $Ax = 0$ and inhomogenous systems $Ax = b$, nullspace of A
3. **Fields.**
   (1) axioms of fields, examples $\mathbb{R}, \mathbb{Q}, \mathbb{C}, \mathbb{Z}_2, \mathbb{Z}_3, \ldots$, properties of fields
   (2) linear systems over arbitrary F
4. **Vector spaces.**
   (1) axioms of vector spaces over F, examples F^n, functions, ..., properties of vector spaces
   (2) linear combination of vectors, span, column space, row space of matrices
   (3) axioms of subspaces, examples
   (4) linearly independent vectors, basis, spanning set theorem