

# Math 2135 Fall 2018 - Review for Midterm 1

## 1. Vectors in $\mathbb{R}^n$ .

- (1) vector sum, scalar multiples, dot product and their properties
- (2) parametric form of lines and planes
- (3) linear combination of vectors, span
- (4) length, angle between vectors, orthogonality, projection of one vector onto another
- (5) Cauchy-Schwartz inequality, triangle inequality

## 2. Matrices.

- (1) matrix sum, matrix multiplication and their properties
- (2) identity matrix
- (3) elementary row operations, (reduced) row echelon form, pivot columns

## 3. 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  $A$

## 4. Fields.

- (1) axioms of fields, examples  $\mathbb{R}, \mathbb{Q}, \mathbb{C}, \mathbb{Z}_2, \mathbb{Z}_3, \dots$ , properties of fields