Topics for Test 1

1. Systems of linear equations

   - homogeneous and non-homogeneous
   - echelon form
   - leading variables and free variables
   - Finding all solutions using Gauss' algorithm
   - parameterized solutions

2. Matrices

   - addition and scalar multiplicaton
   - echelon and reduced echelon form

3. Vectors in $\mathbb{R}^2$ and $\mathbb{R}^3$

   - magnitude and direction
   - addition and scalar product
   - parallel vectors
   - dot product and perpendicularity
   - parameterized equations
   - lines
   - planes and normal vectors
   - subspaces
   - linear combinations and span

4. Abstract Vector Spaces

   - definition
   - examples
   - linear combinations and span
   - subspaces
   - checking if subsets are closed under addition or scalar multiplication.