Chapter 3 Foundations

Abstract Algebra takes a step back from all other forms of algebra, such as linear, Boolean, and elementary algebra, and attempts to see what can be generalized between them.

The key objective of Chapter 3 is to define **vector spaces** rigorously.

Key concepts in Chapter 3:

* Sets
* Functions
* Binary operations
* Groups
* Fields
* Vector spaces

Sets

A set is a collection of objects. This collection can be finite or infinite. Mathematical objects are abstract, have properties, and can be acted upon by operations. Objects in a set are called elements or members.

A set does not care about duplication of elements within the set.

Set-builder notation is more formal, but with this formality, you gain precision. Examples of sets defined using set-builder notation include:

* N = {He, Ne, Ar, Kr, Xe, Rn, Og}
* X = {1, 2, 3, …, 100}

some condition

* Y = {…, -2, -1, 0, 1, 2, …}

all *x*

such that

Set S defined as

Other important notations include: