Lecture Notes for Introduction to Abstract Algebra: Lecture 0

1 Abstract Algebra

Abstract Algebra or Modern Algebra tries to identify the fundamental properties of many sets and shapes that we have learned in our Algebra classes. By identifying common features of our usual numerical domain, set of functions, polynomials and equations, we get a better understanding of these objects, and move forward to discover new objects with similar properties.

An Abstract Algebra class begins with the study of sets, relations and functions. However, Abstract Algebra becomes immediately, the study of algebraic structures beyond sets. Typically divided in two parts. A first part dedicated to:

(1) Groups: definition, examples, homomorphisms, groups of symmetries, group actions, etc.

A second part dedicated to:

(2) Rings, ideals , Domains, Fields, etc

Although an area of Mathematics with many applications in Physics, Chemistry, Computer Science and Engineering, its sole object of study and the methods it uses, make Abstract Algebra into a very important subject from the Mathematical point of view.