Abstract

Class number is an important invariant associated to an algebraic number field K. In this thesis, our main aim is to prove Dirichlet's Class Number Formula and some of its applications. For stating this formula, we need to know the structure of the group of units of the ring $\mathcal{O}_K$ of algebraic integers of K. In the first chapter, we prove Dirichlet's Unit Theorem which describes the structure of group of units of $\mathcal{O}_K$. The second chapter contains a proof of the finiteness of class number of an algebraic number field K. The third chapter contains a proof of Dirichlet's Class Number Formula and Dirichlet's Density Theorem besides some applications of this formula. In the fourth chapter, we describe simplified version of Dirichlet's Class Number Formula for cyclotomic fields and quadratic fields.