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Abstract: In this thesis we focus on algebraic curves defined over an algebraically closed field of characteristic zero. We begin by giving some basic definitions of terms in chapter 1 which will be used throughout. In chapter 2 and chapter 3 we define singular and normal varieties. We show that the nonsingular varieties are normal. Our main aim in these two chapters is to resolve the singularities of curves. We will show that there exists a normalization of any variety. We will conclude that normalization resolves the singularities of the curve. We then will give the construction of blowup of a surface at a point and show that an embedded curve can be resolved after finitely many blowups of the surface. In chapter 5 and chapter 6 we discuss the notion of Weil divisors and Cartier divisors. In chapter 7 we look at the vector space of rational functions constructed with respect to a given divisor. Given a divisor we will see in chapter 8 that there is 1-1 correspondence between Cartier divisors and invertible sheaves on a projective variety, in particular a nonsingular projective curve. After having developed the necessary machinery we will then prove the Riemann- Roch theorem for curves and look at some of its applications in chapter 10. In the next chapter given a finite morphism between two curves we look at relation between their genus. And finally, we show that any nonsingular, projective curve can be embedded in P^3 :


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