INTRODUCTION

In [1], Louis Dale and Dorothy L. Hanson have defined a semiring to be a nonempty set S together with binary operations called addition $(+)$ and multiplication $(\cdot)$ provided that $(S, +)$ is a commutative semigroup with identity (0), $(S, \cdot)$ is a semigroup, and multiplication distributes over addition from the left and the right. A commutative semiring is a semiring where multiplication is commutative. From this definition, Louis Dale and Janet D. Pitts then generalized to define a semifield in [2], to be a commutative semiring S such that $(S-\{0\},\cdot)$ is an abelian group. In this paper, just the definition and simplest examples of a semifield have been given but no theorems have been proven at all. And also in [1], Louis Dale and Dorothy L. Hanson have said that, there are different definitions of semiring appearing in the literature. In this thesis we shall define a semiring slightly different way from Louis Dale and Dorothy L. Hanson's. We shall also slightly change the definition of a semifield. With these definitions we prove some theorems classifying semifields and some basic theorems concerning their properties.

In chapter I, we introduce some notations, give our definition of a semiring and recall some theorems concerning groups, rings and fields that will be used.

Chapter II is a study of positive rational domains, abbreviated by P.R.D., which are closely related to semifields. We propose to give some theorems classifying P.R.D., and their applications to the theory of semirings.

Our main result in this chapter is the proof that do not exist finite P.R.D.'s of order greater than 1.

Chapter III begins with a study of some basic theorems about semifields, then we shall give some theorems classifying semifields.

Chapter IV contains the embedding theorems concerning semirings, rings, P.R.D.'s, semifields and fields. We then conclude the thesis with an embedding theorem for a special semiring that can be embedded into a field in two different ways.