

ABSTRACT

This thesis focuses on conic sections and approaches them as graphs of functions. Its aim is to highlight the possibility of defining conic sections using functional expressions and to present the connections and differences that this approach introduces compared to the standard analytical description, primarily through a collection of solved problems dedicated to examining the behavior of functions. The thesis is divided into three chapters. The first chapter summarizes the basic information necessary for understanding the topic and is divided into six parts: the first revisits the classical definitions of conic sections; the second describes the occurrence of conic sections in the curriculum of primary and secondary schools; the third discusses the transformation of the general equation of a conic section into a functional expression and demonstrates when a conic section can be fully described by a functional expression and when only a part of it can be represented. The fourth and fifth parts outline the general procedures used in solving the problems presented in subsequent chapters: how to analyze the behavior of a function and how to describe the conic section forming its graph analytically and determine its characteristic features. The last sixth part of the first chapter introduces the results of the solved problems: an overview of the graphs of the analyzed functions and their corresponding conic sections. The final two chapters of the thesis contain the collection of solved and unsolved problems: the second chapter specifically focuses on functions whose graphs form conic sections in their standard positions, while the third chapter deals with functions whose graphs form conic sections in general positions. The solution to each problem consists of two parts: an analysis of the behavior of the given function and an analytical description of the corresponding conic section. The resulting material provides a collection of problems primarily aimed at students or teachers at secondary schools, enabling a more comprehensive understanding of the topic of conic sections and serving as practice for analyzing the behavior of functions. However, the collection can also be utilized by university instructors and students to connect these seemingly unrelated topics.