

Preface

The notion of a functional dependence is one of the most important notions in modern mathematics. In studying processes in nature and solving engineering problems, one encounters a situation in which one quantity varies depending on another quantity.

Among the many ways to define the function (analytical, tabular, descriptive), defining it by its graph is widely used because of its visual presentation. In some cases, this method of defining the function is the only one possible. However, it is surprising that so far there are not many reference books that describe different aspects of studying and plotting graphs of various functions, in particular, with the use of methods of calculus.

This reference book gives essentials on functions and methods of plotting their graphs. Special attention is paid to methods used for plotting graphs of functions that are defined implicitly and in a parametric form, methods for making plots in polar coordinates, and plotting graphs of remarkable curves, special functions, etc.

The book consists of two parts. The first part gives general information about the notion of a function and methods of plotting graphs of functions without the use of derivatives. The second part deals with methods of studying functions and plotting their graphs with the use of calculus. The book contains many examples of functions that are more complicated than commonly considered, graphs of important curves, and properties, and graphs of common special functions (gamma function, integral exponential functions, Fresnel integrals, Bessel functions, orthogonal polynomials, elliptic functions, Mathieu functions, etc.).

The book contains 760 figures and uses material found in existing references, textbooks, articles, and other sources on the subject.