Preface

There is presented herewith the basic material of a course in the theory of functions which I have given several times at Columbia University during the past twenty years. This course, which is given annually, is a two-semester course with twenty eight periods of seventy five minutes in each semester. The emphasis is on the complex variable. From this standpoint, about twenty periods are given to the real variable and the remaining time to the complex.

By the end of the first semester, the student finds himself equipped for higher courses in the real variable, or for a course on existence theorems for differential equations. After the second semester, he can study almost any topic of mathematical analysis. Above all, he has learned what it means to understand mathematics and can deal with any mathematical book.

In treating the real number system, I have used the method of infinite decimals, rather than the Dedekind or Cantor theories. The decimals have the advantage of lacking profundity and of not putting the student through a mathematical revolution. The numbers stay quite what they always were, instead of becoming new and bizarre objects. The objection that the decimals employ the special radix ten does not strike me as important. In any case, after the student has seen how simple the matter really is, he can read the Dedekind and Cantor theories with very little effort.

There is hardly time in the course for a full treatment of topological questions. However, all geometrical questions are formulated in arithmetic terms and every topological assumption made is explicitly stated. Of course, the student quickly sees that topological considerations are important only for securing a rounded theory and may be disregarded as far as cases arising in the applications are concerned.

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