

ANALYTICAL GEOMETRY FOR BEGINNERS

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Analytical geometry for beginners by Alfred Baker

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ALFRED BAKER

**ANALYTICAL
GEOMETRY
FOR BEGINNERS**

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ANALYTICAL GEOMETRY

FOR
BEGINNERS

BY
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PREFACE.

THE following pages embrace, in the main, the substance of lectures which for some years past I have been giving to students of applied science. Fragments of this work have also been given to students to whom a general knowledge of the principles of Analytical Geometry was part of a liberal education.

It is important that the beginner should not think the terms "Analytical Geometry" and "Conic Sections" are synonymous. Analytical Geometry is the application of Analysis, or algebra, to Geometry, the principal quantities involved in the equations having reference to and receiving their meaning from certain lines known as axes of co-ordinates, or their equivalents. The principles of Analytical Geometry are developed in the first two chapters of this book. It is usual to illustrate these principles by applying them to the straight line, and to obtaining the properties of the simplest yet most important curves with which we are acquainted,—the Conic Sections. Hence the remainder of the book is occupied in applying the principles and methods of Analytical Geometry to the straight line, circle, parabola, etc.

Throughout the effort has been to limit the size of the book, while omitting nothing that seemed essential. Many important properties of the Conics are given as exercises, the solutions being made simple by the results of previous exercises, as well as by hints and suggestions. These hints and suggestions will be found of very frequent occurrence in the exercises; they seem necessary to students beginning a

subject, with whom the usual question is, "How shall I start the problem?" In addition it seems wise to make the exercises easy by offering suggestions, rather than to make them easy through their being mere repetitions of the same problem.

Several of the articles in the chapters on the parabola and ellipse will be found to be almost verbatim copies of the corresponding articles in the chapter on the circle, the object being to impress on the student the essential uniformity of the methods employed.

I take the liberty of suggesting that institutions where the conics are studied should be provided with accurately-constructed metal discs for drawing the curves. A large part of the beauty and attractiveness of the subject is lost when figures are rudely and carelessly represented. The majority of students can best realize and be made to feel an interest in the analytical demonstration of a proposition, when it has been preceded or followed by an instrumental proof of the probability of its truth.

A. B.

UNIVERSITY OF TORONTO,
December, 1904.

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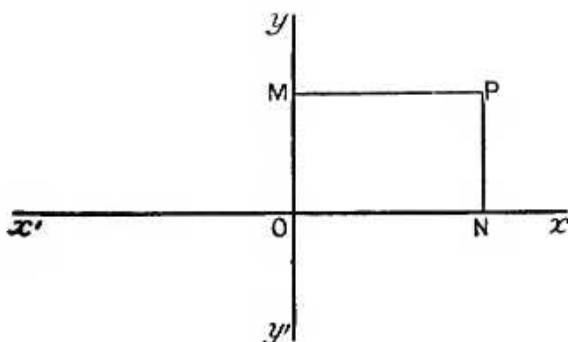
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ANALYTICAL GEOMETRY.

CHAPTER I.

POSITION OF A POINT IN A PLANE. CO-ORDINATES.

1. On a sheet of paper draw two lines xOx' , yOy' , intersecting at O . On Ox measure ON of length 23 millimetres; and through N draw NP , parallel to Oy , and of length 16 millimetres. We arrive evidently,



in this way, at a definite point P , i.e., definite so far as its position with respect to the lines xOx' , yOy' is concerned.

Again, we reach the same point P , if we take on Ox , $ON = 23$ millimetres, on Oy , $OM = 16$ millimetres, and through N and M draw NP , MP , parallel to Oy , Ox respectively, intersecting in P .