

**THE ELEMENTS OF
PLANE AND SPHERICAL
TRIGONOMETRY**

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The Elements of Plane and Spherical Trigonometry by Thomas U. Taylor & Charles Puryear

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THOMAS U. TAYLOR & CHARLES PURYEAR

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BY

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PREFATORY NOTE

THE authors have endeavored to present the essential parts of trigonometry in a form adapted to practical applications. They have had in mind particularly the requirements of schools of technology. In high-school courses it is recommended that the chapters and sections marked with a star be omitted.

Most of the problems and numerical exercises are new. The answers have been purposely omitted in some cases in the solution of triangles, in the belief that the student should be given considerable practice in the use of the check formulas.

In the preparation of the book the authors have freely consulted standard works on the subject. They are also indebted to Dr. H. Y. Benedict of the University of Texas, and to Dr. W. H. Bruce of the Denton Normal Institute, Denton, Texas, for many valuable suggestions.

THOMAS U. TAYLOR,
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OCTOBER, 1902.

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PLANE TRIGONOMETRY

CHAPTER I

TRIGONOMETRIC FUNCTIONS OF AN ACUTE ANGLE

1. Definition. The six parts of a triangle are the three sides and the three angles. In a plane triangle, if any three parts be given, provided at least one of them be a side, the remaining parts can be computed. Finding the unknown parts is called *solving* the triangle.

Plane trigonometry is, primarily, that branch of mathematics which has for its object the solution of plane triangles. In the extended sense in which the term is now used, it includes also the investigation of the relations of angular magnitudes in general.

2. Functions. Suppose $y = 5x^2 - 2x + 3$. Then it is evident that the value of y depends upon that of x . Thus, if $x = 3$, $y = 45 - 6 + 3 = 42$; if $x = 1$, $y = 6$; if $x = 0$, $y = 3$. When one quantity is so connected with another that the value of the one depends upon the value of the other, the one is said to be a *function* of the other. In the above equation, y is a function of x .

3. Trigonometric Functions of an Acute Angle. Let MAN (Fig. 1)

be any acute angle. From any point, B , in one of the sides draw BC perpendicular to the other side, forming the right triangle $\triangle CB$. Let $\angle MAN = A$. By taking

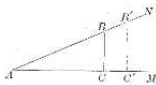


FIG. 1