NEW ELEMENTARY GEOMETRY, WITH PRACTICAL APPLICATIONS

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649656561

New Elementary Geometry, with Practical Applications by Benjamin Greenleaf

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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BENJAMIN GREENLEAF

NEW ELEMENTARY GEOMETRY, WITH PRACTICAL APPLICATIONS

Trieste

NEW

Elementary Geometry,

WITH

PRACTICAL APPLICATIONS.

A SHORTER COURSE,

UPON THE BASIS OF THE LARGER WORK:

BY

BENJAMIN GREENLEAF, A.M.,

AUTHOR OF A MATHEMATICAL SERIES.

BOSTON:

PUBLISHED BY ROBERT S. DAVIS & CO.

NEW YORK: BAKER, PRATT, & CO., 142 & 144 GRAND STREET.

PHILADELPHIA: J. A. BANCROFT & COMPANY.

ST. LOUIS: GRAY, BAKER, & COMPANY.

CHICAGO: JANSEN, MCCLURG, & CO.

1875.

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PREFACE.

THE amount of time usually devoted to the study of Geometry in High Schools and Academies is not sufficient for the mastery of a lengthy treatise. The present edition of Greenleaf's Elements of Geometry has been prepared to meet the wants of such institutions. It consists of all the more important theorems and problems of the science, and contains, therefore, all the Geometry required for admission into the best Scientific Schools and Colleges of the country.

The arrangement and language of the "Elements" having been commended by the best mathematical teachers, no change has been made in either, except as appeared absolutely necessary to adapt the same to the proper character of a briefer and more elementary work. This book is, then not wholly a new work; but a more compendious edition of a standard manual that has proved its excellence by standing the test of the school-room.

The exercises which have been freely introduced are intended to test the thoroughness of the learner's geometrical knowledge, besides being especially adapted to develop skill and discrimination in the demonstration of theorems,

and in the solution of problems, unaided except by definitions and principles.

The Practical Applications, or Exercises in Mensuration, given at the close of the volume, can be used at the discretion of the teacher, after the completion of Book III., in connection with the text, to which they refer, as the pupil progresses.

The course can be limited wholly to Plane Geometry by omitting all after Book IV.

In general, Geometry follows Algebra in a full Mathematical Course; but in a limited course, the first four books of this Manual may often be read with advantage by the Student, even before entering upon Higher Arithmetic, or Elementary Algebra.

The larger work, known as Greenleaf's Elements of Geometry, especially adapted to the wants of Higher Seminaries, and now extensively used in them, will continue to be published.

It is proper to state that this volume has been prepared by H. B. MAGLATHLIN, whose valuable labors have been before acknowledged in several books of the series.

BOSTON, May, 1873.

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FOR TEACHERS.

A Key to New Elementary Geometry has been prepared, and published for the convenience of teachers, which will be mailed prepaid, on receipt of 50 cents by the Publishers.

ELEMENTARY GEOMETRY.

BOOK I.

GENERAL PRINCIPLES.

PRELIMINARY DEFINITIONS.

1. **Geometry** is the science of position and extension.

The elements of position are direction and distance.

The dimensions of extension are length, breadth, and thickness.

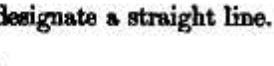
2. A **Point** is that which has position, without magnitude.

3. A **Line** is that which has length, without either breadth or thickness.

4. A **Straight Line** is one which has the same direction in its whole extent; as the line $A\,B$.

The word *line* is frequently used to designate a straight line.

5. A **Curved Line** is one which continually changes its direction; as the line $C\,D$.



The word *curve* is frequently used to designate a curved line.

6. A **Surface** is that which has length and breadth, without hight or thickness.

7. A **Plane Surface**, or simply a PLANE, is one in which any two points being taken, the straight line that joins them will lie wholly in the surface.