

**A TEXT-BOOK OF
GEOMETRICAL DEDUCTIONS:
BOOK I. CORRESPONDING TO
EUCLID, BOOK I**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649471911

A Text-book of Geometrical Deductions: Book I. Corresponding to Euclid, Book I by James
Blaikie & W. Thomson

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

JAMES BLAIKIE & W. THOMSON

**A TEXT-BOOK OF
GEOMETRICAL DEDUCTIONS:
BOOK I. CORRESPONDING TO
EUCLID, BOOK I**

0

A TEXT-BOOK OF
GEOMETRICAL DEDUCTIONS

BOOK I.

Corresponding to Euclid, Book I.

BY
(Andrew)
JAMES BLAIKIE, M.A.

LATE FELLOW OF GONVILLE AND CAIUS COLLEGE, CAMBRIDGE

AND
William
W. THOMSON, M.A., B.Sc.

PROFESSOR OF MATHEMATICS, VICTORIA COLLEGE, UNIVERSITY
OF THE CAPE OF GOOD HOPE

FORMERLY EXAMINERS IN MATHEMATICS IN
THE UNIVERSITY OF EDINBURGH

LONDON
LONGMANS, GREEN, AND CO.
AND NEW YORK: 15 EAST 16TH STREET

1891

~~VV. 6945~~

Math 538.912



Haven Fund.

P R E F A C E

THE object of this treatise is to afford a systematic course of training in the art of solving Geometrical Deductions or Riders. With this view it is divided into sections, each section consisting of three parts. There is first a deduction worked out in full, which is intended to serve as a model for the student. This is followed by a number of similar deductions, which are to be written out by the student, the figure being given in each case, and such hints regarding the mode of solution as experience shows are required by beginners. Lastly, each section contains some deductions to be accomplished without this aid, no figures or assistance being given except an occasional reference to the proposition on which the proof depends, or to a previous example.

As a rule it is desirable that the proofs should depend upon propositions of Euclid, and not upon previous examples, the only exception being in the case of certain standard theorems which are indicated in the text.

For convenience of reference, especially in the case of those who have used text-books other than Euclid's, the

enunciations of Euclid's propositions are given in an Appendix.

It is not necessary, and perhaps not desirable, that on his first reading the student should work through every example in each section. He should in each case, however, write out a sufficient number to insure his mastery of the principles involved; the others will be found useful when he comes to revise.

Through the kindness of friends the book has been tested, when in proof, by actual work with pupils, and the satisfactory result of this experiment has encouraged the authors to believe that the treatise may be found generally useful.

They have to acknowledge valuable suggestions and assistance from Messrs. Butters, Clark, and Walker, Heriot's Hospital School, Edinburgh; Mr. R. F. Davis; the Rev. W. F. Failes, Westminster School; Mr. Hayward, Harrow School; Mr. Macdonald, Daniel Stewart's College, Edinburgh; Dr. Mackay, Edinburgh Academy; Rev. J. J. Milne; Dr. Muir, Glasgow High School; Professor Raitt, Glasgow Technical College; Mr. Robertson, Edinburgh Ladies' College; Rev. G. Style, Giggleswick School; Mr. Tucker, University College School, and other friends.

Additional parts, corresponding to the remaining books of Euclid, are in preparation.

CONTENTS

CHAPTER I—THEOREMS.

Section.	Bookwork.	Page.	Section.	Bookwork.	Page.
1.	Euclid I. 1- 4, .	1	12.	Euclid I. 1-32, .	33
2.	„ 1- 6, .	4	13.	„ 1-32, .	38
3.	„ 1- 8, .	6	14.	„ 1-32 Cor. .	42
4.	„ 1-14, .	9	15.	„ 1-33, .	46
5.	„ 1-20, .	12	16.	„ 1-34, .	50
6.	„ 1-21, .	15	17.	„ 1-38, .	59
7.	„ 1-26, .	19	18.	„ 1-41, .	67
8.	„ 1-26, .	22	19.	„ 1-43, .	73
9.	„ 1-26, .	24	20.	„ 1-48, .	75
10.	„ 1-27, .	27	21.	Maxima and Minima, .	82
11.	„ 1-29, .	30			

CHAPTER II—PROBLEMS.

Section.	Page.
22. Problems which follow directly from known Theorems, .	86
23. Loci, .	92
24. Intersection of Loci, .	97
25. Intersection of Loci—continued, .	103
26. Straight lines which satisfy two conditions, .	107
27. Analysis and Synthesis, .	111
28. Reduction to a Simpler Case, .	118
29. Construction of Triangles, .	122
30. Miscellaneous Problems, .	131

APPENDIX.

Enunciations of the Propositions and Corollaries of Euclid,	
Book I, .	135
List of Standard Theorems and Loci, .	138

DEFINITIONS.		Page.
Concurrent Straight Lines,	.	8
Complements and Supplements,	.	9
Collinear Points,	.	11
Median,	.	12
Altitude,	.	13
Hypotenuse,	.	13
Perimeter,	.	14
Bisector,	.	19
Distance from a Line,	.	20
Convex Polygon,	.	42
Centre of Parallelogram,	.	56
Orthocentre,	.	60
Trapezium,	.	62
Locus,	.	92
Inscribed Figures,	.	110

SYMBOLS.

\therefore	signifies	<i>therefore.</i>
$=$	„	<i>is equal to.</i>
\equiv	„	<i>is equal in every respect to, is congruent with, or is identically equal to.</i>

Congruent figures are such as can be made to coincide by superposition.

\perp	signifies	<i>is at right angles to or is perpendicular to.</i>
\parallel	„	<i>is parallel to.</i>
$>$	„	<i>is greater than.</i>
$<$	„	<i>is less than.</i>
$+$	„	<i>together with.</i>
$-$	„	<i>diminished by.</i>
\triangle	„	<i>triangle.</i>
\sphericalangle	„	<i>angle.</i>
rt. \sphericalangle	„	<i>right angle.</i>
\square	„	<i>parallelogram.</i>
AB^2	„	<i>square on AB.</i>
$AB \cdot CD$	„	<i>rectangle contained by AB and CD.</i>
$AB - CD$	„	<i>the difference between AB and CD.</i>

CHAPTER I.

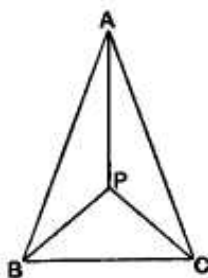
THEOREMS.

§ 1. (*Bookwork*, EUCLID, I. 1-4.)

1. Any point on the bisector of the vertical angle of an isosceles triangle is equally distant from the extremities of the base.

Let ABC be an isosceles triangle, and let AP bisect its vertical angle; it is required to prove that

$$BP = CP.$$



$$\text{In } \Delta s \text{ BAP, CAP } \begin{cases} BA = CA, & \text{[Hypothesis.]} \\ AP = AP, & \\ \angle BAP = \angle CAP; & \text{[Hypothesis.]} \end{cases}$$

$$\therefore \Delta BAP \cong \Delta CAP;$$

$$\therefore BP = CP.$$

A