DRILL BOOK IN PLANE GEOMETRY

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649465330

Drill Book in Plane Geometry by Robert Remington Goff

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

ROBERT REMINGTON GOFF

DRILL BOOK IN PLANE GEOMETRY

Trieste

DRILL BOOK

IN

PLANE GEOMETRY

[REVISED]

ROBERT REMINGTON GOFF

Director of Mathematics
Academic High School
New Britain, Conn.

BOSTON
THE PALMER COMPANY
1922

EducT 149.22.434
V

HARVARD COLLEGE LIBRARY
GIFT OF
GINN & CO.
NOV 2 1938

COPYRIGHT, 1916
BY ROBERT R. GOFF

Printed in the United States of America

The Riverdale Press, Brookline, Boston, Mass.

CONTENTS

STRAIGHT LINES

Chapter		Page
I.	First Principles	1
II.	Equal Angles	4
III.	Angle-Sums	6
IV.	Congruent Triangles	8
V.	Equality from Congruent Triangles	11
VI.	Parallel Lines	15
VII.	Equality from Parallel Lines	18
VIII.	Perpendicular Lines	21
IX.	Inequality	23
X.	Loci	25

CIRCLES

XI.	Circles and Tangents	33
XII.	Equality of Arcs and Chords	35
XIII.	Inequality of Arcs and Chords	37
XIV.	Measurement of Angles	39
XV.	Regular Polygons	42

PROPORTION

XVI.	Proportion from Parallel Lines	51
XVII.	Similar Triangles	53
XVIII.	Proportion from Similar Triangles	55
XIX.	The Pythagorean Theorem	57
XX.	Similar Polygons and Circles	59

AREAS

CHAPTER		PAGE
XXI.	AREAS OF SIMPLE FIGURES	66
XXII.	EQUALITY OF AREAS	68
XXIII.	PROPORTION IN AREAS	70
XXIV.	MENSURATION OF THE TRIANGLE	73
XXV.	FURTHER RATIOS	76
	MISCELLANEOUS EXERCISES	77
	NOTES	86
	SUMMARIES OF METHODS	102
	DEFINITIONS	112

PREFACE

The special aim of this book is to increase emphasis on analysis, classification, and determination of method in geometry. The pupil is to be taught not the proof but how to find the proof. What is to be done? Then, what are the common methods of doing it?

For this purpose the propositions are arranged not, as usual, according to their conditions, but by their conclusions. The thing to be proved determines the class of proof. The given conditions determine the particular method. Consequently the principal theorems that prove any one thing, such as equality, parallel lines, etc., are grouped in one chapter. The basic principle, upon which all theorems in each chapter depend, is placed conspicuously at the head of that chapter. A Summary of Methods for that group is at the end of that chapter, and this is followed by selected exercises applying these methods. The most important theorems are marked by heavy type and are often followed by a note for emphasis.

This arrangement gives systematic drill in analysis and classification. The pupil soon begins to see that for doing certain things there are certain successful methods. He places a theorem in its class; he recalls the methods for that class; then selects the method for this particular case. He learns one group of methods before taking up another, and he knows the basic principles in each.

Another point of originality is in the explanation of the method of proof just before the proof. The plan is made clear at the beginning, and this fact reduces guessing and memorizing to the minimum.

I gladly give credit to Professor C. H. Currier of Brown University for many valuable suggestions.

IMPORTANT FEATURES OF THIS BOOK

1. Syllabus plan; proofs of theorems to be found in the class.
2. Every definition suggested as needed; these also have to be found, but need not be written.
3. Propositions arranged in groups, each group with a single purpose.
4. Emphasis upon fundamental methods in each group.
5. Summaries of methods in each group.
6. Exercises applying these summaries.
7. Comprehensive sets of review questions on definitions, fundamental principles, and methods.
8. Notes giving a general survey of Geometry, a general survey of each chapter, and methods of proof for each theorem. In some cases special proofs are given.
9. Dictionary of geometrical terms, answering all questions on definitions.
10. It follows closely the recommendations of the National Committee, and is suitable for both elementary and advanced classes.
11. It is especially adapted for reviews and can be used with any text-book. Only seven proofs may not fit the logical order of the class text-book, and these are explained in the Notes, page 86. These notes should be consulted regularly. Pages 83, 84, and 85 are recommended for drill immediately before college examinations.

12. It is ideal for beginning classes if the teacher believes that the pupil should be given "the notion that he is discovering for himself that which he is being taught." Here no other book is needed, but the proof of each theorem marked with an asterisk should be written in a notebook. This work is not harder for the pupil and does not take more time.

SUGGESTED CLASSROOM PROCEDURE

Drill with books open:

1. Stating definitions, summaries, etc., with illustrations.
2. Stating a method of proof for each theorem.
3. Stating a method and outline of proof for each theorem.
4. Stating a method and complete proof for each theorem.

The work should be distinctly heuristic. Let the students find out everything if possible.

A plan that gives good results is:

1. The theorem is read very carefully. The figure without aid lines is on the blackboard.
2. What is given? First pupil answers.
3. What is to be proved? Second pupil answers.
4. What are methods of proving this thing? Third pupil answers.
5. What does the first method require?
6. Can we get this requirement from the given conditions? Aid lines should be drawn when needed.
7. If not, try another method similarly.
8. After a method has been adopted, the outline or proof is built up, each student taking his turn.

Many theorems not marked with an asterisk may be treated as exercises.

All exercises need not be taken by any one class.