

**ARITHMETIC BY GRADES
FOR INDUCTIVE TEACHING,
DRILLING AND TESTING.
BOOK NUMBER SEVEN**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649446636

Arithmetic by Grades for Inductive Teaching, Drilling and Testing. Book Number Seven by
John T. Prince

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Edited by Trieste Publishing Pty Ltd.
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JOHN T. PRINCE

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AND TESTING

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*Profits and Loss, Commission, Insurance Taxes, Duties, Interest
Banking, Stocks and Bonds, Exchange, Business Accounts
Geometrical Exercises, Ratio and Proportion*

PREPARED UNDER THE DIRECTION OF
JOHN T. PRINCE

BOSTON, U.S.A.
GINN & COMPANY, PUBLISHERS
1902

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The Athenaeum Press
GINN & COMPANY, BOSTON, U.S.A.

NOTE TO TEACHERS.

THE attention of teachers is called to the following features of this series of books—features which should be kept in mind as the various subjects are presented.

1. The separation of teachers' and pupils' books, whereby pupils may be taught properly and may not be given too great assistance. Suggestions as to methods of teaching and drilling, as well as the illustrative processes, explanations, rules, and definitions which belong to the teacher to develop analytically are put into the Teachers' Manual, while in the pupils' books are presented only such exercises as are needed for practice.

2. The careful gradation of problems, by which pupils acquire inductively a knowledge of arithmetical relations and principles, and skill in arithmetical processes. This is in recognition of the well-known pedagogical principles of proceeding from the known to the unknown, and from the simple to the complex. It is advised that this plan be kept constantly in mind by the teacher, and that whenever a process is not understood or is not readily performed, the pupils should be taken back to processes which are well known and which can be performed readily, and then should be led forward by easy steps until the desired end is reached.

3. Frequent reviews, and such an arrangement of exercises as will enable pupils to have needed practice in the applications of each principle, first by itself, and afterwards in connection with other principles which have been learned.

4. The large amount of oral work, or work which may be done without the aid of figures. Three objects of Mental Arithmetic are sought in these exercises: (a) Illustration of principles and a preparation for written work, (b) Development of the logical powers, (c) Cultivation of ability to work with large numbers by short processes.

5. The great number and variety of problems. The aim has been to give the *largest number* of problems that will be needed for teaching and for drilling in all grades. For this reason, and because the forms of expression are varied, being taken from many sources, there will be no necessity of giving supplementary drill lessons on the blackboard. Blackboard lessons are objectionable not only on account of a waste of the teachers' time and strength, but also on account of the injury done to pupils' eyes in much reading and copying from the blackboard.

6. Practicalness of work in respect to the character of the problems, and the solution of them. Care has been taken to give problems which are most likely to be met in every-day life, and to give them in a practical form. Many of the miscellaneous review problems were made by mechanics, clerks, accountants, etc., with a view of presenting conditions most likely to occur.

7. The introduction of statistics and facts of physics, astronomy, history, geography, etc., thus enabling pupils to gain incidentally much useful information.

8. The use of drill tables and other devices to save the time of teachers.

In addition to the above features, some of which are distinctively new so far as American text-books are concerned, there is the separation of pupils' exercises for practice into small books somewhat on the lines of gradation in City graded schools. By this arrangement there are gained greater convenience of handling and economy of wear than in the use of a large book which is intended to be used for several years by the same pupil.

In the preceding books of this series, rules and definitions are not called for, and the analysis and explanation of problems are not required to any great extent. In this book all these means of mental discipline are required, and should be insisted upon by the teacher.

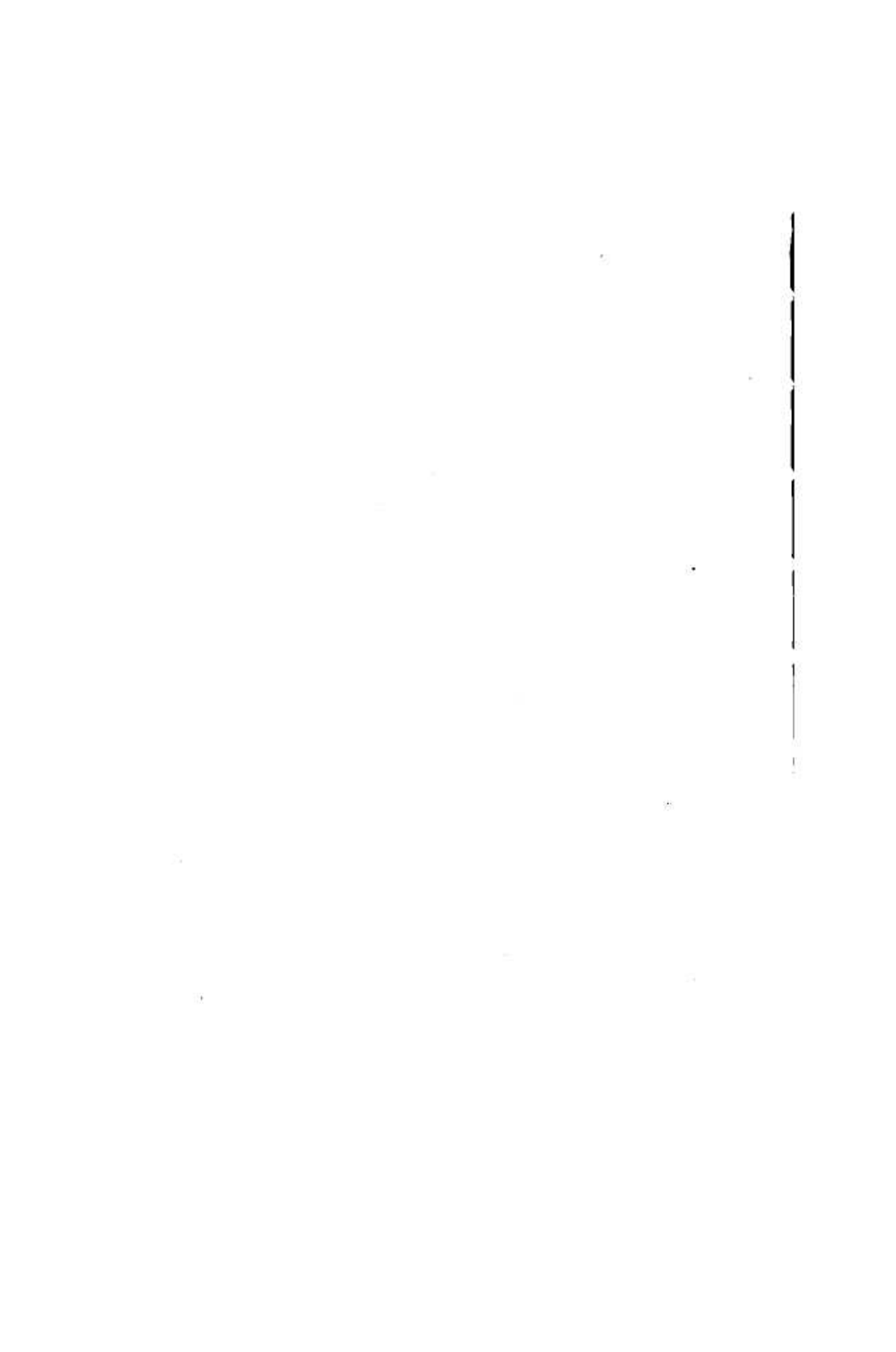
The simpler applications of percentage which are given in Book No. 6 will serve as a useful introduction to the more formal study of Profit and Loss, Commission, Interest, etc., which are here presented. While some of the most important business forms are given, it will be found necessary to show to the pupils some papers which are actually used in business, such as bonds with appended coupons, drafts, insurance policies, etc.

In teaching the measurements also it should be understood that geometrical forms must be presented, by the aid of which definitions and simple demonstrations may be derived. For the constructive work required, each pupil should be supplied with a pair of compasses, ruler, and a protractor such as is described in Book No. 6. The subject of Ratio and Proportion is placed after Percentage and Measurements; but if it is thought desirable, it may be taken up immediately after the Review Exercises of Section I.

In the early stages of the study of Arithmetic, correctness in numerical computations is made of primary importance. In the higher grades it ought to be assumed that the mere work of addition, subtraction, multiplication, and division can be done accurately and quickly, and that therefore the logical processes are to be more and more emphasized. Frequently the pupils may be asked to indicate only the steps of analysis that would lead to the correct solution of a given problem. Short processes also, and the indication of processes "on a line," should be constantly encouraged.

The problems given on the last pages of this book will suggest a kind of work that may be done profitably in connection with the elementary science lessons.

For methods of teaching the various subjects, and for answers to problems, see Teachers' Manual, which is designed to accompany all books of the series.



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